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TETRA TECH

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RCRA Facility Investigation Report for Zone J at

Charleston Naval Complex North Charleston, South Carolina

Contract Task Orders 0017 and 0104

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Naval Facilities Engineering Command Southeast
4130 Faber Place Drive, Suite 202
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RCRA FACILITY INVESTIGATION REPORT
FOR
ZONE J

CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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ACRONYM LIST

ADAF	Age-dependent adjustment factor
AET	Apparent Effects Threshold
AFF	Bioavailable Fraction of Lead in Fish
AOC	Area of Concern
ALM	Adult Lead Model
atm-m^3/mole	atmosphere-cubic meter per mole
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	Area use factor
BCT	BRAC Cleanup Team
BEHP	bis(2-Ethylhexyl)phthalate
BRAC	Base Realignment and Closure
bgs	Below ground surface
BSAF	Biota-sediment-accumulation factor
Cal EPA	California Environmental Protection Agency
CDF	Confined disposal facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M Hill
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
cm	centimeter
CMS	Corrective Measures Study
CNC	Charleston Naval Complex
CNO	Chief of Naval Operations
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSI	Confirmatory Sampling Investigation
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
CTO	Contract Task Order
DD	Drydock
DDD	Dichlorodiphenyldichloroethane
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
EIS	Environmental Impact Statement

EnSafe	EnSafe Inc.
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESV	Ecological Screening Value
EU	exposure unit
FAQ	Frequently Asked Question
FI	Fraction ingested
FS	Feasibility Study
g	gram
gpm	Gallons Per Minute
GPS	Global Positioning System
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HSWA	Hazardous and Solid Waste Amendment
ILCR	Incremental Lifetime Cancer Risk
IRIS	Integrated Risk Information System
kg	kilogram
K_{oc}	Organic carbon partition coefficient
K_{ow}	Octanol-water partition coefficient
LOAEL	Lowest Observed Adverse Effects Level
m	meter
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/L	Milligrams per liter
MLW	Mean Low Water
MRL	Minimal Risk Level
msl	Mean Sea Level
NAVFAC SE	Naval Facilities Engineering Command Southeast
Navy	Department of the Navy
NCEA	National Center for Environmental Assessment
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effects Level
NPDES	National Pollutant Discharge Elimination System

NS&T/MW	National Status and Trends/Mussel Watch
OC	Organic Carbon
OERR	Office of Emergency and Remedial Response
ORNL	Oak Ridge National Laboratory
OSWER	Office of Solid Waste and Emergency Response
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PEL	Probable Effects Level
PQL	Project Quantitation Limit
PMO	Program Management Office
PPRTV	Provisional Peer Reviewed Toxicity Values
ppt	parts per thousand
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RDA	Redevelopment Authority
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facilities Investigation
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SE	Southeast
SLERA	Screening Level Ecological Risk Assessment
SMDP	Scientific/Management Decision Point
SOP	Standard Operating Procedure
Spectra Tech	Sepctra Tech, Inc.
SQuiRT	Screening Quick Reference Tables
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TCDD	2,3,7,8-tetrachlorodibenzo-*p*-dioxin
TEF	Toxicity Equivalence Factors
TEL	Threshold Effects Level
TEQ	Toxic equivalency

TOC	Total organic carbon
TRV	Toxicity Reference Value
TRW	Technical Review Workgroup
Tetra Tech	Tetra Tech, Inc.
µg/l	Microgram per liter
µg/kg	Microgram per kilogram
µg/g	Microgram per gram
µg/dL	Microgram per deciliter
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

E.1 PURPOSE AND OBJECTIVE OF REPORT

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report summarizes investigations conducted since 1997 at Zone J, Charleston Naval Complex (CNC), in North Charleston, South Carolina, and uses the data from previous investigations as well as sediment data collected in April 2008 to assess potential Navy-related impacts to Zone J water bodies. The RFI report assesses human health and ecological risks at Zone J, and provides recommendations regarding whether or not additional evaluation is needed.

E.2 HISTORICAL INFORMATION AND SETTING

CNC is located on the west bank of the Cooper River in Charleston Harbor, which is formed by the confluence of the Cooper, Ashley, and Wando Rivers and their tributaries. CNC has been divided into 12 investigative zones to facilitate RCRA corrective action processes and for management purposes. These are designated Zones A through L. Zone J consists of portions of the Cooper River, Shipyard Creek, Noisette Creek, and associated marsh areas.

The former Charleston Navy Base was the Navy's third largest home port, supporting more than 70 surface vessels and submarines until 1996 when the base was closed. During Navy operations, the facility performed various tasks related primarily to ship repair and maintenance. CNC currently supports several private and federal entities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., the National Oceanic and Atmospheric Administration (NOAA), and the United States Coast Guard (USCG).

The CNC waterfront along the Cooper River is dominated by 25 piers and five dry docks, and is protected along most of its length by a wooden and/or concrete seawall. The United States Army Corps of Engineers (USACE) maintains a navigation channel along the waterfront. The Cooper River and Noisette and Shipyard Creeks provide habitat for numerous aquatic organisms including a variety of fish, crustaceans, and mollusks.

Shipyard Creek discharges into the Cooper River at the southern end of CNC. Portions of Zones G, H, and I drain into the creek. The Cooper River Marina is located at the confluence of Shipyard Creek and the Cooper River. Industrial facilities along the west bank of Shipyard Creek include the Macalloy Corporation, Foster Wheeler Resource Recovery Plant, Chevron Products Co., and Kinder Morgan Bulk Terminal (known locally as Shipyard River Terminal) (EnSafe 2003a). Most of the non-industrial portions

of Shipyard Creek's shoreline consist of marsh vegetation, primarily cordgrass (*Spartina* spp.). The intertidal mudflats and marshy areas provide habitat for numerous wildlife species, including herons, egrets, and other wading birds, and mammals such as raccoons (*Procyon lotor*), rice rats (*Oryzomys palustris*), and marsh rabbits (*Sylvilagus aquaticus*).

Noisette Creek flows eastward into the Cooper River near the north end of Zone J. Portions of the creek are bordered by undercut banks that are 3 to 6 feet above the water. Vegetation along the banks consists of various trees and shrubs. Vegetation in lower areas along the creek is dominated by smooth cordgrass (*Spartina alterniflora*), with patches of salt meadow cordgrass (*S. patens*) and black needlerush (*Juncus roemerianus*). Wildlife species associated with Noisette Creek are largely the same as mentioned above for Shipyard Creek.

E.3 SCOPE OF RFI REPORT

The purpose of the Zone J RFI is to assess potential Navy-related impacts to Zone J, which consists of portions of the Cooper River, Shipyard Creek, Noisette Creek, and associated marsh areas. Several investigations of areas of concern (AOCs) solid waste management units (SWMUs), and adjacent near shore areas have been conducted at CNC since 1997. Interim reports have been generated based on these investigations, and the Navy has worked closely with the South Carolina Department of Health and Environmental Control (SCDHEC), the United States Environmental Protection Agency (USEPA) and other Natural Resource Trustees throughout the investigations. The CNC Base Realignment and Closure (BRAC) Cleanup Team (BCT) initiated this comprehensive Zone J investigation to ensure a consolidated data set.

This RFI report also includes an evaluation of potential risks to human health and the environment posed by sediments at AOC 695 in Zone K. AOC 695 is an underwater site near the west bank of Clouter Island, which lies across the Cooper River from CNC. Discussions at prior CNC BCT meetings concluded that impacted sediment was the only concern for AOC 695. Therefore, it was agreed upon by the CNC BCT team that presentation of the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) for AOC 695 would be included in the Zone J RFI. Sediment data from samples collected at AOC 695 were evaluated separately from the Zone J data (see Appendix R).

E.4 CONTAMINANT SOURCES ASSOCIATED WITH ZONE J

The Zone J water bodies (Cooper River, Noisette Creek, and Shipyard Creek) receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several National Pollutant Discharge Elimination System (NPDES) outfalls. Several onshore sites that previously contributed contaminants to Zone J have been remediated; these sites no longer pose potential risks to human health

or the environment and have been closed under the RCRA process. Final decisions regarding AOCs, 517, 555, 556, 557, 691, and 692, however, have not been made. A Corrective Measures Study (CMS) is currently being conducted at AOC 517. Given their proximity to Zone J, contaminants from AOCs 555, 556, 557, 691, and 692 may have impacted sediment in the Cooper River. Therefore, the CNC BCT reached the consensus that decisions regarding future investigation and/or remediation at these five AOCs will depend on conclusions presented in this Zone J RFI.

E.5 PREVIOUS INVESTIGATIONS

Preliminary sampling of Zone J water bodies was completed in September 1997 (EnSafe, 1997). Several investigations of surface water and sediment were subsequently conducted to determine the nature and extent of contamination, evaluate contaminant migration pathways and linkages with upland sites, evaluate hydrodynamics in the Cooper River estuary, characterize reference conditions, and to evaluate ecological risks. Table ES-1 summarizes previous investigations and BCT decisions pertaining to Zone J. Section 1.3.3 of this report provides more details on the previous investigations.

Based on the results of several investigations, and particularly considering the nature and extent of contamination, migration pathways, and linkages with upland sites, the BCT concluded that the potential for significant risk existed at five areas with elevated sediment contaminant concentrations and CNC source linkages. The five areas consisted of three locations in the Cooper River, one location in Shipyard Creek and one location in Noisette Creek. Other locations within Zone J were determined to represent areas of insignificant risk or areas with contamination that was not linked with CNC sources. Each of these five locations had been previously sampled, but due to the length of time since the previous collection efforts, additional sampling of sediment was needed. Therefore, investigations since that time have been focused on sediment contamination in these five areas (see Section 1.3.3). The BCT also decided that sediment samples would be collected and analyzed to generate background reference values in Cooper River and Charleston Harbor.

E.6 DREDGING

The USACE maintains Charleston Harbor's navigation channels, turning basins, and access channels. The CNC Redevelopment Authority (RDA) conducts maintenance dredging between the main channel and the piers at CNC. The frequency of dredging is variable, since dredging is conducted on an as-needed basis, but dredging around the piers typically occurs every few years. Areas from which Cooper River sediment samples were collected in April 2008 are periodically dredged.

The downstream portion of Shipyard Creek is considered a navigable water body and is dredged annually or as needed to give large ships access to maintenance service piers. Locations at which Shipyard

Creek sediment samples were collected in April 2008 were approximately 0.7 mile upstream of the area that is regularly dredged. Dredging is not conducted in Noisette Creek. Thus, the areas from which Shipyard Creek sediment samples were collected in April 2008 and Noisette Creek sediment samples were collected in April 2008 are not dredged.

E.7 NATURE AND EXTENT OF CONTAMINATION

Surface Water Contamination

Zone J lies within Charleston Harbor and the Charleston Harbor estuary, and consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek. Charleston Harbor is the second largest container port on the East and Gulf Coasts and the fourth largest in the nation (EnSafe, 2003a). The Charleston Harbor estuary is a complex tidal system that is comprised of the Cooper River, Ashley River, Wando River, and numerous small tributaries. It encompasses more than 100 square miles of coastal marshlands and open water habitat. Factors such as tides, freshwater inflow, and bathymetry affect hydrodynamics in the Charleston Harbor estuary. The dynamic nature of these factors affects the fate and transport of CNC-related chemicals in Noisette Creek, Shipyard Creek, and the Cooper River. An evaluation of the hydrodynamics of the Charleston Harbor Estuary was presented in the *Zone J Storm Water Effluent Evaluation Report* (EnSafe, 2003a) and the *Zone J Storm Water Effluent Evaluation Report Addendum* (EnSafe, 2003b). The evaluation showed that during a single tidal cycle, a particle (such as a contaminant) released at CNC at peak low tide can travel about 4.5 miles upstream. Similarly, in one tidal cycle, a particle released at peak high tide can travel downstream to the entrance of Charleston Harbor. A particle released at CNC can be transported into the Wando and Ashley Rivers by the tides, with the limits of upstream transport being about five miles. Thus, contaminants released from CNC can be flushed out of the harbor during one tidal cycle, and contaminants released from CNC can be transported into the Wando and Ashley Rivers. Conversely, the Zone J water bodies can be receptors of contaminants from numerous remote locations in the Ashley and Wando Rivers and other locations within Charleston Harbor.

In view of factors such as tides, freshwater inflow, and bathymetry, contaminant monitoring in marine and estuarine systems is typically focused on sediments rather than surface water. Most contaminants that are released into surface water eventually bind with particulate material, then settle and become concentrated in sediment. Higher concentrations of chemicals in sediment (relative to surface water) aid in the detection and quantification of target analytes. In addition, sediments integrate contaminants over time, and indicate a history of contamination to a greater degree than surface water, especially in a water body such as Charleston Harbor.

Water quality parameters such as temperature, dissolved oxygen, salinity, pH, and total suspended solids in estuarine waters change constantly with the tide, season, and flow rates. As a consequence, surface water chemical data can be quite variable at a given location over time. This has been the case at Zone J, and although numerous surface water samples have been collected and analyzed over the long history of the Zone J investigation, no clear trends in surface water contamination have been identified. Overall, evaluations of surface water samples collected during previous investigations at Zone J have indicated that surface water concentrations at Zone J are similar to surface water concentrations elsewhere in the harbor, or that ecological risks posed by CNC-related chemicals in surface water are negligible. Because of this, and since sediments integrate contaminants over time and indicate a history of contamination, the BCT decided that sampling activities conducted in 2008 would focus on sediment.

Sediment Contamination

Nine sediment samples were collected in April 2008 from water bodies comprising Zone J; three samples each from Noisette Creek, Shipyard Creek, and the Cooper River. Section 4 of this RFI report discusses chemicals detected in sediment collected during April 2008 and compares the 2008 data to historical sediment data collected from the same locations. A summary of the 2008 sediment data is presented below.

Noisette Creek

Semivolatile organic compounds (SVOCs) detected in sediment at concentrations greater than USEPA Region 4 Ecological Screening Values and background concentrations consisted of PAHs and bis(2-ethylhexyl)phthalate (BEHP). Sediment concentrations of SVOCs were generally lower in 2008 than in 1997 and 2005. Copper concentrations exceeded background concentrations and USEPA Region 4 Ecological Screening Values in sediment samples collected from Noisette Creek. Mercury and zinc concentrations exceeded their Region 4 Ecological Screening Values in the duplicate sample obtained from one Noisette Creek sample but not in the original sample. The pesticide 4,4'-DDD was detected in two Noisette Creek samples, while 4,4'-DDE was detected in one sample. Detected concentrations of these pesticides slightly exceeded USEPA Region 4 Ecological Screening Values. No other pesticides or polychlorinated biphenyls (PCBs) were detected in Noisette Creek samples.

Shipyard Creek

Several SVOCs and metals were detected in sediment at concentrations greater than USEPA Region 4 Ecological Screening Values and background concentrations. Aroclor-1260 and two pesticides (4,4'-DDE and dieldrin) were detected at concentrations greater than USEPA Region 4 Ecological Screening

Values. Sediment concentrations of chemicals of potential concern (COPCs) were generally lower in 2008 than in 1994 and 2005.

Cooper River

Sediment samples were collected in 2008 from three locations in the Cooper River. PAH concentrations were highest in sample 556M000503, which was the southernmost of the three samples, and were lowest in sample 054M000103, the northernmost of the three samples. Comparisons of PAH concentrations over time at the three Cooper River locations were hindered by high detection limits in previous studies, but overall, PAH concentrations at location E054M0001 and E556M0007 (the northern and central sample locations) were highest in 1995, and PAH concentrations at location E556M0005 (the southern sample location) were highest in 2008. Aroclor-1260 was the only PCB detected in Cooper River sediments in 2008, and 4,4'-DDD was the only pesticide detected in Cooper River sediments in 2008, These two compounds were detected in only one of the three Cooper River samples.

Six metals were detected in 2008 at concentrations exceeding screening values and background concentrations: arsenic, chromium, copper, lead, nickel, and zinc. Concentrations of these metals at sample locations E556M0007 and E556M0005 (the central and southern locations, respectively) tended to be about the same or slightly lower in 2008 than in 2005. In the northern sample location (054M0001), concentrations of copper, lead, and zinc were higher in 2008 than in 2005.

E.8 HUMAN HEALTH RISK ASSESSMENT

The baseline HHRA for Zone J was performed to characterize the potential risks to likely human receptors under current and potential future land uses. Potential receptors retained for quantitative evaluation consisted of current/future recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, and the Cooper River. Fish tissue concentrations were estimated based on sediment concentrations.

Cumulative Incremental Lifetime Cancer Risks (ILCRs) for recreational fishermen at Noisette Creek, Shipyard Creek, and Cooper River were less than or within the USEPA's target risk range of 10^{-4} to 10^{-6} under both the Reasonable Maximum Exposure (RME) scenario and the Central Tendency Exposure (CTE) scenario. Thus, carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River.

Cumulative Hazard Indices (HIs) for recreational fishermen under the RME scenario for Noisette Creek and Shipyard Creek were less than unity (1). The cumulative HI for the recreational fisherman (HI = 2) in the Cooper River under the RME scenario exceeded unity, but the HIs calculated on a target organ/target effect specific basis were all less than unity. Cumulative HIs for the recreational fisherman under the CTE

scenario for Noisette Creek, Shipyard Creek, and the Cooper River were less than or equal to unity. Consequently, non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under both the CTE and RME scenarios.

Recreational fishermen's exposures to lead in Shipyard Creek and Cooper River fish were evaluated using a version of the USEPA's Technical Review Workgroup (TRW) Adult Lead Model (ALM) adapted for fish ingestion. Lead was not a COPC in Noisette Creek sediment. The average fish lead concentration of 1.54 microgram per gram (µg/g) for Shipyard Creek results in a geometric mean blood lead level of approximately 3.2 microgram per deciliter (µg/dL) in a hypothetical recreational fisherman. The average fish lead concentration of 1.23 µg/g for the Cooper River results in a geometric mean blood lead level of approximately 2.8 µg/dL in a hypothetical recreational fisherman. These concentrations are less than the USEPA benchmark goal of 10 µg/dL. The probability that the blood lead levels of a fetus of a childbearing female angler would exceed 10 µg/L is 4.2 percent for Shipyard Creek and 2.9 percent for Cooper River. Therefore, human health effects due to lead in fish are not anticipated.

E.9 ECOLOGICAL RISK ASSESSMENT

The ERA for Zone J consisted of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ERA process described by USEPA (1997). These three steps are as follows:

- Step 1 Screening-Level Problem Formulation and Ecological Effects Evaluation
- Step 2 Screening-Level Exposure Estimate and Risk Calculation
- Step 3A Refinement of Preliminary COPCs

Noisette Creek

Concentrations of several chemicals in Noisette Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs, pesticides, PCBs, and inorganics are minimal. Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals foraging in Noisette Creek.

Shipyard Creek

Concentrations of several chemicals in Shipyard Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs are minimal. Some COPCs (particularly Aroclor-1260, chromium, copper, lead, and zinc) pose risks to benthic receptors in Shipyard Creek. The probable

sources of these COPCs have been remediated, and sediment concentrations of COPCs in Shipyard Creek tended to be lower in 2008 than in 1994. In addition, sediment contamination is limited to a small area. Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals foraging in Shipyard Creek.

Cooper River

Concentrations of several chemicals in Cooper River sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Some COPCs (particularly PAHs, copper, and zinc) pose risks to benthic receptors in the Cooper River. All Cooper River locations from which sediment samples were collected in 2008 are in an industrial shipyard that is periodically dredged for ship traffic. Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals foraging in the Cooper River.

E.10 CONCLUSIONS AND RECOMMENDATIONS

The HHRA indicates the following:

- Carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River, under both the CTE and RME scenarios.

- Non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under both the CTE and RME scenarios.

The ERA indicates the following:

- Potential risks to benthic invertebrates, piscivorous birds, and piscivorous mammals foraging in Noisette Creek are minimal.

- Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals foraging in Shipyard Creek. Some COPCs (particularly, Aroclor-1260, chromium, copper, lead, and zinc) pose risks to benthic receptors in Shipyard Creek. The probable sources of these COPCs have been remediated, and sediment concentrations of COPCs in Shipyard Creek tended to be less in 2008 than in 1994. In addition, sediment contamination is limited to a small area.

- Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in the Cooper River. Some COPCs (particularly, PAHs, copper, and zinc) pose risks to benthic receptors in the Cooper

River. All three Cooper River sample locations are in an industrial shipyard that is periodically dredged for ship traffic.

In conclusion, the Zone J HHRA and ERA indicate that further evaluation or remedial action based on human health or ecological risks is not warranted for sediment in Noisette Creek, Shipyard Creek, or the Cooper River. To that end, further evaluation or remedial action for historical sediment contamination resulting from wastes associated with AOCs, 555, 556, 557, 691, and 692 does not appear warranted.

Furthermore, wastes associated with AOC 695 in Zone K pose negligible risks to human health or the environment (see Appendix R), so further evaluation or remedial action based on human health or ecological risks is not warranted for sediment at AOC 695.

TABLE ES-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Summary and Pertinent Information[1]
Preliminary Results of Zone J Sampling[2]	EnSafe, 1997	Presented the investigative approach, sampling protocols, and analytical results of initial sampling; identified preliminary COPCs in Zone J sediments and surface waters; mapped COPC distributions.
Zone J Draft RFI Report - Part One[2]	EnSafe, 2000	Reviewed contaminant transport/migration pathways and conducted a SLERA. Sediment samples from locations along the dry-docks had the highest ERM quotients. ERM quotients in most samples from Zone J were low, suggesting minimal toxicity. BCT decided that evaluations of linkages between CNC sites and Zone J were needed, along with more thorough reference (background) chemical data.
August 2000 BCT Meeting	-	Three primary scenarios were identified to determine if a contaminant released from a site at CNC could migrate to Zone J: Scenario 1: Transport to Zone J via storm water drainage pipeline Scenario 2: Overland transport to Zone J via sheet flow Scenario 3: Transport to Zone J via groundwater to surface water discharge.
May 2001 BCT Meeting	-	Conceptual approach for collecting storm water effluent samples from CNC and from non-point-source reference locations offsite was approved.
Zone J Point of Entry Work Plan[2]	EnSafe, 2001	Sampling strategy developed for collection of storm water runoff data to define contaminant migration pathways and potential receptors, nature and extent of contamination, characterize reference values, and identify storm water COPCs.
Evaluation of Reference Values of Off-Site Locations for Zone J Stormwater Effluent Evaluation Report at CNC	EnSafe, 2002	Storm water samples collected from 18 locations were determined to represent reference (background) storm water values.

TABLE ES-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Summary and Pertinent Information[1]
Storm Water Effluent Evaluation Reports	EnSafe, 2003a EnSafe, 2003b	Compared CNC storm water data to storm water reference data and surface water screening criteria, and evaluated upland surface soil data, groundwater data, environmental incident reports, and sewer cross-connect reports to determine COPCs for further evaluation and linkages to CNC sites. Also presented a comprehensive evaluation of Charleston Harbor hydrodynamics.
SLERA Technical Memorandum Progress Reports.	EnSafe, 2003c EnSafe, 2003d EnSafe, 2003e	SLERAs for Noisette Creek, Shipyard Creek, and Cooper River identified sediment and storm water COPCs. Reports did not include conclusions; stated that additional information on the groundwater-to-surface water and soil-to-surface water (overland sheet flow) pathways were needed.
Zone J Technical Memorandum: Evaluation of Potential for Contaminant Runoff from Various SWMUs and AOCs via Sheet Flow Runoff	CH2MHill, 2003	Evaluated overland transport of soil contaminants to Zone J via sheet flow runoff. Evaluated surface soil data, fate and transport factors, surface cover present, general topography. Concluded that soil contamination was not expected to cause significant impacts to Zone J water bodies via sheet flow.
Linkage between Charleston Naval Complex Upland AOCs/SWMUs to Analytical Data from Sediment Samples Collected During the Zone J RFI	EnSafe, 2004	Determined the potential for upland source linkages to Zone J sediment contamination. Evaluated storm water effluent, surface water, soil, groundwater, and sediment data. Generated four categories of ERM quotients to rank the likelihood of toxicity to benthic organisms at sediment sample locations. Based on the results of the investigations conducted up to that time, and particularly on the results of the SLERA progress reports and the linkage document, and considering various data uncertainties, the BCT concluded that the potential for significant risk existed at five locations with elevated ERM quotients and CNC source linkages (three locations in Cooper River, one location in Shipyard Creek and one location in Noisette Creek). Due to the time lapse since the previous collection efforts, additional sediment sampling needed at the five locations. Other locations within Zone J were considered to represent areas of insignificant risk or areas with contamination that was not linked with CNC sources. BCT also decided that sediment samples would be collected and analyzed to generate background reference values in Cooper River and Charleston Harbor.

TABLE ES-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Summary and Pertinent Information[(1)]
Zone J Sediment Sampling Report	Spectra Tech, 2006	Provided results of sediment samples collected from 15 locations in December 2005. Ten sample locations represented background (reference) locations. The other five locations were those previously identified as having elevated ERM quotients and CNC source linkages. MDLs exceeded ecological screening values for numerous analytes, preventing conclusions regarding sediment-related ecological risk. BCT determined that collection and analysis of additional sediment samples (with adequately low detection limits) would be conducted.
Quality Assurance Project Plan for Supplemental RFI at Zone J	Tetra Tech, 2008	QAPP generated to address the collection and analyses of sediment samples from the five CNC locations with elevated ERM quotients and CNC source linkages; provided quantitation limits that would be needed to evaluate the data; provided details on the human health risk assessment methodology and ecological risk assessment methodology to be used in the Supplemental RFI for Zone J.

Notes:
(1) See Section 1.3.3 for details regarding the reports and BCT meetings.
(2) Report not available in Navy database; information taken from EnSafe (2003a)
Abbreviations:
AOC: Area of Concern
BCT: Base Realignment and Closure (BRAC) Cleanup Team
CNC: Charleston Naval Complex
COPC: Contaminant of Potential Concern
ERM: Effects Range Median
MDL: Method Detection Limit
QAPP: Quality Assurance Project Plan
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation
SCDHEC: South Carolina Department of Health and Environmental Control
SLERA: Screening Level Ecological Risk Assessment
SWMU: Solid Waste Management Unit

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report was prepared by Tetra Tech, Inc. (Tetra Tech) for the Department of the Navy (Navy), Naval Facilities Engineering Command Southeast (NAVFAC SE) under Contract Task Orders (CTO) 0017 and 0104 of Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055. The RFI Report addresses investigations of Zone J at the Charleston Naval Complex (CNC) in North Charleston, South Carolina, as governed under the RCRA program and managed by the Navy's Base Realignment and Closure (BRAC) Program Management Office (PMO) Southeast (SE). The environmental investigation and remediation at CNC are required by the Hazardous and Solid Waste Amendments (HSWA) portion of the RCRA Part B permit issued by the South Carolina Department of Health and Environmental Control (SCDHEC, 2011). RCRA Corrective Action Program objectives are designed to evaluate the nature and extent of any hazardous waste or constituent releases and to identify, develop, and implement appropriate corrective measures to protect human health and the environment.

1.2 SCOPE OF RCRA FACILITY INVESTIGATION

CNC has been divided into 12 investigative zones for management purposes and to facilitate RCRA corrective action processes. They are designated as Zones A through L. Zone J encompasses portions of the Cooper River, Shipyard Creek, Noisette Creek, and adjoining marsh areas. The purpose of the Zone J RFI is to assess potential Navy-related impacts to these water bodies and marsh areas.

Several investigations of areas of concern (AOCs) and solid waste management units (SWMUs) at CNC and near shore areas have been conducted since 1997. The Navy has worked closely with SCDHEC, the United States Environmental Protection Agency (USEPA) and other Natural Resource Trustees in planning, conducting, and reporting these investigations. The CNC BRAC Cleanup Team (BCT) eventually initiated this comprehensive Zone J investigation to ensure a consolidated data set. This RFI report describes the previous investigations and uses the data from previous investigations, as well as sediment data collected in April 2008, to assess potential Navy-related impacts to Zone J water bodies and marshes.

1.3 HISTORICAL INFORMATION

1.3.1 Facility Background

CNC is located on the west bank of the Cooper River in Charleston Harbor (Figure 1-1), which is formed by the confluence of the Cooper, Ashley, and Wando Rivers and their tributaries. As mentioned above, Zone J encompasses portions of the Cooper River, Shipyard Creek, and Noisette Creek. Zone J lies within the Charleston Harbor estuary, which is a mixing zone where fresh water meets salt water. Zone J is subjected to twice-daily tidal cycles, which mix salt water and fresh water and transport sediments and contaminants within the estuary.

The former Charleston Navy Base was the Navy's third largest home port, supporting more than 70 surface vessels and submarines until 1996, when the base was closed. When operational, the facility performed various tasks related primarily to ship repair and maintenance [EnSafe Inc. (EnSafe) 2003a]. CNC currently supports several private and federal entities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., the National Oceanic and Atmospheric Administration (NOAA), and the United States Coast Guard (USCG).

The CNC waterfront along the Cooper River is dominated by 25 piers and five dry docks, and is protected along most of its length by a wooden and/or concrete seawall. The United States Army Corps of Engineers (USACE) maintains a navigation channel along the waterfront. The Cooper River and Noisette and Shipyard Creeks provide habitat for numerous aquatic organisms including a variety of fish, crustaceans, and mollusks (see Section 7.1.1).

Shipyard Creek flows into the Cooper River at the southern end of CNC (Figure 1-2), and drains portions of Zones G, H, and I. The Cooper River Marina is located at the confluence of Shipyard Creek and the Cooper River. Industrial facilities along the western shoreline of Shipyard Creek include the Macalloy Corporation, the Foster Wheeler Resource Recovery Plant, Chevron Products Co., and the Kinder Morgan Bulk Terminal (known locally as the "Shipyard River Terminal") (EnSafe 2003a). Most of the non-industrial portions of Shipyard Creek's shoreline consist of marsh vegetation, primarily cordgrass (*Spartina* spp.). The intertidal mudflats and marshy areas provide habitat for a variety of wildlife species, including herons, egrets, and other wading birds, and mammals such as raccoons (*Procyon lotor*), rice rats (*Oryzomys palustris*), and marsh rabbits (*Sylvilagus aquaticus*).

Noisette Creek flows eastward into the Cooper River near the northern end of Zone J (Figure 1-2). Portions of the creek are bordered by undercut banks that are 3 to 6 feet above the water. Vegetation along the banks consists of various trees and shrubs. Vegetation in lower areas along the creek is dominated by smooth cordgrass (*Spartina alterniflora*), with patches of salt meadow cordgrass (*S. patens*)

and black needlerush (*Juncus roemerianus*). Wildlife species associated with Noisette Creek are largely the same as mentioned previously for Shipyard Creek.

1.3.2 Contaminant Sources Associated with Zone J

The Zone J water bodies (Cooper River, Noisette Creek, and Shipyard Creek) receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several National Pollutant Discharge Elimination System (NPDES) outfalls. Several onshore sites that previously contributed contaminants to Zone J have been remediated; these sites no longer pose potential risks to human health or the environment and have been closed under the RCRA process. Final decisions regarding remediation of six AOCs (see Figure 1-3), have not been made, however, pending evaluation of Zone J. These AOCs are discussed below:

AOC 517 - Indoor Firing Range, Building M-192

AOC 517 consists of Building M-192 and a one-story, 80' x 40' concrete block structure built in 1959. The building was used as an indoor pistol range from 1959 until 1974. Bullets fired at the range were contained within the structure. The building was converted into a classroom and storage building in 1974. A Corrective Measures Study (CMS) to address known releases of hazardous waste or hazardous constituents is being conducted at AOC 517 (SCDHEC, 2011).

AOC 555 - Former Latrine & Substation, Building 1119

AOC 555 is former Building 29, which was constructed in 1922 and was used as a latrine and substation. Aerial photos show that the facility was removed some time before 1968. During operation, its waste stream was apparently diverted directly into the Cooper River. No other information was found regarding the size, design features, or operating practices of the site. It is currently a flat, paved area near the junction of Pier D and the quay wall. Because wastes from AOC 555 previously discharged into the Cooper River and could have impacted sediment, conclusions resulting from the current Zone J evaluation will be germane to AOC 555. Therefore, although the current RCRA Part B permit indicates that a Confirmatory Sampling Investigation (CSI) is being conducted for AOC 555 (SCDHEC, 2011), the CNC BCT has determined that decisions regarding remediation at AOC 555 will depend on conclusions of the Zone J RFI.

AOC 556 - Dry Dock Discharge Areas

AOC 556 consists of the dry dock (DD) drains and areas around the gates of each of the five dry docks. The dry docks were constructed in the following years: DD 1 in 1907, DD 2 in 1942, DD 3 and DD 4 in 1943, and DD 5 in 1964. A large grated drain runs along the center of the length of each dry dock.

Underground pumps remove water collected in the drain and direct it to the sanitary sewer system after the dry dock is sealed and pumped dry. Outfalls adjacent to the dry docks are used to de-water the dry docks immediately following the sealing of the caisson. Because wastes from the dry docks could have impacted sediment in the Cooper River, conclusions resulting from the Zone J evaluation will be applicable to AOC 556. Therefore, although the current RCRA Part B permit indicates that an RFI is in process at AOC 556 (SCDHEC, 2011), the BCT has determined that decisions regarding remediation at AOC 556 will depend on conclusions of the Zone J RFI.

AOC 557 - Former Latrine, south of Dry Dock #1

AOC 557 consists of former Building 1020 and a latrine constructed in 1909 and used until 1939. Wastes are believed to have been discharged into the Cooper River during operation. AOC 557 is currently covered with asphalt. Because wastes from AOC 557 could have impacted sediment in the Cooper River, conclusions resulting from the Zone J evaluation will be applicable to AOC 557. The current RCRA Part B permit indicates that a CSI is being conducted at AOC 557 (SCDHEC, 2011), but decisions regarding remediation at AOC 557 will depend on conclusions of the Zone J RFI.

AOC 691- Waterfront

AOC 691 consists of approximately 21,600 feet of Cooper River shoreline, approximately 2,500 feet of Noisette Creek shoreline, and approximately 4,800 feet of Shipyard Creek shoreline. These waterfront areas were previously controlled by the Charleston Naval Ship Yard, the Naval Supply Center, and Naval Station Charleston, the three primary tenants at CNC. Historic activities and operations along the waterfront included ship and equipment repair, painting, cleaning, transporting, manufacturing, and general maintenance. A variety of wastes were generated by these operations. More than 20 piers are located along the Cooper River waterfront. Activities on these piers included refueling, repair, ship docking, and loading/unloading of cargo, and are potential sources of waterfront contamination. Building drains and storm drains underlying CNC have the potential to discharge contaminants into the Cooper River, which comprises part of Zone J. The current RCRA Part B permit indicates that an RFI is being conducted at AOC 691 (SCDHEC, 2011), but the BCT has determined that decisions regarding remediation at AOC 691 will depend on conclusions of the Zone J RFI.

AOC 692 - Free Product along Cooper River

AOC 692 consists of areas along Cooper River where excavations conducted prior to 1995 revealed free product consisting primarily of petroleum products. Spills of oil or petroleum products along the river occasionally occurred when the Charleston Navy Base was in operation, and were usually small, involving approximately 50 to 100 gallons. Based on oil spill logs, at least 7,940 gallons of petroleum

products were discharged into the Cooper River between 1990 and 1995. Some spills were presumably not visible or detectable, and if so, such spills might have gone unreported. No free product nor any other evidence of past oil spills was observed along the Cooper River shoreline during the collection of sediment samples in 2008. Because the Cooper River is part of Zone J, conclusions resulting from the Zone J evaluation will apply to AOC 692. The current RCRA Part B permit indicates that an RFI is in process for AOC 692 (SCDHEC, 2011), but decisions regarding remediation at AOC 692 will depend on conclusions of the Zone J RFI.

Other Contaminant Sources

Because Zone J lies along the CNC waterfront, sediments within Zone J can be exposed to contaminants released during spills at various locations within Charleston Harbor. Each year, numerous accidental spills occur in and around Charleston Harbor. The National Response Center (NRC) is the federal government's national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment. The NRC is staffed by U.S. Coast Guard officers and marine science technicians who maintain a 24 hour per day, 365 day per year telephone watch. In addition to gathering and distributing spill data for On-Scene Coordinators and serving as the communications and operations center for the National Response Team, the NRC maintains agreements with a variety of federal and state agencies to make additional notifications regarding incidents meeting established trigger criteria (NRC, 2012).

When an oil spill or other type of spill occurs at CNC, the tenant (e.g., Detyens Shipyards) notifies the NRC by phone, and the NRC subsequently notifies the appropriate Federal On-Scene Coordinator, as well as agencies such as USACE, SCDHEC, and South Carolina Department of Natural Resources (SCDNR). The notified agencies then analyze the information and respond in accordance with established spill countermeasures (NRC, 2012). Since deactivating the Charleston Naval Base in 1996, the Navy no longer maintains oil spill logs. Instead, spill data that collected by the NRC is shared with cooperating state and federal agencies but is available to the general public only under the Freedom of Information Act.

Most spills within Charleston Harbor are less than 50 gallons and are typically diesel fuels (USACE, 2006). Occasionally, however, large spills occur due to sinkings, groundings or fires. The largest spill in recent years occurred on September 30, 2002, when approximately 12,500 gallons of No. 6 heavy fuel oil were accidentally discharged into the Cooper River and Charleston Harbor from the M/V Ever Reach, a 961-foot long container ship (SCDNR et al., 2012). Released oil was found over approximately 30 linear miles of shoreline, and was concentrated in several areas, including the portion of CNC Zone J shown on Figure 1-3 as AOCs 691 and 692. Response actions were carried out by Evergreen International (the owner of the M/V Ever Reach), the U.S. Coast Guard, and SCDHEC, with participation and assistance

from other agencies. The response effort included actions such as protective booming, and oil containment and partial removal from some shoreline areas, especially from beaches, man-made structures, and areas where pooling occurred (SCDNR et al., 2012). Estimates of the actual amount of oil removed are not available (SCDNR et al., 2012), and no information was found describing cleanup actions conducted in Zone J.

1.3.3 Previous Investigations

Investigations of AOCs and SWMUs near the CNC shoreline have generated useful information regarding site-related contaminants of potential concern (COPCs), nature and extent of contamination, and the potential for contaminant migration to Zone J. For some of the larger investigations, however, it was not uncommon for months or even years to separate zone-specific sampling programs, which affected the sequence of data availability for use during the Zone J investigation. Before the scope of the Zone J RFI was defined as the assessment of the surrounding water bodies, several of the earlier site investigations included small-scale, offshore sampling. This added to the complexity of the Zone J data set. In addition, water quality parameters such as temperature, dissolved oxygen, salinity, pH, and total suspended solids change constantly with the tide, season, and river flows, and can affect contaminant concentrations. Therefore, the BCT proceeded with a comprehensive Zone J investigation to ensure a consolidated data set for the water bodies. Table 1-1 and the remainder of this section summarize previous investigations and BCT decisions pertaining to Zone J.

Preliminary Results of Zone J Sampling (December 1997)

The Navy completed preliminary sampling of Zone J water bodies in September 1997. In a technical memorandum entitled *Preliminary Results of Zone J Sampling* (EnSafe, 1997), the Navy presented the investigative approach, sampling protocols, and analytical results. The technical memorandum also provided a preliminary list of COPCs in Zone J sediments and surface waters, and a map of COPC distributions. Numerous investigations of upland AOCs and SWMUs were ongoing when the 1997 Zone J sampling was conducted, and since results from those investigations were not yet available, no attempts were made to correlate Zone J surface water and sediment COPCs and potential CNC sources.

A technical subcommittee of the BCT met in January 1998 to discuss the EnSafe (1997) technical memorandum. The subcommittee determined that the available data were inconclusive because: (1) available data could not be linked to CNC, (2) the Zone J water bodies had not been confirmed as depositional areas for CNC contamination, and (3) characterization of potential impacts from potential upstream contaminant sources was lacking. Based on the lack of information on river dynamics and upstream non-Navy contaminant sources, the BCT determined that a river dynamics study should be conducted to examine river flows and tidal influences.

Zone J Draft RFI Report – Part One (April 2000)

The Navy submitted the *Zone J Draft RFI Report - Part One* (EnSafe, 2000) which included a Screening Level Ecological Risk Assessment (SLERA) using the preliminary results of Zone J sampling and the protocols outlined in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997c). The SLERA included a screening-level problem formulation, conceptual model, ecological effects evaluation, exposure estimates, and risk calculations. Effects Range-Median (ERM) quotients were also calculated in the SLERA to estimate the cumulative toxic effects that Zone J sediment contaminants could have on benthic organisms (i.e., invertebrate organisms that live on or in sediment).

The EnSafe (2000) report included reviews of contaminant transport discussions from relevant RFI reports of upland sites at CNC, and evaluated potential migration pathways. The reviews and evaluations were not intended to confirm linkages between CNC sites and Zone J; instead they were meant to initially evaluate possible connections suggested by available chemical data, drainage features, and the storm sewer system. The report concluded that sediment samples from locations along the dry-docks had the highest ERM quotients, suggesting that sediments from those locations were toxic to sediment-dwelling organisms. However, ERM quotients in most sediment samples from Zone J were low, and at values associated with minimal toxicity.

Regulatory agency reviewers indicated the need for the Zone J RFI to include a more in-depth evaluation of linkages between CNC sites and Zone J, including a thorough evaluation of potential contaminant migration pathways. A clearer determination of reference (background) chemical data was also requested along with calculations of mean ERM quotients for reference samples to better define regional baseline toxicity.

BCT Meetings (July and August 2000)

In the July 2000 BCT meeting, SCDHEC presented six primary goals for the Zone J RFI:

- Develop an understanding of the nature and extent of COPCs in Zone J water bodies.
- Determine whether Zone J COPCs were correlated with CNC contaminant sources.
- Select sampling locations corresponding to potential release points.
- Establish trends in the data.
- Establish background levels of chemicals.
- Perform an ecological risk assessment.

On August 30, 2000, the Navy presented a strategy for identifying sites at CNC that could potentially affect contaminant migration in the Zone J water bodies. The strategy included the development of migration pathway conceptual models to determine potential source identification and migration pathways between the sources and the Zone J water bodies. Based on this strategy, three primary scenarios were subsequently evaluated to determine if a contaminant released from a site at CNC could migrate to Zone J:

- Scenario 1: Transport to Zone J via Storm Water Drainage Pipeline
- Scenario 2: Overland Transport to Zone J via Sheet Flow
- Scenario 3: Transport to Zone J via Groundwater to Surface Water Discharge

Each upland site at CNC potentially associated with Zone J underwent a thorough migration pathway analysis to identify CNC sites that might be adversely impacting Zone J and to identify those that lacked sufficient data for complete migration analysis (i.e., data gaps). The standardized migration scenario checklist included site-related information from pertinent RCRA facility assessments and investigations, corrective measures studies, remedial actions, or other reports, and information regarding drainage basin and storm water sewer line configuration. The resulting evaluations of drainage basins and upland sites determined that data gaps existed predominately in the storm water migration pathway (Scenario 1), leading the BCT to conclude that storm water effluent data were needed from relevant drainage basins.

BCT Meeting (May 2001)

At the May 2001 BCT meeting, EnSafe presented the conceptual approach for collecting storm water effluent samples from CNC and from non-point-source reference locations offsite. The BCT approved the approach, and decided that a scoping package incorporating comments from SCDHEC would be presented to the team prior to submittal of a Point of Entry Effluent Sampling Work Plan. The scoping package was presented at the August 2001 BCT meeting, where a consensus was reached that samples should be collected from reference locations on base that were not influenced by AOCs or SWMUs, if possible.

Zone J Point of Entry Work Plan (September 2001)

The *Zone J Point of Entry Work Plan* (EnSafe, 2001) was generated to address potential data gaps identified during the analyses of migration pathways and upland source linkages of the CNC storm water sewer system.

The work was based on the following topics relevant to Zone J:

- Hazardous waste management history at CNC
- Associated estuary system and possible sources of pollution
- Upland zone investigations
- CNC storm water system
- Excursion zones around Charleston Harbor

The *Zone J Point of Entry Work Plan* (EnSafe, 2001) described a sampling strategy for the collection of storm water runoff data that would be adequate to accomplish the following:

- Characterize the storm water runoff from listed RCRA sites throughout the CNC.
- Define contaminant migration pathways and potential receptors (onsite and offsite, where applicable).
- Define the nature and extent of contamination.
- Characterize reference values.
- Identify storm water COPCs.

Evaluation of Reference Values of Off-Site Locations for Zone J Storm Water Effluent Evaluation Report at CNC (May 2002)

In accordance with the *Zone J Point of Entry Work Plan* (EnSafe, 2001), storm water samples were collected from 18 non-point source locations in local watersheds not influenced by CNC (EnSafe, 2002). The resulting storm water data represented naturally occurring conditions and/or were associated with anthropogenic activities. The data were used to represent reference (background) storm water values, and were subsequently used in Zone J ecological risk assessments to determine contaminants that were attributable to CNC-related activity. The EnSafe (2002) report is included herein as Appendix A.

Storm Water Effluent Evaluation Reports (July 2003)

The *Zone J RFI Storm Water Effluent Evaluation Report* (EnSafe, 2003a) and the *Zone J RFI Storm Water Effluent Evaluation Report Addendum* (EnSafe, 2003b), which are included in this report as Appendix B and Appendix C, respectively, compared storm water data from CNC drainage basins to storm water reference data and surface water screening criteria. The *Zone J RFI Storm Water Effluent Evaluation Report* (EnSafe, 2003a) focused on CNC outfalls associated with Noisette Creek and Shipyard Creek. The *Zone J RFI Storm Water Effluent Evaluation Addendum* (EnSafe, 2003b), focused on CNC outfalls associated with the Cooper River. The two reports also evaluated upland surface soil data, groundwater data, environmental incident reports, and sewer cross-connect reports to determine COPCs for further evaluation and linkages to CNC sites. The evaluations were guided by the layout of CNC drainage basins. Ninety-eight drainage basins have been identified at CNC, 68 of which are associated with a SWMU or AOC. A watershed-based approach that evaluates all potential sources within a

drainage basin was considered more appropriate than a site-by-site assessment. Using this approach, multiple sites located within a common drainage basin (as defined by surface water drainage maps) and with a single known storm water outfall (point source) were consolidated and assessed simultaneously. Conversely, if several smaller drainage basins were within a single large AOC or SWMU, they were combined for evaluation. The two reports identified several potential storm water COPCs in 10 drainage basins that discharge to Zone J. Appendix D summarizes storm water drainage basins, potential storm water COPCs, and upland linkages that warranted further investigation.

The EnSafe (2003a) report also presented a comprehensive evaluation of the dynamic nature of the Charleston Harbor Estuary and how it relates to the fate and transport mechanisms of CNC-related constituents in Noisette Creek, Shipyard Creek, and the Cooper River. Factors such as tides, freshwater inflow, and bathymetry affect estuarine hydrodynamics, so it was important to identify the area in which tidal mixing could disperse contaminants discharged from the CNC, and conversely, the area from which non-CNC contaminants could disperse to CNC. With this in mind, hydrodynamic modeling was conducted and a tidal excursion zone was described for CNC. The net horizontal distance travelled by a hypothetical particle in the water at a point during a tidal cycle of one flood and one ebb defines the tidal excursion zone for that point. During a tidal cycle, a particle released at CNC at the start of an incoming tide can travel upstream for six hours, which equates to about 4.5 miles upstream. Similarly, a particle released at the start of an outgoing tide can travel downstream for six hours, reaching the entrance of Charleston Harbor. In addition, a particle released at CNC can be transported into the Wando and Ashley Rivers by the tides, with the limits of upstream transport being about five miles. The tidal excursion zone extends up the entire length of Shipyard and Noisette Creeks. Thus, some contaminants released from CNC can be flushed out of the harbor during one tidal cycle, and some contaminants released from CNC can be transported into the Wando and Ashley Rivers. Conversely, the Zone J water bodies can be receptors of contaminants from numerous remote locations in the Ashley and Wando Rivers and Charleston Harbor. The hydrodynamic evaluation was included in Section 7 of the EnSafe (2003a) report (see Appendix B) and was summarized in a power point presentation (ECT, 2003), which is included herein as Appendix E.

SLERA Progress Reports for Noisette Creek, Shipyard Creek, and Cooper River (August 2003)

SLERAs for Noisette Creek, Shipyard Creek, and Cooper River were submitted in 2003 in the form of technical memorandum progress reports (EnSafe, 2003c; 2003d; 2003e). Although all three water bodies are part of the Cooper River watershed, they differ in size, flow, and level of near-shore industrialization. Therefore, storm water and sediment data collected from each water body were evaluated separately. The SLERAs identified sediment and storm water COPCs in each water body that may pose ecological risks. The three “technical memorandum progress reports” did not purport to be final risk assessments, did not include conclusions, and noted that additional information on the groundwater-to-surface water

and soil-to-surface water (overland sheet flow) pathways were needed. The SLERAs for Noisette Creek (EnSafe, 2003c), Shipyard Creek (EnSafe, 2003d) and Cooper River (EnSafe, 2003e) are included herein as Appendices F, G, and H, respectively.

Zone J Technical Memorandum: Evaluation of Potential for Contaminant Runoff from Various SWMUs and AOCs via Sheet Flow Runoff (November 2003)

As discussed previously [see "BCT Meetings (July and August 2000)"], the overall Zone J evaluation strategy involves the assessment of three potential migration scenarios through which a contaminant released from an upland site (SWMU or AOC) at the CNC could migrate to Zone J. The CH2MHill, Inc. (CH2MHill) (2003) memorandum addressed Scenario 2: Overland Transport to Zone J via Sheet Flow. This scenario applies to those portions of CNC that are not served by the storm water sewer system and contain SWMUs or AOCs.

The CH2MHill (2003) evaluation identified seven areas at the CNC where storm water sheet flow runoff could cause migration of contaminants into Zone J. To assess the migration potential via the sheet flow pathway, surface soil samples in each of these areas were evaluated using a conservative two-phased approach. The first phase involved the comparison of surface soil analytical data to sediment screening values and background (reference) data. The second phase included the evaluation of fate and transport factors and other aspects (e.g., type of land cover present, general topography) that influence whether surface soil could migrate via sheet flow. The evaluation concluded that none of the seven areas had levels of contamination that were likely to cause unacceptable impacts to the Zone J water bodies via storm water sheet flow runoff (see Appendix I).

Technical Memorandum: Linkage between Charleston Naval Complex Upland AOCs/SWMUs to Analytical Data from Sediment Samples Collected During the Zone J RFI (May 2004)

The EnSafe (2004) technical memorandum (Appendix J) presented ecological evaluations for media sampled during the Zone J RFI and assessed the potential for upland source linkages to Zone J sediment contamination. Storm water effluent, surface water, soil, groundwater, and sediment data were evaluated. Hazard quotients and ERM quotients were calculated to evaluate the adverse effects of chemical mixtures in sediment. Mean ERM quotients for each sample were calculated by summing the concentration of each chemical divided by the ERM for that chemical, then dividing the sum of ERM quotients by the total number of ERMs evaluated. This methodology generated four categories that were used to predict the likelihood of toxicity to benthic receptors at each sediment sample location:

- Category 1: Mean ERM quotient less than 0.1; no Effects Range-Low (ERL) values exceeded; sediments least likely to be toxic.

- Category 2: Mean ERM quotient between 0.11 and 0.5; one to five ERMs exceeded.

- Category 3: Mean ERM quotient between 0.51 and 1.5; six to ten ERMs exceeded.

- Category 4: Mean ERM quotient greater than 1.5; more than 10 ERMs exceeded; high probability of sediment toxicity.

The EnSafe (2004) technical memorandum further evaluated each of the Category 3 and 4 sample locations to determine if the chemicals that exceeded their individual ERM concentrations could be linked to upland sources at CNC. All three previously identified migration pathways (transport to Zone J via storm water drainage pipeline, overland transport to Zone J via sheet flow, and transport to Zone J via groundwater to surface water discharge) were evaluated to determine if such a linkage existed.

The BCT, in evaluating the results of the EnSafe (2004) technical memorandum, identified the following issues that contributed to uncertainties regarding the results of the evaluation:

- Background sediment samples had never been collected; therefore sediment data could not be compared to background reference values

- All storm water data were collected after Navy operations ceased in 1996. Thus, screening criteria exceedances could not be conclusively tied to Navy operations.

- The data evaluated in the technical memorandum represented samples collected as far back as the mid-1990s; some as early as 1993.

- Areas already remediated eliminate on-going potential for contamination to Zone J.

Based on the results of the investigations conducted up to that time, and particularly on the results of the SLERA progress reports and the EnSafe (2004) technical memorandum, and considering the issues noted above, the BCT concluded that the potential for significant risk existed at five areas with elevated ERM quotients and CNC source linkages. The five areas consisted of three locations in the Cooper River, one location in Shipyard Creek and one location in Noisette Creek. Each of these five locations had been previously sampled, but due to the time lapse since the previous collection efforts, additional sampling of sediment would be conducted. Other locations within Zone J were considered to represent

areas of insignificant risk or areas with contamination that was not linked with CNC sources. The BCT also decided that sediment samples would be collected and analyzed to generate background reference values for the Cooper River and Charleston Harbor.

Zone J Sediment Sampling Report (May 2006)

In accordance with the BCT's decisions (see preceding paragraph), sediment samples were collected from 15 locations in December 2005 (Spectra Tech, 2006) following protocols described in the *Zone J Sampling and Analysis Plan* (Spectra Tech, 2005). Ten of the 15 locations had been pre-approved by SCDHEC and SCDNR representatives as locations representing regional baseline (reference) concentrations of naturally occurring inorganic constituents and widespread organic constituents such as polycyclic aromatic hydrocarbons (PAHs) and pesticides. The 10 baseline samples were collected in various locations within the Cooper River and Charleston Harbor. The other five samples collected in December 2005 were from the locations having elevated ERM quotients and CNC source linkages (see preceding paragraph). The analytical results of the December 2005 sampling event were summarized in Table 3-1 (reference samples) and Table 3-2 (CNC samples) of the Spectra Tech (2006) report; the entire report is included here as Appendix K.

Analytical results for the five CNC samples collected in December 2005 showed that concentrations of most inorganics in the three Cooper River samples had increased since the initial sampling event in November 1995, while concentrations of most inorganics at Shipyard and Noisette Creek locations had decreased since initial sampling in 1994 and 1997.

Method detection limits (MDLs) exceeded ecological screening values for numerous analytes [particularly pesticides, polychlorinated biphenyls (PCBs), and PAH compounds] in the five CNC samples collected in December 2005 (see Appendix K, Table 3-2). The elevated MDLs made it impossible to draw conclusions regarding sediment-related ecological risk. Therefore, the BCT determined that collection and analysis of additional sediment samples (with sufficiently low detection limits) were required to address this situation.

Quality Assurance Project Plan for Supplemental RFI at Zone J (March 2008)

A Quality Assurance Project Plan (QAPP) (TtNUS, 2008) was generated to address the collection and analysis of sediment samples from the five aforementioned CNC locations with elevated ERM quotients and CNC source linkages. The five locations were 054M0001, 556M0005, and 556M0007 in the Cooper River, NOIM0004 in Noisette Creek, and 009M0004 in Shipyard Creek (Figure 1-4). The QAPP specified that sediment samples from these five locations would be analyzed for semivolatile organic compounds (SVOCs), pesticides, PCBs, metals, and total organic carbon. The QAPP provided quantitation limits that

would be needed to evaluate the data and specified analytical methods that would be used to achieve the necessary sensitivity in laboratory analysis of the sediment samples. The QAPP (included here as Appendix L) also provided details on the human health risk assessment methodology and ecological risk assessment methodology to be used in the Supplemental RFI for Zone J.

As mentioned above, the March 2008 QAPP specified that sediment samples collected in April 2008 would be analyzed for SVOCs, pesticides, PCBs, and metals. The BCT's selection of these compounds for further evaluation in sediment was based on the results of numerous investigations conducted prior to 2008 (Table 1-1). Samples collected in 2008 were not analyzed for compounds such as volatile organic compounds and dioxins and furans because, by 2008, these compounds had been eliminated as COPCs. Regarding dioxins and furans, for example, these compounds were analyzed in approximately 10 percent of soil and groundwater samples collected early in the investigations of AOCs and SWMUs located in drainage basins that discharge to Zone J. Tables in Section 6 of the previously described *Zone J RFI Storm Water Effluent Evaluation Report*, included herein as Appendix B, indicate that in sampling events conducted between 1995 and 2000, dioxins and furans were analyzed in samples collected at SWMU 39 (soil and groundwater), SWMU 42 (soil), AOC 505 (soil), SWMU 44 (soil and groundwater), AOC 700 (soil), SWMU 47 (soil and groundwater), AOC 516 (soil and groundwater), AOC 670 (soil), AOC 637 (soil and groundwater), AOC 706 (soil), SWMU 3 (soil and groundwater), and SWMU 11 (soil). These AOCs and SWMUs are located within drainage basins associated with Noisette Creek or Shipyard Creek (EnSafe, 2003a). The *Zone J RFI Storm Water Effluent Evaluation Addendum* (EnSafe, 2003b), presents similar dioxin-related information for AOCs and SWMUs in drainage basins associated with the Cooper River. A technical memorandum entitled *Proposed Approach for Addressing Dioxin (TEQ) in Soils at CNC Sites* (included in Appendix I of this report), was presented to the CNC BCT in 2002 (CH2MHill, 2002). The technical memorandum summarized dioxin/furan data, expressed as 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) toxic equivalency (TEQ) concentrations, for over 500 samples of surface soil and subsurface soil collected from CNC sites and background areas. All TEQ results were less than the USEPA policy-based target soil cleanup level of 1 µg/kg for unrestricted land use. Basewide TEQ concentrations in surface soil averaged 11.6 ng/kg (0.0116 µg/kg) and basewide TEQ concentrations in subsurface soil averaged 5.2 ng/kg (0.0052 µg/kg) (CH2MHill, 2002). Dioxins/furans have not been final chemicals of concern (COCs) at any CNC sites, and remedial actions based on dioxins/furans have not been conducted at any CNC sites.

The BCT, after evaluating the EnSafe (2003a; 2003b) reports and the CH2MHill (2002) memorandum, determined that analyses of sediments at Zone J for dioxins and furans were not necessary based on the lack of upland sources of these compounds. Therefore, laboratory analyses of sediment samples collected in April 2008 did not include dioxins and furans. The Navy has worked closely with SCDHEC, USEPA, and other Natural Resource Trustees throughout the investigations, and the QAPP (TtNUS,

2008), which specified that sediment samples collected in April 2008 would be analyzed for SVOCs, pesticides, PCBs, and metals, was approved by the CNC BCT after being submitted to SCDHEC, USEPA, and other Natural Resource Trustees for review and approval.

1.4 DREDGING

The shipping channels of Charleston Harbor have been dredged since colonial times to maintain adequate depths for shipping activities. The USACE maintains Charleston Harbor's navigation channels, turning basins, and access channels. The CNC Redevelopment Authority (RDA) conducts maintenance dredging between the main channel and the piers at CNC. Section 1.10 of EnSafe's (2003a) *Zone J RFI Storm Water Effluent Evaluation Report* (see Appendix B) provides a history of dredging activities in Charleston Harbor, including Shipyard Creek and the Cooper River.

Dredging is used to maintain a depth in the main shipping channels of 45 feet at mean low water (MLW). Mean low water is 2.6 feet below mean sea level. The areas around the piers at CNC are dredged to a depth of 36-37 feet. The frequency of dredging is variable, since dredging is conducted on an as-needed basis, but personnel at CNC state that dredging is conducted, at a minimum, every few years.

The downstream portion of Shipyard Creek is considered a navigable water body and is maintained to a depth of 45 feet to give large ships access to ship maintenance service piers. This portion of Shipyard Creek is dredged annually or as needed. The three locations at which Shipyard Creek sediment samples were collected in April 2008 were approximately 0.7 mile upstream of the area that is periodically dredged. Dredging is not conducted in Noisette Creek. Thus, the areas where Shipyard Creek and Noisette Creek samples were collected in April 2008 are not dredged.

Tetra Tech was informed by USACE that more detailed information regarding dredging activities at CNC cannot be made available except by formal request through the Freedom of Information Act. However, a comparison of Figure 1-4 of the EnSafe (2003a) report (see Appendix B of this RFI) to Figure 1-4 of this RFI report indicates that Cooper River sediment sampling locations 054M0001, 556M0007, and 556M0005 are within the area shown in Figure 1-4 of the EnSafe (2003a) report as "Naval Base Maintenance Dredging."

In summary, areas from which Shipyard Creek samples and Noisette Creek samples were collected in April 2008 are not dredged, while areas from which Cooper River samples were collected in April 2008 are regularly dredged.

1.5 RFI REPORT ORGANIZATION

This report is divided into nine sections. Section 1.0, Introduction, provides historic information about CNC and Zone J in particular. Section 2.0, Environmental Setting, provides geological and geographical information about Zone J. Section 3.0, Investigation Summary, summarizes the sediment sampling program conducted in April 2008. Section 4.0, Nature and Extent of Contamination, addresses the nature and extent of site contamination. Section 5.0, Chemical Fate and Transport Analysis, is a reference-like section describing the chemical and physical properties of the analytes detected at Zone J. Section 6.0, Baseline Human Health Risk Assessment (HHRA), and Section 7.0, ERA, present the methodology and results of the human health and ecological risk assessments, respectively. Section 8.0 presents conclusions and recommendations regarding site-related risks for Zone J. Appendices A through Q provide copies of pertinent historical reports, documentation for the April 2008 sampling, and supplemental information to facilitate the evaluation of results. Appendix R provides the HHRA and ERA for AOC 695, which was investigated as part of Zone K (Clouter Island). SCDHEC and SCDNR comments and Navy responses on the RFI Report for Zone J, Revision 1 dated November 2011, and Revision 2 dated September 2012, are provided in Appendix S.

TABLE 1-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Submitted to SCDHEC?	Finalized?	Summary and Pertinent Information[1]
Preliminary Results of Zone J Sampling[2]	EnSafe, 1997	Unknown	Unknown	Presented the investigative approach, sampling protocols, and analytical results of initial sampling; identified preliminary COPCs in Zone J sediments and surface waters; mapped COPC distributions.
Zone J Draft RFI Report - Part One[2]	EnSafe, 2000	Yes	Unknown	Reviewed contaminant transport/migration pathways and conducted a SLERA. Sediment samples from locations along the dry-docks had the highest ERM quotients. ERM quotients in most samples from Zone J were low, suggesting minimal toxicity. BCT decided that evaluations of linkages between CNC sites and Zone J were needed, along with more thorough reference (background) chemical data.
August 2000 BCT Meeting	-	-	-	Three primary scenarios were identified to determine if a contaminant released from a site at CNC could migrate to Zone J: Scenario 1: Transport to Zone J via storm water drainage pipeline Scenario 2: Overland transport to Zone J via sheet flow Scenario 3: Transport to Zone J via groundwater to surface water discharge.
May 2001 BCT Meeting	-	-	-	Conceptual approach for collecting storm water effluent samples from CNC and from non-point-source reference locations offsite was approved.
Zone J Point of Entry Work Plan[2]	EnSafe, 2001	Unknown	Unknown	Sampling strategy developed for collection of storm water runoff data to define contaminant migration pathways and potential receptors, nature and extent of contamination, characterize reference values, and identify storm water COPCs.

TABLE 1-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Submitted to SCDHEC?	Finalized?	Summary and Pertinent Information[1]
Evaluation of Reference Values of Off-Site Locations for Zone J Stormwater Effluent Evaluation Report at CNC	EnSafe, 2002	Yes	Unknown	Storm water samples collected from 18 locations were determined to represent reference (background) storm water values.
Storm Water Effluent Evaluation Reports	EnSafe, 2003a EnSafe, 2003b	Yes	Unknown	Compared CNC storm water data to storm water reference data and surface water screening criteria, and evaluated upland surface soil data, groundwater data, environmental incident reports, and sewer cross-connect reports to determine COPCs for further evaluation and linkages to CNC sites. Also presented a comprehensive evaluation of Charleston Harbor hydrodynamics.
SLERA Technical Memorandum Progress Reports.	EnSafe, 2003c EnSafe, 2003d EnSafe, 2003e	Yes	Unknown	SLERAs for Noisette Creek, Shipyard Creek, and Cooper River identified sediment and storm water COPCs. Reports did not include conclusions; stated that additional information on the groundwater-to-surface water and soil-to-surface water (overland sheet flow) pathways were needed.
Zone J Technical Memorandum: Evaluation of Potential for Contaminant Runoff from Various SWMUs and AOCs via Sheet Flow Runoff	CH2MHill, 2003	Unknown	Unknown	Evaluated overland transport of soil contaminants to Zone J via sheet flow runoff. Evaluated surface soil data, fate and transport factors, surface cover present, general topography. Concluded that soil contamination was not expected to cause significant impacts to Zone J water bodies via sheet flow.

TABLE 1-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Submitted to SCDHEC?	Finalized?	Summary and Pertinent Information[1]
Linkage between Charleston Naval Complex Upland AOCs/SWMUs to Analytical Data from Sediment Samples Collected During the Zone J RFI	EnSafe, 2004	Unknown	Unknown	Determined the potential for upland source linkages to Zone J sediment contamination. Evaluated storm water effluent, surface water, soil, groundwater, and sediment data. Generated four categories of ERM quotients to rank the likelihood of toxicity to benthic organisms at sediment sample locations. Based on the results of the investigations conducted up to that time, and particularly on the results of the SLERA progress reports and the linkage document, and considering various data uncertainties, the BCT concluded that the potential for significant risk existed at five locations with elevated ERM quotients and CNC source linkages (three locations in Cooper River, one location in Shipyard Creek and one location in Noisette Creek). Due to the time lapse since the previous collection efforts, additional sediment sampling needed at the five locations. Other locations within Zone J were considered to represent areas of insignificant risk or areas with contamination that was not linked with CNC sources. BCT also decided that sediment samples would be collected and analyzed to generate background reference values in Cooper River and Charleston Harbor.
Zone J Sediment Sampling Report	Spectra Tech, 2006	Yes	Yes	Provided results of sediment samples collected from 15 locations in December 2005. Ten sample locations represented background (reference) locations. The other five locations were those previously identified as having elevated ERM quotients and CNC source linkages. MDLs exceeded ecological screening values for numerous analytes, preventing conclusions regarding sediment-related ecological risk. BCT determined that collection and analysis of additional sediment samples (with adequately low detection limits) would be conducted.

TABLE 1-1

SUMMARY OF PREVIOUS REPORTS AND NOTABLE BCT MEETINGS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Title	Source and Date of Report	Submitted to SCDHEC?	Finalized?	Summary and Pertinent Information(1)
Quality Assurance Project Plan for Supplemental RFI at Zone J	Tetra Tech, 2008	Yes	Yes	QAPP generated to address the collection and analyses of sediment samples from the five CNC locations with elevated ERM quotients and CNC source linkages; provided quantitation limits that would be needed to evaluate the data; provided details on the human health risk assessment methodology and ecological risk assessment methodology to be used in the Supplemental RFI for Zone J.

Notes:
(1) See Section 1.3.3 for details regarding the reports and BCT meetings.
(2) Report not available in Navy database; information taken from EnSafe (2003a)
Abbreviations:
AOC: Area of Concern
BCT: Base Realignment and Closure (BRAC) Cleanup Team
CNC: Charleston Naval Complex
COPC: Contaminant of Potential Concern
ERM: Effects Range Median
MDL: Method Detection Limit
QAPP: Quality Assurance Project Plan
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation
SCDHEC: South Carolina Department of Health and Environmental Control
SLERA: Screening Level Ecological Risk Assessment
SWMU: Solid Waste Management Unit

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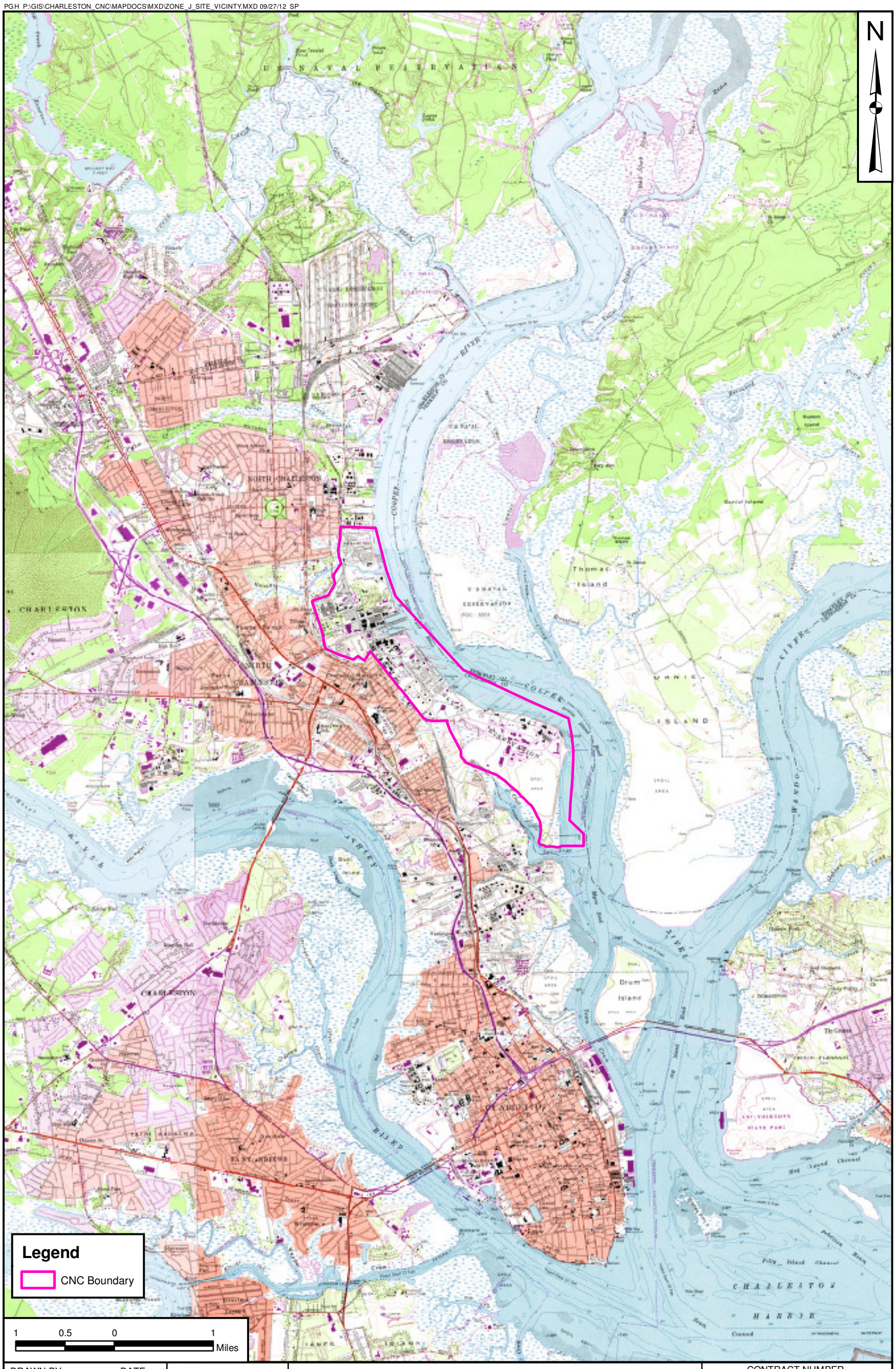

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REVISED BY	DATE
S.PAXTON	09/27/12
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CHARLESTON NAVAL COMPLEX VICINITY MAP
NORTH CHARLESTON, SOUTH CAROLINA

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FIGURE NO.	REV
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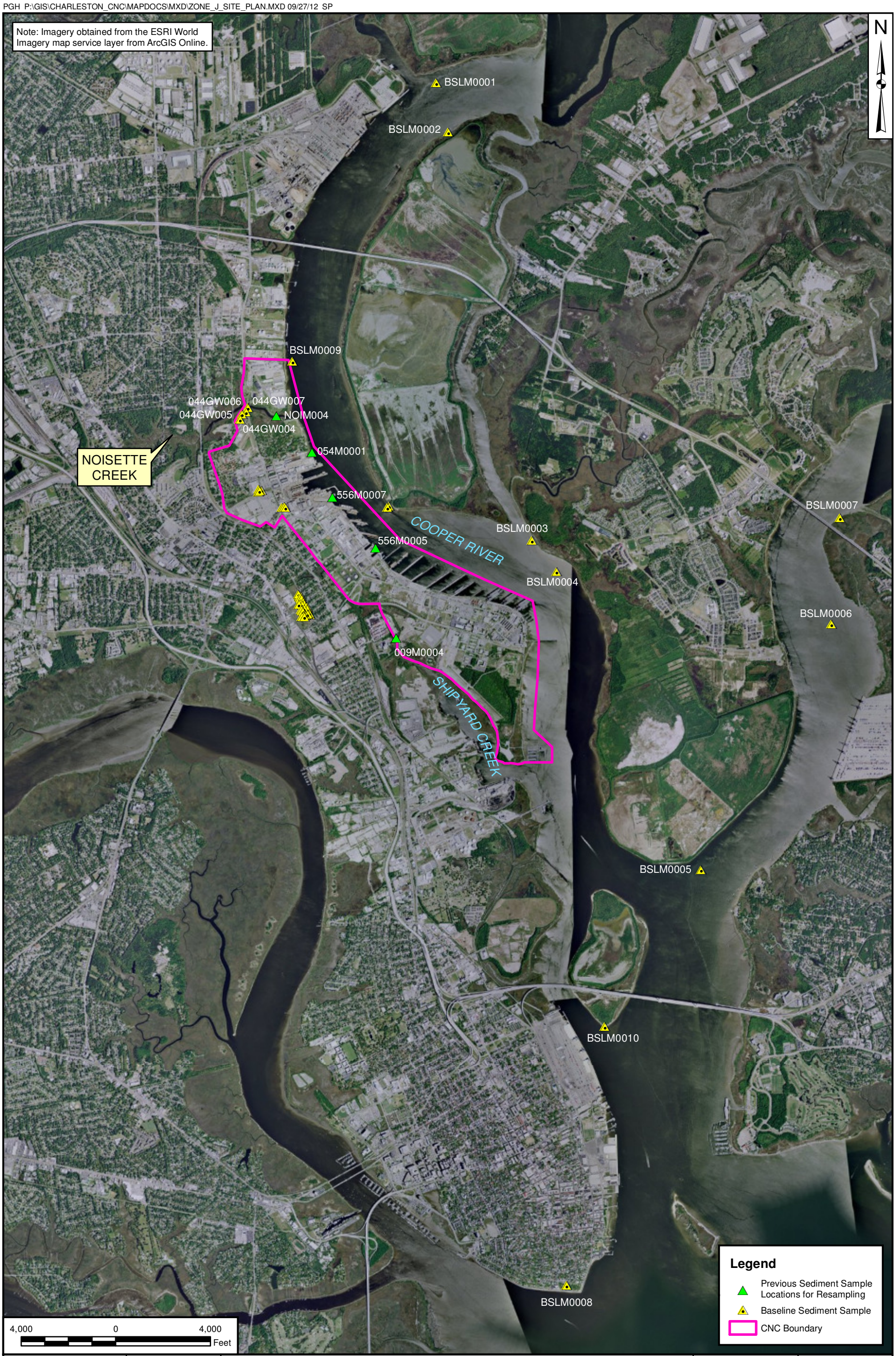

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ZONE J SITE PLAN
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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FIGURE NO. FIGURE 1-2	REV 0

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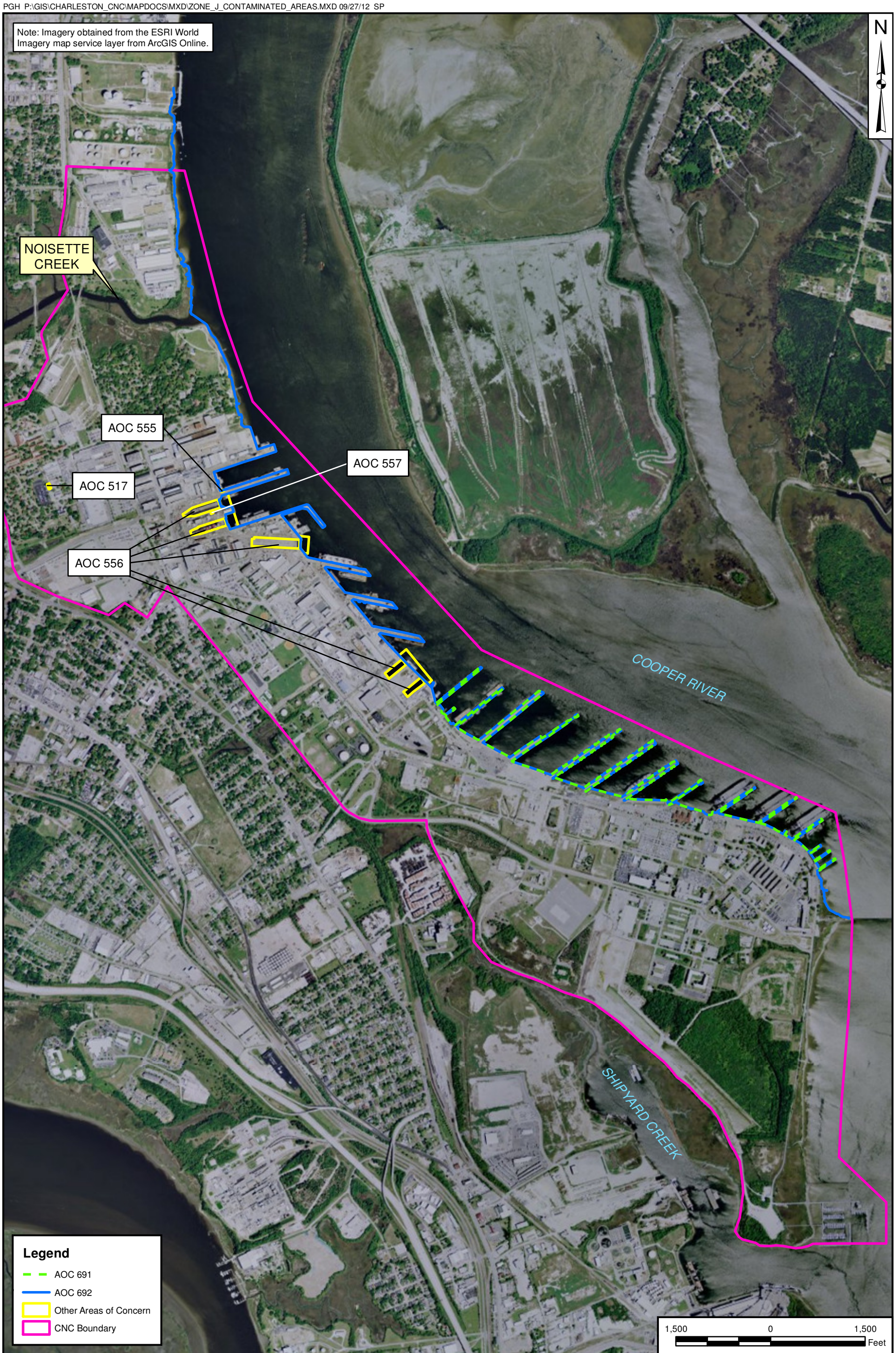

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S. PAXTON	09/27/12
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AREAS OF CONCERN (AOCs) ALONG ZONE J
WHERE FINAL DECISIONS HAVE NOT BEEN MADE
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	017
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FIGURE NO. FIGURE 1-3	REV 0

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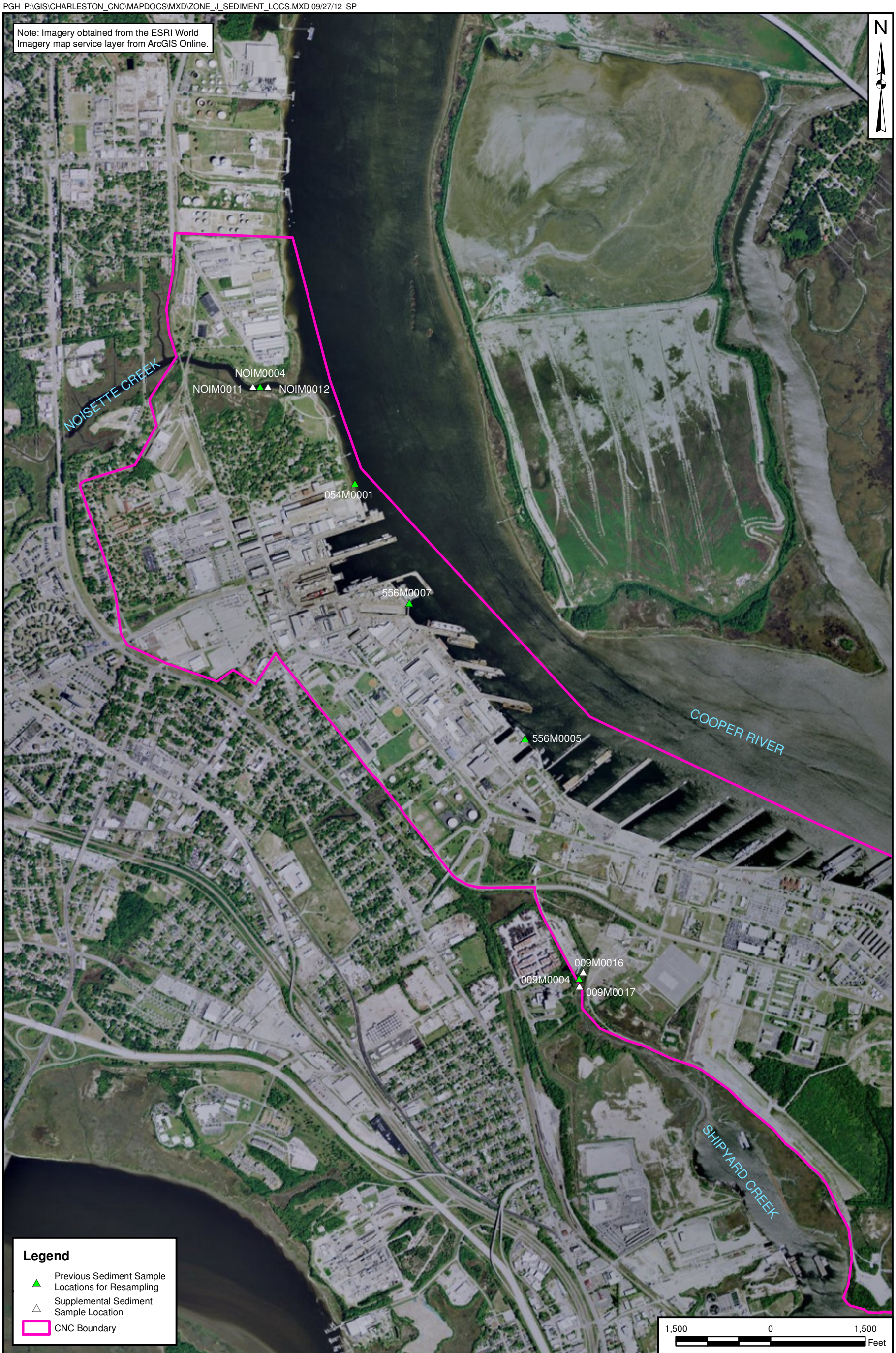

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ZONE J SEDIMENT SAMPLE LOCATION MAP
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

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FIGURE NO. FIGURE 1-4	REV 0

2.0 ENVIRONMENTAL SETTING

This section contains information relative to the environmental setting of Zone J. The following topics are discussed in this section:

- Climate
- Topography
- Surface Water Drainage
- Geology
- Hydrogeology
- Hydrodynamic Evaluation

2.1 CLIMATE

The Charleston area is characterized by warm, humid summers and mild winters. The area is subject to hurricanes between June 1 and November 30. The average temperature and precipitation data from a 30-year period, provided by the Southeast Regional Climate Center, are presented in Table 2-1.

A wind-rose indicating the prevailing wind direction for the CNC area is provided on Figure 2-1 and is based on data collected at Charleston International Airport for a 5-year period between January 1, 1986 and December 31, 1990.

2.2 TOPOGRAPHY

The CNC is a 1,575-acre area located in North Charleston along the west bank of the Cooper River. It is bordered to the east by the Cooper River, to the south by Shipyard Creek, to the west by Spruill Avenue, and to the north by Hess Oil. Storm water runoff from CNC drains into the Cooper River, Shipyard Creek, and Noisette Creek, carrying potential pollutants with it.

The general topography of the CNC area is relatively flat and low-lying. Most of the land surface slope is less than 2 percent. The land elevation in the area ranges from 2 to 11 meter (m)-MLW, and most of the CNC land surface lies below 3.7 m-MLW. Land use in the area is mainly heavy industrial, with predominantly impervious surfaces. Other land uses include marshlands, grassy fields, residential, light industrial and commercial use. The southern portion of CNC consists almost entirely of dredge spoil material, which is generally a mixture of sands, silts, and clays.

2.3 SURFACE WATER DRAINAGE

The storm water drainage system is divided into 98 sub-basins (EnSafe, 2003a). Some basins do not have any drainage facilities, and in those basins, storm water runoff drains directly to receiving waters in the form of sheet flow, or overland flow. Other basins have complex drainage systems that consist of catchment basins, inlets, storm sewer pipes and culverts, manholes, detention ponds, flow control structures, and outfall structures.

There are 86 known storm water outfalls at CNC. Two outfalls drain into Shipyard Creek, 15 outfalls drain into Noisette Creek, and the remaining outfalls drain into the Cooper River. Most outfall structures are reinforced concrete or corrugated metal pipes. Outfall structures range from 8 inches to 54 inches in diameter.

The most common outfall pipe sizes are 18 inches and 30 inches in diameter with the majority of invert elevations between mean high water and mean low water.

2.4 GEOLOGY

The Lower Coastal Plain of South Carolina consists of a series of sediments and partially lithified sedimentary rocks ranging in age from the Late Cretaceous Period to the Holocene Epoch. The Coastal Plain units strike northeast-southwest and dip seaward to the southeast (Figure 2-2) such that the sedimentary units are thickest near the coast and thin to the northwest. The Coastal Plain deposits thicken southward from 980 feet near the coast at the North Carolina-South Carolina border to more than 3,280 feet at the South Carolina-Georgia border (Colquhoun et al., 1983).

Figure 2-3 shows the major geological units that underlie CNC. Coastal terrace deposits form the uppermost geologic unit at CNC. These deposits average about 30 feet in thickness and consist primarily of sand and clay with local beds of seashells and limestone that were deposited during a series of marine transgressions and regressions in the Pleistocene and Pliocene epochs (Aucott et al., 1987). In the CNC area, the coastal terrace deposits are underlain by unconsolidated to weakly consolidated Holocene to Miocene clastic sediments, which are composed of calcareous and organic-rich clays, silts, and sands (Figure 2-3). These surficial deposits in the CNC area are commonly referred to as the Ladson Formation. The thickness of the Ladson Formation in the CNC area ranges from a maximum of approximately 82 feet to less than 17 feet in isolated areas.

Unconformably underlying the Ladson Formation is the phosphatized late Eocene to late Oligocene Cooper Formation, which is composed of the Ashley and Parkers Ferry Formation (Weems and Lemon, 1993). The Cooper Formation is approximately 200 feet thick near CNC, and it is a massive, olive-

colored, impure, fine-grained carbonate deposit of very low permeability. It consists of calcium carbonate, phosphate, fine-grained sand and clay that were deposited in a relatively deep-water marine environment. The Cooper deposits, which dip to the southeast at 8 to 24 feet per mile, pinch out about 20 miles north of Charleston and thicken south of the city.

Below the Cooper Formation is a thick sequence of sedimentary units that extends to the basement complex approximately 2,300 feet below mean sea level (msl). Mean sea level generally lies within the Ladson Formation at CNC. This sequence of sedimentary deposits below the Cooper Formation includes (in increasing age) the Santee Limestone (180 feet thick); the Black Mingo Group (200 feet thick); and the Peedee, Black Creek, Middendorf, and Cape Fear formations (1,700 feet thick total) (Colquhoun et al., 1983).

Crystalline bedrock lies below the sedimentary units near CNC Charleston and consists of diabase, basalt, quartz, and meta-sedimentary rocks. Seismic activity that occurs within pre-Cretaceous rocks beneath the Lower Coastal Plain indicates that active faults and fracture zones exist. The permeability of the crystalline bedrock is lower than that of the overlying Coastal Plain sediments (Aucott et al., 1987).

2.5 HYDROGEOLOGY

The following subsections discuss general groundwater information in the area of CNC.

The Lower Coastal Plain near CNC consists of an unconfined surficial aquifer (Ladson Formation), a confined Tertiary aquifer system (Santee Limestone and Black Mingo Group), and a confined Cretaceous aquifer system (Pedee, Black Creek, Middendorf, Cape Fear Formations) (Colquhoun et al., 1983).

2.5.1 Hydrogeology of the Surficial Aquifer

The surficial aquifer occurs within the Ladson Formation, which consists of fine- to coarse-grained sand and clay. It is an unconfined, laterally extensive aquifer that ranges from 17 to 82 feet thick near CNC. This water table aquifer is recharged by infiltration of precipitation and discharges principally as seepage into surface water bodies and secondarily via pumping. Downward migration into the underlying aquifers is inhibited by the low permeability sediments of the Cooper Formation.

Although locally isolated higher permeability zones are found within the Cooper Formation (near Edisto Island and Ravenal, not in the vicinity of CNC), it is considered to be a confining unit that allows virtually no vertical migration of groundwater from the surficial aquifer to the deeper aquifer. Only a few feet of the Ashley Formation of the Cooper Formation need to be present to effectively retard the vertical movement of groundwater (Park, 1985).

Groundwater depths in the surficial aquifer range from approximately 0 to 15 feet below ground surface (bgs) across CNC, and the water table surface tends to mimic the local topography. The shallow groundwater system discharges into the Cooper River directly or indirectly via discharge into its tributaries.

The predominant groundwater flow direction in the CNC area is east and southeast toward the Cooper River. Across CNC, the overall southeasterly flow direction continues; although, because the topography is relatively flat, minor surface irregularities and stream drainage patterns produce local variations in the shallow flow directions.

Below the surficial aquifer is the Ashley Formation of the Cooper Formation. As stated earlier, the Cooper Formation is considered to be a low permeability confining unit that separates the surficial aquifer from the underlying aquifers.

2.5.2 Hydrogeology and Water Quality of Deep Aquifer Systems

Underlying the Cooper Group is the Tertiary aquifer system, which is composed of the Santee Limestone and the Black Mingo Group (sand and sandstone, limestone, and clay). These units are an approximate 400 foot thick combined near CNC (Colquhoun, et al. 1983). Groundwater flows to the east in the Tertiary aquifer system, which is recharged by infiltration along updip outcrop areas to the west. Water yields from wells completed in the Santee Limestone range from 200 to 500 gallons per minute (gpm). The Black Mingo Group underlies the Santee Limestone and constitutes much of the Tertiary aquifer system. Water yields from wells completed in the sands of the Black Mingo Group range from 58 to 660 gpm, and transmissivities range from 500 to 3,700 square feet per day for these wells. Under natural conditions, groundwater elevations are artesian (often above the ground surface), but widely vary due to pumping primarily and tidal fluctuations secondarily. Variations in groundwater elevations resulting from other factors such as rainfall are obscured.

Along the Atlantic coastline in South Carolina, the water quality of the Tertiary aquifer system has been affected by saltwater intrusion. As a result, high concentrations of chloride and sodium are present. Calcium and bicarbonate ions are dominant, and the groundwater is extremely hard (Park, 1985).

The Cretaceous aquifer system is a confined system that is approximately 2,000 feet thick near CNC and consists of sand and clay of the Peedee, Black Creek, Middendorf, and Cape Fear Formations. The Cretaceous aquifer system yields water under artesian conditions because outcrop/recharge areas are far to the west in areas of higher elevations. Typical potentiometric surface elevations range from approximately 20 to 120 feet above msl. The predominant horizontal groundwater flow direction is toward

the east. Well yields range from 125 to 2,000 gpm (Park, 1985). Generally, the Black Creek is the most productive formation, and the Peedee is the least productive.

In the Lower Coastal Plain, the groundwater in the Black Creek and Middendorf Formations has a high pH (8.0 to 9.2), high dissolved solids [greater than 500 to 2,700 milligrams per liter (mg/L)], fluoride (greater than 4.0 mg/L), chloride (greater than 250 mg/L), and sodium (several hundred mg/L) concentrations, and is classified geochemically as a sodium bicarbonate water. The groundwater geochemistry in these units within the Lower Coastal Plain is the result of dissolution of carbonate material and calcium for sodium ion exchange (Park, 1985).

2.6 HYDRODYNAMIC EVALUATION

Hydrodynamic evaluation of the Cooper River was performed by EnSafe (2003a) to determine transport of CNC and non-CNC contaminants into Noisette and Shipyard Creeks and the Cooper River. The evaluation determined that pollutants released into these water bodies are transported both up and down stream with the flood and ebb tides, although there is a net downstream component towards the ocean. The hydrodynamic evaluation is presented in Appendix B and in Appendix E.

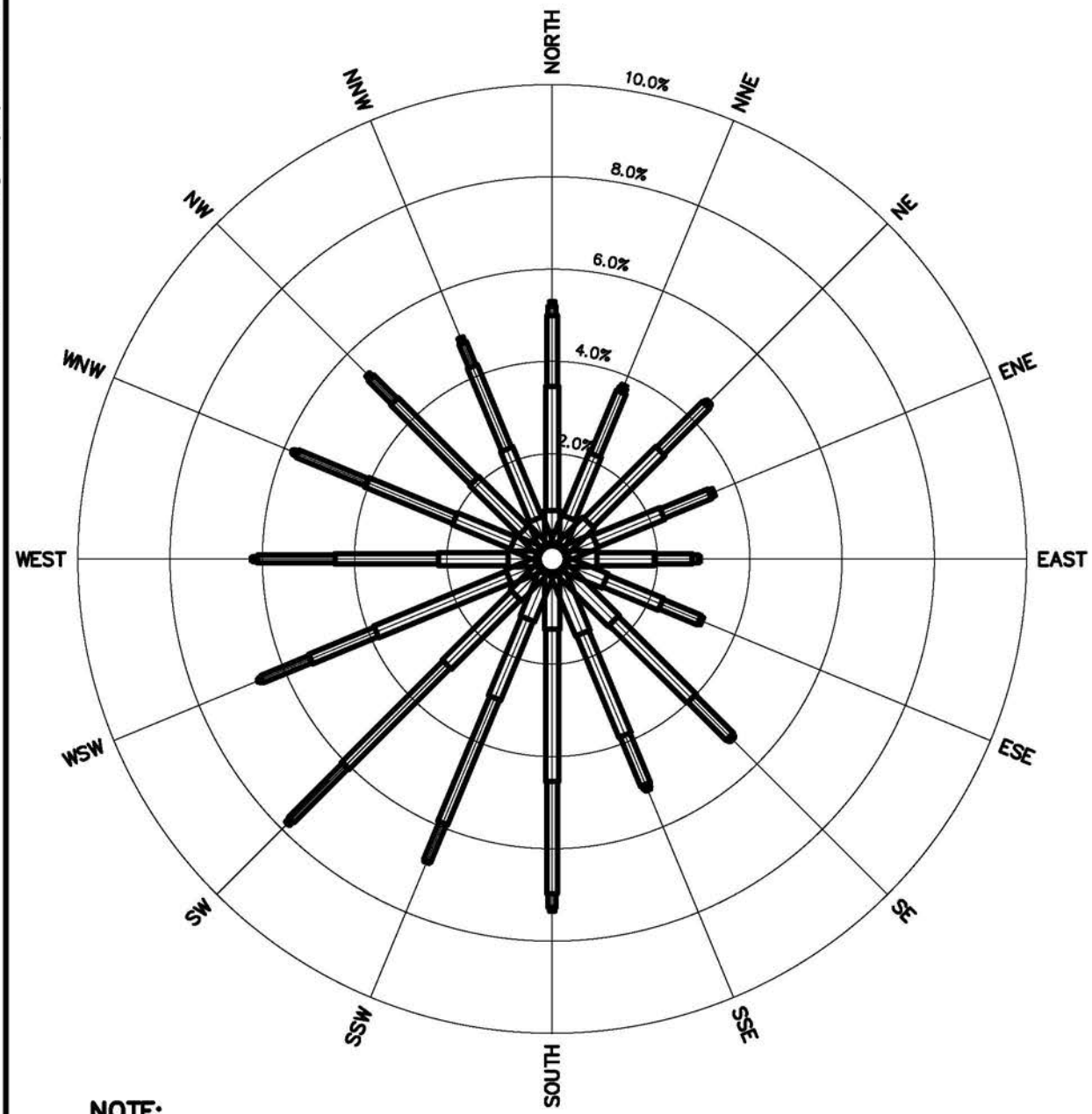
TABLE 2-1

CLIMATIC CONDITIONS FOR CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Climatic Variable	Average Conditions, January through December											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
TEMPERATURE (°F)												
Average Maximum Temperature	58.9	62.3	69.3	76.1	82.9	87.9	90.9	89.4	85.0	77.0	69.6	61.6
Average Minimum Temperature	38.4	40.5	47.2	53.1	62.2	69.4	73.4	72.4	67.9	56.3	47.7	40.7
PRECIPITATION (in.)												
Average Total	4.07	3.08	4.00	2.77	3.67	5.92	6.13	6.91	6.33	3.09	2.66	3.24

Source: Southeast Regional Climate Center, sercc@dnr.state.sc.us
Period of Record: 1971-2000.

ACAD: 0528KM01.dwg 9/28/12 CK PIT



NOTE:
FREQUENCIES INDICATE DIRECTION FROM WHICH THE WIND IS BLOWING.

WIND SPEED (KNOTS)

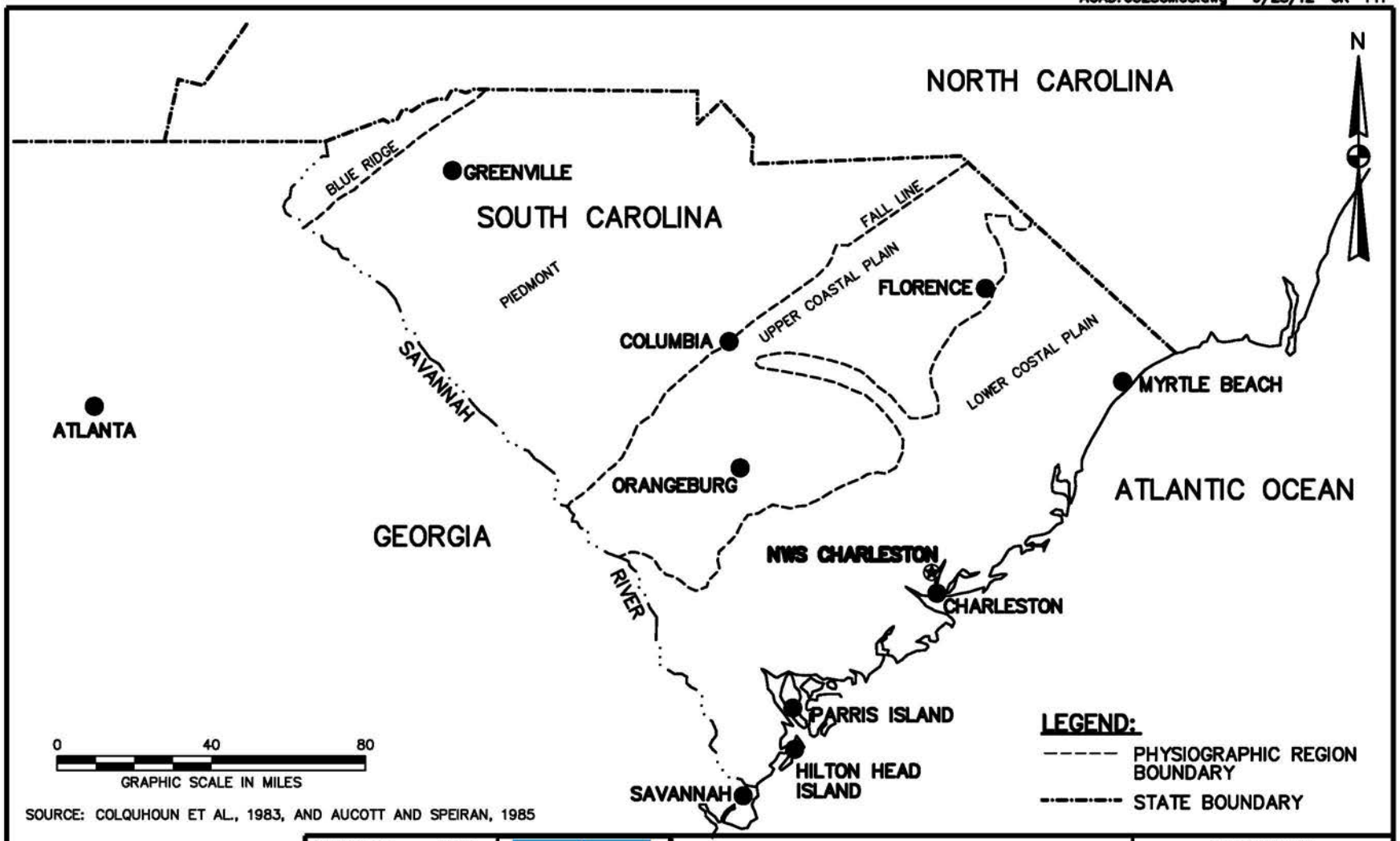
CALM | 1–3 | 4–6 | 7–10 | 11–16 | 17–21 | >21

CALM WINDS 14.61%

DRAWN BY CK DATE 10/16/09	NAVFAC	PREVAILING WIND DIRECTION CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY DATE			OWNER NO. 0000
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2–1 / REV. 0

FORM CADD NO. SDIV-AV.DWG - REV 1 - 9/10/98

ACAD: 0528GM08.dwg 9/28/12 CK PIT

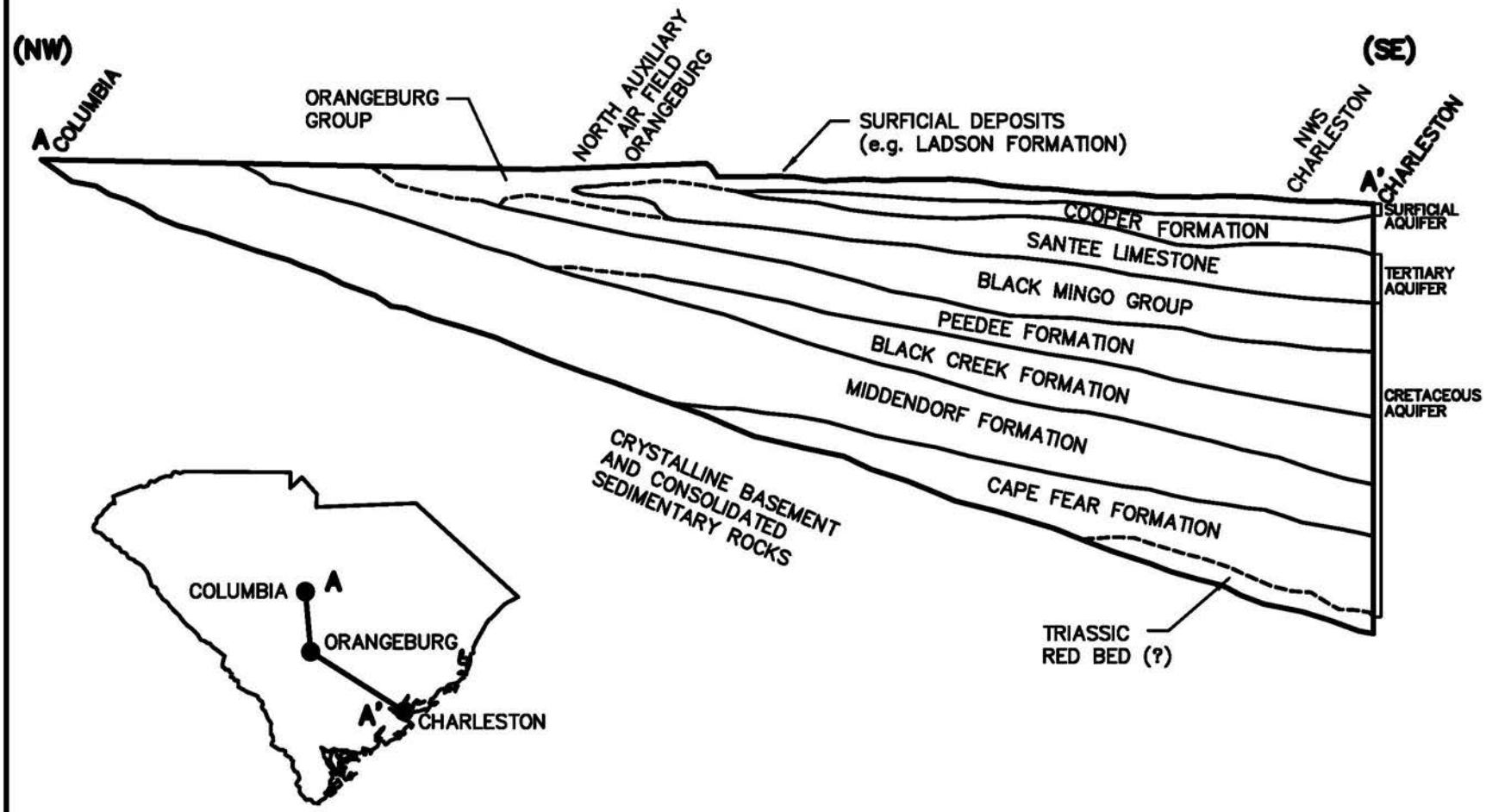


SOURCE: COLQUHOUN ET AL., 1983, AND AUCOTT AND SPEIRAN, 1985

DRAWN BY CK DATE 10/16/09	NAVFAC	PHYSIOGRAPHIC PROVINCES OF SOUTH CAROLINA CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 0528
CHECKED BY DATE			OWNER NO. 0000
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 REV. 0

FORM CADD NO. SDIV-AH.DWG - REV 1 - 9/10/98

ACAD: 0377GX01.dwg 9/28/12 CK PIT



SOURCE: AUCOTT AND SPEIRAN, 1985

DRAWN BY MF	DATE 7/31/07	GENERALIZED GEOLOGICAL CROSS-SECTION FROM COLUMBIA TO CHARLESTON, SOUTH CAROLINA JOINT BASE CHARLESTON – WEAPONS NORTH CHARLESTON, SOUTH CAROLINA	CONTRACT NO. 2031
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-3 / REV. 0

NAVFAC

FORM CADD NO. SDIV-AH.DWG - REV 1 - 9/10/98

3.0 INVESTIGATION SUMMARY

This section summarizes the sediment sampling activities conducted in April 2008.

3.1 DEVIATIONS FROM THE WORK PLAN

Two deviations from the work plan (TtNUS, 2008) occurred during the field effort and are described below.

The sample identification for two of the three sediment samples collected in Shipyard Creek did not follow the work plan. Specifically, sample 009M001603 was supposed to be collected 50 feet upstream of sample location 009M0004, but it was mistakenly collected 50 feet downstream of sample location 009M0004. Conversely, sample 009M001703 was supposed to be collected 50 feet downstream of sample location 009M0004, but it was mistakenly collected 50 feet upstream of location 009M0004. In other words, samples 009M001603 and 009M001703 were reversed relative to sample location 009M0004. The reversal of sample location identifications did not have any impact on the Zone J investigation. Figure 1-4 of this report indicates the actual sample locations.

The work plan stated that sediment samples would to be shipped to the laboratory overnight for next day delivery. The sediment samples were collected on April 30, 2008, and delivered later that day to the nearest Federal Express office, where their shipping labels were clearly marked for next-day (May 1) morning delivery. However, the sediment samples arrived at the analytical laboratory on the morning of May 2, 24 hours later than requested. Nevertheless, personnel at the analytical laboratory confirmed that there was ice in the coolers upon arrival and sample temperatures were acceptable (4 degrees Celsius). Thus, this deviation (one-day late arrival at the lab) did not impact the resulting analytical data.

3.2 SEDIMENT SAMPLING

Nine sediment samples (plus one field duplicate) were collected April 30, 2008, for the current sediment evaluation. Sample locations are shown in Figure 1-4. Five of the nine sampling locations (009M0004, 054M0001, 556M0005, 556M0007, and NOIM0004) were sampled in December 2005 and were re-sampled on April 30, 2008. The additional four sampling locations (009M0016, 009M0017, NOIM0011, and NOIM0012) were included to provide additional data for the ecological and human health risk assessments. A global positioning system (GPS) unit was used to document sample locations. The samples were collected in accordance with TtNUS Standard Operating Procedures (SOPs) and the Zone J Quality Assurance Project Plan (TtNUS, 2008), with the exceptions described in Section 3.1.

Sediment samples NOIM000403, NOIM001103, NOIM001203, and a field duplicate of NOIM001203 were collected in Noisette Creek; the three sample locations were centered on location NOIM0004, which is approximately 650 feet from the mouth of the creek (Figure 1-4). The three sediment samples collected in Shipyard Creek (009M000403, 009M001603, and 009M001703) were centered on location 009M0004, approximately 1.6 miles from the mouth of the creek (Figure 1-4). The three Cooper River sediment samples (054M000103, 556M000503, and 556M000703) were collected from the same locations as in December 2005 (Figure 1-4).

The April 2008 sediment samples were collected with a petite ponar dredge, and thus represent a depth of 0 to about 6 inches below the sediment surface. Sediment samples in Noisette Creek and the Cooper River were accessed by boat. The Shipyard Creek samples were accessed by wading, taking care to approach the sample locations from downstream to minimize disturbance. The petite ponar was decontaminated between samples in accordance with the work plan, and sample aliquots were emptied from the ponar into decontaminated stainless steel bowls and then transferred, using decontaminated stainless steel spoons, to laboratory-supplied sample containers immediately following collection. Sample containers were labeled, placed in coolers, chilled with ice, and shipped via Federal Express to Katahdin Analytical Services, Inc., Scarborough, Maine, for laboratory analyses. Quality control samples (e.g., field duplicates, equipment rinsate blanks) were prepared and also shipped to the laboratory. Sampling activities were documented in a site-specific field logbook and samples were transmitted under chain-of-custody protocol to the laboratory. Photographs of the sediment sampling and copies of sediment sample log sheets are provided in Appendices M and N.

As per the work plan (TtNUS, 2008), the sediment samples were subjected to the following laboratory analyses:

- Target Compound List SVOCs via SW-846 8270C, with PAH and bis(2-ethylhexyl)phthalate analysis performed in selective ion monitoring mode.

- Target Compound List pesticides and PCBs via SW-846 8081A and 8082, respectively (these methods were modified to achieve lower detection limits).

- Target Analyte List metals via SW-846 6010B trace ICP with mercury via SW-846 7471A.

- Total organic carbon via Lloyd Kahn method.

4.0 NATURE AND EXTENT OF CONTAMINATION

Zone J lies within Charleston Harbor and the Charleston Harbor estuary, and consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek. Charleston Harbor is the second largest container port on the East and Gulf Coasts and the fourth largest in the nation (EnSafe, 2003a). The Charleston Harbor Estuary is a complex tidal system that is comprised of the Cooper River, Ashley River, Wando River, and numerous small tributaries. It encompasses more than 100 square miles of coastal marshlands and open water habitat. Factors such as tides, freshwater inflow, and bathymetry affect hydrodynamics in the Charleston Harbor Estuary. The dynamic nature of these factors affects the fate and transport of CNC-related chemicals in Noisette Creek, Shipyard Creek, and the Cooper River. An evaluation of the hydrodynamics of the Charleston Harbor Estuary was presented in the *Zone J RFI Storm Water Effluent Evaluation Report* (EnSafe, 2003a) and the *Zone J RFI Storm Water Effluent Evaluation Report Addendum* (EnSafe, 2003b). The evaluation showed that during a single tidal cycle, a particle (such as a contaminant) released at CNC at the start of an incoming tide can travel about 4.5 miles upstream. Similarly, in one tidal cycle, a particle released at the start of an outgoing tide can travel downstream to the entrance of Charleston Harbor. A particle released at CNC can be transported into the Wando and Ashley Rivers by the tides, with the limits of upstream transport being about five miles. Thus, contaminants released from CNC can be flushed out of the harbor during one tidal cycle, and contaminants released from CNC can be transported into the Wando and Ashley Rivers. Conversely, the Zone J water bodies can be receptors of contaminants from numerous remote locations in the Ashley and Wando Rivers and other locations within Charleston Harbor.

Because estuarine systems are so dynamic, with constant tide-driven changes in water levels, currents, and water quality, contaminant monitoring in marine and estuarine systems is typically focused on sediments rather than surface water. Most contaminants that are released into surface water eventually bind with particulate material, then settle and become concentrated in sediment. Higher concentrations of chemicals in sediment (relative to surface water) aid in the detection and quantification of target analytes. In addition, sediments integrate contaminants over time, and thus, often indicate a history of contamination to a greater degree than surface water, especially in an estuarine water body such as Charleston Harbor.

Water quality parameters such as temperature, dissolved oxygen, salinity, pH, and total suspended solids change constantly with the tide, season, and flow rates. One result of these irregular variables (and especially the changing tides and currents) in Charleston Harbor is that surface water chemical data can be quite variable at a given location over time. This has been the case at Zone J, and although numerous surface water samples have been collected and analyzed over the long history of the Zone J investigation, no clear trends in surface water contamination have been identified. Overall, evaluations of

surface water samples collected during previous investigations at Zone J have indicated that surface water chemical concentrations at Zone J are similar to surface water concentrations throughout the harbor, or that ecological risks posed by CNC-related chemicals in surface water are negligible. Because of this, and since sediments integrate contaminants over time and often indicate a history of contamination to a greater extent than surface water, the BCT, which includes representatives of SCDHEC and other Natural Resource Trustees, decided that 2008 sampling activities would focus on sediment. Thus, the remainder of this section discusses chemicals detected in sediment collected during the latest round of sampling (April 2008), and compares the 2008 data to historical sediment data collected from the same locations.

As explained in Section 1.3.3, a series of investigations at Zone J resulted in a conclusion by the BCT that the potential for significant risk existed at five sample locations with elevated ERM quotients and CNC source linkages. The five locations consist of three locations in the Cooper River (054M0001, 556M0005, and 556M007), one location in Shipyard Creek (009M0004), and one location in Noisette Creek (NOIM0004). Sediment data from these five locations are available from samples collected in 1994-1997 and 2005. Each of these locations was re-sampled in April 2008. As explained in Section 3.2, sediment samples were also collected in April 2008 from four additional locations (009M0016 and 009M0017 in Shipyard Creek; NOIM0011 and NOIM0012 in Noisette Creek). Thus, a total of nine sediment samples were collected in April 2008 (three from Noisette Creek, three from Shipyard Creek, and three from the Cooper River). The samples were analyzed for SVOCs, pesticides, PCBs, metals, and total organic carbon. As explained in the last paragraph of Section 1.3.3, the selection of these compounds for further evaluation in sediment was based on the results of numerous previous investigations. The analytical results for all sediment samples collected in April 2008 are provided in Table 4-1. Data validation reports for the April 2008 sampling event are provided in Appendix O.

4.1 NOISETTE CREEK SEDIMENT SAMPLES

Three sediment samples were collected in April 2008 from Noisette Creek. Positive detections for each sediment sample collected in April 2008 are provided in Table 4-2. Table 4-3 provides a comparison of results for sediment sample location NOIM0004 during the June 1997, December 2005, and April 2008 sampling events. Exceedances of Region 4 Ecological Screening Values (ESVs) and facility background concentrations are shown in Figure 4-1.

SVOCs detected in 2008 sediment samples included numerous PAHs. Of these, benzo[a]anthracene, benzo(a)pyrene, bis(2-ethylhexyl)phthalate (BEHP), chrysene, fluoranthene, phenanthrene and pyrene exceeded USEPA Region 4 ESVs and/or two times the average background concentrations in sediment samples. Benzo(a)anthracene was detected at concentrations exceeding both screening criteria at sample locations NOIM0004 [720 microgram per kilogram (µg/kg)] and NOIM0012 (810 µg/kg).

Benzo(a)pyrene was detected at sample locations NOIM004 (510 µg/kg) and NOIM0012 (540 µg/kg) at concentrations exceeding the Region 4 Ecological Screening Value. BEHP was detected at one location (NOIM0011) at a concentration of 240 µg/kg, which exceeds the USEPA Region 4 ESV of 182 µg/kg. Chrysene was detected in all sediment samples at elevated concentrations ranging from 390 (NOIM0011) to 670 µg/kg (NOIM0012). Flouranthene and pyrene were detected at concentrations exceeding screening criteria in the three samples collected from Noisette Creek. Flouranthene and pyrene concentrations ranged from 720 µg/kg to 1,500 µg/kg and 770 µg/kg to 1,200 µg/kg, respectively. Flouranthene and pyrene concentrations have increased at sample location NOIM0004 since the December 2005 sampling event. Phenanthrene was detected at a concentration of 370 µg/kg at location NOIM0012.

Copper was the only metal detected at concentrations exceeding background concentrations and USEPA Region 4 ESVs in sediment samples collected from Noisette Creek in 2008. Mercury (1.1 milligrams per kilogram [mg/kg]) and zinc (158 mg/kg) concentrations exceeded screening criteria and background concentrations in the duplicate sample obtained from sample location NOIM0012, but not in the original NOIM0012 sample. Sample locations NOIM0004 and NOIM0012 contained copper concentrations of 19.9 mg/kg and 42.8 mg/kg. Copper concentrations increased slightly from 15 mg/kg in December 2005 to 19.9 mg/kg in April 2008. Metal concentrations in sample NOIM001103 did not exceed screening criteria. Arsenic was detected at a concentration of 9.2 mg/kg at location NOIM0012, exceeding the USEPA Region 4 ESV (7.24 mg/kg) but less than two times the average background concentration (12.0 mg/kg).

The pesticide dichlorodiphenyldichloroethane (4,4'-DDD) was detected in samples from NOIM0004 and NOIM0012 in 2008 at concentrations of 4.8 and 3.8 µg/kg, exceeding the USEPA Region 4 ESV of 3.3 µg/kg. Dichlorodiphenyldichloroethylene (4,4'-DDE) was detected at location NOIM001 at a concentration of 3.6 µg/kg, exceeding the 3.3 µg/kg screening value. No other pesticides/PCBs were detected in samples collected in 2008 from Noisette Creek.

4.2 SHIPYARD CREEK SEDIMENT SAMPLES

Three sediment samples were collected in April 2008 from Shipyard Creek. Positive detections for each sediment sample collected in April 2008 are shown in Table 4-4. Table 4-5 provides a comparison of results from sediment sample location 009M0004 during the September 1994, December 2005, and April 2008 sampling events. Exceedances of USEPA Region 4 ESVs and facility background concentrations are shown in Figure 4-2.

SVOCs detected in sediment included numerous PAHs. Concentrations of six PAHs exceeded two times the average background concentrations and/or USEPA Region 4 ESVs. Benzo(a)anthracene and

benzo(a)pyrene were detected at concentrations exceeding USEPA Region 4 ESVs in samples from 009M0004 and 009M0017. The maximum concentrations of chrysene (560 µg/kg) and flouranthene (860 µg/kg) were reported for sample location 009M0017. The maximum BEHP (750 µg/kg) and pyrene (1200 µg/kg) concentrations were detected in sediment samples 009M001603 and 009M000403, respectively. Benzo(a)anthracene, benzo(a) pyrene, BEHP, chrysene, flouranthene, and pyrene concentrations were higher at sample location 009M0004 in 2008 than in 2005.

Several inorganics were detected at concentrations exceeding screening values and background concentrations. The inorganics detected at Shipyard Creek are as follows:

- Arsenic was detected in 009M0016 and 009M0017 at concentrations of 11.9 mg/kg and 19.8 mg/kg.

- Chromium, copper, lead, mercury, and zinc were detected in all of the samples collected from Shipyard Creek at concentrations exceeding screening values.
  - Chromium concentrations ranged from 89.5 mg/kg to 336 mg/kg.
  - Copper concentrations ranged from 56.4 mg/kg to 133 mg/kg.
  - Lead concentrations ranged from 55.7 mg/kg to 177 mg/kg.
  - Mercury concentrations ranged from 0.22 mg/kg to 0.45 mg/kg.
  - Zinc concentrations ranged from 150 mg/kg to 494 mg/kg.

- The maximum concentrations of these metals were detected at sample location 009M001703.

Arsenic, chromium, lead, and zinc concentrations at sample location 009M0004 were lower in 2008 than in 2005.

The pesticide 4,4'-DDE was detected at concentrations ranging from 6.6 to 25 µg/kg, which exceeds the Region 4 ESV, in all three sediment samples collected from Shipyard Creek. Dieldrin was detected in one sample (009M000403) in 2008; its concentration in that sample (9.1 µg/kg) exceeded the 3.3 µg/kg screening criteria.

4.3 COOPER RIVER SEDIMENT SAMPLES

Three sediment samples were collected from the Cooper River in April 2008. Positive detections for each sediment sample collected in April 2008 are provided in Table 4-6. Tables 4-7, 4-8, and 4-9 provide comparisons of results for sediment samples 054M0001, 556M0005, and 556M0007 during the November 1995, December 2005, and April 2008 sampling events. Exceedances of USEPA Region 4 ESVs and facility background concentrations are shown in Figure 4-3.

SVOCs detected in sediment included numerous PAHs. Concentrations of nine PAHs exceeded background concentrations and Region 4 Ecological Screening Values in samples 0556M000503 and 556M000703. PAHs were not detected at concentrations exceeding screening criteria at 054M0001, the northernmost sample location. Acenaphthene, anthracene, benzo(a)pyrene, fluorine, and phenanthrene were detected in only one sample (556M000503) at concentrations exceeding screening criteria. Sample location 556M0005 contained the highest concentration of each PAH detected. The concentrations of these compounds were higher in 2008 than in the December 2005 sampling event. The maximum concentration of each PAH detected during the April 2008 sampling event is listed below:

Acenaphthene:	1,400 µg/kg
Anthracene:	2,400 µg/kg
Benzo(a)anthracene:	5,800 µg/kg
Benzo(a)pyrene:	2,500 µg/kg
Chrysene:	5,100 µg/kg
Fluoranthene:	41,000 µg/kg
Fluorene:	2,200 µg/kg
Phenanthrene:	18,000 µg/kg
Pyrene:	26,000 µg/kg

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, flouranthene, flourene, phenanthrene, and pyrene concentrations from sample location 054M0001 in 2008 were less than USEPA Region 4 ESVs and less than in the 2005 sampling event. Concentrations for these compounds have also decreased since the 2005 sampling event at sample location 556M0007, with the exception of benzo(a)pyrene and pyrene.

Five metals were detected in 2008 at concentrations exceeding screening values and background concentrations: arsenic, chromium, copper, lead, nickel, and zinc.

- Arsenic and chromium were detected in samples 556M000503 and 556M00703 at concentrations exceeding screening criteria. Arsenic concentrations were 20.5 mg/kg (556M000503) and 17.6 mg/kg (556M000503). Chromium concentrations were 68.4 mg/kg (556M000503) and 57.9 mg/kg (556M000703).

- Copper and nickel were detected in all of the samples collected from the Cooper River at concentrations exceeding screening values. Copper concentrations ranged from 43.5 mg/kg to 386 mg/kg and nickel concentrations ranged from 20 mg/kg to 32.6 mg/kg. The maximum concentrations of copper and nickel were detected at the northernmost sample location (54M0001).

- Lead concentrations at sample locations 54M0001 (147 mg/kg) and 556M0005 (40.5 mg/kg) exceeded screening criteria.

- Zinc was detected at concentrations exceeding screening criteria in samples 54M000103 (826 mg/kg) and 556M000703 (144 mg/kg).

Copper, lead, nickel, and zinc concentrations were higher at sample location 054M0001 in 2008 than in 2005. The arsenic concentration at sample location 054M0001 was below the USEPA Region 4 ESV and was less than in 2005. Arsenic, lead, and zinc concentrations have increased slightly since December 2005 in sample location 556M0005. Arsenic, chromium, copper, nickel, and zinc concentrations were slightly less in 2008 than in the 2005 sampling event in the sample collected from location 556M0007, but still exceed USEPA Region 4 ESVs.

The pesticide 4,4'-DDD was detected in sample 556M0005; its concentration (4.8 µg/kg) exceeded USEPA Region 4 ESV. No other pesticides were detected in samples obtained from the Cooper River.

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	SHIPYARD CREEK								
		009M000403			009M001603			009M001703		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Semivolatile Organics (ug/kg)										
1,1-BIPHENYL	NA	740 U	330	740	1100 U	510	1100	1200 U	550	1200
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	740 U	260	740	1100 U	410	1100	1200 U	440	1200
2,4,5-TRICHLOROPHENOL	NA	1800 U	670	1800	2800 U	1000	2800	3000 U	1100	3000
2,4,6-TRICHLOROPHENOL	NA	740 U	520	740	1100 U	810	1100	1200 U	880	1200
2,4-DICHLOROPHENOL	NA	740 U	640	740	1100 U	990	1100	1200 U	1100	1200
2,4-DIMETHYLPHENOL	NA	740 U	550	740	1100 U	860	1100	1200 U	920	1200
2,4-DINITROPHENOL	NA	1800 U	1400	1800	2800 U	2200	2800	3000 U	2400	3000
2,4-DINITROTOLUENE	NA	740 U	550	740	1100 U	860	1100	1200 U	920	1200
2,6-DINITROTOLUENE	NA	740 U	470	740	1100 U	730	1100	1200 U	790	1200
2-CHLORONAPHTHALENE	NA	740 U	410	740	1100 U	640	1100	1200 U	690	1200
2-CHLOROPHENOL	NA	740 U	560	740	1100 U	870	1100	1200 U	940	1200
2-METHYLPHENOL	NA	740 U	570	740	1100 U	890	1100	1200 U	950	1200
2-NITROANILINE	NA	1800 U	500	1800	2800 U	770	2800	3000 U	830	3000
2-NITROPHENOL	NA	740 U	500	740	1100 U	780	1100	1200 U	840	1200
3&4-METHYLPHENOL	NA	740 U	630	740	1100 U	980	1100	1200 U	1000	1200
3,3'-DICHLOROBENZIDINE	NA	740 U	490	740	1100 U	760	1100	1200 U	820	1200
3-NITROANILINE	NA	1800 U	550	1800	2800 U	850	2800	3000 U	910	3000
4,6-DINITRO-2-METHYLPHENOL	NA	1800 U	1300	1800	2800 U	2000	2800	3000 U	2200	3000
4-BROMOPHENYL PHENYL ETHER	NA	740 U	330	740	1100 U	510	1100	1200 U	550	1200
4-CHLORO-3-METHYLPHENOL	NA	740 U	600	740	1100 U	930	1100	1200 U	1000	1200
4-CHLOROANILINE	NA	740 U	210	740	1100 U	330	1100	1200 U	350	1200
4-CHLOROPHENYL PHENYL ETHER	NA	740 U	300	740	1100 U	470	1100	1200 U	510	1200
4-NITROANILINE	NA	1800 U	560	1800	2800 U	880	2800	3000 U	940	3000
4-NITROPHENOL	NA	1800 U	1400	1800	2800 U	2200	2800	3000 U	2400	3000
ACETOPHENONE	NA	740 U	600	740	1100 U	940	1100	1200 U	1000	1200
ATRAZINE	NA	740 U	410	740	1100 U	630	1100	1200 U	680	1200
BENZALDEHYDE	NA	740 U	390	740	1100 U	610	1100	1200 U	650	1200
BIS(2-CHLOROETHOXY)METHANE	NA	740 U	270	740	1100 U	420	1100	1200 U	450	1200
BIS(2-CHLOROETHYL)ETHER	NA	740 U	380	740	1100 U	590	1100	1200 U	630	1200
BUTYL BENZYL PHTHALATE	NA	740 U	360	740	1100 U	560	1100	1200 U	600	1200
CAPROLACTAM	NA	740 U	460	740	1100 U	720	1100	1200 U	770	1200
CARBAZOLE	NA	740 U	460	740	1100 U	720	1100	1200 U	780	1200
DI-N-BUTYL PHTHALATE	NA	740 U	420	740	1100 U	650	1100	1200 U	700	1200
DI-N-OCTYL PHTHALATE	NA	740 U	550	740	1100 U	850	1100	1200 U	910	1200
DIBENZOFURAN	NA	740 U	380	740	1100 U	590	1100	1200 U	640	1200
DIETHYL PHTHALATE	NA	740 U	320	740	1100 U	500	1100	1200 U	530	1200
DIMETHYL PHTHALATE	NA	740 U	310	740	1100 U	490	1100	1200 U	520	1200
HEXACHLOROBENZENE	NA	740 U	300	740	1100 U	470	1100	1200 U	500	1200
HEXACHLOROBUTADIENE	NA	740 U	280	740	1100 U	440	1100	1200 U	470	1200
HEXACHLOROCYCLOPENTADIENE	NA	740 U	360	740	1100 U	560	1100	1200 UR	610	1200
HEXACHLOROETHANE	NA	740 U	310	740	1100 U	480	1100	1200 U	520	1200
ISOPHORONE	NA	180 U	16	740	1100 U	480	1100	1200 U	520	1200
N-NITROSO-DI-N-PROPYLAMINE	NA	740 U	310	740	1100 U	480	1100	1200 U	510	1200
N-NITROSODIPHENYLAMINE	NA	740 U	570	740	1100 U	880	1100	1200 U	950	1200
NITROBENZENE	NA	740 U	290	740	1100 U	450	1100	1200 U	480	1200
PENTACHLOROPHENOL	NA	1800 U	950	1800	2800 U	1500	2800	3000 U	1600	3000
PHENOL	NA	740 U	600	740	1100 U	930	1100	1200 U	1000	1200
Polynuclear Aromatic Compounds (ug/kg)										
2-METHYLNAPHTHALENE	330	28 J	25	180	18 J	9.6	69	30 J	20	150
ACENAPHTHENE	330	44 J	13	180	9.6 J	5	69	13 J	11	150
ACENAPHTHYLENE	330	20 J	12	180	24 J	4.6	69	56 J	9.9	150
ANTHRACENE	330	110 J	23	180	48 J	8.8	69	80 J	19	150
BENZO(A)ANTHRACENE	330	490 J	22	180	260 J	8.7	69	580 J	19	150
BENZO(A)PYRENE	330	420	18	180	170	7.2	69	560	15	150
BENZO(B)FLUORANTHENE	NA	950	20	180	460	7.6	69	1500	16	150
BENZO(G,H,I)PERYLENE	NA	200 J	30	180	99	11	69	330 J	25	150
BENZO(K)FLUORANTHENE	NA	200 J	17	180	100 J	6.5	69	400 J	14	150
BIS(2-ETHYLHEXYL)PHTHALATE	182	540 J	21	890	750	8	350	630 J	17	740
CHRYSENE	330	360	24	180	190	9.1	69	560	20	150
DIBENZO(A,H)ANTHRACENE	330	180 UJ	34	180	69 U	13	69	150 UJ	28	150
FLUORANTHENE	330	820	36	180	370	14	69	860	30	150
FLUORENE	330	33 J	15	180	13 J	5.7	69	17 J	12	150
INDENO(1,2,3-CD)PYRENE	NA	180	39	180	100	15	69	320	32	150
NAPHTHALENE	330	180 U	16	180	7.5 J	6.2	69	150 U	13	150
PHENANTHRENE	330	280	38	180	90	15	69	120 J	32	150
PYRENE	330	1200 J	61	180	620 J	24	69	1000 J	51	150

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	SHIPYARD CREEK								
		009M000403			009M001603			009M001703		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3.3	1.8 U	1.3	1.8	2.9 U	2	2.9	3.1 U	2.1	3.1
4,4'-DDE	3.3	6.6 J	0.89	1.8	25	1.4	2.9	12	1.5	3.1
4,4'-DDT	3.3	1.8 U	0.93	1.8	2.9 U	1.4	2.9	3.1 U	1.6	3.1
ALDRIN	NA	0.95 U	0.78	0.95	1.5 U	1.2	1.5	1.6 UR	1.3	1.6
ALPHA-BHC	NA	0.95 U	0.63	0.95	1.5 U	0.98	1.5	1.6 U	1	1.6
ALPHA-CHLORDANE	NA	0.95 U	0.97	0.95	1.5 U	1.5	1.5	1.6 U	1.6	1.6
AROCLOR-1016	NA	19 U	18	19	29 U	28	29	32 U	30	32
AROCLOR-1221	NA	19 U	13	19	29 U	21	29	32 U	22	32
AROCLOR-1232	NA	19 U	5.9	19	29 U	9.2	29	32 U	9.9	32
AROCLOR-1242	NA	19 U	7.5	19	29 U	12	29	32 U	12	32
AROCLOR-1248	NA	19 U	6.4	19	29 U	9.9	29	32 U	11	32
AROCLOR-1254	NA	19 U	14	19	29 U	22	29	32 U	24	32
AROCLOR-1260	NA	150 J	16	19	210 J	24	29	200 J	26	32
BETA-BHC	NA	0.95 U	0.82	0.95	1.5 U	1.3	1.5	1.6 UR	1.4	1.6
DELTA-BHC	NA	0.95 U	0.52	0.95	1.5 U	0.81	1.5	1.6 U	0.87	1.6
DIELDRIN	3.3	9.1 J	0.86	1.8	2.9 U	1.3	2.9	3.1 U	1.4	3.1
ENDOSULFAN I	NA	0.95 U	0.63	0.95	1.5 U	0.98	1.5	1.6 U	1	1.6
ENDOSULFAN II	NA	1.8 U	0.67	1.8	2.9 U	1	2.9	3.1 U	1.1	3.1
ENDOSULFAN SULFATE	NA	1.8 U	1	1.8	2.9 U	1.6	2.9	3.1 U	1.7	3.1
ENDRIN	3.3	1.8 U	1.5	1.8	2.9 U	2.4	2.9	3.1 U	2.5	3.1
ENDRIN ALDEHYDE	NA	1.8 U	0.78	1.8	2.9 U	1.2	2.9	3.1 U	1.3	3.1
ENDRIN KETONE	NA	1.8 U	1.1	1.8	2.9 U	1.7	2.9	3.1 U	1.8	3.1
GAMMA-BHC (LINDANE)	3.3	0.95 U	0.82	0.95	1.5 U	1.3	1.5	1.6 U	1.4	1.6
GAMMA-CHLORDANE	NA	0.95 U	0.93	0.95	1.5 U	1.4	1.5	1.6 U	1.6	1.6
HEPTACHLOR	NA	0.95 U	0.74	0.95	1.5 U	1.2	1.5	1.6 U	1.2	1.6
HEPTACHLOR EPOXIDE	NA	0.95 U	1.7	0.95	1.5 U	2.7	1.5	1.6 UR	2.9	1.6
METHOXYCHLOR	NA	9.5 U	4.1	9.5	15 U	6.4	15	16 U	6.8	16
TOXAPHENE	NA	18 U	14	18	28 U	22	28	31 U	24	31
Inorganics (mg/kg)										
ALUMINUM	NA	12700 J	1.46	31	25400 J	2.18	47	32900 J	2.68	57
ANTIMONY	12	0.61 U	0.16	0.83	0.73 U	0.23	1.2	1.1 U	0.29	1.5
ARSENIC	7.24	6.9	0.18	0.83	11.9	0.27	1.2	19.8	0.33	1.5
BARIUM	NA	50.9	0.03	0.52	44.1	0.04	0.78	86.6	0.05	0.96
BERYLLIUM	NA	0.42 U	0.01	0.52	0.71 U	0.02	0.78	1.0 U	0.02	0.96
CADMIUM	1	0.55 U	0.01	1	0.49 U	0.02	1.6	2.1 U	0.02	1.9
CALCIUM	NA	31200	1.15	5.2	24800	1.72	7.8	37200	2.1	9.6
CHROMIUM	52.3	89.5	0.04	1.6	219	0.06	2.3	336	0.07	2.9
COBALT	NA	2.5	0.03	3.1	4.4	0.04	4.7	7.4	0.05	5.7
COPPER	18.7	56.4	0.08	2.6	78.9	0.12	3.9	133	0.15	4.8
IRON	NA	11800	0.63	10	23600	0.94	16	33900	1.15	19
LEAD	30.2	55.7	0.15	0.52	61.8	0.22	0.78	142	0.27	0.96
MAGNESIUM	NA	3230	0.58	5.2	5810	0.87	7.8	9300	1.07	9.6
MANGANESE	NA	78.3	0.07	0.52	192	0.11	0.78	201	0.13	0.96
MERCURY	0.13	0.45	0.01	0.07	0.22	0.01	0.12	0.39	0.01	0.12
NICKEL	15.9	12.3	0.03	4.2	22.3	0.05	6.2	32.8	0.06	7.6
POTASSIUM	NA	1280	8.13	100	2460	12.2	160	3540	14.9	190
SELENIUM	NA	0.53	0.23	1	0.89	0.34	1.6	0.86	0.42	1.9
SILVER	2	0.06 U	0.06	1.6	0.08 U	0.08	2.3	0.1 U	0.1	2.9
SODIUM	NA	5700	1.88	100	11800	2.81	160	16400	3.44	190
THALLIUM	NA	0.28	0.21	1.6	0.42	0.31	2.3	0.38 U	0.38	2.9
VANADIUM	NA	22.6	0.05	2.6	46.5	0.08	3.9	62.2	0.1	4.8
ZINC	124	150	0.02	2.6	204	0.03	3.9	494	0.04	4.8
Miscellaneous Parameters (mg/kg)										
TOTAL ORGANIC CARBON	NA	47000	190	890	58000	290	1400	91000	320	1500
Miscellaneous Parameters (%)										
TOTAL SOLIDS	NA	45	NA	1	29	NA	1	27	NA	1

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	COOPER RIVER								
		054M000103			556M000503			556M000703		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Semivolatile Organics (ug/kg)										
1,1-BIPHENYL	NA	420 U	190	420	1400 U	620	1400	1400 U	620	1400
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	420 U	150	420	1400 U	500	1400	1400 U	490	1400
2,4,5-TRICHLOROPHENOL	NA	1000 U	390	1000	3400 U	1200	3400	3400 U	1200	3400
2,4,6-TRICHLOROPHENOL	NA	420 U	300	420	1400 U	980	1400	1400 U	980	1400
2,4-DICHLOROPHENOL	NA	420 U	360	420	1400 U	1200	1400	1400 U	1200	1400
2,4-DIMETHYLPHENOL	NA	420 U	320	420	1400 U	1000	1400	1400 U	1000	1400
2,4-DINITROPHENOL	NA	1000 U	830	1000	3400 U	2700	3400	3400 U	2700	3400
2,4-DINITROTOLUENE	NA	420 U	320	420	1400 U	1000	1400	1400 U	1000	1400
2,6-DINITROTOLUENE	NA	420 U	270	420	1400 U	880	1400	1400 U	880	1400
2-CHLORONAPHTHALENE	NA	420 U	240	420	1400 U	780	1400	1400 U	770	1400
2-CHLOROPHENOL	NA	420 U	320	420	1400 U	1000	1400	1400 U	1000	1400
2-METHYLPHENOL	NA	420 U	330	420	1400 U	1100	1400	1400 U	1100	1400
2-NITROANILINE	NA	1000 U	290	1000	3400 U	930	3400	3400 U	930	3400
2-NITROPHENOL	NA	420 U	290	420	1400 U	940	1400	1400 U	940	1400
3&4-METHYLPHENOL	NA	420 U	360	420	1400 U	1200	1400	1400 U	1200	1400
3,3'-DICHLOROBENZIDINE	NA	420 U	280	420	1400 U	920	1400	1400 U	910	1400
3-NITROANILINE	NA	1000 U	310	1000	3400 U	1000	3400	3400 U	1000	3400
4,6-DINITRO-2-METHYLPHENOL	NA	1000 U	750	1000	3400 U	2400	3400	3400 U	2400	3400
4-BROMOPHENYL PHENYL ETHER	NA	420 U	190	420	1400 U	620	1400	1400 U	620	1400
4-CHLORO-3-METHYLPHENOL	NA	420 U	340	420	1400 U	1100	1400	1400 U	1100	1400
4-CHLOROANILINE	NA	420 U	120	420	1400 U	400	1400	1400 U	400	1400
4-CHLOROPHENYL PHENYL ETHER	NA	420 U	170	420	1400 U	570	1400	1400 U	560	1400
4-NITROANILINE	NA	1000 U	320	1000	3400 U	1000	3400	3400 U	1000	3400
4-NITROPHENOL	NA	1000 U	830	1000	3400 U	2700	3400	3400 U	2700	3400
ACETOPHENONE	NA	420 U	350	420	1400 U	1100	1400	1400 U	1100	1400
ATRAZINE	NA	420 U	230	420	1400 U	760	1400	1400 U	760	1400
BENZALDEHYDE	NA	420 U	220	420	1400 U	730	1400	1400 U	730	1400
BIS(2-CHLOROETHOXY)METHANE	NA	420 U	150	420	1400 U	500	1400	1400 U	500	1400
BIS(2-CHLOROETHYL)ETHER	NA	420 U	220	420	1400 U	710	1400	1400 U	710	1400
BUTYL BENZYL PHTHALATE	NA	420 U	210	420	1400 U	680	1400	1400 U	670	1400
CAPROLACTAM	NA	420 U	260	420	1400 U	860	1400	1400 U	860	1400
CARBAZOLE	NA	420 U	270	420	1400 U	870	1400	1400 U	860	1400
DI-N-BUTYL PHTHALATE	NA	420 U	240	420	1400 U	780	1400	1400 U	780	1400
DI-N-OCTYL PHTHALATE	NA	420 U	310	420	1400 U	1000	1400	1400 U	1000	1400
DIBENZOFURAN	NA	420 U	220	420	1400 U	710	1400	1400 U	710	1400
DIETHYL PHTHALATE	NA	420 U	180	420	1400 U	600	1400	1400 U	590	1400
DIMETHYL PHTHALATE	NA	420 U	180	420	1400 U	590	1400	1400 U	590	1400
HEXACHLOROBENZENE	NA	420 U	170	420	1400 U	560	1400	1400 U	560	1400
HEXACHLOROBUTADIENE	NA	420 U	160	420	1400 U	530	1400	1400 U	530	1400
HEXACHLOROCYCLOPENTADIENE	NA	420 U	210	420	1400 U	680	1400	1400 U	680	1400
HEXACHLOROETHANE	NA	420 U	180	420	1400 U	580	1400	1400 U	580	1400
ISOPHORONE	NA	420 U	180	420	1400 U	580	1400	1400 U	580	1400
N-NITROSO-DI-N-PROPYLAMINE	NA	420 U	180	420	1400 U	580	1400	1400 U	570	1400
N-NITROSODIPHENYLAMINE	NA	420 U	330	420	1400 U	1100	1400	1400 U	1100	1400
NITROBENZENE	NA	420 U	170	420	1400 U	540	1400	1400 U	540	1400
PENTACHLOROPHENOL	NA	1000 U	540	1000	3400 U	1800	3400	3400 U	1800	3400
PHENOL	NA	420 U	340	420	1400 U	1100	1400	1400 U	1100	1400
Polynuclear Aromatic Compounds (ug/kg)										
2-METHYLNAPHTHALENE	330	5.2 J	3.5	26	4200 U	580	4200	330 U	46	330
ACENAPHTHENE	330	7 J	1.9	26	1400 J	300	4200	330 U	24	330
ACENAPHTHYLENE	330	3.9 J	1.7	26	4200 U	280	4200	72 J	22	330
ANTHRACENE	330	64	3.3	26	2400 J	530	4200	200 J	42	330
BENZO(A)ANTHRACENE	330	190 J	3.2	26	5800 J	530	4200	640 J	42	330
BENZO(A)PYRENE	330	120	2.6	26	2500 J	430	4200	840	34	330
BENZO(B)FLUORANTHENE	NA	250	2.8	26	5400	460	4200	1700	36	330
BENZO(G,H,I)PERYLENE	NA	51	4.3	26	780 J	690	4200	270 J	55	330
BENZO(K)FLUORANTHENE	NA	82 J	2.4	26	1200 J	390	4200	560 J	31	330
BIS(2-ETHYLHEXYL)PHTHALATE	182	110 U	3	130	21000 U	480	21000	1700 U	38	1700
CHRYSENE	330	170	3.4	26	5100	550	4200	880	44	330
DIBENZO(A,H)ANTHRACENE	330	11 J	4.8	26	4200 UJ	780	4200	68 J	62	330
FLUORANTHENE	330	330	5.1	26	41000	840	4200	550	66	330
FLUORENE	330	14 J	2.1	26	2200 J	340	4200	330 U	27	330
INDENO(1,2,3-CD)PYRENE	NA	50	5.6	26	4200 U	910	4200	280 J	72	330
NAPHTHALENE	330	2.7 J	2.3	26	4200 U	370	4200	330 U	30	330
PHENANTHRENE	330	110	5.5	26	18000	900	4200	97 J	71	330
PYRENE	330	300 J	8.8	26	26000 J	1400	4200	2600 J	110	330

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	COOPER RIVER								
		054M000103			556M000503			556M000703		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Pesticides/PCBs (ug/kg)										
4,4'-DDD	3.3	1.1 U	0.73	1.1	4.8 J	2.4	3.5	3.5 U	2.4	3.5
4,4'-DDE	3.3	1.1 U	0.51	1.1	3.5 U	1.7	3.5	3.5 U	1.7	3.5
4,4'-DDT	3.3	1.1 U	0.53	1.1	3.5 U	1.7	3.5	3.5 U	1.7	3.5
ALDRIN	NA	0.54 U	0.45	0.54	1.8 U	1.5	1.8	1.8 U	1.4	1.8
ALPHA-BHC	NA	0.54 U	0.36	0.54	1.8 U	1.2	1.8	1.8 U	1.2	1.8
ALPHA-CHLORDANE	NA	0.54 U	0.56	0.54	1.8 U	1.8	1.8	1.8 U	1.8	1.8
AROCLOR-1016	NA	11 U	10	11	35 U	33	35	35 U	33	35
AROCLOR-1221	NA	11 U	7.7	11	35 U	25	35	35 U	25	35
AROCLOR-1232	NA	11 U	3.4	11	35 U	11	35	35 U	11	35
AROCLOR-1242	NA	11 U	4.3	11	35 U	14	35	35 U	14	35
AROCLOR-1248	NA	11 U	3.6	11	35 U	12	35	35 U	12	35
AROCLOR-1254	NA	11 U	8.3	11	35 U	27	35	35 U	27	35
AROCLOR-1260	NA	94 J	9	11	35 U	29	35	35 U	29	35
BETA-BHC	NA	0.54 U	0.47	0.54	1.8 U	1.5	1.8	1.8 U	1.5	1.8
DELTA-BHC	NA	0.54 U	0.3	0.54	1.8 U	0.97	1.8	1.8 U	0.97	1.8
DIELDRIN	3.3	1.1 U	0.49	1.1	3.5 U	1.6	3.5	3.5 U	1.6	3.5
ENDOSULFAN I	NA	0.54 U	0.36	0.54	1.8 U	1.2	1.8	1.8 U	1.2	1.8
ENDOSULFAN II	NA	1.1 U	0.38	1.1	3.5 U	1.2	3.5	3.5 U	1.2	3.5
ENDOSULFAN SULFATE	NA	1.1 U	0.58	1.1	3.5 U	1.9	3.5	3.5 U	1.9	3.5
ENDRIN	3.3	1.1 U	0.88	1.1	3.5 U	2.8	3.5	3.5 U	2.8	3.5
ENDRIN ALDEHYDE	NA	1.1 U	0.45	1.1	3.5 U	1.5	3.5	3.5 U	1.4	3.5
ENDRIN KETONE	NA	1.1 U	0.62	1.1	3.5 U	2	3.5	3.5 U	2	3.5
GAMMA-BHC (LINDANE)	3.3	0.54 U	0.47	0.54	1.8 U	1.5	1.8	1.8 U	1.5	1.8
GAMMA-CHLORDANE	NA	0.54 U	0.53	0.54	1.8 U	1.7	1.8	1.8 U	1.7	1.8
HEPTACHLOR	NA	0.54 U	0.43	0.54	1.8 U	1.4	1.8	1.8 U	1.4	1.8
HEPTACHLOR EPOXIDE	NA	0.54 U	1	0.54	1.8 U	3.3	1.8	1.8 U	3.2	1.8
METHOXYCHLOR	NA	5.4 U	2.4	5.4	18 U	7.6	18	18 U	7.6	18
TOXAPHENE	NA	10 U	8.3	10	34 U	27	34	34 U	27	34
Inorganics (mg/kg)										
ALUMINUM	NA	5900 J	0.86	18	47700 J	2.76	59	37800 J	2.94	63
ANTIMONY	12	0.51 U	0.09	0.49	0.32 U	0.3	1.6	0.35 U	0.32	1.7
ARSENIC	7.24	2.1	0.1	0.49	20.5	0.33	1.6	17.6	0.36	1.7
BARIUM	NA	85.7	0.02	0.31	44.6	0.06	0.98	44.6	0.06	1
BERYLLIUM	NA	2.1 U	0.01	0.31	1.3 U	0.02	0.98	1.1 U	0.03	1
CADMIUM	1	0.1 U	0.01	0.61	0.02 U	0.02	2	0.02 U	0.02	2.1
CALCIUM	NA	9330	0.68	3.1	26600	2.17	9.8	31200	2.31	10
CHROMIUM	52.3	37	0.02	0.92	68.4	0.07	3	57.9	0.08	3.2
COBALT	NA	10	0.02	1.8	9.2	0.06	5.9	8.4	0.06	6.3
COPPER	18.7	386	0.05	1.5	43.5	0.16	4.9	148	0.17	5.2
IRON	NA	10200	0.37	6.1	36700	1.18	20	30500	1.26	21
LEAD	30.2	147	0.09	0.31	40.5	0.28	0.98	21	0.29	1
MAGNESIUM	NA	2040	0.34	3.1	10600	1.1	9.8	9850	1.18	10
MANGANESE	NA	196	0.04	0.31	494	0.13	0.98	383	0.14	1
MERCURY	0.13	0.11	0.01	0.04	0.08	0.01	0.14	0.06	0.01	0.13
NICKEL	15.9	32.6	0.02	2.4	20	0.06	7.9	23	0.06	8.4
POTASSIUM	NA	634	4.79	61	4540	15.36	200	4070	16.38	210
SELENIUM	NA	0.14 U	0.14	0.61	0.65	0.43	2	0.77	0.46	2.1
SILVER	2	0.54 U	0.03	0.92	0.11 U	0.11	3	0.11 U	0.11	3.2
SODIUM	NA	2220	1.11	61	24200	3.55	200	25300	3.78	210
THALLIUM	NA	0.12 U	0.12	0.92	0.39 U	0.39	3	0.42 U	0.42	3.2
VANADIUM	NA	5	0.03	1.5	80.1	0.1	4.9	66	0.11	5.2
ZINC	124	826	0.01	1.5	95.8	0.04	4.9	144	0.05	5.2
Miscellaneous Parameters (mg/kg)										
TOTAL ORGANIC CARBON	NA	7100	110	510	46000	350	1700	56000	350	1700
Miscellaneous Parameters (%)										
TOTAL SOLIDS	NA	78	NA	1	24	NA	1	24	NA	1

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	NOISETTE CREEK											
		NOIM000403			NOIM001103			NOIM001203			NOIM001203-Dup		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Semivolatile Organics (ug/kg)													
1,1-BIPHENYL	NA	570 U	260	570	530 U	240	530	650 U	290	650	770 U	340	770
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	570 U	210	570	530 U	190	530	650 U	230	650	770 U	280	770
2,4,5-TRICHLOROPHENOL	NA	1400 U	520	1400	1300 U	490	1300	1600 U	590	1600	1900 U	700	1900
2,4,6-TRICHLOROPHENOL	NA	570 U	410	570	530 U	380	530	650 U	460	650	770 U	550	770
2,4-DICHLOROPHENOL	NA	570 U	490	570	530 U	460	530	650 U	560	650	770 U	660	770
2,4-DIMETHYLPHENOL	NA	570 U	430	570	530 U	400	530	650 U	490	650	770 U	580	770
2,4-DINITROPHENOL	NA	1400 U	1100	1400	1300 U	1000	1300	1600 U	1300	1600	1900 U	1500	1900
2,4-DINITROTOLUENE	NA	570 U	430	570	530 U	400	530	650 U	490	650	770 U	580	770
2,6-DINITROTOLUENE	NA	570 U	360	570	530 U	340	530	650 U	420	650	770 U	490	770
2-CHLORONAPHTHALENE	NA	570 U	320	570	530 U	300	530	650 U	370	650	770 U	430	770
2-CHLOROPHENOL	NA	570 U	440	570	530 U	410	530	650 U	500	650	770 U	590	770
2-METHYLPHENOL	NA	570 U	440	570	530 U	410	530	650 U	500	650	770 U	600	770
2-NITROANILINE	NA	1400 U	390	1400	1300 U	360	1300	1600 U	440	1600	1900 U	520	1900
2-NITROPHENOL	NA	570 U	390	570	530 U	360	530	650 U	440	650	770 U	520	770
3&4-METHYLPHENOL	NA	570 U	490	570	530 U	460	530	650 U	560	650	770 U	660	770
3,3'-DICHLOROBENZIDINE	NA	570 U	380	570	530 U	360	530	650 U	430	650	770 U	510	770
3-NITROANILINE	NA	1400 U	420	1400	1300 U	400	1300	1600 U	480	1600	1900 U	570	1900
4,6-DINITRO-2-METHYLPHENOL	NA	1400 U	1000	1400	1300 U	950	1300	1600 U	1200	1600	1900 U	1400	1900
4-BROMOPHENYL PHENYL ETHER	NA	570 U	260	570	530 U	240	530	650 U	290	650	770 U	340	770
4-CHLORO-3-METHYLPHENOL	NA	570 U	460	570	530 U	430	530	650 U	530	650	770 U	630	770
4-CHLOROANILINE	NA	570 U	160	570	530 U	150	530	650 U	190	650	770 U	220	770
4-CHLOROPHENYL PHENYL ETHER	NA	570 U	240	570	530 U	220	530	650 U	270	650	770 U	320	770
4-NITROANILINE	NA	1400 U	440	1400	1300 U	410	1300	1600 U	500	1600	1900 U	590	1900
4-NITROPHENOL	NA	1400 U	1100	1400	1300 U	1000	1300	1600 U	1300	1600	1900 U	1500	1900
ACETOPHENONE	NA	570 U	470	570	530 U	440	530	650 U	530	650	770 U	630	770
ATRAZINE	NA	570 U	320	570	530 U	300	530	650 U	360	650	770 U	430	770
BENZALDEHYDE	NA	570 U	300	570	530 U	280	530	650 U	340	650	770 U	410	770
BIS(2-CHLOROETHOXY)METHANE	NA	570 U	210	570	530 U	190	530	650 U	240	650	770 U	280	770
BIS(2-CHLOROETHYL)ETHER	NA	570 U	290	570	530 U	270	530	650 U	340	650	770 U	400	770
BUTYL BENZYL PHTHALATE	NA	570 U	280	570	530 U	260	530	650 U	320	650	770 U	380	770
CAPROLACTAM	NA	570 U	360	570	530 U	330	530	650 U	410	650	770 U	480	770
CARBAZOLE	NA	570 U	360	570	530 U	340	530	650 U	410	650	770 U	480	770
DI-N-BUTYL PHTHALATE	NA	570 U	320	570	530 U	300	530	650 U	370	650	770 U	440	770
DI-N-OCTYL PHTHALATE	NA	570 U	420	570	530 U	400	530	650 U	480	650	770 U	570	770
DIBENZOFURAN	NA	570 U	300	570	530 U	280	530	650 U	340	650	770 U	400	770
DIETHYL PHTHALATE	NA	570 U	250	570	530 U	230	530	650 U	280	650	770 U	330	770
DIMETHYL PHTHALATE	NA	570 U	240	570	530 U	230	530	650 U	280	650	770 U	330	770
HEXACHLOROBENZENE	NA	570 U	230	570	530 U	220	530	650 U	270	650	770 U	310	770
HEXACHLOROBUTADIENE	NA	570 U	220	570	530 UR	200	530	650 U	250	650	770 U	300	770
HEXACHLOROCYCLOPENTADIENE	NA	570 U	280	570	530 U	260	530	650 U	320	650	770 U	380	770
HEXACHLOROETHANE	NA	570 U	240	570	530 U	230	530	650 U	280	650	770 U	330	770
ISOPHORONE	NA	570 U	240	570	530 U	230	530	650 U	280	650	770 U	330	770
N-NITROSO-DI-N-PROPYLAMINE	NA	570 U	240	570	530 U	220	530	650 U	270	650	770 U	320	770
N-NITROSODIPHENYLAMINE	NA	570 U	440	570	530 U	410	530	650 U	500	650	770 U	590	770
NITROBENZENE	NA	570 U	220	570	530 U	210	530	650 U	260	650	770 U	300	770
PENTACHLOROPHENOL	NA	1400 U	740	1400	1300 U	690	1300	1600 U	840	1600	1900 U	990	1900
PHENOL	NA	570 U	460	570	530 U	430	530	650 U	530	650	770 U	630	770
Polynuclear Aromatic Compounds (ug/kg)													
2-METHYLNAPHTHALENE	330	170 U	24	170	16 J	13	97	200 U	27	200	140 U	19	140
ACENAPHTHENE	330	18 J	13	170	97 U	7.1	97	200 U	14	200	140 U	10	140
ACENAPHTHYLENE	330	34 J	12	170	15 J	6.4	97	34 J	13	200	31 J	9.3	140
ANTHRACENE	330	58 J	22	170	58 J	12	97	170 J	25	200	170	18	140
BENZO(A)ANTHRACENE	330	720 J	22	170	460 J	12	97	810 J	25	200	730 J	18	140
BENZO(A)PYRENE	330	510	18	170	330	10	97	540	20	200	510	14	140
BENZO(B)FLUORANTHENE	NA	1200	19	170	790	11	97	1200	22	200	1100	15	140
BENZO(G,H,I)PERYLENE	NA	200 J	29	170	150 J	16	97	250 J	33	200	240 J	23	140
BENZO(K)FLUORANTHENE	NA	270 J	16	170	170 J	9	97	380 J	18	200	380 J	13	140
BIS(2-ETHYLHEXYL)PHTHALATE	182	860 U	20	860	240 J	11	480	980 U	23	980	700 U	16	700
CHRYSENE	330	510	23	170	390	13	97	670	26	200	690	18	140
DIBENZO(A,H)ANTHRACENE	330	170 UJ	32	170	97 UJ	18	97	200 UJ	37	200	76 J	26	140
FLUORANTHENE	330	1000	35	170	720	19	97	1500	39	200	1200	28	140
FLUORENE	330	16 J	14	170	11 J	7.9	97	30 J	16	200	21 J	11	140
INDENO(1,2,3-CD)PYRENE	NA	220	38	170	170	21	97	260	43	200	250	30	140
NAPHTHALENE	330	170 U	15	170	97 U	8.7	97	200 U	18	200	140 U	12	140
PHENANTHRENE	330	170 J	37	170	160	21	97	370 J	42	200	190 J	30	140
PYRENE	330	1200 J	59	170	770 J	33	97	1200 J	68	200	1000 J	48	140

TABLE 4-1

ANALYTICAL RESULTS OF SEDIMENT SAMPLES COLLECTED IN APRIL 2008
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

	USEPA Region 4 Sediment ESV	NOISETTE CREEK											
		NOIM000403			NOIM001103			NOIM001203			NOIM001203-Dup		
		Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Pesticides/PCBs (ug/kg)													
4,4'-DDD	3.3	4.8 J	0.98	1.4	2.8 J	0.92	1.3	3.8 J	1.1	1.6	6 J	1.3	1.9
4,4'-DDE	3.3	1.4 U	0.69	1.4	3.6 J	0.64	1.3	1.6 U	0.79	1.6	1.9 U	0.93	1.9
4,4'-DDT	3.3	1.4 U	0.72	1.4	1.3 U	0.67	1.3	1.6 U	0.82	1.6	1.9 U	0.97	1.9
ALDRIN	NA	0.74 U	0.61	0.74	0.69 U	0.56	0.69	0.84 U	0.69	0.84	0.99 U	0.82	0.99
ALPHA-BHC	NA	0.74 U	0.49	0.74	0.69 U	0.46	0.69	0.84 U	0.56	0.84	0.99 U	0.66	0.99
ALPHA-CHLORDANE	NA	0.74 U	0.75	0.74	0.69 U	0.7	0.69	0.84 U	0.85	0.84	0.99 U	1	0.99
AROCLOR-1016	NA	15 U	14	15	14 U	13	14	17 U	16	17	20 U	19	20
AROCLOR-1221	NA	15 U	10	15	14 U	9.7	14	17 U	12	17	20 U	14	20
AROCLOR-1232	NA	15 U	4.6	15	14 U	4.3	14	17 U	5.2	17	20 U	6.2	20
AROCLOR-1242	NA	15 U	5.8	15	14 U	5.4	14	17 U	6.6	17	20 U	7.8	20
AROCLOR-1248	NA	15 U	4.9	15	14 U	4.6	14	17 U	5.6	17	20 U	6.6	20
AROCLOR-1254	NA	15 U	11	15	14 U	10	14	17 U	13	17	20 U	15	20
AROCLOR-1260	NA	15 U	12	15	14 U	11	14	17 U	14	17	20 U	16	20
BETA-BHC	NA	0.74 U	0.63	0.74	0.69 U	0.59	0.69	0.84 U	0.72	0.84	0.99 U	0.85	0.99
DELTA-BHC	NA	0.74 U	0.4	0.74	0.69 U	0.38	0.69	0.84 U	0.46	0.84	0.99 U	0.54	0.99
DIELDRIN	3.3	1.4 U	0.66	1.4	1.3 U	0.62	1.3	1.6 U	0.76	1.6	1.9 U	0.89	1.9
ENDOSULFAN I	NA	0.74 U	0.49	0.74	0.69 U	0.46	0.69	0.84 U	0.56	0.84	0.99 U	0.66	0.99
ENDOSULFAN II	NA	1.4 U	0.52	1.4	1.3 U	0.48	1.3	1.6 U	0.59	1.6	1.9 U	0.7	1.9
ENDOSULFAN SULFATE	NA	1.4 U	0.78	1.4	1.3 U	0.73	1.3	1.6 U	0.89	1.6	1.9 U	1	1.9
ENDRIN	3.3	1.4 U	1.2	1.4	1.3 U	1.1	1.3	1.6 U	1.3	1.6	1.9 U	1.6	1.9
ENDRIN ALDEHYDE	NA	1.4 U	0.61	1.4	1.3 U	0.56	1.3	1.6 U	0.69	1.6	1.9 U	0.82	1.9
ENDRIN KETONE	NA	1.4 U	0.84	1.4	1.3 U	0.78	1.3	1.6 U	0.95	1.6	1.9 U	1.1	1.9
GAMMA-BHC (LINDANE)	3.3	0.74 U	0.63	0.74	0.69 U	0.59	0.69	0.84 U	0.72	0.84	0.99 U	0.85	0.99
GAMMA-CHLORDANE	NA	0.74 U	0.72	0.74	0.69 U	0.67	0.69	0.84 U	0.82	0.84	0.99 U	0.97	0.99
HEPTACHLOR	NA	0.74 U	0.58	0.74	0.69 U	0.54	0.69	0.84 U	0.66	0.84	0.99 U	0.78	0.99
HEPTACHLOR EPOXIDE	NA	0.74 U	1.4	0.74	0.69 U	1.3	0.69	0.84 U	1.5	0.84	0.99 U	1.8	0.99
METHOXYCHLOR	NA	7.4 U	3.2	7.4	6.9 U	3	6.9	8.4 U	3.6	8.4	9.9 U	4.3	9.9
TOXAPHENE	NA	14 U	11	14	13 U	10	13	16 U	13	16	19 U	15	19
Inorganics (mg/kg)													
ALUMINUM	NA	8360 J	1.26	27	6540 J	1.18	25	12400 J	1.38	30	14000 J	1.61	34
ANTIMONY	12	0.23 U	0.13	0.72	0.25 U	0.13	0.68	0.15 U	0.15	0.79	2.0 U	0.17	0.92
ARSENIC	7.24	5	0.15	0.72	6.5	0.14	0.68	9.2	0.17	0.79	6.3	0.2	0.92
BARIUM	NA	19.4	0.03	0.45	8.5	0.02	0.42	17.7	0.03	0.49	22.1	0.03	0.58
BERYLLIUM	NA	0.35 U	0.01	0.45	0.2 U	0.01	0.42	0.4 U	0.01	0.49	0.58 U	0.01	0.58
CADMIUM	1	0.01 U	0.01	0.9	0.03 U	0.01	0.84	0.02 U	0.01	0.98	0.01 U	0.01	1.2
CALCIUM	NA	47700	0.99	4.5	15200	0.93	4.2	6370	1.08	4.9	5330	1.27	5.8
CHROMIUM	52.3	14.7 U	0.03	1.3	11.1 U	0.03	1.3	27	0.04	1.5	27	0.04	1.7
COBALT	NA	2.8	0.03	2.7	2.0 U	0.02	2.5	3.2	0.03	3	4.1	0.03	3.4
COPPER	18.7	19.9	0.07	2.2	10.3	0.07	2.1	42.8	0.08	2.5	36.6	0.09	2.9
IRON	NA	8630	0.54	9	6310	0.51	8.4	10200	0.59	9.8	11900	0.69	12
LEAD	30.2	18.5	0.13	0.45	10.9	0.12	0.42	18.9	0.14	0.49	28.9	0.16	0.58
MAGNESIUM	NA	2010	0.5	4.5	1600	0.47	4.2	2250	0.55	4.9	2700	0.65	5.8
MANGANESE	NA	73.5	0.06	0.45	39.4	0.06	0.42	67.2	0.07	0.49	78.5	0.08	0.58
MERCURY	0.13	0.07	0.01	0.044	0.05	0.01	0.044	0.1	0.01	0.064	1.1	0.01	0.073
NICKEL	15.9	5.5	0.03	3.6	3.5	0.03	3.4	6.3	0.03	3.9	8.3	0.03	4.6
POTASSIUM	NA	808	7	90	661	6.59	84	1120	7.69	98	1300	8.99	120
SELENIUM	NA	0.23	0.2	0.9	0.19 U	0.19	0.84	0.32	0.22	0.98	0.26	0.25	1.2
SILVER	2	0.05 U	0.05	1.3	0.05 U	0.05	1.3	0.05 U	0.05	1.5	0.06 U	0.06	1.7
SODIUM	NA	4840	1.62	90	4350	1.52	84	5380	1.77	98	6940	2.08	120
THALLIUM	NA	0.19	0.18	1.3	0.17 U	0.17	1.3	0.2 U	0.2	1.5	0.23 U	0.23	1.7
VANADIUM	NA	14.1	0.05	2.2	11.4	0.04	2.1	19.2	0.05	2.5	21.8	0.06	2.9
ZINC	124	86.8	0.02	2.2	29.7	0.02	2.1	62.7	0.02	2.5	158	0.03	2.9
Miscellaneous Parameters (mg/kg)													
TOTAL ORGANIC CARBON	NA	32000	150	690	37000	140	640	25000	170	790	26000	200	930
Miscellaneous Parameters (%)													
TOTAL SOLIDS	NA	58	NA	1	62	NA	1	51	NA	1	43	NA	1

ESV = Ecological Screening Value
MDL = Method Detection Limit
NA = An Ecological Screening Value is not available from USEPA Region 4.
RL = Reporting Limit
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
R = Rejected; results are unusable because certain criteria were not met.

Shading indicates the MDL was greater than the sediment screening value for non detected analyte.

TABLE 4-2

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
NOISETTE CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

SAMPLE ID	2X Average Background Concentration	Region 4 Sediment Screening Values	NOIM000403			NOIM001103			NOIM001203			NOIM001203-D			NOIM001203-AVG		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Polynuclear Aromatic Compounds (ug/kg)																	
2-METHYLNAPHTHALENE	NA	330	170 U	24	170	16 J	13	97	200 U	27	200	140 U	19	140	170 U	27	200
ACENAPHTHENE	NA	330	18 J	13	170	97 U	7.1	97	200 U	14	200	140 U	10	140	170 U	14	200
ACENAPHTHYLENE	45.1	330	34 J	12	170	15 J	6.4	97	34 J	13	200	31 J	9.3	140	32.5 J	13	200
ANTHRACENE	60	330	58 J	22	170	58 J	12	97	170 J	25	200	170	18	140	170 J	25	200
BENZO(A)ANTHRACENE	103.5	330	**720 J**	22	170	460 J	12	97	**810 J**	25	200	**730 J**	18	140	**770 J**	25	200
BENZO(A)PYRENE	135	330	**510**	18	170	330	10	97	**540**	20	200	**510**	14	140	**525**	20	200
BENZO(B)FLUORANTHENE	160.4	NA	1200	19	170	790	11	97	1200	22	200	1100	15	140	1150	22	200
BENZO(G,H,I)PERYLENE	91.4	NA	200 J	29	170	150 J	16	97	250 J	33	200	240 J	23	140	245 J	33	200
BENZO(K)FLUORANTHENE	153.1	NA	270 J	16	170	170 J	9	97	380 J	18	200	380 J	13	140	380 J	18	200
BIS(2-ETHYLHEXYL)PHTHALATE	166.4	182	860 U	20	860	240 J	11	480	980 U	23	980	700 U	16	700	840 U	23	980
CHRYSENE	146.2	330	510	23	170	**390**	13	97	**670**	26	200	**690**	18	140	**680**	26	200
DIBENZO(A,H)ANTHRACENE	NA	330	170 UJ	32	170	97 UJ	18	97	200 UJ	37	200	76 J	26	140	76 J	37	200
FLUORANTHENE	142.1	330	**1000**	35	170	**720**	19	97	**1500**	39	200	**1200**	28	140	**1350**	39	200
FLUORENE	NA	330	16 J	14	170	11 J	7.9	97	30 J	16	200	21 J	11	140	25.5 J	16	200
INDENO(1,2,3-CD)PYRENE	92.6	NA	220	38	170	170	21	97	260	43	200	250	30	140	255	43	200
NAPHTHALENE	NA	330	170 U	15	170	97 U	8.7	97	200 U	18	200	140 U	12	140	170 U	18	200
PHENANTHRENE	NA	330	170 J	37	170	160	21	97	**370 J**	42	200	190 J	30	140	280 J	42	200
PYRENE	178.2	330	**1200 J**	59	170	**770 J**	33	97	**1200 J**	68	200	**1000 J**	48	140	**1100 J**	68	200
Pesticides/PCBs (ug/kg)																	
4,4'-DDD	NA	3.3	**4.8 J**	0.98	1.4	2.8 J	0.92	1.3	**3.8 J**	1.1	1.6	**6 J**	1.3	1.9	**4.9 J**	1.1	1.6
4,4'-DDE	NA	3.3	1.4 U	0.69	1.4	**3.6 J**	0.64	1.3	1.6 U	0.79	1.6	1.9 U	0.93	1.9	1.75 U	0.79	1.6
AROCLOR-1260	NA	NA	15 U	12	15	14 U	11	14	17 U	14	17	20 U	16	20	18.5 U	14	17
DIELDRIN	NA	3.3	1.4 U	0.66	1.4	1.3 U	0.62	1.3	1.6 U	0.76	1.6	1.9 U	0.89	1.9	1.75 U	0.76	1.6
Inorganics (mg/kg)																	
ALUMINUM	21440	NA	8360 J	1.26	27	6540 J	1.18	25	12400 J	1.38	30	14000 J	1.61	34	13200 J	1.38	30
ARSENIC	12.016	7.24	5.0	0.15	0.72	6.5	0.14	0.68	9.2	0.17	0.79	6.3	0.2	0.92	7.75	0.17	0.79
BARIUM	34.58	NA	19.4	0.03	0.45	8.5	0.02	0.42	17.7	0.03	0.49	22.1	0.03	0.58	19.9	0.03	0.49
CALCIUM	53260	NA	47700	0.99	4.5	15200	0.93	4.2	6370	1.08	4.9	5330	1.27	5.8	5850	1.08	4.9
CHROMIUM	43.5	52.3	14.7 U	0.03	1.3	11.1 U	0.03	1.3	27.0	0.04	1.5	27.0	0.04	1.7	27.0	0.04	1.5
COBALT	6.358	NA	2.8	0.03	2.7	2.0 U	0.02	2.5	3.2	0.03	3	4.1	0.03	3.4	3.65	0.03	3
COPPER	14.9	18.7	**19.9**	0.07	2.2	10.3	0.07	2.1	**42.8**	0.08	2.5	**36.6**	0.09	2.9	**39.7**	0.08	2.5
IRON	23600	NA	8630	0.54	9	6310	0.51	8.4	10200	0.59	9.8	11900	0.69	12	11050	0.59	9.8
LEAD	18.08	30.2	18.5	0.13	0.45	10.9	0.12	0.42	18.9	0.14	0.49	28.9	0.16	0.58	23.9	0.14	0.49
MAGNESIUM	6426	NA	2010	0.5	4.5	1600	0.47	4.2	2250	0.55	4.9	2700	0.65	5.8	2475	0.55	4.9
MANGANESE	216	NA	73.5	0.06	0.45	39.4	0.06	0.42	67.2	0.07	0.49	78.5	0.08	0.58	72.85	0.07	0.49

TABLE 4-2

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
NOISETTE CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

SAMPLE ID	2 x Average Background Concentration	Region 4 Sediment Screening Values	NOIM000403			NOIM001103			NOIM001203			NOIM001203-D			NOIM001203-AVG		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Inorganics (mg/kg) (Continued)																	
MERCURY	0.07222	0.13	0.07	0.01	0.044	0.05	0.01	0.044	0.1	0.01	0.064	**1.1**	0.01	0.073	**0.6**	0.01	0.064
NICKEL	12.42	15.9	5.5	0.03	3.6	3.5	0.03	3.4	6.3	0.03	3.9	8.3	0.03	4.6	7.3	0.03	3.9
POTASSIUM	3046	NA	808	7	90	661	6.59	84	1120	7.69	98	1300	8.99	120	1210	7.69	98
SELENIUM	4.87	NA	0.23	0.2	0.9	0.19 U	0.19	0.84	0.32	0.22	0.98	0.26	0.25	1.2	0.29	0.22	0.98
SODIUM	13880	NA	4840	1.62	90	4350	1.52	84	5380	1.77	98	6940	2.08	120	6160	1.77	98
THALLIUM	4.87	NA	0.19	0.18	1.3	0.17 U	0.17	1.3	0.2 U	0.2	1.5	0.23 U	0.23	1.7	0.215 U	0.2	1.5
VANADIUM	48.84	NA	14.1	0.05	2.2	11.4	0.04	2.1	19.2	0.05	2.5	21.8	0.06	2.9	20.5	0.05	2.5
ZINC	71.54	124	86.8	0.02	2.2	29.7	0.02	2.1	62.7	0.02	2.5	**158**	0.03	2.9	110.35	0.02	2.5
Miscellaneous Parameters (MG/KG)																	
TOTAL ORGANIC CARBON	NA	NA	32000	150	690	37000	140	640	25000	170	790	26000	200	930	25500	170	790
Miscellaneous Parameters (%)																	
TOTAL SOLIDS	NA	NA	58	NA	1	62	NA	1	51	NA	1	43	NA	1	47	NA	1

Shading indicates detected concentration exceeds 2 x Average Background Concentration and Region 4 Ecological Screening Value.
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
RL = Reporting Limit
MDL = Method Detection Limit

TABLE 4-3

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
NOISETTE CREEK SAMPLE LOCATION NOIM0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	June 1997[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Inorganics (mg/kg)					
Aluminum	7830	9500		8360 J	
Antimony	1.1J	3.8U	0.86	0.23 U	0.13
Arsenic	10.7	5.9		5.0	
Barium	44.4J	14		19.4	
Beryllium	1.9	0.46J		0.35 U	0.01
Cadmium	0.45J	0.96U	0.42	0.01 U	0.01
Calcium	51200	2600		47700	
Chromium	25.3	20		14.7 U	0.03
Cobalt	10.6J	3.3		2.8	
Copper	127	15		19.9	
Iron	19200	11000		8630	
Lead	126	23		18.5	
Magnesium	2400	2400		2010	
Manganese	140	52		73.5	
Mercury	0.16	0.14		0.07	
Nickel	20.5	5.6J		5.5	
Potassium	1050J	1300		808	
Selenium	0.91U	4.8U	1.7	0.23	
Silver	0.98U	1.9U	0.19	0.05 U	0.05
Sodium	4420J	5600		4840	
Thallium	1.6U	4.8U	2.5	0.19	
Vanadium	22.2	21		14.1	
Zinc	718	100		86.8	
Pesticides (µg/kg)					
4,4'-DDD	5.65U	72U	6.6	4.8 J	
4,4'-DDE	5.65U	72U	6.6	1.4 U	0.69
4,4'-DDT	5.65U	72U	5.9	1.4 U	0.72
Aldrin	2.91U	37U	3.1	0.74 U	0.61
alpha-BHC	2.91U	37U	11	0.74 U	0.49
beta-BHC	2.91U	37U	10	0.74 U	0.63
delta-BHC	2.91U	37U	5	0.74 U	0.4
Dieldrin	5.65U	72U	7.7	1.4 U	0.66
Endosulfan I	2.91U	37U	3.5	0.74 U	0.49
Endosulfan II	5.65U	72U	5.9	1.4 U	0.52
Endosulfan sulfate	5.65U	72U	8.1	1.4 U	0.78
Endrin	5.65U	72U	7	1.4 U	1.2
Endrin aldehyde	5.65U	72U	14	1.4 U	0.61
Endrin ketone	5.65U	72U	7	1.4 U	0.84
gamma-BHC (Lindane)	2.91U	37U	3.1	0.74 U	0.63
Heptachlor	2.91U	37U	7	0.74 U	0.58
Heptachlor epoxide	2.91U	37U	4.6	0.74 U	1.4
Methoxychlor	29.1U	370U	10	7.4 U	3.2

TABLE 4-3

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
NOISETTE CREEK SAMPLE LOCATION NOIM0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	June 1997[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Pesticides (µg/kg) (Continued)					
PCB-1016	56.5U	720U	150	15 U	14
PCB-1221	115U	1500U	150	15 U	10
PCB-1232	56.5U	720U	140	15 U	4.6
PCB-1242	56.5U	720U	160	15 U	5.8
PCB-1248	56.5U	720U	170	15 U	4.9
PCB-1254	56.5U	720U	110	15 U	11
PCB-1260	56.5U	720U	140	15 U	12
Toxaphene	291U	3700U	260	14 U	11
Semivolatile Organic Compounds (µg/kg)					
1,2,4-Trichlorobenzene	570U	720U	46	NA	NA
1,2-Dichlorobenzene	570U	720U	50	NA	NA
1,3-Dichlorobenzene	570U	720U	57	NA	NA
1,4-Dichlorobenzene	570U	720U	48	NA	NA
2,4,5-Trichlorophenol	1400U	720U	70	1400 U	520
2,4,6-Trichlorophenol	570U	720U	44	570 U	410
2,4-Dichlorophenol	570U	720U	50	570 U	490
2,4-Dimethylphenol	570U	720U	76	570 U	430
2,4-Dinitrophenol	1400U	3700U	370	1400 U	1100
2,4-Dinitrotoluene	570U	720U	41	570 U	430
2,6-Dinitrotoluene	570U	720U	72	570 U	360
2-Chloronaphthalene	570U	720U	52	570 U	320
2-Chlorophenol	570U	720U	59	570 U	440
2-Methylnaphthalene	570U	720U	52	170 U	24
2-Methylphenol	570U	720U	65	570 U	440
2-Nitroaniline	1400U	3700U	50	1400 U	390
2-Nitrophenol	570U	720U	44	570 U	390
3 & 4 Methylphenol	570U	720U	63	570 U	490
3,3'-Dichlorobenzidine	570U	1400U	65	570 U	380
3-Nitroaniline	1400U	3700U	72	1400 U	420
4,6-Dinitro-2-methylphenol	1400U	3700U	440	1400 U	1000
4-Bromophenyl phenyl ether	570U	720U	68	570 U	260
4-Chloro-3-methylphenol	570U	720U	74	570 U	460
4-Chloroaniline	570U	1400U	57	570 U	160
4-Chlorophenyl phenyl ether	570U	720U	41	570 U	240
4-Nitroaniline	1400U	3700U	37	1400 U	440
4-Nitrophenol	1400U	3700U	460	1400 U	1100
Acenaphthene	570U	720U	41	18 J	
Acenaphthylene	570U	720U	37	34 J	
Anthracene	610	150J		58 J	
Benzo[a]anthracene	1000	290J		720 J	
Benzo[a]pyrene	990	320J		510	
Benzo[b]fluoranthene	1200	400J		1200	

TABLE 4-3

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
NOISETTE CREEK SAMPLE LOCATION NOIM0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	June 1997[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Semivolatile Organic Compounds (µg/kg) (Continued)					
Benzo[g,h,i]perylene	210J	240J		200 J	
Benzo[k]fluoranthene	760	330J		270 J	
Bis(2-chloroethoxy)methane	570U	720U	52	570 U	210
Bis(2-chloroethyl)ether	570U	720U	61	570 U	290
Bis(2-ethylhexyl) phthalate	570U	460J		860 U	20
bis(chloroisopropyl) ether	NA	720U	76	NA	NA
Butyl benzyl phthalate	570U	720U	59	570 U	280
Carbazole	570U	720U	61	570 U	360
Chrysene	1500	380J		510	
Dibenz(a,h)anthracene	150J	66J		170 UJ	32
Dibenzofuran	570U	720U	52	570 U	300
Diethyl phthalate	570U	720U	48	570 U	250
Dimethyl phthalate	570U	720U	41	570 U	240
Di-n-butyl phthalate	570U	720U	61	570 U	320
Di-n-octyl phthalate	570U	720U	68	570 U	420
Fluoranthene	1500	650J		1000	
Fluorene	570U	720U	48	16 J	
Hexachlorobenzene	570U	720U	57	570 U	230
Hexachlorobutadiene	570U	720U	44	570 U	220
Hexachlorocyclopentadiene	570U	720U	180	570 U	280
Hexachloroethane	570U	720U	44	570 U	240
Indeno[1,2,3-cd]pyrene	270J	230J		220	
Isophorone	570U	720U	48	570 U	240
Naphthalene	570U	720U	41	170 U	15
Nitrobenzene	570U	720U	76	570 U	220
N-Nitrosodi-n-propylamine	570U	720U	61	570 U	240
N-Nitrosodiphenylamine	570U	720U	50	570 U	440
Pentachlorophenol	1400U	3700U	180	1400 U	740
Phenanthrene	83J	110J		170 J	
Phenol	570U	720U	65	570 U	460
Pyrene	950	540J		1200 J	

Notes:
Although sediment samples were collected from three locations in Noisette Creek in April 2008, only one of the three locations (NOIM0004) had been previously sampled (in June 1997 and December 2005). This table provides a comparison of results for sample location NOIM0004 during the 1997, 2005, and 2008 sampling events.
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
(1) Data taken from Table 3-2 of Spectra Tech (2006).
(2) Method detection limits (MDLs) are shown for non-detect samples. MDLs for samples collected in 2005 were taken from Appendix A of Spectra Tech (2006). MDLs for samples collected in 1997 were not available in the Spectra Tech (2006) report.

TABLE 4-4

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
SHIPYARD CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample ID	2X Average Background Concentration	Region 4 Sediment Screening Values	009M000403			009M001603			009M001703		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Polynuclear Aromatic Compounds (ug/kg)											
2-METHYLNAPHTHALENE	NA	330	28 J	25	180	18 J	9.6	69	30 J	20	150
ACENAPHTHENE	NA	330	44 J	13	180	9.6 J	5	69	13 J	11	150
ACENAPHTHYLENE	45.14	330	20 J	12	180	24 J	4.6	69	56 J	9.9	150
ANTHRACENE	60	330	110 J	23	180	48 J	8.8	69	80 J	19	150
BENZO(A)ANTHRACENE	103.5	330	**490 J**	22	180	260 J	8.7	69	**580 J**	19	150
BENZO(A)PYRENE	135	330	**420**	18	180	170	7.2	69	**560**	15	150
BENZO(B)FLUORANTHENE	160.4	NA	950	20	180	460	7.6	69	1500	16	150
BENZO(G,H,I)PERYLENE	91.4	NA	200 J	30	180	99	11	69	330 J	25	150
BENZO(K)FLUORANTHENE	153.1	NA	200 J	17	180	100 J	6.5	69	400 J	14	150
BIS(2-ETHYLHEXYL)PHTHALATE	166.4	182	**540 J**	21	890	**750**	8	350	**630 J**	17	740
CHRYSENE	146.2	330	**360**	24	180	190	9.1	69	**560**	20	150
DIBENZO(A,H)ANTHRACENE	NA	330	180 UJ	34	180	69 U	13	69	150 UJ	28	150
FLUORANTHENE	142.1	330	**820**	36	180	**370**	14	69	**860**	30	150
FLUORENE	NA	330	33 J	15	180	13 J	5.7	69	17 J	12	150
INDENO(1,2,3-CD)PYRENE	92.6	NA	180	39	180	100	15	69	320	32	150
NAPHTHALENE	NA	330	180 U	16	180	7.5 J	6.2	69	150 U	13	150
PHENANTHRENE	NA	330	280	38	180	90	15	69	120 J	32	150
PYRENE	178.2	330	**1200 J**	61	180	**620 J**	24	69	**1000 J**	51	150
Pesticides/PCBs (ug/kg)											
4,4'-DDD	NA	3.3	1.8 U	1.3	1.8	2.9 U	2	2.9	3.1 U	2.1	3.1
4,4'-DDE	NA	3.3	**6.6 J**	0.89	1.8	**25**	1.4	2.9	**12**	1.5	3.1
AROCLOR-1260	NA	NA	150 J	16	19	210 J	24	29	200 J	26	32
DIELDRIN	NA	3.3	**9.1 J**	0.86	1.8	2.9 U	1.3	2.9	3.1 U	1.4	3.1
Inorganics (mg/kg)											
ALUMINUM	21440	NA	12700 J	1.46	31	**25400 J**	2.18	47	**32900 J**	2.68	57
ARSENIC	12.016	7.24	6.9	0.18	0.83	11.9	0.27	1.2	**19.8**	0.33	1.5
BARIUM	34.58	NA	50.9	0.03	0.52	44.1	0.04	0.78	86.6	0.05	0.96
CALCIUM	53260	NA	31200	1.15	5.2	24800	1.72	7.8	37200	2.1	9.6
CHROMIUM	43.5	52.3	**89.5**	0.04	1.6	**219**	0.06	2.3	**336**	0.07	2.9

TABLE 4-4

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
SHIPYARD CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample ID	2X Average Background Concentration	Region 4 Sediment Screening Values	009M000403			009M001603			009M001703		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Inorganics (mg/kg) (Continued)											
COBALT	6.358	NA	2.5	0.03	3.1	4.4	0.04	4.7	7.4	0.05	5.7
COPPER	14.9	18.7	**56.4**	0.08	2.6	**78.9**	0.12	3.9	**133**	0.15	4.8
IRON	23600	NA	11800	0.63	10	23600	0.94	16	33900	1.15	19
LEAD	18.08	30.2	**55.7**	0.15	0.52	**61.8**	0.22	0.78	**142**	0.27	0.96
MAGNESIUM	6426	NA	3230	0.58	5.2	5810	0.87	7.8	9300	1.07	9.6
MANGANESE	216	NA	78.3	0.07	0.52	192	0.11	0.78	201	0.13	0.96
MERCURY	0.07222	0.13	**0.45**	0.01	0.069	**0.22**	0.01	0.12	**0.39**	0.01	0.12
NICKEL	12.42	15.9	12.3	0.03	4.2	**22.3**	0.05	6.2	**32.8**	0.06	7.6
POTASSIUM	3046	NA	1280	8.13	100	2460	12.17	160	3540	14.92	190
SELENIUM	NA	NA	0.53	0.23	1	0.89	0.34	1.6	0.86	0.42	1.9
SODIUM	13880	NA	5700	1.88	100	11800	2.81	160	16400	3.44	190
THALLIUM	NA	NA	0.28	0.21	1.6	0.42	0.31	2.3	0.38 U	0.38	2.9
VANADIUM	48.84	NA	22.6	0.05	2.6	46.5	0.08	3.9	62.2	0.1	4.8
ZINC	71.54	124	**150**	0.02	2.6	**204**	0.03	3.9	**494**	0.04	4.8
Miscellaneous Parameters (MG/KG)											
TOTAL ORGANIC CARBON	NA	NA	47000	190	890	58000	290	1400	91000	320	1500
Miscellaneous Parameters (%)											
TOTAL SOLIDS	NA	NA	45	NA	1	29	NA	1	27	NA	1

Shading indicates an exceedance of 2 x Average Background Concentration and Region 4 Ecological Screening Value.
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
MDL = Method Detection Limit
RL = Reporting Limit

TABLE 4-5

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
SHIPYARD CREEK SAMPLE LOCATION 009M0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	September 1994[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Inorganics (mg/kg)					
Aluminum	20600	14000		12700 J	
Antimony	2.7J	5.3U	1.2	0.61 U	0.16
Arsenic	11.9	7		6.9	
Barium	29.1	37		50.9	
Beryllium	0.94	0.64J		0.42 U	0.01
Cadmium	0.64J	1.6		0.55 U	0.01
Calcium	35400	20000		31200	
Chromium	291	160		89.5	
Cobalt	5.7	3.9		2.5	
Copper	141	54		56.4	
Iron	26000	15000		11800	
Lead	107	71		55.7	
Magnesium	7200	4900		3230	
Manganese	274	100		78.3	
Mercury	0.69	0.15		0.45	
Nickel	37.3	19		12.3	
Potassium	2470	1900		1280	
Selenium	0.56J	6.7U	2.4	0.53	
Silver	0.46U	2.7U	0.26	0.06 U	0.06
Sodium	10600	8700		5700	
Thallium	0.52U	6.7U	3.5	0.28	
Vanadium	52.2	32		22.6	
Zinc	387	230		150	
Pesticides (µg/kg)					
4,4'-DDD	41J	89U	8.1	1.8 U	1.3
4,4'-DDE	110	89U	8.1	6.6 J	
4,4'-DDT	50U	89U	7.3	1.8 U	0.93
Aldrin	18J	46U	3.8	0.95 U	0.78
alpha-BHC	20U	46U	14	0.95 U	0.63
beta-BHC	20U	46U	13	0.95 U	0.82
delta-BHC	20U	46U	6.2	0.95 U	0.52
Dieldrin	20U	89U	9.5	9.1 J	
Endosulfan I	20U	46U	4.3	0.95 U	0.63
Endosulfan II	50U	89U	7.3	1.8 U	0.67
Endosulfan sulfate	50U	89U	10	1.8 U	1
Endrin	20U	89U	8.7	1.8 U	1.5
Endrin aldehyde	50U	89U	18	1.8 U	0.78
Endrin ketone	50U	89U	8.7	1.8 U	1.1
gamma-BHC (Lindane)	20UJ	46U	3.8	0.95 U	0.82
Heptachlor	20U	46U	8.7	0.95 U	0.74
Heptachlor epoxide	20U	46U	5.7	0.95 U	1.7
Methoxychlor	200U	460U	13	9.5 U	4.1
PCB-1016	200U	890U	180	19 U	18
PCB-1221	200U	1800U	180	19 U	13
PCB-1232	200U	890U	170	19 U	5.9

TABLE 4-5

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
SHIPYARD CREEK SAMPLE LOCATION 009M0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	September 1994[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Pesticides (µg/kg) (Continued)					
PCB-1242	200	890U	200	19 U	7.5
PCB-1248	3000	890U	220	19 U	6.4
PCB-1254	690	890U	140	19 U	14
PCB-1260	770	890U	170	150 J	
Toxaphene	900U	4600U	330	18 U	14
Semivolatile Organic Compounds (µg/kg)					
1,2,4-Trichlorobenzene	NA	900U	57	NA	NA
1,2-Dichlorobenzene	18000U	900U	63	NA	NA
1,3-Dichlorobenzene	18000U	900U	71	NA	NA
1,4-Dichlorobenzene	18000U	900U	60	NA	NA
2,4,5-Trichlorophenol	91000U	900U	87	1800 U	670
2,4,6-Trichlorophenol	18000U	900U	54	740 U	520
2,4-Dichlorophenol	18000U	900U	63	740 U	640
2,4-Dimethylphenol	18000U	900U	95	740 U	550
2,4-Dinitrophenol	91000U	4600U	460	1800 U	1400
2,4-Dinitrotoluene	18000U	900U	52	740 U	550
2,6-Dinitrotoluene	18000U	900U	90	740 U	470
2-Chloronaphthalene	18000U	900U	65	740 U	410
2-Chlorophenol	18000U	900U	73	740 U	560
2-Methylnaphthalene	3600U	900U	65	28 J	
2-Methylphenol	18000U	900U	82	740 U	570
2-Nitroaniline	91000U	4600	63	1800 U	500
2-Nitrophenol	18000U	900U	54	740 U	500
3 & 4 Methylphenol	18000U	900U	79	740 U	630
3,3'-Dichlorobenzidine	36000U	1800U	82	740 U	490
3-Nitroaniline	91000U	4600U	90	1800 U	550
4,6-Dinitro-2-methylphenol	91000U	4600U	540	1800 U	1300
4-Bromophenyl phenyl ether	18000U	900U	84	740 U	330
4-Chloro-3-methylphenol	18000U	900U	92	740 U	600
4-Chloroaniline	18000U	1800U	71	740 U	210
4-Chlorophenyl phenyl ether	18000U	900U	52	740 U	300
4-Nitroaniline	91000U	4600U	46	1800 U	560
4-Nitrophenol	91000U	4600U	570	1800 U	1400
Acenaphthene	3600U	900U	52	170 U	14
Acenaphthylene	3600U	900U	46	32.5 J	
Anthracene	3600U	900U	63	170 J	
Benzo[a]anthracene	18000U	100J		770 J	
Benzo[a]pyrene	18000U	120J		525	
Benzo[b]fluoranthene	18000U	230J		1150	
Benzo[g,h,i]perylene	18000U	100J		245 J	
Benzo[k]fluoranthene	18000UJ	110J		380 J	
Bis(2-chloroethoxy)methane	18000U	900U	65	740 U	270
Bis(2-chloroethyl)ether	18000U	900U	76	740 U	380
Bis(2-ethylhexyl) phthalate	18000U	230J		540 J	
bis(chloroisopropyl) ether	NA	900U	95	NA	NA

TABLE 4-5

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
SHIPYARD CREEK SAMPLE LOCATION 009M0004 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	September 1994[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Semivolatile Organic Compounds (µg/kg) (Continued)					
Butyl benzyl phthalate	18000U	900U	73	740 U	360
Carbazole	NA	900U	76	740 U	460
Chrysene	18000U	150J		360	
Dibenz(a,h)anthracene	18000U	900U	65	180 UJ	34
Dibenzofuran	18000U	900U	52	740 U	380
Diethyl phthalate	18000U	900U	60	740 U	320
Dimethyl phthalate	18000U	900U	52	740 U	310
Di-n-butyl phthalate	18000U	900U	79	740 U	420
Di-n-octyl phthalate	18000U	900U	84	740 U	550
Fluoranthene	9500J	230J		820	36
Fluorene	3600U	900U	60	33 J	
Hexachlorobenzene	18000U	900U	71	740 U	300
Hexachlorobutadiene	18000U	900U	54	740 U	280
Hexachlorocyclopentadiene	18000U	900U	230	740 U	360
Hexachloroethane	18000U	900U	54	740 U	310
Indeno[1,2,3-cd]pyrene	18000U	86J		180	
Isophorone	18000U	900U	60	180 U	16
Naphthalene	18000U	900U	52	180 U	16
Nitrobenzene	18000U	900U	95	740 U	290
N-Nitrosodi-n-propylamine	18000U	900U	76	740 U	310
N-Nitrosodiphenylamine	18000U	900U	63	740 U	570
Pentachlorophenol	18000U	4600U	230	1800 U	950
Phenanthrene	18000U	900U	79	280	
Phenol	18000U	900U	82	740 U	600
Pyrene	6400J	230J		1200 J	

Notes:
Although sediment samples were collected from three locations in Shipyard Creek in April 2008, only one of the three locations (009M0004) had been previously sampled (in September 1994 and December 2005). This table provides a comparison of results for sample location NOIM0004 during the 1994, 2005, and 2008 sampling events.
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
(1) Data taken from Table 3-2 of Spectra Tech (2006).
(2) Method detection limits (MDLs) are shown for non-detect samples. MDLs for samples collected in 2005 were taken from Appendix A of Spectra Tech (2006). MDLs for samples collected in 1994 were not available in the Spectra Tech (2006) report.

TABLE 4-6

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
COOPER RIVER - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample ID	2X Average Background Concentration	Region 4 Sediment Screening Values	054M000103			556M000503			556M000703		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Polynuclear Aromatic Compounds (ug/kg)											
2-METHYLNAPHTHALENE	NA	330	5.2 J	3.5	26	4200 U	580	4200	330 U	46	330
ACENAPHTHENE	NA	330	7 J	1.9	26	**1400 J**	300	4200	330 U	24	330
ACENAPHTHYLENE	45.1	330	3.9 J	1.7	26	4200 U	280	4200	72 J	22	330
ANTHRACENE	60	330	64	3.3	26	**2400 J**	530	4200	200 J	42	330
BENZO(A)ANTHRACENE	103.5	330	190 J	3.2	26	**5800 J**	530	4200	640 J	42	330
BENZO(A)PYRENE	135	330	120	2.6	26	**2500 J**	430	4200	**840**	34	330
BENZO(B)FLUORANTHENE	160.4	NA	250	2.8	26	5400	460	4200	1700	36	330
BENZO(G,H,I)PERYLENE	91.4	NA	51	4.3	26	780 J	690	4200	270 J	55	330
BENZO(K)FLUORANTHENE	153.1	NA	82 J	2.4	26	1200 J	390	4200	560 J	31	330
CHRYSENE	146.2	330	170	3.4	26	**5100**	550	4200	**880**	44	330
DIBENZO(A,H)ANTHRACENE	NA	330	11 J	4.8	26	4200 UJ	780	4200	68 J	62	330
FLUORANTHENE	142.1	330	330	5.1	26	**41000**	840	4200	**550**	66	330
FLUORENE	NA	330	14 J	2.1	26	**2200 J**	340	4200	330 U	27	330
INDENO(1,2,3-CD)PYRENE	92.6	NA	50	5.6	26	4200 U	910	4200	280 J	72	330
NAPHTHALENE	NA	330	2.7 J	2.3	26	4200 U	370	4200	330 U	30	330
PHENANTHRENE	NA	330	110	5.5	26	**18000**	900	4200	97 J	71	330
PYRENE	178.2	330	300 J	8.8	26	**26000 J**	1400	4200	**2600 J**	110	330
Pesticides/PCBs (ug/kg)											
4,4'-DDD	NA	3.3	1.1 U	0.73	1.1	4.8 J	2.4	3.5	3.5 U	2.4	3.5
AROCLOR-1260	NA	NA	94 J	9	11	35 U	29	35	35 U	29	35
Inorganics (mg/kg)											
ALUMINUM	21440	NA	5900 J	0.86	18	47700 J	2.76	59	37800 J	2.94	63
ARSENIC	12.016	7.24	2.1	0.1	0.49	**20.5**	0.33	1.6	**17.6**	0.36	1.7
BARIUM	34.58	NA	85.7	0.02	0.31	44.6	0.06	0.98	44.6	0.06	1
CALCIUM	53260	NA	9330	0.68	3.1	26600	2.17	9.8	31200	2.31	10
CHROMIUM	43.5	52.3	37.0	0.02	0.92	**68.4**	0.07	3	**57.9**	0.08	3.2
COBALT	6.358	NA	10	0.02	1.8	9.2	0.06	5.9	8.4	0.06	6.3
COPPER	14.9	18.7	**386**	0.05	1.5	**43.5**	0.16	4.9	**148**	0.17	5.2
IRON	23600	NA	10200	0.37	6.1	36700	1.18	20	30500	1.26	21

TABLE 4-6

ANALYTES DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
COOPER RIVER - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample ID	2X Average Background Concentration	Region 4 Sediment Screening Values	054M000103			556M000503			556M000703		
			Result	MDL	RL	Result	MDL	RL	Result	MDL	RL
Inorganics (mg/kg) (Continued)											
LEAD	18.08	30.2	**147**	0.09	0.31	**40.5**	0.28	0.98	21	0.29	1
MAGNESIUM	6426	NA	2040	0.34	3.1	10600	1.1	9.8	9850	1.18	10
MANGANESE	216	NA	196	0.04	0.31	494	0.13	0.98	383	0.14	1
MERCURY	0.07222	0.13	0.11	0.01	0.04	0.08	0.01	0.14	0.06	0.01	0.13
NICKEL	12.42	15.9	**32.6**	0.02	2.4	**20**	0.06	7.9	**23**	0.06	8.4
POTASSIUM	3046	NA	634	4.79	61	4540	15.36	200	4070	16.38	210
SELENIUM	ND	NA	0.14 U	0.14	0.61	0.65	0.43	2	0.77	0.46	2.1
SODIUM	13880	NA	2220	1.11	61	24200	3.55	200	25300	3.78	210
VANADIUM	48.84	NA	5.0	0.03	1.5	80.1	0.1	4.9	66	0.11	5.2
ZINC	71.54	124	**826**	0.01	1.5	95.8	0.04	4.9	**144**	0.05	5.2
Miscellaneous Parameters (MG/KG)											
TOTAL ORGANIC CARBON	NA	NA	7100	110	510	46000	350	1700	56000	350	1700
Miscellaneous Parameters (%)											
TOTAL SOLIDS	NA	NA	78	NA	1	24	NA	1	24	NA	1

Shading indicates an exceedance of 2 x Average Background Concentration and Region 4 Ecological Screening Value.
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
MDL = Method Detection Limit
RL = Reporting Limit

TABLE 4-7

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 054M0001 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Inorganics (mg/kg)					
Aluminum	2140	23000		5900 J	
Antimony	1.8J	4.9U	1.1	0.51 U	0.09
Arsenic	3.7	11		2.1	
Barium	19.5J	48		85.7	
Beryllium	0.26J	1		2.1 U	0.01
Cadmium	0.3J	0.54J		0.1 U	0.01
Calcium	8800	11000		9330	
Chromium	28.4	51		37.0	
Cobalt	2.9J	10		10	
Copper	83.1	140		386	
Iron	7170	26000		10200	
Lead	87J	79		147	
Magnesium	2080	6100		2040	
Manganese	47.1	390		196	
Mercury	0.52	0.23		0.11	
Nickel	19.7	28		32.6	
Potassium	592U	2200		634	
Selenium	0.64U	6.1U	2.2	0.14 U	0.14
Silver	0.26U	0.97J		0.54 U	0.03
Sodium	1350	9600		2220	
Thallium	0.64U	6.1U	3.2	0.12 U	0.12
Vanadium	7.4	49		5.0	
Zinc	211J	680		826	
Pesticides (µg/kg)					
4,4'-DDD	NA	88U	8	1.1 U	0.73
4,4'-DDE	NA	88U	8	1.1 U	0.51
4,4'-DDT	NA	88U	7.2	1.1 U	0.53
Aldrin	NA	45U	3.7	0.54 U	0.45
alpha-BHC	NA	45U	14	0.54 U	0.36
beta-BHC	NA	45U	13	0.54 U	0.47
delta-BHC	NA	45U	6.1	0.54 U	0.3
Dieldrin	NA	88U	9.4	1.1 U	0.49
Endosulfan I	NA	45U	4.3	0.54 U	0.36
Endosulfan II	NA	88U	7.2	1.1 U	0.38
Endosulfan sulfate	NA	88U	9.9	1.1 U	0.58
Endrin	NA	88U	8.6	1.1 U	0.88
Endrin aldehyde	NA	88U	17	1.1 U	0.45
Endrin ketone	NA	88U	8.6	1.1 U	0.62
gamma-BHC (Lindane)	NA	45U	3.7	0.54 U	0.47
Heptachlor	NA	45U	8.6	0.54 U	0.43
Heptachlor epoxide	NA	45U	5.6	0.54 U	1
Methoxychlor	NA	450U	13	5.4 U	2.4
PCB-1016	NA	880U	180	11 U	10
PCB-1221	NA	1800U	180	11 U	7.7
PCB-1232	NA	880U	170	11 U	3.4

TABLE 4-7

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 054M0001 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Pesticides (µg/kg) (Continued)					
PCB-1242	NA	880U	200	11 U	4.3
PCB-1248	NA	880U	210	11 U	3.6
PCB-1254	NA	880U	140	11 U	8.3
PCB-1260	NA	880U	170	94 J	
Toxaphene	NA	4500U	320	10 U	8.3
Semivolatile Organic Compounds (µg/kg)					
1,2,4-Trichlorobenzene	850U	880U	56	NA	NA
1,2-Dichlorobenzene	850U	880U	62	NA	NA
1,3-Dichlorobenzene	850U	880U	70	NA	NA
1,4-Dichlorobenzene	850U	880U	59	NA	NA
2,4,5-Trichlorophenol	4100U	880U	86	1000 U	390
2,4,6-Trichlorophenol	850U	880U	54	420 U	300
2,4-Dichlorophenol	850U	880U	62	420 U	360
2,4-Dimethylphenol	850U	880U	94	420 U	320
2,4-Dinitrophenol	4100U	4500U	450	1000 U	830
2,4-Dinitrotoluene	850U	880U	51	420 U	320
2,6-Dinitrotoluene	850U	880U	88	420 U	270
2-Chloronaphthalene	850U	880U	64	420 U	240
2-Chlorophenol	850U	880U	72	420 U	320
2-Methylnaphthalene	220J	880U	64	5.2 J	
2-Methylphenol	850U	880U	80	420 U	330
2-Nitroaniline	4100U	4500U	62	1000 U	290
2-Nitrophenol	850U	880U	54	420 U	290
3 & 4 Methylphenol	850U	880U	78	420 U	360
3,3'-Dichlorobenzidine	1700U	1800U	80	420 U	280
3-Nitroaniline	4100U	4500U	88	1000 U	310
4,6-Dinitro-2-methylphenol	4100U	4500U	540	1000 U	750
4-Bromophenyl phenyl ether	850U	880U	83	420 U	190
4-Chloro-3-methylphenol	850U	880U	91	420 U	340
4-Chloroaniline	850U	1800U	70	420 U	120
4-Chlorophenyl phenyl ether	850U	880U	51	420 U	170
4-Nitroaniline	NA	4500U	45	1000 U	320
4-Nitrophenol	NA	4500U	560	1000 U	830
Acenaphthene	640J	880U	51	7 J	
Acenaphthylene	850U	880U	45	3.9 J	
Anthracene	1400	880U	62	64	
Benzo[a]anthracene	2600	880U	87	190 J	
Benzo[a]pyrene	2200	78J		120	
Benzo[b]fluoranthene	850U	99J		250	
Benzo[g,h,i]perylene	1200	880U	62	51	
Benzo[k]fluoranthene	3600	880U	96	82 J	
Bis(2-chloroethoxy)methane	850U	880U	64	420 U	150
Bis(2-chloroethyl)ether	850U	880U	75	420 U	220
Bis(2-ethylhexyl) phthalate	850U	230J		110 U	3
bis(chloroisopropyl) ether	NA	880U	94	NA	NA

TABLE 4-7

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 054M0001 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Semivolatile Organic Compounds (µg/kg) (Continued)					
Butyl benzyl phthalate	850U	880U	72	420 U	210
Carbazole	NA	880U	75	420 U	270
Chrysene	2900	100J		170	
Dibenz(a,h)anthracene	720J	880U	64	11 J	
Dibenzofuran	590J	880U	51	420 U	220
Diethyl phthalate	850U	880U	59	420 U	180
Dimethyl phthalate	850U	880U	51	420 U	180
Di-n-butyl phthalate	850U	880U	75	420 U	240
Di-n-octyl phthalate	850U	880U	83	420 U	310
Fluoranthene	6700	150J		330	
Fluorene	760J	880U	59	14 J	
Hexachlorobenzene	850U	880U	70	420 U	170
Hexachlorobutadiene	850U	880U	54	420 U	160
Hexachlorocyclopentadiene	850U	880U	220	420 U	210
Hexachloroethane	850U	880U	54	420 U	180
Indeno[1,2,3-cd]pyrene	1100	880U	70	50	
Isophorone	850U	880U	59	420 U	180
Naphthalene	590J	880U	51	2.7 J	
Nitrobenzene	850U	880U	94	420 U	170
N-Nitrosodi-n-propylamine	850U	880U	75	420 U	180
N-Nitrosodiphenylamine	850U	880U	62	420 U	330
Pentachlorophenol	4100	4500U	220	1000 U	540
Phenanthrene	6900	880U	78	110	
Phenol	850U	880U	80	420 U	340
Pyrene	5600	200J		300 J	

Notes:
J = Estimated
U = Non Detect
(1) Data taken from Table 3-2 of Spectra Tech (2006).
(2) Method detection limits (MDLs) are shown for non-detect samples. MDLs for samples collected in 2005 were taken from Appendix A of Spectra Tech (2006). MDLs for samples collected in 1995 were not available in the Spectra Tech (2006) report.

TABLE 4-8

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0005 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Inorganics (mg/kg)					
Aluminum	2770	35000		47700 J	
Antimony	1.7J	9.6U	2.2	0.32 U	0.3
Arsenic	5.4	18		20.5	
Barium	27.4	42		44.6	
Beryllium	0.49J	1.5J		1.3 U	0.02
Cadmium	0.29J	2.4U	1.1	0.02 U	0.02
Calcium	25300	29000		26600	
Chromium	36.7	69		68.4	
Cobalt	6.8	10		9.2	
Copper	1930	44		43.5	
Iron	20300	34000		36700	
Lead	220	26		40.5	
Magnesium	1820	11000		10600	
Manganese	162	400		494	
Mercury	0.05	0.077J		0.08	
Nickel	32.6J	20		20	
Potassium	656J	5000		4540	
Selenium	0.6	12U	4.3	0.65	
Silver	0.24U	4.8U	0.48	0.11 U	0.11
Sodium	1060	29000		24200	
Thallium	0.6U	12U	6.3	0.39 U	0.39
Vanadium	6.3J	77		80.1	
Zinc	774	120		95.8	
Pesticides (µg/kg)					
4,4'-DDD	3200U	180U	16	4.8 J	
4,4'-DDE	7600	180U	16	3.5 U	1.7
4,4'-DDT	3200U	180U	15	3.5 U	1.7
Aldrin	1700U	93U	7.7	1.8 U	1.5
alpha-BHC	1700U	93U	29	1.8 U	1.2
beta-BHC	1700U	93U	26	1.8 U	1.5
delta-BHC	1700U	93U	13	1.8 U	0.97
Dieldrin	3200U	180U	19	3.5 U	1.6
Endosulfan I	1700U	93U	8.8	1.8 U	1.2
Endosulfan II	3200U	180U	15	3.5 U	1.2
Endosulfan sulfate	3200U	180U	20	3.5 U	1.9
Endrin	3200U	180U	18	3.5 U	2.8
Endrin aldehyde	3200U	180U	36	3.5 U	1.5
Endrin ketone	3200U	180U	18	3.5 U	2
gamma-BHC (Lindane)	1.7U	93U	7.7	1.8 U	1.5
Heptachlor	1.7U	93U	18	1.8 U	1.4
Heptachlor epoxide	1.7U	93U	12	1.8 U	3.3
Methoxychlor	45	930U	26	18 U	7.6
PCB-1016	43U	1800U	370	35 U	33
PCB-1221	43U	3700U	370	35 U	25
PCB-1232	43U	1800U	340	35 U	11

TABLE 4-8

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0005 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Pesticides (µg/kg) (Continued)					
PCB-1242	43U	1800U	410	35 U	14
PCB-1248	43U	1800U	440	35 U	12
PCB-1254	87U	1800U	290	35 U	27
PCB-1260	87U	1800U	350	35 U	29
Toxaphene	110U	9300U	660	34 U	27
Semivolatile Organic Compounds (µg/kg)					
1,2,4-Trichlorobenzene	NA	1800U	120	NA	NA
1,2-Dichlorobenzene	1700U	1800U	130	NA	NA
1,3-Dichlorobenzene	1700U	1800U	140	NA	NA
1,4-Dichlorobenzene	1700U	1800U	120	NA	NA
2,4,5-Trichlorophenol	8300U	1800U	180	3400 U	1200
2,4,6-Trichlorophenol	1700U	1800U	110	1400 U	980
2,4-Dichlorophenol	1700U	1800U	130	1400 U	1200
2,4-Dimethylphenol	1700U	1800U	190	1400 U	1000
2,4-Dinitrophenol	8300U	9300U	930	3400 U	2700
2,4-Dinitrotoluene	1700U	1800U	100	1400 U	1000
2,6-Dinitrotoluene	1700U	1800U	180	1400 U	880
2-Chloronaphthalene	1700U	1800U	130	1400 U	780
2-Chlorophenol	1700U	1800U	150	1400 U	1000
2-Methylnaphthalene	1700U	1800U	130	4200 U	580
2-Methylphenol	1700U	1800U	160	1400 U	1100
2-Nitroaniline	8300U	9300U	130	3400 U	930
2-Nitrophenol	1700U	1800U	110	1400 U	940
3 & 4 Methylphenol	1700U	1800U	160	1400 U	1200
3,3'-Dichlorobenzidine	3400U	3600U	160	1400 U	920
3-Nitroaniline	8300U	9300U	180	3400 U	1000
4,6-Dinitro-2-methylphenol	8300U	9300U	1100	3400 U	2400
4-Bromophenyl phenyl ether	1700U	1800U	170	1400 U	620
4-Chloro-3-methylphenol	1700U	1800U	190	1400 U	1100
4-Chloroaniline	1700U	3600U	140	1400 U	400
4-Chlorophenyl phenyl ether	1700U	1800U	100	1400 U	570
4-Nitroaniline	8300U	9300U	93	3400 U	1000
4-Nitrophenol	8300U	9300U	1200	3400 U	2700
Acenaphthene	260J	1800U	100	1400 J	
Acenaphthylene	1700U	1800U	93	4200 U	280
Anthracene	1200J	280J		2400 J	
Benzo[a]anthracene	4300	520J		5800 J	
Benzo[a]pyrene	3600	770J		2500 J	
Benzo[b]fluoranthene	4300	880J		5400	460
Benzo[g,h,i]perylene	1800	300J		780 J	
Benzo[k]fluoranthene	3200	790J		1200 J	
Bis(2-chloroethoxy)methane	1700U	1800U	130	1400 U	500
Bis(2-chloroethyl)ether	1700U	1800U	150	1400 U	710
Bis(2-ethylhexyl) phthalate	1700U	510J		21000 U	480
bis(chloroisopropyl) ether	NA	1800U	190	NA	NA

TABLE 4-8

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0005 - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Semivolatile Organic Compounds (µg/kg) (Continued)					
Butyl benzyl phthalate	1700	1800U	150	1400 U	680
Carbazole	NA	1800U	150	1400 U	870
Chrysene	5600	1000J		5100	
Dibenz(a,h)anthracene	820J	1800U	130	4200 UJ	780
Dibenzofuran	1700U	1800U	100	1400 U	710
Diethyl phthalate	1700U	1800U	120	1400 U	600
Dimethyl phthalate	1700U	1800U	100	1400 U	590
Di-n-butyl phthalate	1700U	1800U	150	1400 U	780
Di-n-octyl phthalate	1700U	1800U	170	1400 U	1000
Fluoranthene	14000	640J		41000	
Fluorene	1700U	1800U	120	2200 J	
Hexachlorobenzene	1700U	1800U	140	1400 U	560
Hexachlorobutadiene	1700U	1800U	110	1400 U	530
Hexachlorocyclopentadiene	1700U	1800U	460	1400 U	680
Hexachloroethane	1700U	1800U	110	1400 U	580
Indeno[1,2,3-cd]pyrene	1800	320J		4200 U	910
Isophorone	1700U	1800U	120	1400 U	580
Naphthalene	1700U	1800U	100	4200 U	370
Nitrobenzene	1700U	1800U	190	1400 U	540
N-Nitrosodi-n-propylamine	1700U	1800U	150	1400 U	580
N-Nitrosodiphenylamine	1700U	1800U	130	1400 U	1100
Pentachlorophenol	8300	9300U	460	3400 U	1800
Phenanthrene	5700	1800U	160	18000	
Phenol	1700U	1800U	160	1400 U	1100
Pyrene	10000	1300J		26000 J	

Notes:
J = Estimated
U = Non Detect
UJ = The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample.
(1) Data taken from Table 3-2 of Spectra Tech (2006).
(2) Method detection limits (MDLs) are shown for non-detect samples. MDLs for samples collected in 2005 were taken from Appendix A of Spectra Tech (2006). MDLs for samples collected in 1995 were not available in the Spectra Tech (2006) report.

TABLE 4-9

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0007 ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Inorganics (mg/kg)					
Aluminum	8770	31000		37800 J	
Antimony	1.6U	8.4U	1.9	0.35 U	0.32
Arsenic	9.1	19		17.6	
Barium	15J	93		44.6	
Beryllium	0.59J	1.4J		1.1 U	0.03
Cadmium	0.41U	2.1U	0.93	0.02 U	0.02
Calcium	19800	40000		31200	
Chromium	20.9	60		57.9	
Cobalt	4.4J	9.1		8.4	
Copper	26.9	1200		148	
Iron	13300	33000		30500	
Lead	13.4	26		21	
Magnesium	4460	11000		9850	
Manganese	230	650		383	
Mercury	0.09	0.074J		0.06	
Nickel	7.3J	25		23	
Potassium	2190J	4400		4070	
Selenium	2U	11U	3.8	0.77	
Silver	0.81U	4.2U	0.42	0.11 U	0.11
Sodium	8530	27000		25300	
Thallium	2U	11U	5.5	0.42 U	0.42
Vanadium	25.3J	71		66	
Zinc	55.4	600		144	
Pesticides (µg/kg)					
4,4'-DDD	10U	160U	15	3.5 U	2.4
4,4'-DDE	10U	160U	15	3.5 U	1.7
4,4'-DDT	10U	160U	13	3.5 U	1.7
Aldrin	5.2U	83U	6.8	1.8 U	1.4
alpha-BHC	5.2U	83U	25	1.8 U	1.2
beta-BHC	5.2U	83U	23	1.8 U	1.5
delta-BHC	5.2U	83U	11	1.8 U	0.97
Dieldrin	10U	160U	17	3.5 U	1.6
Endosulfan I	5.2U	83U	7.8	1.8 U	1.2
Endosulfan II	10U	160U	13	3.5 U	1.2
Endosulfan sulfate	10U	160U	18	3.5 U	1.9
Endrin	10U	160U	16	3.5 U	2.8
Endrin aldehyde	10U	160U	32	3.5 U	1.4
Endrin ketone	10U	160U	16	3.5 U	2
gamma-BHC (Lindane)	5.2U	83U	6.8	1.8 U	1.5
Heptachlor	5.2U	83U	16	1.8 U	1.4
Heptachlor epoxide	5.2U	83U	10	1.8 U	3.2
Methoxychlor	52U	830U	23	18 U	7.6
PCB-1016	130U	1600U	330	35 U	33
PCB-1221	130U	3300U	330	35 U	25

TABLE 4-9

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0007 ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Pesticides (µg/kg) (Continued)					
PCB-1232	130U	1600U	300	35 U	11
PCB-1242	130U	1600U	370	35 U	14
PCB-1248	130U	1600U	390	35 U	12
PCB-1254	270U	1600U	250	35 U	27
PCB-1260	270U	1600U	310	35 U	29
Toxaphene	330U	8300U	580	34 U	27
Semivolatile Organic Compounds (µg/kg)					
1,2,4-Trichlorobenzene	NA	1600U	100	NA	NA
1,2-Dichlorobenzene	2600U	1600U	110	NA	NA
1,3-Dichlorobenzene	2600U	1600U	130	NA	NA
1,4-Dichlorobenzene	2600U	1600U	110	NA	NA
2,4,5-Trichlorophenol	13000U	1600U	160	3400 U	1200
2,4,6-Trichlorophenol	2600U	1600U	97	1400 U	980
2,4-Dichlorophenol	2600U	1600U	110	1400 U	1200
2,4-Dimethylphenol	2600U	1600U	170	1400 U	1000
2,4-Dinitrophenol	13000U	8300U	830	3400 U	2700
2,4-Dinitrotoluene	2600U	1600U	93	1400 U	1000
2,6-Dinitrotoluene	2600U	1600U	160	1400 U	880
2-Chloronaphthalene	2600U	1600U	120	1400 U	770
2-Chlorophenol	2600U	1600U	130	1400 U	1000
2-Methylnaphthalene	2600U	130J		330 U	46
2-Methylphenol	2600U	1600U	150	1400 U	1100
2-Nitroaniline	13000U	8300U	110	3400 U	930
2-Nitrophenol	2600U	1600U	97	1400 U	940
3 & 4 Methylphenol	2600U	1600U	140	1400 U	1200
3,3'-Dichlorobenzidine	5300U	3200U	150	1400 U	910
3-Nitroaniline	13000U	8300U	160	3400 U	1000
4,6-Dinitro-2-methylphenol	13000U	8300U	970	3400 U	2400
4-Bromophenyl phenyl ether	2600U	1600U	150	1400 U	620
4-Chloro-3-methylphenol	2600U	1600U	170	1400 U	1100
4-Chloroaniline	2600U	3200U	130	1400 U	400
4-Chlorophenyl phenyl ether	2600U	1600U	93	1400 U	560
4-Nitroaniline	13000U	8300U	83	3400 U	1000
4-Nitrophenol	13000U	8300U	1000	3400 U	2700
Acenaphthene	690J	190J		330 U	24
Acenaphthylene	2600U	1600U	83	72 J	
Anthracene	1200J	680J		200 J	
Benzo[a]anthracene	1800J	870J		640 J	
Benzo[a]pyrene	1500J	670J		840	
Benzo[b]fluoranthene	2600U	670J		1700	36
Benzo[g,h,i]perylene	710J	290J		270 J	
Benzo[k]fluoranthene	2200J	700J		560 J	
Bis(2-chloroethoxy)methane	2600U	1600U	120	1400 U	500
Bis(2-chloroethyl)ether	2600U	1600U	140	1400 U	710

TABLE 4-9

ANALYTICAL RESULTS DURING THREE SAMPLING PERIODS
COOPER RIVER SAMPLE LOCATION 556M0007 ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	November 1995[1]	December 2005		April 2008	
		Result[1]	MDL[2]	Result	MDL[2]
Semivolatile Organic Compounds (µg/kg) (Continued)					
Bis(2-ethylhexyl) phthalate	2600U	780J		1700 U	38
bis(chloroisopropyl) ether	NA	1600U	170	NA	NA
Butyl benzyl phthalate	2600U	1600U	130	1400 U	670
Carbazole	NA	1600U	140	1400 U	860
Chrysene	1900J	1100J		880	34
Dibenz(a,h)anthracene	360J	1600U	120	68 J	
Dibenzofuran	2600U	1600U	93	1400 U	710
Diethyl phthalate	2600U	1600U	110	1400 U	590
Dimethyl phthalate	2600U	1600U	93	1400 U	590
Di-n-butyl phthalate	2600U	1600U	140	1400 U	780
Di-n-octyl phthalate	290J	1600U	150	1400 U	1000
Fluoranthene	4600	2000		550	
Fluorene	520J	1600U	110	330 U	27
Hexachlorobenzene	2600U	1600U	130	1400 U	560
Hexachlorobutadiene	2600U	1600U	97	1400 U	530
Hexachlorocyclopentadiene	2600U	1600U	400	1400 U	680
Hexachloroethane	2600U	1600U	97	1400 U	580
Indeno[1,2,3-cd]pyrene	690J	270J		280 J	
Isophorone	2600U	1600U	110	1400 U	580
Naphthalene	2600U	1600U	93	330 U	30
Nitrobenzene	2600U	1600U	170	1400 U	540
N-Nitrosodi-n-propylamine	2600U	1600U	140	1400 U	570
N-Nitrosodiphenylamine	2600U	1600U	110	1400 U	1100
Pentachlorophenol	13000U	8300U	400	3400 U	1800
Phenanthrene	2400J	370J		97 J	
Phenol	2600U	1600U	150	1400 U	1100
Pyrene	4400	1400J		2600 J	

Notes:
J = Estimated
U = Non Detect
(1) Data taken from Table 3-2 of Spectra Tech (2006).
(2) Method detection limits (MDLs) are shown for non-detect samples. MDLs for samples collected in 2005 were taken from Appendix A of Spectra Tech (2006). MDLs for samples collected in 1995 were not available in the Spectra Tech (2006) report.

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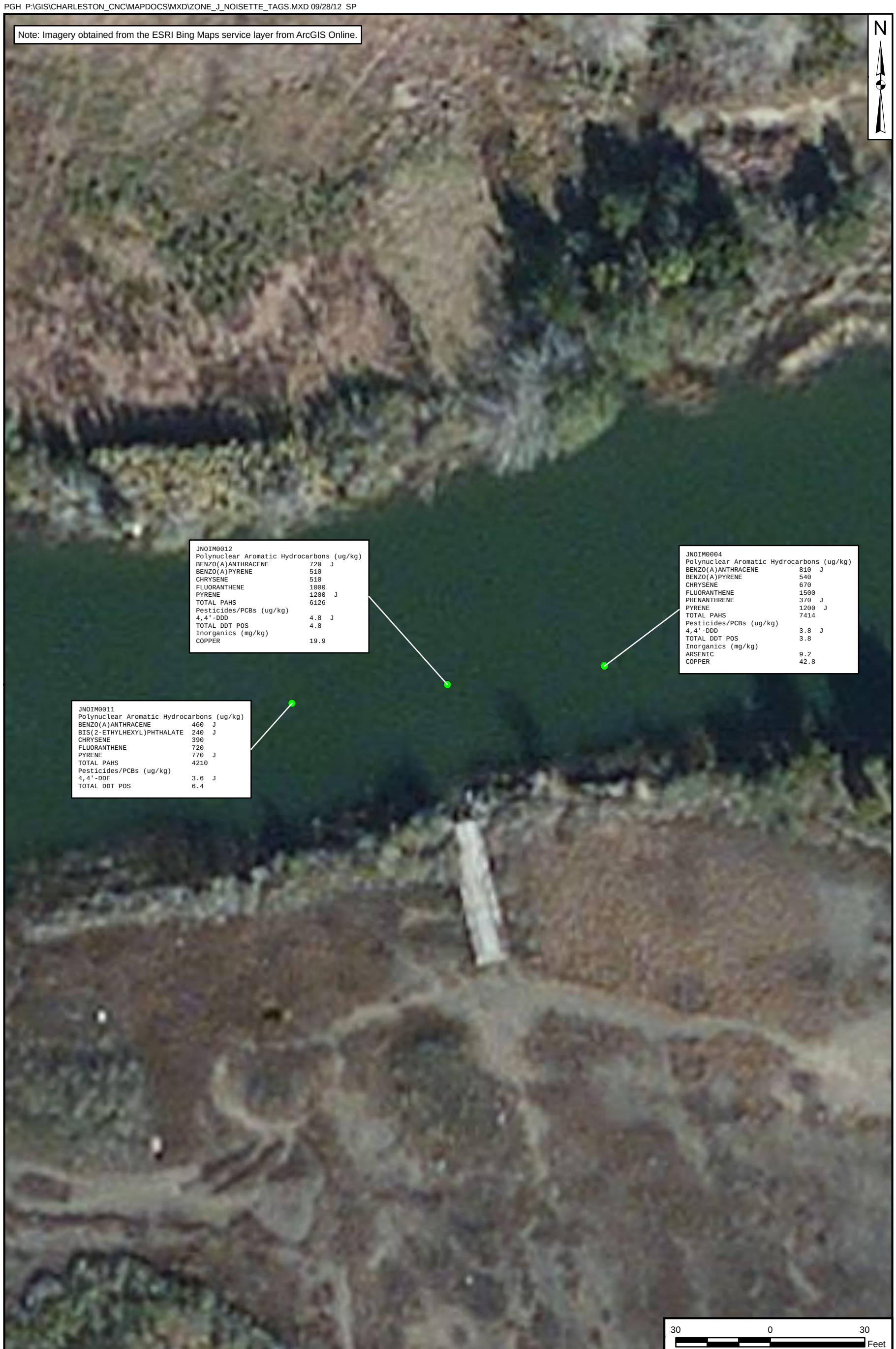


DRAWN BY	DATE
K. MOORE	4/15/09
CHECKED BY	DATE
G. POPE	09/27/12
REVISED BY	DATE
K. MOORE	09/27/12
SCALE	
AS NOTED	

NAVFAC

ZONE J SEDIMENT SAMPLE LOCATION MAP
NOISETTE CREEK
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	017
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-1	0

PGH P:\GIS\CHARLESTON_CNC\MAPDOCS\MXD\ZONE_J_SHIPYARD_TAGS.MXD 09/28/12 SP

DRAWN BY	DATE
K. MOORE	4/15/09
CHECKED BY	DATE
G. POPE	09/27/12
REVISED BY	DATE
K. MOORE	09/27/12
SCALE	
AS NOTED	

NAVFAC

ZONE J SEDIMENT SAMPLE LOCATION MAP
SHIPYARD CREEK
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	017
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-2	0

PGH P:\GIS\CHARLESTON_CNC\MAPDOCS\MXD\ZONE_J_COOPER_TAGS.MXD 09/28/12 KM

DRAWN BY	DATE
K. MOORE	4/15/09
CHECKED BY	DATE
G. POPE	09/27/12
REVISED BY	DATE
K. MOORE	09/27/12
SCALE	
AS NOTED	

NAVFAC

ZONE J SEDIMENT SAMPLE LOCATION MAP
COOPER RIVER
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	017
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 4-3	0

5.0 CONTAMINANT FATE AND TRANSPORT

This section contains a discussion of the fate and transport of contaminants in Zone J. The evaluation focuses on the following COPCs defined by the human and ecological risk assessments:

- PAHs
- Metals
- Pesticides
- PCBs
- Phthalates

Generally, the methods by which the contaminants are transported from source areas to environmental media (and from one environmental medium to another) and the ultimate fate of a chemical in an environmental medium are examined. The discussion is organized by contaminant type and then by environmental medium. The following chemical characteristics are discussed:

- **Henry's Law Constant:** Describes the ratio of atmospheric to solution concentrations at low partial pressures. This constant indicates a chemical's potential to volatilize. In general, chemicals having a Henry's Law constant of less than 1E-05 atmosphere-cubic meter per mole (atm-m^3/mole), such as PAHs, should volatilize very little and be present only in minute amounts in the atmosphere or soil gas. In contrast, for chemicals with a Henry's Law constant greater than 5E-03 atm-m^3/mole, such as many VOCs, volatilization and diffusion could be very significant.

- **Organic carbon partition coefficient (K_{oc}):** Indicates a chemical's potential to bind to organic carbon in soil and sediment. This parameter may be used to infer the relative rates at which chemicals are transported in water. Chemicals with a high K_{oc} value tend to bind to organic carbon, while chemicals with a low K_{oc} value tend to be highly soluble in water.

- **Octanol-water partition coefficient (K_{ow}):** Estimates the potential for an organic chemical to move from water into lipid (or fats). A linear relationship between K_{ow} and the uptake of chemicals by the fatty tissues of animal and human receptors (i.e., the bioconcentration factor) has been established.

5.1 PAHs

PAHs have been detected in sediment in all three water bodies at Zone J. The physiochemical properties of the PAHs (water solubility, vapor pressure, Henry's law constant, K_{ow}, and K_{oc}) explain, to a large extent, the observed partitioning of these contaminants among the environmental media (soil,

groundwater, surface water, sediment). The transport and partitioning of an individual PAH compound is roughly related to the molecular weight of the compound. PAHs fall into one of three categories, low molecular weight (two to three benzene rings, e.g., acenaphthene, anthracene, fluorene, and phenanthrene), medium molecular weight (four benzene rings, e.g., fluoranthene and pyrene), and high molecular weight (five or more benzene rings, e.g., benzo(a)pyrene, dibenzo(a,h)anthracene and indeno(1,2,3-c,d)pyrene) compounds. Typically those PAHs with lower molecular weights will be more mobile within a given medium. For example, a low molecular weight PAH will be much more likely to volatilize, than a high molecular weight PAH. Low molecular weight PAHs tend to have lower K_{oc} values and a moderate potential to be adsorbed to organic carbon in soil and sediments compared to high molecular weight PAHs, which have stronger tendencies to adsorb to organic carbon.

In the CNC area, the coastal terrace deposits are underlain by unconsolidated to weakly consolidated Holocene to Miocene clastic sediments, which are composed of calcareous and organic-rich clays, silts, and sands. Thus, the PAH contamination is generally expected to adhere strongly to these sediments and not significantly migrate vertically or horizontally.

The following narrative provides a brief summary of chemical fate information for PAH compounds from the literature.

Chemical Fate in a Surface Water Column

In water, PAH compounds tend to be physically removed by volatilization to the atmosphere, by binding to suspended particles or sediments, or by being accumulated by or sorbed onto aquatic biota. The Henry's Law Constant determines how readily an individual PAH compound will volatilize from surface water to air. Ideal conditions for volatilization of PAHs from surface water would be high temperature, low depth (from the water surface), and high wind. However, because of their low solubility and high affinity for organic carbon, PAHs in aquatic systems are primarily found sorbed to particles that either have settled to the bottom or are suspended in the water column. In an estuary, volatilization and adsorption to suspended sediments with subsequent deposition are the primary physical removal processes for medium and high molecular weight PAHs, whereas volatilization and biodegradation are the major removal processes for low molecular weight PAHs. In some instances, PAHs will settle quickly to sediment, but may be recycled back into the water column from the sediment surface. This scenario is more likely for PAHs with lower molecular weights than for those with higher molecular weights, which tend to stay bound to sediment. Low molecular weight PAHs also have a lesser tendency to be adsorbed to organic carbon than high molecular weight PAHs.

The most important chemical/biological processes contributing to the degradation of PAHs in water are photo-oxidation, chemical oxidation, and biodegradation by aquatic microorganisms. Temperature,

depth, flow rate, and oxygen content impact the overall fate of a PAH in water. The rate and extent of photodegradation vary widely among PAHs and do not follow a discernable pattern. PAHs in water can be chemically oxidized by chlorination and ozonation. However, the PAH-related by-products resulting from chlorination are not fully known, and there appears to be no correlation between biodegradability and molecular weight.

Chemical Fate in Soil and Sediment

In soil, PAHs can volatilize, undergo abiotic degradation (photolysis and oxidation), biodegrade, or accumulate in plants. In sediment, PAHs can biodegrade or accumulate in aquatic organisms. Sorption of PAHs to soil and sediment increases with increasing organic carbon content and with increasing surface area of the sorbent particles (e.g., greater sorption to clays than sands). For example, three to four times more anthracene and about two times more fluoranthene, benzo(a)anthracene and benzo(a)pyrene can be retained by marsh sediment than by sand. Sorption of PAHs to organic matter and soil particulates influences bioavailability and biotransformation potential.

Microbial metabolism is the major process for degradation of PAHs in soils. Chemical degradation (photolysis, hydrolysis, and oxidation) is generally not considered as significant. PAH losses from surface soil because of volatilization and photolysis can be substantial for low molecular weight PAHs; however, losses for medium and high molecular weight compounds are typically insignificant. The rate and extent of biodegradation of PAHs in soil are affected by environmental factors such as the organic content, structure, and particle size of the soil, characteristics of the microbial population, presence of other contaminants such as metals and cyanides that may be toxic to microorganisms, and physical and chemical properties of the individual PAHs. Other environmental factors that influence the rate of PAH degradation in soil include temperature, pH, oxygen concentration, PAH concentrations, and contamination history of soil, soil type, moisture, nutrients, and other substances that may act as substrate co-metabolites. Biodegradation of PAHs in soil is faster for low molecular weight compounds than high molecular weight compounds. The pathways of microbial degradation are well known for some PAHs. Mean half-lives (or the rate of degradation of PAHs) are positively correlated with log K_{ow} and inversely correlated with log water solubility.

In studies, the rate of microbial transformation of PAHs in freshwater sediments from both pristine and oil-contaminated streams was 10 to 400 times greater in contaminated sediment than uncontaminated sediment. Absolute rates of PAH transformation were 3,000 to 125,000 times greater in the contaminated sediment. Turnover times in the oil-contaminated sediment increased 30 to 100-fold per additional benzene ring from naphthalene through benzo(a)anthracene. Naphthalene was broken down in hours, but the turnover times for benzo(a)anthracene and benzo(a)pyrene were approximately 400 days and 3.3 years, respectively. Therefore, the four- and five-ring PAHs may persist even in sediments that have

received chronic PAH inputs. As noted previously, the rate of PAH biodegradation may also be decreased by the degree of contamination. Half-lives may be longer when contaminants at the site are toxic to degrading mircoorganisms.

Bioconcentration

PAHs can accumulate in aquatic organisms from water, sediments, and food. Bioconcentration is greater for high molecular weight PAHs than for low molecular weight PAHs. Some aquatic organisms are able to metabolize and eliminate PAHs. However, in others, PAHs are transformed into carcinogenic and mutagenic intermediates, and exposure to PAHs has been linked to the development of tumors in fish. Sediment-associated PAHs can accumulate in bottom-dwelling invertebrates and fish.

5.2 METALS

Concentrations of metals (particularly aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, vanadium, and zinc) in excess of background concentrations have been detected in sediment at Zone J.

Overview of Metals Fate and Transport Information from Literature

The following narrative provides a brief summary of chemical fate information for metals from the literature.

Metals are highly persistent and do not readily biodegrade, photolyze, or hydrolyze. The transport of metals in the subsurface is influenced by a variety of complex mechanisms and interactions. The major fate mechanisms for metals are adsorption to the soil matrix and bioaccumulation. The interactions are not well understood in many cases due to the fact that natural systems are mixtures of various reactive substances that can vary over distances in the subsurface and can vary with time as subsurface conditions change. Transport of metals in the subsurface environment can be a function of the following mechanisms:

- **Advection**: Metals particles are transported with the flow of groundwater. Advection is one of the primary mechanisms by which constituents are transported from a source area in the form of a plume. Advection results in the reduction of constituent concentrations by dilution with surrounding groundwater but does not result in mass reduction.

- **Dispersion**: Dispersion is the mixing of constituents in groundwater primarily caused by its movement through a complex network of small openings (i.e., pores) located between the individual

grains of sand, silt, and clay. Dispersion is one of the primary mechanisms by which constituents are transported from a source area in the form of a plume. Dispersion results in the reduction of constituent concentrations by dilution with surrounding groundwater, but not by mass reduction.

- **Sorption/Desorption**: The complex chemical processes (e.g., ionic attraction, oxidation-reduction reactions, complexation with an organic constituent) by which constituents partition between the aqueous phase and solid phase (soil) in the aquifer matrix. A particular trace metal will typically compete for available adsorption sites with other trace metals, hydrogen, calcium, and sulfate. The sorption (i.e., attachment) of a constituent onto a mineral surface or organic matter results in the retardation (i.e., slowing or delaying) of constituent transport in the aquifer.

- **Speciation:** The process of changing the ionic strength and reactivity of a constituent. Speciation may cause significant differences in the sorption behavior of the constituent.

- **Dissolution/Precipitation:** The dissolving or solidifying of a constituent as a result of a chemical reaction. For trace metals, dissolution and precipitation behavior are largely a function of pH (i.e., acidity or alkalinity) and the initial distributions of the aqueous, solid, and adsorbed masses of each constituent. Dissolution of a constituent from a source area typically provides a continuous or intermittent influx of constituents to the groundwater until geochemical equilibrium conditions are achieved.

Many studies have found that the predominant adsorbates of metal ions are iron and manganese oxides and organic matter such as detrital plant material and humic coatings on mineral surfaces. Metal hydroxides of iron, aluminum, and manganese are important reductive surfaces in subsurface materials with respect to interactions with charged species such as hydrogen, aluminum, cadmium, zinc, lead, and copper and with negatively charged species such as phosphate, sulfate, bicarbonate, and fluoride. The adsorption of species on oxides is strongly dependent on pH due to the variable, pH-dependent, surface charge and potential of metal hydroxides and to a pH-dependent speciation of the adsorbate.

5.3 PESTICIDES

Whether pesticides are sprayed, dusted, or applied directly to the soil, soil is the ultimate sink for these chemicals. Surface soil runoff may carry pesticides to adjacent surface water bodies. Bioconcentration of pesticides in the food chain is another important fate mechanism. In water, they do not typically biodegrade or hydrolyze to any significant extent; rather, they tend to bioconcentrate in aquatic organisms. Hydrolysis, oxidation, and photolysis are not generally important fate mechanisms for pesticides in soil or water. Hydrolysis half-lives for several pesticides are reported in periods of months to

years (USEPA, 1979). The pesticides 4,4-DDD, 4,4-DDE, and dieldrin were detected in sediment at Zone J and are discussed below:

Dichlorodiphenyltrichloroethane (4,4'-DDT) and its metabolites are considered to be persistent chemicals. They undergo extensive adsorption to soil and are not highly soluble. Biodegradation may occur under both aerobic and anaerobic conditions in the presence of certain soil microorganisms. Under aerobic conditions, 4,4'-DDT may be transformed to DDE, and under anaerobic conditions, 4,4'-DDD may result. These compounds are, however, somewhat volatile, with a reported half-life of 100 days for 4,4'-DDT. These compounds are highly lipophilic and therefore readily bioaccumulate (Agency for Toxic Substances and Disease Registry [ATSDR]), 1997). 4,4'-DDT is no longer produced in the United States.

Aldrin is readily converted to **dieldrin.** Dieldrin is a particularly persistent pesticide but is no longer registered for general use. In soil, dieldrin will persist for long periods of time (more than 7 years) and may slowly evaporate. It does not readily leach to groundwater. Once in surface waters (via runoff), dieldrin adsorbs strongly to sediments, where it can bioconcentrate or slowly photodegrade. Biodegradation and hydrolysis are not significant (Howard, 1991).

5.4 PCBs

PCBs are considered to be very persistent organic chemicals. Biodegradation is the only process known to transform PCBs under environmental conditions, and only the lighter compounds are measurably biodegraded (USEPA, 1979). Although some microorganisms (e.g., *Phanaerochaete chrysosporium*) may biodegrade PCBs, such fungi may not exist in local soil. There is experimental evidence to suggest that heavier PCBs (five or more chlorines per molecule) can undergo photolytic degradation, but there are no data to suggest that this process operates under environmental conditions (USEPA, 1979). Base-, acid-, and neutral-promoted hydrolysis are considered to be inconsequential degradation mechanisms for PCBs (USEPA, 1982).

5.5 PHTHALATE ESTERS

Phthalate esters are considered to be relatively persistent chemicals in the environment. Although numerous studies have demonstrated that phthalate esters undergo biodegradation, it appears that this is a slow process in both soils and surface waters. Certain microorganisms have been shown to excrete products that increase the solubility of phthalate esters and enhance their biodegradation (Gibbons and Alexander, 1989).

Biodegradation of BEHP is an important fate mechanism. However, hydrolysis of BEHP is very slow, with a calculated half-life of 2000 years (USEPA, 1979). Bioaccumulation is also a significant fate process.

Photolysis and volatilization are considered to be insignificant degradation mechanisms (USEPA, 1979; Howard, 1989).

6.0 HUMAN HEALTH RISK ASSESSMENT

6.1 INTRODUCTION

This HHRA presents a quantitative and qualitative assessment of the potential risks to public health posed by chemicals detected in sediments at Zone J of the CNC, Charleston, South Carolina. There are three water bodies associated with Zone J: Noisette Creek, Shipyard Creek, and the Cooper River. As stated in the Supplemental RFI QAPP (TtNUS, 2008), each water body is distinctly different in size, flow, and level of near-shore industrialization. Therefore, Noisette Creek, Shipyard Creek, and the Cooper River will be evaluated separately. All three water bodies receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several NPDES outfalls. Noisette Creek flows eastward into the Cooper River at the northern end of Zone J. CNC occupies the eastern shoreline of Shipyard Creek with portions of Zones G, H, and I draining into the creek. There are industrial facilities located along the western shoreline of Shipyard Creek that are not related to CNC. The CNC waterfront along the Cooper River is dominated by 25 piers and five dry docks and mostly protected by a wooden and/or concrete seawall. Shipyard Creek discharges into the Cooper River at the southern end of Zone J. The RI risk assessment is segregated by area so that further actions appropriate to each area can be determined.

The risk assessment is performed to evaluate specifically the potential ingestion of fish by a recreational fisherman assumed to catch and eat fish from Noisette Creek, Shipyard Creek, and/or the Cooper River. The overall objective of the HHRA is to determine the potential for health risks in the absence of remedial action at the site and, if action is required, to focus the evaluation of remedial action alternatives.

The following current USEPA risk assessment guidance documents were used to develop the framework for the HHRA:

- Risk Assessment Guidance for Superfund (RAGS): Volume I, Human Health Evaluation Manual (Part A) (USEPA, 1989).

- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Washington, D.C. Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6 03 (USEPA, 1991).

- Distribution of Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. OSWER, Washington, D.C. (USEPA, 1993a).

- Exposure Factors Handbook. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/P 95/002Fa (USEPA, 1997a).

- Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA, 2001a).

- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Office of Emergency and Remedial Response (OERR), Washington, D.C. OSWER 9285.6-10 (USEPA, 2002).

An HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 6.2 through 6.6 contain detailed discussions of the five components of the HHRA.

Three major circumstances relating to chemical contamination and environmental fate and transport must be present in order for a risk assessment to proceed: (1) Contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of the factors listed above is absent, the exposure pathway is incomplete, and risks are not quantitatively evaluated.

6.2 DATA EVALUATION

Data evaluation, the first component of an HHRA, is a two-step, medium-specific task involving the compilation and evaluation of analytical data. The first step involves the compilation of the analytical database and an evaluation of data usability for purposes of HHRA. The second step of the data evaluation is the selection of a medium-specific list of COPCs which are used to quantitatively or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a toxicity screen (i.e., a comparison of site contaminant concentrations to conservative toxicity screening values) and a background screen (i.e., a comparison of site concentrations to background concentrations).

6.2.1 Data Usability

Data collected from this investigation were used to assess potential risks to human receptors. All analytical data used in the quantitative estimation of potential risks were subject to a data quality

evaluation (i.e., data validation). The data validation was conducted in accordance with the QAPP (TtNUS, 2008). Validated data are included in Appendix O of this RI report.

Fixed-base laboratory analytical results for the targeted analytes were used in the quantitative risk evaluation. Field measurements and data regarded as unreliable (i.e., qualified as "R" during the validation process) were not used in the quantitative risk assessment. The uncertainty associated with the rejection of analytical results is discussed in Section 6.6.6.

6.2.2 Selection of Contaminants of Potential Concern

This section explains how COPCs were selected. As outlined in the work plan, the COPCs evaluated in the ecological risk assessment were selected as COPCs for the HHRA. COPCs were also examined in light of human health criteria but no significant changes to the COPC list resulted.

6.2.2.1 Toxicity Screening Methodology

USEPA Region 4 sediment ESVs were used as toxicity screening values for purposes of selecting COPCs for both human and ecological risk assessments.

6.2.2.2 Background Screening Methodology

Background concentrations are concentrations of chemicals that would exist in the absence of influence from site operations. Background samples were obtained from locations that have not been influenced by site operations. A background sediment dataset representing regional baseline reference (background) conditions has been developed and approved by representatives of SCDHEC and other Natural Resource Trustees (TtNUS, 2008). The background dataset consists of 10 sediment samples from various locations in Charleston Harbor. The background concentrations used in the COPC selection tables are twice the average background concentration.

6.2.2.3 Other Considerations

The essential nutrients (calcium, magnesium, potassium, and sodium) were not identified as COPCs for Zone J. These inorganic chemicals are naturally abundant in environmental matrices and are toxic only at high doses. There are no ESVs for these nutrients and there have been no activities at sites near Zone J that have resulted in known releases of high concentrations of these nutrients.

6.2.2.4 Decision Rules for Establishing COPCs

The applicable decision rules for the selection of COPCs are explained briefly below and were previously presented in the QAPP for the Zone J Supplemental RFI (TtNUS, 2008):

- If the maximum site sediment concentration exceeds the ESV or if a screening value is not available for a chemical, the maximum detected concentration will be compared to twice the average background concentration. Then, a chemical with a maximum concentration less than or equal to twice the average background concentration will be eliminated from further consideration, and a chemical with a maximum concentration that exceeds twice the background concentration will be considered to be a COPC and will be retained for further evaluation.

6.2.3 COPCs Selected for HHRA

COPCs in Zone J sediments were selected using the methodology described in Section 6.2.2. The rationale for COPC selection is provided in the following subsections. Chemicals retained as COPCs for Noisette Creek, Shipyard Creek, and Cooper River are presented in Tables 6-1, 6-2, and 6-3, respectively, and are summarized in Table 6-4.

6.2.3.1 Sediment

Noisette Creek – Sediment

Eighteen SVOCs, three pesticides/PCBs, and 19 inorganics were detected in Noisette Creek sediment samples from Zone J. A comparison of the maximum detected sediment concentrations to ESVs is presented in Table 6-1. The following chemicals were detected in sediment at maximum concentrations exceeding the ESV-based COPC screening levels and background concentrations, and were retained as COPCs for sediment at Noisette Creek.

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo (g,h,i) perylene, benzo (k) fluoranthene, BEHP, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene]
- Pesticides/PCBs [4,4'-DDD, 4,4'-DDE, Total DDT]
- Inorganics [copper, mercury, selenium, thallium, and zinc]

As indicated in Table 6-1, the maximum arsenic concentration exceeded the screening level; however it did not exceed the background value. Concentrations of aluminum, barium, cobalt, iron, manganese, and vanadium were also below background levels.

Shipyard Creek – Sediment

Eighteen SVOCs, three pesticides/PCBs, and 19 inorganics were detected in Shipyard Creek sediment samples from Zone J. A comparison of the maximum detected sediment concentrations to ESVs is presented in Table 6-2. The following chemicals were detected in sediment at maximum concentrations exceeding the ESV-based COPC screening levels and background concentrations, and were retained as COPCs for sediment at Shipyard Creek.

- SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, BEHP, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene]

- Pesticides/PCBs [4,4'-DDE, Aroclor-1260, and dieldrin]

- Inorganics [aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, thallium, vanadium, and zinc]

Cooper River – Sediment

Eighteen SVOCs, two pesticides/PCBs, and 18 inorganics were detected in Cooper River sediment samples from Zone J. A comparison of the maximum detected sediment concentrations to ESVs is presented in Table 6-3. The following chemicals were detected in sediment at maximum concentrations exceeding the ESV based COPC screening levels and background concentrations, and were retained as COPCs for sediment at Cooper River.

- SVOCs [acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene]

- Pesticides/PCBs [4,4'-DDD, and Aroclor-1260]

- Inorganics [aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, vanadium, and zinc]

6.2.3.2 Summary

Table 6-4 summarizes the chemicals retained as COPCs for sediment at Zone J.

6.3 EXPOSURE ASSESSMENT

The exposure assessment component of a baseline HHRA defines and provides a means to evaluate, quantitatively or qualitatively, the type and magnitude of human exposure to chemicals present at or associated with a site. A foundation of the exposure assessment is the conceptual site model (CSM), which identifies site characteristics including potential contaminant sources, contaminant release mechanisms, transport routes, receptors, and other appropriate information. CSMs consider both current and future land use scenarios for Zone J.

Estimated chemical intakes developed during the exposure assessment are evaluated for complete exposure pathways in the risk characterization to produce quantitative estimates of cancer and non-cancer risk. A complete exposure pathway has three components: 1) a source of chemicals that can be released to the environment, 2) a route of contaminant transport through an environmental medium, and 3) an exposure or contact point for a human receptor. In accordance with the QAPP (TtNUS, 2008), the only exposure pathway evaluated in this HHRA is fish consumption.

6.3.1 Sources of Environmental Contamination

Zone J lies within the Charleston Harbor estuary, which is a mixing zone where fresh water meets salt water. Zone J is also subjected to twice-daily tidal ebb and flow, which mix salt water and fresh water and transport sediments and (potentially) pollutants within the estuary. The Zone J water bodies receive storm water runoff and other inputs from numerous points and nonpoint discharges, including several NPDES outfalls. Activities such as refueling, repair, ship docking, and loading/unloading of cargo also are potential sources of waterfront contamination. Building drains and storm drains underlying CNC also have the potential to discharge contaminants into the Cooper River.

6.3.2 Potential Migration Routes

Potential migration pathways from CNC sites to Zone J include the following:

- Transport to Zone J via storm water drainage systems and outfalls
- Overland transport to Zone J via sheet flow
- Transport to Zone J via groundwater discharge to surface water

6.3.3 Potential Current and Future Receptors of concern and Exposure Pathways

The HHRA for Zone J evaluates risks to recreational fisherman who are assumed to periodically catch and consume fish from the study area as stated in the QAPP. Because actual fish tissue samples were not collected, the chemical concentrations in fish tissue were derived/estimated based on available

sediment data. This assumes that chemicals in sediment are bioaccumulated and bioconcentrated in fish tissue; this would be most likely for bottom-dwelling fish such as flounder.

6.3.4 Calculation of Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for COPCs only, is an estimate of the chemical concentration within an exposure unit (EU) likely to be contacted over time by a receptor and is used to estimate exposure intakes. An EU is defined as the area typically encountered/traversed by a receptor under a particular land use scenario. For example, a residential lot with an area of ¼ acre to two acres is often used for the evaluation of a hypothetical future resident. However, the size of an EU selected for HHRA is typically based on the distribution of the chemical concentrations in a medium as well as on presumed receptor activity patterns.

Each Zone J water body, although part of the same dynamic watershed, is distinctly different in size, flow, and level of near-shore industrialization. Therefore, Noisette Creek, Shipyard Creek, and the Cooper River were evaluated as separate entities. Only three sediment samples were collected for each EU, therefore the EPCs for the reasonable maximum exposure (RME) and central tendency exposure (CTE) case were defined as the maximum detected concentration. Sample and duplicate analytical results were averaged for statistical use before the EPC was calculated. One-half the method detection limit was used for non-detected values.

Table 6-5 summarizes the EPCs used in this HHRA. RAGS Part D Tables for the EPCs are presented in Appendix P.

6.3.5 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Traditionally, exposures evaluated in an HHRA are based on the concept of a RME only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, 1989). However, subsequent risk assessment guidance (USEPA, 1992) indicates the need to address an average case or CTE. To provide a full characterization of potential exposure, both RME and CTE intakes/scenarios are evaluated in the HHRA for Zone J. Intakes for the recreational fisherman are calculated using current USEPA risk assessment guidance and are presented in risk assessment spreadsheets and tables (Appendix P). Risk assessment results are presented in USEPA RAGS Part D format.

Exposure assumptions used to estimate chemical intakes in the HHRA are summarized in Table 6-6 and Table 6-7 for RME and CTE scenarios respectively. The fraction ingested (FI) from the contaminated source depended on the areas from which the fish/crabs are taken. A FI of 0.01 (1 percent) was used for

fish/crabs caught in small creeks and streams (i.e., Noisette Creek and Shipyard Creek). A FI of 0.1 (10 percent) was used for fish/crabs caught in the Cooper River. This assumes that 1 or 10 percent of the fish/crabs caught and ingested by the recreational fisherman come from the study area. Fish tissue concentrations (for purposes of evaluating risks associated with human consumption) were calculated by modifying the ecological equation used to calculate the concentrations of organic COPCs found in food items of mammals. A lipid content of 3 percent (0.03) was used for assessing human health effects from the consumption of contaminated fish (USEPA, 2004). Biota-sediment-accumulation factors (BSAFs) provided in Appendix P and a dry weight-to-wet weight conversion factor of 0.25 based on an assumed 75 percent moisture content in fish (Sample et al., 1997) were used with sediment concentrations to estimate fish tissue concentrations (see Appendix P).

Noncarcinogenic intakes are calculated using the concept of an average annual exposure. Carcinogenic intakes are calculated as an incremental lifetime exposure, which assumes a life expectancy of 70 years.

Intakes for the fish ingestion exposure route were estimated using the following equation (USEPA, 1989):

$$\text{Intake} = \frac{(C_{Fish} \text{ x IR x FI x EF x ED})}{(\text{BW x AT})}$$

Where:

Intake	=	ingestion intake (mg/kg-day)
C_{FISH}	=	fish tissue concentration (mg/kg)
IR	=	ingestion rate (kilogram[kg]/meal)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (meals/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365;
		for carcinogens, AT = 70 years x 365 days/year

Exposure to Lead in Fish Tissue

Exposure to lead in fish was assessed using a version of the USEPA's Technical Review Workgroup (TRW) Adult Lead Model (ALM) (January 2003) adapted for fish ingestion. The equation and methodology previously presented cannot be used to evaluate exposure to lead because of the absence of published toxicity criteria (i.e., cancer slope factors, reference doses) for lead. The TRW model is typically used to evaluate exposure to lead in soil, only, assuming a non-residential land use scenario.

The model was adapted for the evaluation of the fish ingestion exposure pathway using guidance presented in Frequently Asked Questions (FAQs) on the ALM (USEPA, 2007). The USEPA guidance for ingestion of lead in fish states the following:

> "The ALM analysis could be performed to evaluate the local fish contribution to lead exposure. A fish advisory could also be developed by applying the ALM in reverse to derive an upper-bound ingestion rate for a given lead concentration in fish tissue, using and increasing intake of fish to determine an intake corresponding to a target risk level (e.g., P10 of five percent). For bioavailable fraction of lead in fish (AFF), a protective estimate of 12% would be appropriate. Site-specific information should be used along with the NHANES guidance and the Exposure Factors Handbook in developing the site-specific exposure scenario."

The equation from the ALM can be used (with the following modifications) to calculate overall risk posed by consuming fish that are contaminated with lead:

$$PbB = (Pb_F \times BKSF \times IR_F \times AF_F \times EF_A/AT_F) + PbB_0$$

Where:

PbB	=	Adult blood lead level for fish ingestion calculated by the model [micrograms per deciliter (µg/dL)] where blood-lead levels greater than 10 µg/L are considered to be a "concern."
Pb_F	=	Fish lead concentration micrograms per gram (µg/g) (appropriate average concentration)
IR_F	=	Fish intake rate [grams (g)/day]
AF_F	=	Absolute gastrointestinal absorption faction for ingested lead in media (unitless)
EF_F	=	Exposure frequency (days/lead)
PbB_0	=	Baseline blood lead (µg/dL)
BKSF	=	Biokinetic slope factor
AT_F	=	Averaging time (days/year)

6.4 TOXICITY ASSESSMENT

The objective of a toxicity assessment is to identify the potential for human health hazards and adverse effects in exposed populations. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified COPCs. Quantitative toxicity values [cancer slope factors (CSFs), reference doses (RfDs), and reference concentrations (RfCs)] determined during this component of the risk assessment will be integrated with outputs of the exposure assessment to characterize the potential for adverse health effects for each

receptor group. A CSF/unit risk factor (URF) is an indicator of the potency of a chemical carcinogen (i.e., the greater the CSF/URF, the more potent the carcinogen). An RfD/RfC is the dose/concentration at which or below which adverse non-carcinogenic effects are not anticipated.

6.4.1 Source of Toxicity Criteria

RfDs and CSFs used in the HHRA for Zone J will be obtained from the following primary literature sources:

- Integrated Risk Information System (IRIS) (Online).
- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical specific basis when requested by USEPA's Superfund program.
- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, ATSDR Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b).

Although toxicity criteria can be found in several toxicological sources, USEPA's IRIS on line database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by USEPA. The Oak Ridge National Laboratory (ORNL) Regional Screening Level (RSL) Table may be used as a source of toxicity criteria when toxicity criteria are not available from the aforementioned references. The toxicity criteria for the constituents selected as COPCs are presented in Tables 6-8 through 6-11.

6.4.2 Toxicity Criteria for Carcinogenic Effects of PAHs

Limited toxicity values are available to evaluate the carcinogenic effects from exposure to PAHs. The most extensively studied PAH is benzo(a)pyrene, which is classified by the USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other carcinogenic PAHs. Toxic effects for these chemicals were evaluated using toxicity equivalence factors (TEFs) based on the potency of each compound relative to that of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, 1993b). The TEFs are used to convert each individual carcinogenic PAH concentration into an equivalent concentration of benzo(a)pyrene.

USEPA's Guidelines for Carcinogen Risk Assessment (USEPA, 2005a) and Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005b) specifies the use of age-dependent adjustment factors (ADAFs) for carcinogens that act via a mutagenic mode of action. Carcinogenic PAHs are included in the group of chemicals that have been determined to act via the mutagenic mode of action. No chemical-specific ADAFs have been derived for carcinogenic PAHs, therefore the following default ADAF was used for ages 16 to 70. The ADAF was used in evaluating exposures to carcinogenic PAHs incurred by adult recreational fisherman using the approach presented in Section 3.5.

6.4.3 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium (trivalent and hexavalent), which is considered to be more toxic in the hexavalent state. Where only total chromium data are available, all of the chromium will be assumed to be hexavalent chromium.

6.5 RISK CHARACTERIZATION

Potential risks (noncarcinogenic and carcinogenic) for human receptors resulting from the potential exposures outlined in the exposure assessment are quantitatively determined during the risk characterization component of the baseline HHRA. Both RME and CTE estimates are generated. The quantitative estimates of risk are calculated in accordance with the risk assessment methods outlined in USEPA guidance (USEPA, 1989).

6.5.1 Quantitative Analysis of Chemicals

Quantitative estimates of risk for chemicals other than lead are calculated according to risk assessment methods outlined in USEPA guidance (USEPA, 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as incremental lifetime cancer risks (ILCRs), based on CSFs. Noncarcinogenic risk estimates are presented in the form of hazard quotients (HQs) that are determined through a comparison of intakes with published RfDs or RfCs.

ILCR estimates are generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

If the above equation results in an ILCR greater than 0.01, the following equation will be used:

$$\text{ILCR} = 1-[\exp(-\text{Estimated Exposure Intake})(\text{CSF})]$$

An ILCR of 1 x 10^{-6} indicates that the exposed receptor has a one in-one million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons.

As mentioned previously, noncarcinogenic risks will be assessed using the concept of HQs and Hazard Indices (HIs). The HQ for a COPC is the ratio of the estimated intake or concentration to the RfD or RfC, as follows:

$$HQ_i = \frac{\text{Intake(Concentration)}}{RfD_i\text{(RfC)}}$$

An HI will be generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

6.5.2 Interpretation of Risk Assessment Results

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. The USEPA has defined a “target cancer risk” range of 1 x 10^{-4} to 1 x 10^{-6} (i.e., a one-in-ten-thousand to one-in-one-million chance of developing cancer). HQs and HIs are typically evaluated using a value of 1.0. Generally, adverse noncarcinogenic health effects are not anticipated if an HQ or HI, developed on a target organ/effect-specific basis, does not exceed 1.0. Current USEPA policy regarding lead exposures is to limit the childhood risk of exceeding a 10 µg/dL blood-lead level to 5 percent.

6.5.3 Results of the Risk Characterization

This section summarizes the results of the risk characterization for Zone J. Quantitative risk estimates for potential recreational fisherman were developed for those chemicals identified as COPCs. Potential cancer risks and hazard indices were calculated for current/future recreational fishermen under the RME and CTE scenarios and are summarized in Tables 6-12 and 6-13. Results of the risk assessment in RAGS Part D format and sample calculations are included in Appendix P.

Ingestion of fish was identified as a potential exposure pathway evaluated in this HHRA. No fish tissue samples were collected at Zone J. However, sediment samples were collected from Noisette Creek, Shipyard Creek, and Cooper River. Consequently, fish tissue concentrations were approximated based on the chemical concentrations detected in the sediments of Noisette Creek, Shipyard Creek, and Cooper

River, and were evaluated in the HHRA. For organics, fish tissue concentrations for human consumption were approximated by modifying the concentrations estimated in the ecological assessment. The fish tissue concentrations were modified for human consumption by changing the lipid content used in the ecological calculation from 12 percent to 3 percent. In addition, estimated fish concentrations were multiplied by 0.25 to convert from a dry weight to wet weight values.

6.5.3.1 Noncarcinogenic Risks – RME

Cumulative HIs for recreational fishermen consuming fish from Noisette Creek and Shipyard Creek under the RME scenario were equal to or less than unity (1) (Table 6-12). The cumulative HI for the recreational fisherman consuming fish from the Cooper River (HI = 2) exceeded unity (Table 6-12); however, the HIs calculated on a target organ/target effect specific basis were all less than or equal to unity. Consequently, adverse non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under the conditions defined in the exposure assessment.

6.5.3.2 Carcinogenic Risks – RME

The cumulative ILCR for recreational fishermen consuming fish taken from Noisette Creek was less than the USEPA's target risk range of 10^{-4} to 10^{-6}. The cumulative ILCR for Shipyard Creek was 9×10^{-6}, which is within the USEPA's target risk range. The cumulative ILCR for consumption of fish from Cooper River was 1×10^{-4}.

6.5.3.3 Noncarcinogenic Risks – CTE

Cumulative HIs for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, and the Cooper River under the CTE scenario are less than or equal to unity (Table 6-13). Therefore, adverse non-carcinogenic effects are not anticipated for the recreational fisherman at Noisette Creek, Shipyard Creek, and Cooper River under the CTE scenario conditions defined in the exposure assessment.

6.5.3.4 Carcinogenic Risks – CTE

Cumulative ILCRs for the recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, and Cooper River under the CTE scenario were less than or within USEPA's target risk range of 10^{-4} to 10^{-6}.

6.5.3.5 Risks from Lead

Lead was selected as a COPC for the sediments of both Shipyard Creek and Cooper River. The maximum and arithmetic mean lead concentrations for the sediments are listed below:

Water Body	Maximum Sediment (µg/g)	Average Sediment (µg/g)
Shipyard Creek	142	86.5
Cooper River	147	69.5

Risks to hypothetical current and future recreational fishermen exposed to lead as a consequence of fish ingestion were evaluated using the ALM adapted for fish ingestion. Average fish lead concentrations were used as the EPCs (1.54 µg/g for Shipyard Creek and 1.23 µg/g for the Cooper River). These average wet weight fish lead concentrations were calculated by multiplying the average sediment concentration by the average BSAF, and then incorporating the fish dry weight-to-wet weight conversion factor (see Section 6.3.5). Default values were used for the rest of the model input parameters. ALM outputs are included in Appendix P. The average fish lead concentration of 1.54 µg/g for Shipyard Creek results in a geometric mean blood lead level of approximately 3.2 µg/dL. The average fish lead concentration of 1.23 µg/g for the Cooper River results in a geometric mean blood lead level of approximately 2.8 µg/dL. These results do not exceed the USEPA benchmark goal of 10 µg/dL. The probability that the blood lead levels of a fetus of a childbearing female angler would exceed 10 µg/L for Shipyard Creek is 4.2 percent and for the Cooper River is 2.9 percent.

6.6 UNCERTAINTY ANALYSIS

There is uncertainty associated with all aspects of the baseline human health risk assessment. A summary of the uncertainties, including a discussion of how they may affect the final risk numbers, is provided in this section.

Uncertainty in the selection of COPCs is related to the current status of the predictive databases, the grouping of samples, the numbers, types, and distributions of samples, and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment includes the values used as input variables for a given intake route or scenario, the assumptions made to determine exposure point concentrations, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment includes the quality of the existing toxicity data needed to support dose response relationships and the weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization includes that associated with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there are various sources of uncertainty, the direction of uncertainty can be influenced by the assumptions made throughout the risk assessment, including selection of COPCs and selection of values for dose response relationships. Throughout the entire risk assessment, assumptions are biased toward a margin of safety so that the final calculated risks are overestimated.

Generally, risk assessments carry two types of uncertainty: measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. For example, this type of uncertainty is associated with analytical data collected for each site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty stems from inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of human exposure to low doses of a chemical, on the biological mechanism of action of a chemical, or the behavior of a chemical in soil.

Once the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates must be made to ensure that the particular assumptions made are protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can magnify the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward over predicting both carcinogenic and noncarcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

This interpretation is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10^{-4} to 10^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10^{-4} to 10^{-6}); any conclusions must take into account this uncertainty.

6.6.1 Uncertainty in Data Evaluation

The most significant issues related to uncertainty in COPC selection are (1) the screening levels used, (2) the absence of screening levels for a few chemicals detected in the site media, and (3) elevated

detection limits for some compounds. A brief discussion of each of these issues is provided in the remainder of this section.

6.6.1.1 COPC Screening Levels

There is some uncertainty associated with choosing COPCs based on ESVs. Maximum concentrations were also screened against USEPA Region 3 Fish Risk Based Screening Levels. There were no significant differences between the COPCs selected using the Fish Risk Based Screening Levels and the ESVs.

6.6.1.2 Chemicals without Established Screening Levels

Ecological risk-based screening levels are currently not available for some constituents [e.g., indeno (1,2,3) pyrene, barium, calcium, magnesium, manganese, potassium, selenium, sodium and vanadium]. Having no toxicity values for some compounds adds to the uncertainty in the risk assessment both with regard to the selection of COPCs and the subsequently calculated risks.

6.6.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arises because of the determination of land use conditions, the selection of receptors and scenarios, the estimation of exposure point concentrations, and the selection of exposure parameters. Each of these is discussed below.

6.6.2.1 Land Use

The current land use patterns at the site are well established, thereby limiting the uncertainty associated with land use assumptions.

6.6.2.2 Exposure Point Concentrations

Significant uncertainty is associated with the EPCs for fish tissue concentrations. The EPCs were estimated based on chemical concentrations in sediments because actual fish tissue data are not available for Noisette Creek, Shipyard Creek, or Cooper River. This assumes that the fish taken by the recreational fisherman are routinely contacting the sediments (i.e., are bottom-dwelling species) and that significant bioaccumulation is occurring between the sediments and the fish. However, this assumption may result in a significant over-estimation of risk if the species typically taken by the recreational fisherman are not routinely in contact with the sediments. Conservatively, bioaccumulation factors published for invertebrates were used to calculate fish tissue concentrations for the inorganics because of the lack of fish-specific sediment bioaccumulation factors.

6.6.2.3 Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and the anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors is minimal because they are considered to be well defined. Recreational fishing is the only exposure route of interest for this risk assessment

6.6.2.4 Exposure Parameters

Each exposure factor selected for use in this HHRA has some associated uncertainty. Generally, HHRA exposure factors are based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally have a broad distribution. To avoid underestimation of exposure, in most cases, the USEPA guidelines (USEPA, 1991) for the RME receptor were used in this evaluation, which generally specify the use of the 95th percentile for most parameters. Therefore, the selected values for the RME receptor represent the upper bound of the observed or expected habits of the majority of the population.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

Many of the exposure parameters used to calculate exposures and risks in this report were selected from a distribution of possible values, including USEPA guidance (USEPA, 1991, 1993a, 1997a, 2004). For the RME scenario, a combination of high-end and average inputs is used with the overall goal that the final risk estimate will be an approximate 95th percentile risk estimate. This risk number is used in risk management decisions but does not indicate what a more average or typical exposure might be or what risk range might be expected for individuals in the exposed population.

6.6.3 <u>Uncertainty in the Toxicity Assessment</u>

Uncertainties associated with the toxicity assessment (determination of RfDs, RfCs, URFs, and CSFs and use of available criteria) are presented in this section.

Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment is associated with hazard assessment and dose response evaluations for the COPCs. The hazard assessment deals with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight of evidence determination, using the USEPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arises from the nature and quality of the animal and human data. Uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; when pharmacokinetic data indicate a similar fate in humans and animals; when postulated mechanisms of toxicity are similar for humans and animals; and when the chemical of concern is structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose response evaluation includes the determination of a CSF/URF for the carcinogenic assessment and derivation of an RfD/RfC for the noncarcinogenic assessment. Uncertainty is introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also results from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate is derived and the database. For cancer effects, the uncertainty associated with dose response factors is mitigated by assuming the 95 percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessment is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal data, is based on a nonthreshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are not carcinogenic. Therefore, the use of the linearized multistage model is conservative for chemicals that exhibit a threshold for carcinogenicity.

For noncancer effects, additional uncertainty factors may be applied in the derivation of the RfD/RfC to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for noncancer effects arises from the use of an effect level in the estimation of an RfD/RfC when "no adverse effect level" data (i.e., non-cancer threshold data) are not available or such data are limited. An uncertainty factor is usually applied to estimate a no effect level. Additional uncertainty arises in the estimation of an RfD/RfC for chronic exposure from subchronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no effect level in the subchronic study. Uncertainty in the derivation of RfDs/RfCs is mitigated by the use of uncertainty and modifying factors that normally range between 3 and 10. The resulting combination of uncertainty and modifying factors may reach 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may cause uncertainty. This is particularly the case when no gastrointestinal absorption rates are available in the literature or when only qualitative statements regarding absorption are available.

6.6.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization results from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing noncancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when compounds affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not be an appropriate assumption. However, the assumption of additivity is considered because in most cases it represents a conservative estimate of risk.

Risks to any individual may also be overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may be exposed via all pathways considered.

Finally, the risk characterization does not consider antagonistic or synergistic effects. Little or no information is available to determine the potential for antagonism or synergism for the COPCs. Because chemical specific interactions cannot be predicted, the likelihood for risks to be over predicted or under predicted cannot be defined, but the methodology that was used is based on current USEPA guidance.

Uncertainty in the risk characterization also results from the fact that, as itemized below, some chemicals were eliminated as COPCs on the basis of twice the average background concentration being greater than the site maximum:

- Arsenic, barium, cobalt, iron, manganese, and vanadium were eliminated as COPCs for Noisette Creek on the basis of site-to-background comparisons. Arsenic is the only chemical with an ESV and the maximum concentration detected (9.2 mg/kg) is within an order of magnitude of the ESV (7.24 mg/kg) for arsenic.

- Manganese was the only chemical eliminated as a COPC for Shipyard Creek on the basis of background comparison. Manganese does not have an ESV.

- No COPCs for Cooper River were eliminated based on background comparison.

6.7 SUMMARY

The baseline HHRA for Zone J was performed to characterize the potential risks to likely human receptors under current and potential future land use. Potential receptors retained for quantitative evaluation consisted of current/future recreational fishermen. Fish tissue concentrations (estimated using sediment concentrations) were evaluated in the assessment.

Summary of Chemicals of Potential Concern for Zone J

COPCs based on the ESVs at Zone J are as follows:

Noisette Creek Sediment	Shipyard Creek Sediment	Cooper River Sediment
		Acenaphthene
		Anthracene
Benzo (a) Anthracene	Benzo (a) Anthracene	Benzo (a) Anthracene
Benzo (a) Pyrene	Benzo (a) Pyrene	Benzo (a) Pyrene
Benzo (b) Fluoranthene	Benzo (b) Fluoranthene	Benzo (b) Fluoranthene
Benzo (g,h,i) Perylene	Benzo (g,h,i) Perylene	Benzo (g,h,i) Perylene
Benzo (k) Fluoranthene	Benzo (k) Fluoranthene	Benzo (k) Fluoranthene
BEHP	BEHP	
Chrysene	Chrysene	Chrysene
Fluoranthene	Fluoranthene	Fluoranthene
		Fluorene
Indeno (1,2,3-cd) Pyrene	Indeno (1,2,3-cd) Pyrene	Indeno (1,2,3-cd) Pyrene
Phenanthrene		Phenanthrene
Pyrene	Pyrene	Pyrene
4,4-DDD		4,4-DDD
4,4-DDE	4,4-DDE	
	Aroclor-1260	Aroclor-1260
	Dieldrin	
	Aluminum	Aluminum
	Arsenic	Arsenic
	Barium	Barium
	Chromium	Chromium
	Cobalt	Cobalt
Copper	Copper	Copper
	Iron	Iron
	Lead	Lead
		Manganese
Mercury	Mercury	
	Nickel	Nickel
Selenium	Selenium	Selenium
Thallium	Thallium	
	Vanadium	Vanadium
Zinc	Zinc	Zinc

Cancer and non-cancer risk estimates calculated for recreational fisherman at Noisette Creek, Shipyard Creek, and Cooper River were compared to the following risk management benchmarks:

- The USEPA "target cancer risk" range of 1 x 10^{-4} to 1 x 10^{-6} (i.e., a one-in-ten-thousand to one-in-one-million chance of developing cancer).

- HQ/HI value of 1.0. Generally, adverse noncarcinogenic health effects are not anticipated if an HQ or HI, developed on a target organ/effect-specific basis, does not exceed 1.0.

- The current USEPA policy regarding lead exposures is to limit the childhood risk of exceeding a 10 µg/dL blood-lead level to 5 percent.

Summary of Cancer and Non-cancer Risk Estimates for Environmental Media at Zone J – Reasonable Maximum Exposure Scenario

Cumulative HIs for recreational fishermen under the RME scenario for Noisette Creek and Shipyard Creek were less than unity (1). The cumulative HI for the recreational fisherman (HI = 2) in Cooper River exceeded unity. However, the HIs calculated on a target organ/target effect specific basis were all less than unity. Consequently, adverse non-carcinogenic effects are not anticipated for recreational fishermen consuming fish form Noisette Creek, Shipyard Creek, or the Cooper River under the conditions defined in the exposure assessment.

The cumulative ILCR for recreational fisherman consuming fish from Noisette Creek was less than USEPA's target risk range of 10^{-4} to 10^{-6}. The cumulative ILCR for Shipyard Creek was 9x10^{-6}, which is within the USEPA's target risk range. The cumulative ILCR for Cooper River is 1 x 10^{-4}.

Summary of Cancer and Non-cancer Risk Estimates for Environmental Media at Zone J – Central Tendency Exposure Scenario

Cumulative HIs for the recreational fisherman under the CTE scenario for Noisette Creek, Shipyard Creek, and the Cooper River are less than or equal to unity (1). Consequently, adverse non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, and the Cooper River under the conditions defined in the exposure assessment.

Cumulative ILCRs for recreational fisherman at Noisette Creek, Shipyard Creek, and the Cooper River were less than or within the USEPA's target risk range of 10^{-4} to 10^{-6}.

Summary of Risk Estimates for Lead

Recreational fishermen's exposures to lead in Shipyard Creek and Cooper River fish were evaluated using a version of the USEPA's TRW ALM adapted for fish ingestion. The average fish lead concentration of 1.54 µg/g for Shipyard Creek results in a geometric mean blood lead level of approximately 3.2 µg/dL. The average fish lead concentration of 1.23 µg/g for Cooper River results in a geometric mean blood lead level of approximately 2.8 µg/dL. These results do not exceed the USEPA benchmark goal of 10 µg/dL. The probability that the blood lead levels of a fetus of a childbearing female angler would exceed 10 µg/L for Shipyard Creek is 4.2 percent and for Cooper River is 2.9 percent.

TABLE 6-1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMCIALS OF POTENTIAL CONCERN - NOISETTE CREEK
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON
SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

EXPOSURE AREA	CAS NUMBER	Chemical	Minimum Concentration (1)	Maximum Concentration (1)	Units	Location of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening (3)	Background Value(4)	Ecological Screening Value	COPC (Yes/No)	Rationale for COPC Selection (5)
Noisette Creek		**Semivolatile Organic Compounds**											
	91-57-6	2-METHYLNAPHTHALENE	16	16	UG/KG	JNOIM0011	1/3	19 - 27	16	ND	330	No	BSV
	83-32-9	ACENAPHTHENE	18	18	UG/KG	JNOIM0004	1/3	7.1 - 14	18	ND	330	No	BSV
	208-96-8	ACENAPHTHYLENE	15	34	UG/KG	JNOIM0004	3/3	-	34	45.1	330	No	BSV
	120-12-7	ANTHRACENE	58	170	UG/KG	JNOIM0012	3/3	-	170	60	330	No	BSV
	56-55-3	**BENZO(A)ANTHRACENE**	460	810	UG/KG	JNOIM0012	3/3	-	810	103.5	330	**Yes**	ASV & ABG
	50-32-8	**BENZO(A)PYRENE**	330	540	UG/KG	JNOIM0012	3/3	-	540	135	330	**Yes**	ASV & ABG
	205-99-2	**BENZO(B)FLUORANTHENE**	790	1200	UG/KG	JNOIM0004	3/3	-	1200	160.4	NA	**Yes**	ABG
	191-24-2	**BENZO(G,H,I)PERYLENE**	150	250	UG/KG	JNOIM0012	3/3	-	250	91.4	NA	**Yes**	ABG
	207-08-9	**BENZO(K)FLUORANTHENE**	170	380	UG/KG	JNOIM0012	3/3	-	380	153.1	NA	**Yes**	ABG
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	240	240	UG/KG	JNOIM0011	1/3	16 - 23	240	166.4	182	**Yes**	ASV & ABG
	218-01-9	**CHRYSENE**	390	690	UG/KG	JNOIM0012	3/3	-	690	146.2	330	**Yes**	ASV & ABG
	53-70-3	DIBENZO(A,H)ANTHRACENE	76	76	UG/KG	JNOIM0012	1/3	18 - 37	76	ND	330	No	BSV
	206-44-0	**FLUORANTHENE**	720	1500	UG/KG	JNOIM0012	3/3	-	1500	142.1	330	**Yes**	ASV & ABG
	86-76-7	FLUORENE	11	30	UG/KG	JNOIM0012	3/3	-	30	ND	330	No	BSV
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	170	260	UG/KG	JNOIM0012	3/3	-	260	92.6	NA	**Yes**	ABG
	85-01-8	**PHENANTHRENE**	160	370	UG/KG	JNOIM0012	3/3	-	370	ND	330	**Yes**	ASV
	129-00-0	**PYRENE**	770	1200	UG/KG	JNOIM0004	3/3	-	1200	178.2	330	**Yes**	ASV & ABG
		TOTAL PAHs	4210	7414	UG/KG	JNOIM0012	3/3	-	7414	877	1684	**Yes**	ASV & ABG
		Pesticides/PCBs											
	72-54-8	**4,4'-DDD**	2.8	6	UG/KG	JNOIM0012	3/3	-	6	ND	3.3	**Yes**	ASV
	72-55-9	**4,4'-DDE**	3.6	3.6	UG/KG	JNOIM0011	1/3	0.69 - 0.93	3.6	ND	3.3	**Yes**	ASV
	50-29-3	**TOTAL DDT**	3.8	6.4	UG/KG	JNOIM0011	3/3	-	6.4	-	3.3	**Yes**	ASV
		Inorganics											
	7429-90-5	ALUMINUM	6540	14000	MG/KG	JNOIM0012	3/3	-	14000	21440	NA	No	BBG
	7440-38-2	ARSENIC	5	9.2	MG/KG	JNOIM0012	3/3	-	9.2	12.0	7.24	No	BBG
	7440-39-3	BARIUM	8.5	22.1	MG/KG	JNOIM0012	3/3	-	22.1	34.6	NA	No	BBG
	7440-70-2	CALCIUM	5330	47700	MG/KG	JNOIM0004	3/3	-	47700	53260	NA	No	Nutrient
	7440-47-3	CHROMIUM	27	27	MG/KG	JNOIM0012	1/3	0.03	27	43.5	52.3	No	BSV
	7440-48-4	COBALT	2.8	4.1	MG/KG	JNOIM0012	2/3	0.02	4.1	6.4	NA	No	BBG
	7440-50-8	**COPPER**	10.3	42.8	MG/KG	JNOIM0012	3/3	-	42.8	14.9	18.7	**Yes**	ASV & ABG
	7439-89-6	IRON	6310	11900	MG/KG	JNOIM0012	3/3	-	11900	23600	NA	No	BBG
	7439-92-1	LEAD	10.9	28.9	MG/KG	JNOIM0012	3/3	-	28.9	18.1	30.2	No	BSV
	7439-95-4	MAGNESIUM	1600	2700	MG/KG	JNOIM0012	3/3	-	2700	6426	NA	No	Nutrient
	7439-96-5	MANGANESE	39.4	78.5	MG/KG	JNOIM0012	3/3	-	78.5	216	NA	No	BBG
	7439-97-6	**MERCURY**	0.05	1.1	MG/KG	JNOIM0012	3/3	-	1.1	0.07	0.13	**Yes**	ASV & ABG
	7440-02-0	NICKEL	3.5	8.3	MG/KG	JNOIM0012	3/3	-	8.3	12.4	15.9	No	BSV
	7440-09-7	POTASSIUM	661	1300	MG/KG	JNOIM0012	3/3	-	1300	3046	NA	No	Nutrient
	7782-49-2	**SELENIUM**	0.23	0.32	MG/KG	JNOIM0012	2/3	0.19	0.32	ND	NA	**Yes**	ESV & BG NA
	7440-23-5	SODIUM	4350	6940	MG/KG	JNOIM0012	3/3	-	6940	13880	NA	No	Nutrient
	7440-28-0	**THALLIUM**	0.19	0.19	MG/KG	JNOIM0004	1/3	0.17 - 0.23	0.19	ND	NA	**Yes**	ESV & BG NA
	7440-62-2	VANADIUM	11.4	21.8	MG/KG	JNOIM0012	3/3	-	21.8	48.8	NA	No	BBG
	7440-66-6	**ZINC**	29.7	158	MG/KG	JNOIM0012	3/3	-	158	71.5	124	**Yes**	ASV & ABG

Shaded chemical indicates that the chemical was retained as a COPC.

Footnotes:
(1) Sample and duplicate were considered as two separate samples when determining the minimum and maximum concentrations, but as one sample when determining the frequency of detection.
(2) Sample-specific method detection limits.
(3) The maximum detected concentration is used for screening purposes.
(4) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2005); ND indicates that the analyte was not detected in any of the 10 reference samples.
(5) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 4).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.

For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

Acronyms:
COCP: Chemical of Potential Concern
NA: Ecological screening value not available.

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SHIPYARD CREEK
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

EXPOSURE POINT	CAS NUMBER	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Location of Maximum Concentration	Frequency of Detection	Range of Nondetects[2]	Concentration Used for Screening [3]	Background Value[4]	Ecological Screening Value	COPC (Yes/No)	Rationale for COPC Selection [5]
Shipyard Creek		**Semivolatile Organic Compounds (µg/kg)**											
	91-57-6	2-METHYLNAPHTHALENE	18	30	UG/KG	009M001703	3/3	-	30	ND	330	No	BSV
	83-32-9	ACENAPHTHENE	9.6	44	UG/KG	009M000403	3/3	-	44	ND	330	No	BSV
	208-96-8	ACENAPHTHYLENE	20	56	UG/KG	009M001703	3/3	-	56	45.1	330	No	BSV
	120-12-7	ANTHRACENE	48	110	UG/KG	009M000403	3/3	-	110	60	330	No	BSV
	56-55-3	**BENZO(A)ANTHRACENE**	260	580	UG/KG	009M001703	3/3	-	580	103.5	330	**Yes**	ASV & ABG
	50-32-8	**BENZO(A)PYRENE**	170	560	UG/KG	009M001703	3/3	-	560	135	330	**Yes**	ASV & ABG
	205-99-2	**BENZO(B)FLUORANTHENE**	460	1500	UG/KG	009M001703	3/3	-	1500	160.4	NA	**Yes**	ABG
	191-24-2	**BENZO(G,H,I)PERYLENE**	99	330	UG/KG	009M001703	3/3	-	330	91.4	NA	**Yes**	ABG
	207-08-9	**BENZO(K)FLUORANTHENE**	100	400	UG/KG	009M001703	3/3	-	400	153.1	NA	**Yes**	ABG
	117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	540	750	UG/KG	009M001603	3/3	-	750	166.4	182	**Yes**	ASV & ABG
	218-01-9	**CHRYSENE**	190	560	UG/KG	009M001703	3/3	-	560	146.2	330	**Yes**	ASV & ABG
	206-44-0	**FLUORANTHENE**	370	860	UG/KG	009M001703	3/3	-	860	142.1	330	**Yes**	ASV & ABG
	86-76-7	FLUORENE	13	33	UG/KG	009M000403	3/3	-	33	ND	330	No	BSV
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	100	320	UG/KG	009M001703	3/3	-	320	92.6	NA	**Yes**	ABG
	91-20-3	NAPHTHALENE	7.5	7.5	UG/KG	009M001603	1/3	13 - 16	7.5	ND	330	No	BSV
	85-01-8	PHENANTHRENE	90	280	UG/KG	009M000403	3/3	-	280	ND	330	No	BSV
	129-00-0	**PYRENE**	620	1200	UG/KG	009M000403	3/3	-	1200	178.2	330	**Yes**	ASV & ABG
		TOTAL PAHs	2579	6426	UG/KG	009M001703	3/3	-	6426	877	1684	**Yes**	ASV & ABG
		Pesticides/PCBs (µg/kg)											
	72-55-9	**4,4'-DDE**	6.6	25	UG/KG	009M001603	3/3	-	25	ND	3.3	**Yes**	ASV
	11096-82-5	**AROCLOR-1260**	150	210	UG/KG	009M001603	3/3	-	210	ND	33[5]	**Yes**	ASV
	60-57-1	**DIELDRIN**	9.1	9.1	UG/KG	009M000403	1/3	1.3 - 1.4	9.1	ND	3.3	**Yes**	ASV
		Inorganics (mg/kg)											
	7429-90-5	**ALUMINUM**	12700	32900	MG/KG	009M001703	3/3	-	32900	21440	NA	**Yes**	ABG
	7440-38-2	**ARSENIC**	6.9	19.8	MG/KG	009M001703	3/3	-	19.8	12.0	7.24	**Yes**	ASV & ABG
	7440-39-3	**BARIUM**	44.1	86.6	MG/KG	009M001703	3/3	-	86.6	34.6	NA	**Yes**	ABG
	7440-70-2	CALCIUM	24800	37200	MG/KG	009M001703	3/3	-	37200	53260	NA	No	Nutrient
	7440-47-3	**CHROMIUM**	89.5	336	MG/KG	009M001703	3/3	-	336	43.5	52.3	**Yes**	ASV & ABG
	7440-48-4	**COBALT**	2.5	7.4	MG/KG	009M001703	3/3	-	7.4	6.4	NA	**Yes**	ABG
	7440-50-8	**COPPER**	56.4	133	MG/KG	009M001703	3/3	-	133	14.9	18.7	**Yes**	ASV & ABG
	7439-89-6	**IRON**	11800	33900	MG/KG	009M001703	3/3	-	33900	23600	NA	**Yes**	ABG
	7439-92-1	**LEAD**	55.7	142	MG/KG	009M001703	3/3	-	142	18.1	30.2	**Yes**	ASV & ABG
	7439-95-4	MAGNESIUM	3230	9300	MG/KG	009M001703	3/3	-	9300	6426	NA	No	Nutrient
	7439-96-5	MANGANESE	78.3	201	MG/KG	009M001703	3/3	-	201	216	NA	No	BBG
	7439-97-6	**MERCURY**	0.22	0.45	MG/KG	009M000403	3/3	-	0.45	0.07	0.13	**Yes**	ASV & ABG
	7440-02-0	**NICKEL**	12.3	32.8	MG/KG	009M001703	3/3	-	32.8	12.4	15.9	**Yes**	ASV & ABG
	7440-09-7	POTASSIUM	1280	3540	MG/KG	009M001703	3/3	-	3540	3046	NA	No	Nutrient
	7782-49-2	**SELENIUM**	0.53	0.89	MG/KG	009M001603	3/3	-	0.89	ND	NA	**Yes**	ESV & BG NA
	7440-23-5	SODIUM	5700	16400	MG/KG	009M001703	3/3	-	16400	13880	NA	No	Nutrient
	7440-28-0	**THALLIUM**	0.28	0.42	MG/KG	009M001603	2/3	0.38	0.42	ND	NA	**Yes**	ESV & BG NA
	7440-62-2	**VANADIUM**	22.6	62.2	MG/KG	009M001703	3/3	-	62.2	48.8	NA	**Yes**	ABG
	7440-66-6	**ZINC**	150	494	MG/KG	009M001703	3/3	-	494	71.5	124	**Yes**	ASV & ABG

TABLE 6-2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SHIPYARD CREEK
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Shaded chemical indicates that the chemical was retained as a COPC.

Footnotes:
(1) Sample and duplicate were considered as two separate samples when determining the minimum and maximum concentrations, but as one sample when determining the frequency of detection.
(2) Sample-specific method detection limits.
(3) The maximum detected concentration is used for screening purposes.
(4) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2005); ND indicates that the analyte was not detected in any of the 10 reference samples.
(5) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 4).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

Acronyms:
COPC: Chemcial of Potential Concern
NA: Ecological screening value not available.

TABLE 6-3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMCIALS OF POTENTIAL CONCERN - COOPER RIVER
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum Concentration (1)	Maximum Concentration (1)	Units	Location of Maximum Concentration	Frequency of Detection	Range of Nondetects(2)	Concentration Used for Screening (3)	Background Value(4)	Ecological Screening Value	COPC (Yes/No)	Rationale for COPC Selection (5)
		Semivolatile Organic Compounds											
Cooper River	91-57-6	2-METHYLNAPHTHALENE	5.2	5.2	UG/KG	054M000103	1/3	46 - 580	5.2	ND	330	No	BSV
	83-32-9	**ACENAPHTHENE**	7	1400	UG/KG	556M000503	2/3	24	1400	ND	330	Yes	ASV
	208-96-8	ACENAPHTHYLENE	3.9	72	UG/KG	556M000703	2/3	280	72	45.1	330	No	BSV
	120-12-7	**ANTHRACENE**	64	2400	UG/KG	556M000503	3/3	-	2400	60	330	Yes	ASV & ABG
	56-55-3	**BENZO(A)ANTHRACENE**	190	5800	UG/KG	556M000503	3/3	-	5800	103.5	330	Yes	ASV & ABG
	50-32-8	**BENZO(A)PYRENE**	120	2500	UG/KG	556M000503	3/3	-	2500	135	330	Yes	ASV & ABG
	205-99-2	**BENZO(B)FLUORANTHENE**	250	5400	UG/KG	556M000503	3/3	-	5400	160.4	NA	Yes	ABG
	191-24-2	**BENZO(G,H,I)PERYLENE**	51	780	UG/KG	556M000503	3/3	-	780	91.4	NA	Yes	ABG
	207-08-9	**BENZO(K)FLUORANTHENE**	82	1200	UG/KG	556M000503	3/3	-	1200	153.1	NA	Yes	ABG
	218-01-9	**CHRYSENE**	170	5100	UG/KG	556M000503	3/3	-	5100	146.2	330	Yes	ASV & ABG
	53-70-3	DIBENZO(A,H)ANTHRACENE	11	68	UG/KG	556M000703	2/3	780	68	ND	330	No	BSV
	206-44-0	**FLUORANTHENE**	330	41000	UG/KG	556M000503	3/3	-	41000	142.1	330	Yes	ASV & ABG
	86-76-7	**FLUORENE**	14	2200	UG/KG	556M000503	2/3	27	2200	ND	330	Yes	ASV
	193-39-5	**INDENO(1,2,3-CD)PYRENE**	50	280	UG/KG	556M000703	2/3	910	280	92.6	NA	Yes	ABG
	91-20-3	NAPHTHALENE	2.7	2.7	UG/KG	054M000103	1/3	30 - 370	2.7	ND	330	No	BSV
	85-01-8	**PHENANTHRENE**	97	18000	UG/KG	556M000503	3/3	-	18000	ND	330	Yes	ASV
	129-00-0	**PYRENE**	300	26000	UG/KG	556M000503	3/3	-	26000	178.2	330	Yes	ASV & ABG
		TOTAL PAHs	1761	111780	UG/KG	556M000503	3/3	-	111780	877	1684	Yes	ASV & ABG
		Pesticides/PCBs											
	72-54-8	**4,4'-DDD**	4.8	4.8	UG/KG	556M000503	1/3	0.73 - 2.4	4.8	ND	3.3	Yes	ASV
	11096-82-5	**AROCLOR-1260**	94	94	UG/KG	054M000103	1/3	29	94	ND	33(6)	Yes	ASV
		Inorganics											
	7429-90-5	**ALUMINUM**	5900	47700	MG/KG	556M000503	3/3	-	47700	21440	NA	Yes	ABG
	7440-38-2	**ARSENIC**	2.1	20.5	MG/KG	556M000503	3/3	-	20.5	12.0	7.24	Yes	ASV & ABG
	7440-39-3	**BARIUM**	44.6	85.7	MG/KG	054M000103	3/3	-	85.7	34.6	NA	Yes	ABG
	7440-70-2	CALCIUM	9330	31200	MG/KG	556M000703	3/3	-	31200	53260	NA	No	Nutrient
	7440-47-3	**CHROMIUM**	37	68.4	MG/KG	556M000503	3/3	-	68.4	43.5	52.3	Yes	ASV & ABG
	7440-48-4	**COBALT**	8.4	10	MG/KG	054M000103	3/3	-	10	6.4	NA	Yes	ABG
	7440-50-8	**COPPER**	43.5	386	MG/KG	054M000103	3/3	-	386	14.9	18.7	Yes	ASV & ABG
	7439-89-6	**IRON**	10200	36700	MG/KG	556M000503	3/3	-	36700	23600	NA	Yes	ABG
	7439-92-1	**LEAD**	21	147	MG/KG	054M000103	3/3	-	147	18.1	30.2	Yes	ASV & ABG
	7439-95-4	MAGNESIUM	2040	10600	MG/KG	556M000503	3/3	-	10600	6426	NA	No	Nutrient
	7439-96-5	**MANGANESE**	196	494	MG/KG	556M000503	3/3	-	494	216	NA	Yes	ABG
	7439-97-6	MERCURY	0.06	0.11	MG/KG	054M000103	3/3	-	0.11	0.07	0.13	No	BSV
	7440-02-0	**NICKEL**	20	32.6	MG/KG	054M000103	3/3	-	32.6	12.4	15.9	Yes	ASV & ABG
	7440-09-7	POTASSIUM	634	4540	MG/KG	556M000503	3/3	-	4540	3046	NA	No	Nutrient
	7782-49-2	**SELENIUM**	0.65	0.77	MG/KG	556M000703	2/3	0.14	0.77	ND	NA	Yes	ESV & BG NA
	7440-23-5	SODIUM	2220	25300	MG/KG	556M000703	3/3	-	25300	13880	NA	No	Nutrient
	7440-62-2	**VANADIUM**	5	80.1	MG/KG	556M000503	3/3	-	80.1	48.8	NA	Yes	ABG
	7440-66-6	**ZINC**	95.8	826	MG/KG	054M000103	3/3	-	826	71.5	124	Yes	ASV & ABG

TABLE 6-3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMCIALS OF POTENTIAL CONCERN - COOPER RIVER
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Shaded chemical indicates that the chemical was retained as a COPC.

Footnotes:
(1) Sample and duplicate were considered as two separate samples when determining the minimum and maximum concentrations, but as one sample when determining the frequency of detection.
(2) Sample-specific method detection limits.
(3) The maximum detected concentration is used for screening purposes.
(4) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2005); ND indicates that the analyte was not detected in any of the 10 reference samples.
(5) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 4).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

Acronyms:
COPC: Chemical of Potential Concern
NA: Ecological screening value not available.

TABLE 6-4

CHEMICALS RETAINED AS COPCS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Parameter	Sediment		
	Noisette Creek	Shipyard Creek	Cooper River
Semivolatile Organic Compounds			
Acenaphthene			X
Anthracene			X
Benzo(a)anthracene	X	X	X
Benzo(a)pyrene	X	X	X
Benzo(b)fluoranthene	X	X	X
Benzo(g,h,i)perylene	X	X	X
Benzo(k)fluoranthene	X	X	X
Bis(2-ethylhexyl)phthalate	X	X	
Chrysene	X	X	X
Fluoranthene	X	X	X
Fluorene			X
Indeno(1,2,3-cd)pyrene	X	X	X
Phenanthrene	X		X
Pyrene	X	X	X
Total PAHs	X	X	X
Pesticides/PCBs			
4,4'-DDD	X		X
4,4'-DDE	X	X	
Aroclor 1260		X	X
Dieldrin		X	
Total DDT	X		
Inorganics			
Aluminum		X	X
Arsenic		X	X
Barium		X	X
Chromium		X	X
Cobalt		X	X
Copper	X	X	X
Iron		X	X
Lead		X	X
Manganese			X
Mercury	X	X	
Nickel		X	X
Selenium	X	X	X
Thallium	X	X	
Vanadium		X	X
Zinc	X	X	X

Notes:
X - Chemical was retained as a COPC.

TABLE 6-5

EXPOSURE POINT CONCENTRATION
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Parameter	Noisette Creek Fish Tissue (mg/kg)	Shipyard Creek Fish Tissue (mg/kg)	Cooper River Fish Tissue (mg/kg)
Semivolatile Organic Compounds			
Acenaphthene	NA	NA	0.081
Anthracene	NA	NA	0.14
Benzo(A) Anthracene	0.056	0.078	0.35
Benzo (A) Pyrene	0.037	0.075	0.15
Benzo (B) Fluoranthene	0.083	0.2	0.32
Benzo (G,H,I) Perylene	0.017	0.044	0.047
Benzo (K) Fluoranthene	0.026	0.013	0.072
Bis(2-Ethylheyxl)phthalate	0.057	0.086	NA
Chrysene	0.048	0.019	0.3
Fluoranthene	0.1	0.029	2.4
Fluorene	NA	NA	0.13
Indeno(1,2,3-CD) Pyrene	0.018	0.011	0.017
Phenanthrene	0.026	NA	1.1
Pyrene	0.083	0.04	1.6
Pesticides/PCBs			
4,4-DDD	0.0004	NA	0.00028
4,4'-DDE	0.0066	0.022	NA
Aroclor 1260	NA	0.045	0.036
Dieldrin	NA	0.0019	NA
Inorganics			
Aluminum	NA	8230	11900
Arsenic	NA	3.4	3.5
Barium	NA	21.7	21.4
Chromium	NA	39.3	8.0
Cobalt	NA	1.9	2.3
Copper	56.2	175	507
Iron	NA	8480	9180
Lead	NA	21.5	10.5
Manganese	NA	NA	124
Mercury	0.79	0.32	NA
Nickel	NA	19	18.9
Selenium	0.08	0.22	0.19
Thallium	0.048	0.11	NA
Vanadium	NA	15.6	20
Zinc	297	930	1550

Notes
NA - Not applicable. Not a COPC for this media.

Maximum detected concentration was used for all exposure point concentrations.

RAGS Part D tables for the exposure point concentrations are included in Appendix P.

TABLE 6-6

SUMMARY OF EXPOSURE INPUT PARAMETERS (RME)
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Exposure Parameter	Cooper River	Noisette Creek/Shipyard Creek
	Adult Recreational Fisherman	Adult Recreational Fisherman
All Exposures		
C_{fish} (mg/kg)	Estimated[1]	Estimated[1]
ED (years)	30	30
BW (kg)	70[2]	70[2]
AT_n (days)	10,950[2]	10,950[2]
AT_c (days)	25,550[2]	25,550[2]
Ingestion of Fish		
IR (kg/meal)	0.025[3]	0.025[3]
BSAF (L/kg)	Chemical Specific	Chemical Specific
FI (unitless)	0.1	0.01
EF (meals/year)	350	350

Notes:
AT_c = Averaging time for carcinogenic effects
AT_n = Averaging time for noncarcinogenic effects
BW = Body weight
BSAF = Chemical specific biota sediment accumulation factor
C_{fish} = Exposure concentration for fish
ED = Exposure duration
EF = Exposure frequency
FI = Fraction ingested from contaminated source
IR = Ingestion rate

1 - Estimated from sediment concentrations (see text).
2 - USEPA, 1989: Risk Assessment Guidance for Superfund.
Vol 1: Human Health Evaluation Manual, Part A.
3 - USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

TABLE 6-7

SUMMARY OF EXPOSURE INPUT PARAMETERS (CTE)
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Exposure Parameter	Cooper River	Noisette Creek/Shipyard Creek
	Adult Recreational Fisherman	Adult Recreational Fisherman
All Exposures		
C_{fish} (mg/kg)	Estimated[2]	Estimated[2]
ED (years)	9	9
BW (kg)	70	70
AT_n (days)	3,285[3]	3,285[3]
AT_c (days)	25,550	25,550
Ingestion of Fish		
IR (kg/meal)	0.008[2]	0.008[2]
BCF (L/kg)	Chemical Specific	Chemical Specific
FI (unitless)	0.1	0.01
EF (meals/year)	350	350

Notes:
AT_c = Averaging time for carcinogenic effects
AT_n = Averaging time for noncarcinogenic effects
BW = Body weight
BSAF = Chemical specific biota sediment accumulation factor
C_{fish} = Exposure concentration for fish
ED = Exposure duration
EF = Exposure frequency
FI = Fraction ingested from contaminated source
IR = Ingestion rate

1 - Estimated from sediment concentrations (see text).
2 - USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
3 - USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health

TABLE 6-8

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s) [3]	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds										
ACENAPHTHENE	Chronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Liver	3000/1	IRIS	2/17/2009
ANTHRACENE	NA	3.00E-01	mg/kg/day	1	3.0E-01	mg/kg/day	None Specified	3000/1	IRIS	2/17/2009
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE[4]	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Neurological	3000/1	IRIS	2/17/2009
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Liver	1000/1	IRIS	2/17/2009
CHRYSENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	Blood, Kidney, Liver	3000/1	IRIS	2/17/2009
FLUORENE	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	Blood	3000/1	IRIS	2/17/2009
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE[4]	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	2/17/2009
PYRENE	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Kidney	3000/1	IRIS	2/17/2009
Pesticides/PCBs										
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	Immune	NA	NA	NA
DIELDRIN	Chronic	5.0E-05	mg/kg/day	1	5.0E-05	mg/kg/day	Liver	100/1	IRIS	2/17/2009
Inorganics										
ALUMINUM	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Body Weight	100	PPRTV	10/23/2006
ARSENIC	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	2/17/2009
BARIUM	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	CVS	300/1	IRIS	2/17/2009
CHROMIUM[4]	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Respiratory	300/3	IRIS	2/17/2009
COBALT	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	CVS, Immune, Neurological, Reproductive	NA	ORNL	4/01/2009
COPPER	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	GS	NA	HEAST	7/1997
IRON	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	GS	1.5	PPRTV	9/11/2006
LEAD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE (soil)[5]	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	Neurological	1/1	IRIS	2/17/2009
MERCURY[6]	Chronic	3.0E-04	mg/kg/day	0.07	2.1E-05	mg/kg/day	Neurological	1000/1	IRIS	2/17/2009
NICKEL	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	2/17/2009
SELENIUM	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Hair Loss, Neurological, Skin	3/1	IRIS	2/17/2009
THALLIUM	Chronic	6.5E-05	mg/kg/day	1	6.5E-05	mg/kg/day	Hair Loss, Liver	3000/1	ORNL	4/1/2009
VANADIUM	Chronic	5.0E-03	mg/kg/day	0.026	1.3E-04	mg/kg/day	Hair Loss	300	ORNL	4/1/2009
ZINC	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	Blood	3/1	IRIS	2/17/2009

Notes:
1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
3 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
4 - Values are for hexavalent chromium.
5 - Adjusted IRIS value in accordance with USEPA Region I Risk Update Number 4, November 1996.
6 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal

HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available.
ORNL = Oak Ridge National Laboratory, Regional Screening Levels for Chemical Contaminants at Superfund Sites, April 2009.
PPRTV = Provisional Peer Reviewed Toxicity Values

TABLE 6-9

NON-CANCER TOXICITY DATA -- INHALATION
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD[1]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds									
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(B)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(K)FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides/PCBs									
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA
AROCLOR-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIELDRIN	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics									
ALUMINUM	Chronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	CNS	300	PPRTV	10/23/2006
ARSENIC	Chronic	1.50E-05	mg/m^3	4.3E-06	(mg/kg/day)	NA	NA	ORNL	4/1/2009
BARIUM	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetotoxicity	1000/1	HEAST	9/97
CHROMIUM	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	2/18/2009
COBALT	Chronic	6.0E-06	mg/m^3	1.7E-06	(mg/kg/day)	Respiratory	NA	ORNL	4/1/2009
COPPER	NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	2/18/2009
MERCURY	NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	Chronic	9.00E-05	mg/m^3	2.6E-05	(mg/kg/day)	NA	NA	ORNL	4/1/2009
SELENIUM	Chronic	2.00E-02	mg/m^3	5.7E-03	(mg/kg/day)	NA	NA	ORNL	4/1/2009
THALLIUM	NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:
CNS = Central Nervous System
HEAST= Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Applicable
ORNL = Oak Ridge National Laboratory, Regional Screening Levels for Chemical Contaminants at Superfund Sites, April, 2009.
PPRTV = Provisional Peer Reviewed Toxicity Values

TABLE 6-10

CANCER TOXICITY DATA -- ORAL/DERMAL
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds								
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE[3]	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	7/1993
BENZO(A)PYRENE[3]	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009
BENZO(B)FLUORANTHENE[3]	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	7/1993
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
BENZO(K)FLUORANTHENE[3]	7.3E-02	$(mg/kg/day)^{-1}$	1	7.3E-02	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	7/1993
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	$(mg/kg/day)^{-1}$	1	1.4E-02	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009
CHRYSENE[3]	7.3E-03	$(mg/kg/day)^{-1}$	1	7.3E-03	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	7/1993
FLUORANTHENE	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
FLUORENE	NA	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE[3]	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(1)	7/1993
PHENANTHRENE	NA	NA	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
Pesticides/PCBs								
4,4'-DDD	2.4E-01	$(mg/kg/day)^{-1}$	1	2.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009
4,4'-DDE	3.4E-01	$(mg/kg/day)^{-1}$	1	3.4E-01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009
AROCLOR-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(2)	9/1996
DIELDRIN	1.6E+01	$(mg/kg/day)^{-1}$	1	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009

TABLE 6-10

CANCER TOXICITY DATA -- ORAL/DERMAL
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Inorganics								
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A / Known/likely human carcinogen	IRIS	2/19/2009
BARIUM	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
CHROMIUM	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
COBALT	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
IRON	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	NA	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	2/19/2009
MANGANESE	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
MERCURY	NA	NA	NA	NA	NA	C / Possible Human Carcinogen	IRIS	2/19/2009
NICKEL	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
VANADIUM	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.
3 - The carcinogenic PAHs are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

HEAST = Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System.

NA = Not Available.

ORNL = Oak Ridge National Laboratory, Regional Screening Levels for Chemical Contaminants at Superfund Sites, April, 2009.

PPRTV = Provisional Peer Reviewed Toxicity Values

USEPA(1) = USEPA, Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, July 1993, EPA/600/R-93/089.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-11

CANCER TOXICITY DATA -- INHALATION
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Semivolatile Organic Compounds							
ACENAPHTHENE	NA	NA	NA	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA	NA	NA	NA
BENZALDEHYDE	NA	NA	NA	NA	NA	NA	NA
BENZO(A)ANTHRACENE[2]	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
BENZO(A)PYRENE[2]	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
BENZO(B)FLUORANTHENE[2]	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
BENZO(G,H,I)PERYLENE	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
BENZO(K)FLUORANTHENE[2]	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
BIS(2-ETHYLHEXYL)PHTHALATE	2.40E-06	$(ug/m^3)^{-1}$	8.4E-03	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
CHRYSENE[2]	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
FLUORANTHENE	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
FLUORENE	NA	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-CD)PYRENE[2]	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
PHENANTHRENE	NA	NA	NA	NA	NA	NA	9/12/2008
PYRENE	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
Pesticides/PCBs							
4,4'-DDD	6.9E-05	$(ug/m^3)^{-1}$	2.4E-01	NA	NA	ORNL	9/12/2008
4,4'-DDE	9.7E-05	$(ug/m^3)^{-1}$	3.4E-01	NA	NA	ORNL	9/12/2008
AROCLOR-1260	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	USEPA(2)	9/1996
DIELDRIN	4.6E-03	$(ug/m^3)^{-1}$	1.6E+01	$(mg/kg/day)^{-1}$	B2 / Probable human carcinogen	IRIS	2/19/2009
Inorganics							
ALUMINUM	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	.	IRIS	2/19/2009
BARIUM	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
CHROMIUM	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	2/19/2009
COBALT	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
COPPER	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
IRON	NA	NA	NA	NA	NA	NA	NA
LEAD	NA	NA	NA	NA	B2 / Probable human carcinogen	IRIS	2/19/2009
MANGANESE	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
MERCURY	NA	NA	NA	NA	C / Possible Human Carcinogen	IRIS	2/19/2009
NICKEL	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	ORNL	9/12/2008
SELENIUM	NA	NA	NA	NA	NA	NA	NA

TABLE 6-11

CANCER TOXICITY DATA -- INHALATION
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
THALLIUM	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
VANADIUM	NA	NA	NA	NA	NA	NA	NA
ZINC	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.
2 - The carcinogenic PAHs are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Definitions:
IRIS = Integrated Risk Information System.
NA = Not Available.
ORNL = Oak Ridge National Laboratory, Regional Screening Levels for Chemical Contaminants at Superfund Sites, April 2009.
USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE 6-12

SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURES
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Noisette Creek								
Adult Recreational Users	Sediment	Fish Ingestion	6E-07	--	--	--	0.04	--
		Total All Media	6E-07				0.04	
Shipyard Creek								
Adult Recreational Users	Sediment	Fish Ingestion	9E-06			Arsenic	1	--
		Total All Media	9E-06				1	
Cooper River								
Adult Recreational Users	Sediment	Fish Ingestion	1E-04		Benzo(a)pyrene, Arsenic	Benzo(a)anthracene, Benzo(b)fluoranthene	2	--
		Total All Media	1E-04					

TABLE 6-13

SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals Contributing to an Target Organ HI > 1
Noisette Creek								
Adult Recreational Users	Sediment	Fish Ingestion	5E-08	--	--	--	0.01	--
		Total All Media	5E-08				0.01	
Shipyard Creek								
Adult Recreational Users	Sediment	Fish Ingestion	8E-07	--	--	--	0.1	--
		Total All Media	8E-07				0.1	
Cooper River								
Adult Recreational Users	Sediment	Fish Ingestion	1E-05	--	--	Benzo(a)pyrene, Arsenic	1	--
		Total All Media	1E-05				1	

7.0 ECOLOGICAL RISK ASSESSMENT

Ecological risk assessments were conducted for Zone J to evaluate the potential for adverse ecological impacts of CNC-related contamination and to determine the appropriate path forward (e.g., no further action, remediation, monitoring). Separate ecological risk assessments were conducted for Noisette Creek, Shipyard Creek, and the Cooper River. The ecological risk assessments were conducted in accordance with USEPA and Navy guidance (USEPA, 1997c; 2001b; Navy, 1999). The ecological risk assessments consisted of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ecological risk assessment process described by USEPA (1997c). The initial portion of Step 3 (hereinafter referred to as Step 3A) equates to the initial portion of Tier 2 of the Navy's three-tier ecological risk assessment process.

Steps 1 through 3A consist of the following:

Step 1	Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2	Screening-Level Exposure Estimate and Risk Calculation
Step 3A	Refinement of Preliminary COPCs

Section 7.1.1 describes the environmental setting at CNC and Zone J. Contaminant sources, migration pathways, and contaminant fate and transport are summarized in Section 7.1.2. The ecotoxicity of contaminants associated with Zone J is described in Section 7.1.3. Section 7.1.4 describes complete exposure pathways, and Section 7.1.5 provides preliminary assessment and measurement endpoints. Sections 7.2, 7.3, and 7.4 describe the screening-level ecological effects evaluation, exposure estimates, and risk calculation, respectively. Section 7.5 describes the refinement of preliminary COPCs. Uncertainties inherent in the ecological risk assessments are discussed in Section 7.6. The summary and conclusions of the ecological risk assessments are provided in Section 7.7.

7.1 SCREENING LEVEL PROBLEM FORMULATION

7.1.1 Environmental Setting and Site Description

The CNC is a 1,575 acre complex located in North Charleston on the west bank of the Cooper River in Charleston Harbor (Figure 1-1), which is formed by the confluence of the Cooper, Ashley, and Wando Rivers. The CNC area is relatively flat and low-lying. Most of the land surface slope is less than 2 percent. The land elevation in the area ranges from 2 to 11 meters MLW, and most of the CNC land surface lies below 3.7 meters MLW. The land use in the area is predominantly impervious heavy

industrial. Other land uses include light industrial, commercial use, residential, grassy fields, and marshes.

The Charleston Navy Base was closed in 1996. During Navy operations, the facility performed various tasks related primarily to ship repair and maintenance (EnSafe 2003a). CNC currently supports several private and federal entities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., NOAA, and the USCG.

Zone J encompasses portions of the Cooper River, Shipyard Creek, and Noisette Creek, all of which are within the Charleston Harbor estuary. Zone J is subjected to the twice-daily tidal ebb and flow, which mix salt water and fresh water and transport sediments and contaminants within the estuary. The salinity in Shipyard Creek, Noisette Creek, and the Cooper River varies depending on rainfall and tidal conditions, but the average daily mean salinity in the Cooper River at CNC is about 11 parts per thousand (ppt) at the surface and 14 ppt at the river bottom (ECT, 2003). The average salinity in Noisette Creek where sediment samples were collected is approximately 13 ppt at low tide and 15 ppt at high tide (ECT, 2003). Salinity data for Shipyard Creek were not available, but Shipyard Creek is near stagnant except for tidal flow, and the salinity where samples were collected for this study is probably similar to that in Noisette Creek and the Cooper River.

The marshes and open water habitats of Charleston Harbor, including the Cooper River, Shipyard Creek, and Noisette Creek, support a diverse assemblage of flora and fauna. Estuarine marshes near open water at CNC are dominated by cordgrass (*Spartina spp*) and black needlerush (*Juncus roemerianus*). Several marshes merge with scrub-shrub wetlands where common plants include wax myrtle (*Myrica cerifera*), groundsel tree (*Baccharis halimifolia*), and salt marsh elder (*Iva frutescens).*

The lower Cooper River supports finfish species such as Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), silver perch (*Bairdiella chrysoura*), weakfish (*Cynoscion regalis*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), red drum (*Sciaenops ocellatus)*, star drum (*Stellifer lanceolatus*), summer flounder (*Paralichtys dentatus*) and southern flounder (*P. lethostigma*), as well as invertebrate species such as white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), and crabs (Van Dolah et al., 1990). These species likely occur in the channels of tidal creeks such as Noisette and Shipyard Creeks. Aquatic species that frequent the marshes at CNC during high tides include mummichog (*Fundulus heteroclitus*) and grass shrimp (*Palaemonetes vulgaris* and *P. pugio*).

7.1.1.1 Noisette Creek

Noisette Creek is a tidal tributary of the Cooper River. It flows eastward through CNC's former golf course into the Cooper River near the north end of Zone J (Figure 1-2). Noisette Creek varies from about 80 to 110 feet wide in the 0.5 mile segment that passes through CNC. Some portions of the creek are bordered by steep-sided banks that are 3 to 6 feet above the water. Vegetation atop the banks includes various trees and shrubs, especially Southern hackberry (*Celtis laevigata*), wax myrtle, groundsel tree, live oak (*Quercus virginiana*), privet (*Ligustrum sp.*), eastern red cedar (*Juniperus silicicola*), yaupon (*Ilex vomitoria*), saw palmetto (*Serenoa repens*), mulberry (*Morus sp.*), chokecherry (*Prunus virginiana*), French tamarisk (*Tamarix gallica*), and black willow (*Salix nigra*). Other portions of Noisette Creek lack steep banks, and these portions of the creek pass through marshy wetlands dominated by smooth cordgrass (*Spartina alterniflora*), salt meadow cordgrass (*S. patens*), and black needlerush.

A variety of fish, crustaceans, and mollusks inhabit Noisette Creek. Wading birds such as herons and egrets, shorebirds, and mammals such as raccoons (*Procyon lotor*) are known to forage in the intertidal mudflats and marshes along the creek. Marsh-related mammals such as rice rats (*Oryzomys palustris*), marsh rabbits (*Sylvilagus aquaticus*), and mink (*Mustela vison*) presumably occur along some portions of the creek. Noisette Creek receives surface water drainage from CNC as well as from off-base property and upstream sources. Several stormwater outfalls discharge into Noisette Creek as it passes through CNC.

Riverfront Park, operated by the City of North Charleston, is located on the south side of Noisette Creek at its confluence with the Cooper River. The park encompasses approximately 10 acres of property that was formerly part of the Charleston Naval Base golf course, and provides an opportunity for the public to access the Cooper River waterfront.

7.1.1.2 Shipyard Creek

Shipyard Creek flows into the Cooper River at the south end of Zone J (Figure 1-2), and separates the southern end of the CNC from the Charleston peninsula. The lower 1-mile portion of Shipyard Creek consists of dredged navigation channels and two turning basins, and is approximately 600 to 1,000 feet wide. Upstream of the turning basins, the creek is shallow and about 10 to 30 feet wide at low tide. Estuarine intertidal marsh habitat is present along the eastern bank of the lower 1-mile portion of the creek, and along both sides of the creek farther upstream. Marsh vegetation along the creek is primarily cordgrass. The marsh is about 1,000 feet wide at the upper end of the turning basin and narrows to about 30 feet wide where sediment samples were collected on April 30, 2008 (Figure 1-2). Riparian vegetation along the upland edge of the marsh consists of the same species of trees and shrubs as described above for Noisette Creek.

The Cooper River Marina is located at the confluence of Shipyard Creek and the Cooper River. Industrial facilities along the western shoreline of the lower portion of Shipyard Creek include the Macalloy Corporation, Foster Wheeler Resource Recovery Plant, Chevron Products Co., and Kinder Morgan Bulk Terminal (known locally as Shipyard River Terminal) (EnSafe 2003a).

The intertidal mudflats and marshes in the non-industrial areas along Shipyard Creek provide habitat for numerous aquatic and wildlife species such as shorebirds, wading birds, and mammals such as raccoons, rice rats, marsh rabbits, and mink.

7.1.1.3 Cooper River

The Cooper River flows south past CNC and empties into Charleston Harbor, which is formed by the confluence of the Cooper, Ashley, and Wando Rivers. The U.S. Army Corps of Engineers maintains a navigation channel along the CNC waterfront. Most of the CNC waterfront along the Cooper River is industrialized, consisting of 25 piers and five dry docks; this portion of the waterfront is protected by a wooden and/or concrete seawall. The northern and southern portions of the CNC waterfront are less industrialized; the shorelines in these areas consist of riprap, with scattered patches of cordgrass in some shallow shoreline areas.

7.1.1.4 Threatened and Endangered Species

Animal and plant species that are federally-listed or state-listed as endangered, threatened, or otherwise of concern at CNC were recently evaluated as part of an Environmental Impact Statement (EIS) associated with a proposed marine container terminal at CNC (USACE, 2006). When preparing the EIS, the U.S. Army Corps of Engineers contacted the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service, and SCDNR for information on endangered or threatened species and other sensitive species in the study area, and conducted field surveys for protected species and their habitats. The study area for the EIS included the entire CNC plus about ½ to 2 miles surrounding the CNC (Figure 4.18-1 of USACE, 2006). Information gathered for the EIS on the area's threatened and endangered species is discussed below.

No federally-listed or state-listed plants are known to occur at CNC (USACE, 2006). The only federally-listed animal species known to occur in the vicinity of the CNC are the American alligator (*Alligator mississippiensis*), West Indian manatee (*Trichechus manatus*), loggerhead turtle (*Caretta caretta*) and shortnose sturgeon (*Acipenser brevirostrum*).

The alligator is federally-listed as "threatened due to similarity of appearance." Alligators are common in coastal South Carolina, and the alligator is not actually endangered or threatened. "Similarity of appearance" to a listed species is a regulatory designation used to facilitate the enforcement of the Endangered Species Act; the designation is used when a species is so similar to a listed species that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species. The alligator has this designation due to its similarity of appearance to the endangered American crocodile (*Crocodylus acutus*) and other rare crocodilians. Although no alligators were observed at CNC during surveys conducted for the EIS, alligators are known to occur in the vicinity and transient individuals could potentially occur in freshwater and brackish habitats at CNC (USACE, 2006).

Manatees, federally-listed as endangered, sometimes enter Charleston Harbor in the summer as they migrate up and down the coast. They are occasionally observed in the Cooper River (USACE, 2006).

Loggerhead turtles, federally-listed as threatened, migrate up and down South Carolina's coast and are often observed in the entrance to Charleston Harbor during spring, summer, and fall. They are rarely seen in the Cooper River and its estuarine system (USACE, 2006).

Shortnose sturgeon, federally-listed as endangered, spend most of their lives in fresh and brackish water, only rarely venturing into the ocean. Shortnose sturgeon spawn in fresh water, and the nearest known spawning habitat is more than 40 miles upriver from CNC (USACE, 2006). Shortnose sturgeon could occur in the Cooper River near CNC but it would be unlikely for them to be in small tributaries such as Noisette and Shipyard Creeks.

Several state-listed animal species have been recorded as occurring in Charleston County, but only the bald eagle (*Haliaeetus leucocephalus),* least tern (*Sterna antillarum*), and brown pelican (*Pelecanus occidentalis*) are known to occur at CNC. The bald eagle is state-listed as endangered. The USFWS removed the bald eagle from the federal list of threatened and endangered species in 2007. Bald eagles are occasionally seen at CNC, but no eagle nests are known to exist at CNC (USACE, 2006). The least tern, state-listed as threatened, nests in low-lying sandbars or on graveled rooftops in lieu of beaches. There is no active nesting of least terns at CNC, but nesting has occurred on rooftops at CNC as recently as 2003 (USACE, 2006). Brown pelicans, classified as a State Species of Concern, were commonly seen in flight during field surveys at CNC (USACE, 2006). Brown pelicans nest on remote natural and dredged-material islands along the coast. There are no nesting sites of brown pelicans or any colonial waterbird species at CNC (USACE, 2006).

7.1.2 Contaminant Sources, Migration Pathways, Fate and Transport

Numerous contaminant sources have been associated with CNC and have potentially contributed to sediment contamination in Zone J water bodies (Cooper River, Noisette Creek, and Shipyard Creek). The former Charleston Navy Base was the Navy's third largest home port until 1996 when the base was closed. During Navy operations, the facility performed various tasks related primarily to ship repair and maintenance (EnSafe 2003a). The former Navy base operated approximately 18 major industrial shops, and generated waste materials such as paint wastes, solvents, boiler cleaning solutions, acids, sludge from metal plating at the ship pretreatment facility, and small quantities of radiologically contaminated hazardous waste (USACE, 2006). CNC currently supports several private and federal entities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., NOAA, and the U.S. Coast Guard. The Zone J water bodies receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several NPDES outfalls. Several onshore sites that previously contributed contaminants to Zone J have been remediated; such sites no longer pose potential risks to human health or the environment and have been closed under the RCRA process. Final decisions regarding some AOCs, however, have not been resolved.

The watershed comprised by CNC is made up of 98 sub-basins. Some of these basins are drained by complex systems that consist of catchments, inlets, storm sewer pipes, manholes, detention ponds, flow control structures, and outfall structures. Others do not have any associated drainage structures, and instead, storm water runoff drains directly to receiving waters in natural swales and ditches, or via sheet flow. There are 86 known storm water outfalls at CNC. Five outfalls drain into Shipyard Creek, 15 outfalls drain into Noisette Creek, and the remaining outfalls drain into the Cooper River. Most outfall structures are reinforced concrete pipes or corrugated metal pipes. About eight percent of the upland watershed drained by Noisette Creek is within CNC property, and the remainder is within the city of North Charleston. About 29 percent of the upland watershed drained by Shipyard Creek is within CNC property, and the remainder is within the urban area west of CNC.

CNC-related contamination could enter Noisette Creek, Shipyard Creek, and/or the Cooper River by one or more of three scenarios:

- Transport of storm water through the storm sewer system of pipes, culverts, and outfalls
- Transport of storm water via overland sheet flow
- Groundwater-to-surface water discharge.

The above scenarios have been investigated in previous Zone J investigations, and the degree to which each of the migration pathways contributes, or has contributed, contaminants to Zone J is beyond the scope of this report.

7.1.3 Ecotoxicity and Potential Receptors

PAH compounds in most animal species are metabolized by a mixed-function oxidase enzyme system into intermediates that may be toxic, mutagenic, or carcinogenic to the host. Some invertebrate species cannot efficiently metabolize PAHs (Eisler, 2000), and PAHs can be chronically toxic to those species, but overall, very little is known about the toxicological mechanisms of PAHs in invertebrates (Erstfield and Snow-Ashbrook, 1999). PAHs can bind to cellular macromolecules and thereby disrupt their function in higher level organisms such as mammals and birds. Biological macromolecules include polymers of carbohydrates (e.g., starch), amino acids (proteins), and nucleotides (e.g., DNA). The cellular functions of these polymers include structure, energy storage, energy transfer, material transport, and the storage and transmittal of genetic information. PAHs show little tendency to biomagnify in the food web (Eisler, 2000). Microbial metabolism is the major process for degradation of PAHs in soil (ATSDR, 1997).

In general, phthalates have a low acute toxicity to animals (Amdur et al., 1991). Chronic oral exposures, however, have been shown to result in liver toxicity in mammals. Ingested phthalates metabolize to monoesters in the gut and are subsequently absorbed. Following absorption, phthalates distribute primarily to the liver and kidneys and in some species, concentrate in the testes (Rhodes et al., 1986). Liver carcinogenesis has been observed (ATSDR, 1997). Many receptors are able to metabolize and excrete phthalate esters, so their ability to bioaccumulate varies among species.

Organochlorine pesticides are reproductive and nervous system toxins. Although these compounds were used as insecticides, they are toxic to other animals as well. Acute exposures primarily affect the nervous system, while chronic exposures can affect the liver and endocrine systems of higher animals. Organochlorine pesticides are lipophilic and can be stored in the fatty tissue of organisms such as birds and mammals. In birds of prey they can cause reproductive failure through eggshell thinning and disruption of egg-laying and nesting cycles (Amdur et al., 1991). Organochlorine pesticides were developed to control insects that damage crops, and as a result, they are practically non-toxic to plants.

PCBs are highly lipophilic, and can bioaccumulate in animals. PCBs can accumulate in offspring through placental transfer in mammals and accumulation in bird eggs, and can accumulate in upper trophic level animals such as carnivorous birds and mammals that feed on contaminated prey items (Eisler, 2000). In animals, the primary effect associated with PCB exposure is the induction of liver enzyme systems. These enzymes are associated with detoxification mechanisms and with the metabolism of hormones. Adverse reproductive effects observed with PCB exposure are associated with induction of the enzyme systems. The toxicity of PCBs to mammals and birds varies, depending on the particular PCB and the animal species. PCBs are not water soluble and accumulate to a much greater degree in animals than in

plants. Nevertheless, plant-related effects of PCB exposure can include slower growth, reduced chlorophyll content, and diminished photosynthesis (USEPA, 1999a).

It is difficult to make generalizations about the toxic actions of metals because of diverse affinities for organic molecules in biologic structures, a wide array of biological effects, and a multiplicity of target organs and systems (Amdur et al., 1991). At the molecular level, metals can manifest toxicity in many ways, including selectively accumulating in target organs (such as the kidneys), substituting for "essential" metals, and mimicking essential substrates (Clarkson, 1983). The reactions of metals at the molecular level typically affect enzyme systems, leading to disruption of cellular transport, cellular respiration, cell division, and other physiological processes. Metal toxicity to aquatic organisms is manifested through a broad spectrum of effects that may range from a reduction in growth rate to death.

7.1.4 Complete Exposure Pathways

Benthic organisms (i.e., invertebrate organisms that live on or in sediment) and aquatic organisms in Noisette Creek, Shipyard Creek, and the Cooper River could be exposed to sediment and surface water contaminants through ingestion and direct contact.

Higher trophic level animals such as piscivorous birds and mammals that forage in the same three water bodies could be exposed to sediment and surface water contaminants through direct contact with surface water and sediment, incidental ingestion of surface water and sediment, and consumption of contaminated food items. Some animals could also come into contact with contaminants in surface water through drinking, although this exposure route represents a negligible portion of total exposure for most receptors (Sample et al., 1996).

With the above factors in mind, complete exposure pathways and routes of entry into biota in Noisette Creek, Shipyard Creek, and the Cooper River consist of:

- direct contact with sediment and surface water
- ingestion of sediment and surface water
- Ingestion of contaminated food items.

Ecological receptors at Zone J could be exposed to contaminants in surface water, so surface water represents a theoretically complete exposure pathway. As discussed in Section 4.0, however, evaluations of surface water samples collected during previous investigations at Zone J have indicated that surface water concentrations at Zone J are similar to surface water concentrations throughout the harbor, and ecological risks posed by CNC-related chemicals in Zone J surface water are negligible. Because of this, and since sediments integrate contaminants over time and often indicate a history of

contamination to a greater extent than surface water, the BCT, which includes representatives of SCDHEC and other Natural Resource Trustees, decided that sampling activities conducted in 2008 would focus on sediment. Therefore, this ecological risk assessment evaluates sediment samples collected in 2008, and does not include an evaluation of surface water data.

7.1.5 Preliminary Assessment and Measurement Endpoints

An assessment endpoint is "an explicit expression of the environmental value that is to be protected," while a measurement endpoint is "a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint" (USEPA, 1997c). Measurement endpoints represent the assessment endpoints chosen for a site, and are measures of biological effects (USEPA, 1997c).

USEPA Region 4 has specified that assessment endpoints for screening-level assessments should be broad and generic. For the Zone J screening level assessments, the preliminary assessment endpoint is the protection of benthic biota and piscivorous wildlife from adverse effects of chemicals on their growth, survival, and reproduction. The term "piscivorous" is used here in a broad sense to describe birds and mammals that prey not only upon fish, but on a variety of crustaceans and mollusks. The preliminary measurement endpoints are chemical concentrations in sediment that are associated with no adverse effects on growth, survival, and reproduction of benthic organisms. The measurement endpoints are represented by USEPA Region 4 ESVs for sediment.

The sediment ESVs are based on conservative endpoints and sensitive ecological effects data, and thus, the screening values represent chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. For this reason, USEPA Region 4 considers their sediment screening values to be protective of benthic invertebrates as well as upper level receptors such as birds and mammals. In the screening level ecological risk assessment, therefore, a distinction is not made between measurement endpoints associated with direct toxicity to benthic invertebrates and measurement endpoints associated with food chain effects.

7.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

Sediment ESVs used in the screening level ecological risk assessment were those established by USEPA Region 4 (USEPA, 2001c). If the maximum detected concentration of a chemical in sediment was equal to or less than the ESV, the chemical was eliminated from further consideration for that medium. If the maximum concentration exceeded the ESV, or if a screening value was not available, the chemical was retained for further evaluation.

7.3 SCREENING-LEVEL EXPOSURE ESTIMATE

As discussed in Section 1, previous evaluations indicated that a potential for adverse ecological effects potentially linked to CNC landside sites existed in five areas at Zone J, and the BCT determined that a more thorough assessment was warranted for these areas. The five areas consist of three locations in the Cooper River, one location in Noisette Creek, and one location in Shipyard Creek.

Nine sediment samples (plus one field duplicate) were collected April 30, 2008, for the current sediment evaluation. Three samples were collected from the Cooper River, three samples and a field duplicate were collected in Noisette Creek, and three samples were collected in Shipyard Creek (Figure 1-4. Five of the nine locations (009M0004, 054M0001, 556M0005, 556M0007, and NOIM0004) had previously been sampled in December 2005.

The April 2008 Noisette Creek sediment sample locations were centered on location NOIM0004, which is approximately 650 feet from the mouth of the creek (Figure 1-2) at the former location of a bridge crossing (see photos in Appendix M). Noisette Creek sample NOIM001103 was collected approximately 50 feet upstream from sample NOIM000403. Sample NOIM001203 and a field duplicate were collected approximately 50 feet downstream from NOIM000403.

The three Shipyard Creek sediment samples collected on April 30, 2008 were centered on location 009M0004, approximately 1.6 miles from the mouth of the creek (Figure 1-2; see photos in Appendix M). Sediment sample 009M001603 was collected approximately 50 feet downstream of sample 009M000403. Sample 009M001703 was collected approximately 50 feet upstream of sample 009M000403.

One sediment sample was collected on April 30, 2008, at each of the three Cooper River locations (054M0001, 556M0005, 556M0007) where sediment contaminants were previously elevated. Sample location 054M0001, which was the northernmost of the three Cooper River sample locations (Figure 1-2), was in a transition zone between industrialized and naturally vegetated shoreline; the shoreline at this sample location was comprised of a narrow band of cordgrass interspersed with riprap and construction debris (see photos in Appendix M). The other two Cooper River sample locations (556M0005 and 556M0007) were located within the heavily industrialized portion of the waterfront.

The April 2008 sediment samples were collected with a petite ponar dredge and represent a depth of 0 to about 6 inches below the sediment surface.

7.4 SCREENING LEVEL RISK CALCULATION

7.4.1 Regional Reference (Background) Considerations

Many years of anthropogenic activities (especially industrial and commercial activities) in the vicinity of CNC have contributed metals, pesticides, PAHs, and other contaminants to the environment at Zone J and throughout Charleston Harbor. In addition, some inorganics occur naturally in sediment. With this in mind, a sediment data set representing regional baseline reference (background) conditions has been developed and approved by the BCT. The background sediment samples were collected by Spectra Tech in December 2005 from 10 locations in Charleston Harbor that had been pre-approved by the BCT (Figure 1-2).

The comparison of site concentrations to background values is usually conducted in Step 3A of the ecological risk assessment process, but to focus the evaluation on Zone J-related analytes, the BCT decided that analytes with maximum concentrations less than their respective background concentrations would not be considered to be ecological COPCs. Therefore, the selection of ecological COPCs in each of the data sets (Noisette Creek, Shipyard Creek, and Cooper River) was accomplished by comparing a chemical's maximum detected concentration in each data set to its USEPA Region 4 sediment ESV and to its background value. Specifically, if the maximum concentration was equal to or less than the ESV (i.e., the HQ was less than or equal to 1), the chemical was eliminated from further consideration. If the maximum concentration exceeded the ESV (i.e., the HQ was greater than 1), or if an ESV was not available, the chemical was then compared to twice the average background concentration; a chemical with a maximum concentration less than or equal to twice the average background concentration was eliminated from further consideration, and a chemical with a maximum concentration that exceeded twice the average background concentration was considered to be an ecological COPC and was retained for further evaluation. Although comparing Zone J concentrations to twice the average background value has less statistical rigor than other comparisons (e.g., parametric or non-parametric tests), it is a simple approach that is often used as an initial screening tool, and was approved by SCDHEC representatives during the November 16, 2006 BCT meeting, when the general approach for the ecological risk assessment was discussed.

The background data are presented in Table 7-1 and represent the data set of 10 samples collected in December 2005 (Spectra Tech, 2006). With the exception of "total PAH" concentrations (see next paragraph), one-half of the sample-specific MDL was used to represent non-detected samples when calculating the average concentrations shown in Table 7-1. Background data were not used in the COPC-determination step for analytes that were not detected in background samples. For example, Table 7-1 shows an average dieldrin background concentration of 3.6 µg/kg. The table also indicates, however, that dieldrin was not detected in any background samples. In this case, the 3.6 µg/kg average

value (derived using one-half of the sample-specific MDLs to represent non-detected samples) is provided for informational purposes only; the COPC selection process for dieldrin omitted the background comparison step.

There is no standard approach for calculating total PAH concentrations when some PAHs are not detected. Uncertainty will exist if non-detected PAHs are assigned values of 0, one-half the reporting limit, or any other commonly used value. In addition, there is no standard list of PAHs with which to calculate total PAH concentrations. The Region 4 ecological screening value for total PAHs in sediment is based on the sum of concentrations of acenaphthene, acenapththylene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene. Some guidelines for total PAHs, however, are based on these 13 PAHs plus several other PAH compounds. In view of the above factors, total PAHs in sediments (Table 7-1) were calculated using two methods. In one method, total PAHs are the sum of detected PAH concentrations (non-detected PAH compounds were ignored). In the second method, total PAHs were calculated as the sum of concentrations of the 17 individual PAH compounds that were included in the laboratory analysis, and one-half the sample-specific MDL was used to represent nondetected compounds.

Total DDT concentrations were not calculated and included in Table 7-1 because DDT isomers were not detected in any of the 10 background samples. MDLs for 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT in background samples are shown in Table 7-1 and were taken from Appendix A of the Spectra Tech (2006) report.

7.4.2 Nutrients

Calcium, magnesium, potassium, and sodium were not retained as COPCs. These essential nutrients can be tolerated by most organisms even at relatively high concentrations and are not typically considered to be COPCs. There are no USEPA Region 4 ESVs for these nutrients, and there have been no activities at sites near Zone J that have resulted in known releases of high concentrations of these nutrients.

7.4.3 Screening Results

In Noisette Creek sediments, BEHP, ten individual PAHs, total PAHs , 4,4’-DDD, 4,4’-DDE, total DDT (the sum of detected concentrations of individual DDT isomers), and five metals were retained as COPCs (Table 7-2).

BEHP, nine individual PAHs, total PAHs, 4,4'-DDE, dieldrin, Aroclor-1260, and 14 metals were retained as COPCs in Shipyard Creek sediments (Table 7-3).

Thirteen individual PAHs, total PAHs, 4,4'-DDD, Aroclor-1260, and 13 metals were retained as COPCs in Cooper River samples (Table 7-4).

The full sediment data set for samples collected in 2008 is presented in Appendix O and is summarized in Tables 4-1, 4-2, 4-4, and 4-6.

7.5 REFINEMENT OF PRELIMINARY CHEMICALS OF POTENTIAL CONCERN

At this point, the first two steps of the ecological risk assessment have been completed. The ecological risk assessment process includes a series of scientific/management decision points (SMDPs) (USEPA, 1997c). The first SMDP typically occurs at the end of Step 2 (Screening Level Exposure Estimate and Risk Calculation), and requires the risk managers to evaluate and approve or redirect the work up to that point and determine whether the risk assessment will continue into Step 3. However, in accordance with the QAPP (TtNUS, 2008), the results of Steps 1-3 are being submitted as a single deliverable document. The screening level ecological risk assessment for Zone J indicates a potential for adverse effects, so a more thorough assessment is warranted, and the risk assessment process for Zone J will proceed into Step 3 (Baseline Risk Assessment Problem Formulation).

7.5.1 General Approach

The baseline ecological risk assessment begins with a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process (USEPA, 1997c; Navy, 1999). The initial phase of Step 3 is typically known as Step 3A, and consists of a refinement of the conservative exposure assumptions in order to more realistically estimate potential risks to ecological receptors. Examples of factors typically considered during Step 3A include toxicological evaluation of COPCs, spatial distribution of contaminants, frequency of detection, and habitat quality (USEPA, 1997c; Navy, 1999). Furthermore, the preliminary assessment and measurement endpoints are refined, the site conceptual model is developed, and food chain modeling is conducted (at sites where applicable) to evaluate risks to upper level receptors. The objective of the COPC refinement is to assist the risk managers in refining the list of COPCs so that a decision regarding further assessment or no further action can be made. Potential ecological risks are evaluated using a weight-of-evidence approach in accordance with USEPA guidance (1997c) guidance, and uncertainties are discussed where applicable.

7.5.2 Assessment and Measurement Endpoints

Based on the habitats present and on the migration pathways and routes of exposure of chemicals at Zone J, the site-specific assessment endpoints are the protection of the following groups of receptors from adverse effects of site-related contaminants on growth, survival, and reproduction:

- benthic invertebrates
- piscivorous birds
- piscivorous mammals

The assessment endpoints listed above were selected for evaluation in Step 3A of the baseline ecological risk assessment for the reasons described below.

7.5.2.1 Benthic Invertebrates

Clams, amphipods, polychaetes, and other benthic invertebrates occur in the Zone J estuarine water bodies. Benthic invertebrates can be exposed to sediment contaminants through ingestion and direct contact. They can accumulate sediment contaminants that can then be transferred to higher trophic level organisms when consumed. Benthic invertebrates serve as prey items for higher trophic level organisms such as birds and mammals.

7.5.2.2 Piscivorous Birds and Mammals

Shipyard and Noisette Creeks provide habitat for a variety of birds and mammals. Chemicals such as organochlorine pesticides, PCBs, and certain metals could potentially bioaccumulate in benthic invertebrates and could then be transferred through ingestion to higher trophic level organisms such as birds and mammals. To the extent that this pathway is complete, birds and mammals that forage in Shipyard and Noisette Creeks could be exposed to bioaccumulative chemicals through the food chain. The areas of contamination in Shipyard and Noisette Creeks are small, so any potential risk via the food chain is assumed to be minor. Similarly, the Cooper River at CNC is heavily industrialized, so piscivorous birds and mammals do not forage in this portion of the river to any significant extent. Nevertheless, as a conservative measure, the protection of piscivorous birds and mammals from adverse effects of site-related contaminants on growth, survival, and reproduction will be an assessment endpoint for bioaccumulative COPCs. The term “piscivorous” is used here in a broad sense to describe birds and mammals that prey not only upon fish, but on a variety of crustaceans, mollusks, and other sediment-dwelling organisms.

Piscivorous birds that forage in Zone J water bodies include wading birds such as herons and egrets. Piscivorous mammals such as the river otter and mink undoubtedly forage in Shipyard and Noisette Creeks, as do raccoons. The raccoon is often thought of as piscivorous, and it does consume aquatic organisms, but the majority of its diet typically consists of non-aquatic animal and plant tissues (USEPA, 1993c).

Piscivorous birds and mammals that forage in Zone J water bodies could be exposed to sediment contaminants through direct contact, incidental ingestion of sediment, and consumption of contaminated food items.

7.5.2.3 Other Potential Endpoints

As indicated in USEPA guidance (USEPA, 1997c), it is not practical to directly evaluate risks to all of the individual components of the ecosystem. Instead, assessment endpoints focus the risk assessment on particular components of the ecosystem that will tend to yield the highest risks; this should provide protection for endpoints that have lower risks.

The Navy has worked closely with SCDHEC, USEPA, and other Natural Resource Trustees during more than 12 years of investigations at CNC. Data from these investigations have served to narrow the focus of this ecological risk assessment on potential risks to benthic invertebrates and piscivorous birds and mammals. Thus, amphibians, reptiles, herbivores, and omnivores were not selected as assessment endpoints.

7.5.2.4 Measurement Endpoints

Measurement endpoints for benthic invertebrates in Step 3A of the baseline ecological risk assessment are similar to those in the screening level assessment: chemical concentrations in sediment that are associated with adverse effects on growth, survival, and reproduction of benthic organisms. The measurement endpoints are represented by USEPA Region 4 sediment ESVs. Other sediment guidelines were also used where applicable.

Measurement endpoints for piscivorous birds and mammals were chemical doses associated with adverse impacts on survival, growth, and reproduction. Food-chain modeling was conducted to estimate ingested doses of sediment COPCs that are known to bioaccumulate or biomagnify, and the estimated doses of contaminants in sediment and food items were then compared to threshold oral toxicity values. The mink and green heron (*Butorides virescens*) were selected as representative ecological receptors for food-chain modeling. The methods used to model the doses that representative piscivorous receptors could receive, as well as the selection of toxicity reference values (TRVs), are presented in Appendix Q1,

and were taken from the Zone J QAPP (TtNUS, 2008). Calculation spreadsheets for the representative receptors and a step-by-step example of how food chain HQs were calculated are also provided in Appendix Q1.

Various fish, mollusk, and crustacean species are present in the Zone J water bodies. Attempts could be made to evaluate potential risks to these organisms by estimating the ingested doses for representative species, and then comparing doses to threshold oral toxicity values. However, there is substantial uncertainty inherent with this approach regarding factors such as food ingestion rates and toxicity thresholds. Instead, the evaluation of potential sediment-associated risks to these organisms was evaluated by the comparison of Zone J sediment concentrations to USEPA Region 4 ESVs; the ESVs are conservative in character and are based on toxicity tests using a variety of sediment organisms. Therefore, food chain modeling for fish, mollusk, and crustacean species was deemed unnecessary, and in accordance with the Zone J QAPP (TtNUS, 2008), was not conducted.

7.5.3 Conceptual Exposure Model

The site conceptual exposure model is designed to illustrate the potentially exposed receptor populations and applicable exposure pathways based on the physical nature of the site and the potential contaminant source areas. The contaminant transport pathways for Zone J are shown schematically in Figure 7-1. These pathways describe the movement from sources of contamination to potential ecological receptors; the linkage of these items is the conceptual site model.

Contaminants at most SWMUs and AOCs at CNC were originally released onto soil and could have been transported into Zone J water bodies by overland sheet flow, by the storm water drainage system, or by infiltration into groundwater and subsequent seepage into surface water and sediment (Figure 7-1). The extent to which each of these transport pathways contributes, or has contributed, contaminants to Zone J is beyond the scope of this report. However, the topography of CNC, the extensive pavement at many SWMUs and AOCs, and the overall absence of visible erosion features suggest that sheet flow and erosion have not been significant transport/release mechanisms.

Figure 7-1 indicates that Zone J sediment contaminants originated as soil contamination. While this is believed to be largely true, the possibility that contaminants have been released directly into surface water bodies cannot be ruled out.

The soil cover of vegetation and pavement throughout most CNC upland areas precludes the wind erosion and volatilization pathways. Because Zone J consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek, and does not include upland areas, the direct contact of receptors with contaminated soil is not a complete pathway (Figure 7-1). A final caveat applicable to Figure 7-1 is that

although ecological receptors at Zone J could be exposed to contaminants in surface water, previous investigations have indicated that surface water concentrations at Zone J are similar to surface water concentrations throughout the harbor, and ecological risks posed by CNC-related chemicals in surface water are negligible (see Section 4.0). Because of this, the surface water exposure pathway is shown in Figure 7-1 as being incomplete.

7.5.4 Step 3A Risk Characterization and Discussion: Noisette Creek

Potential risks to benthic receptors in Noisette Creek are discussed in Section 7.5.4.1 and potential risks to piscivorous wildlife via the food chain are discussed in Section 7.5.4.2.

7.5.4.1 Potential Risks to Benthic Organisms

7.5.4.1.1 Semivolatile Organic Compounds

PAHs

Ten individual PAHs plus total PAHs were identified as COPCs (Table 7-2). PAH concentrations were lowest in sample NOIM001103, which was collected at the most upstream of the three sample locations (Figure 4-1). PAH concentrations in the most downstream sample (NOIM001203) tended to be similar or slightly higher than in the center sample (NOIM000403). Although some PAH ESVs were exceeded, maximum screening HQs for COPCs were not particularly elevated, ranging from 1.1 to 4.5 (Table 7-2).

Concentrations of the 10 PAH COPCs tended to be lower at sample location JNOIM0004 in 2008 than in 1997, and concentrations were generally similar (or within a factor of 2) to concentrations at this location in 2005 (Table 4-3).

PAHs almost always occur in field-collected sediments as a mixture of compounds, and the toxicity of PAHs is typically assumed to be additive, so evaluating PAH toxicity in sediment by examining total PAH concentrations is especially useful when, as at Zone J, several PAHs were detected at concentrations exceeding their respective screening values. In addition, the bioavailability of many nonpolar organic compounds (e.g., PAHs) is reduced in the presence of higher concentrations of total organic carbon. With these factors in mind, Schwartz (1999) evaluated several existing sediment quality guidelines for PAHs in marine and estuarine sediments and developed consensus sediment guidelines for threshold, median, and extreme effects concentrations of total PAHs. The consensus guidelines for total PAHs were normalized to organic carbon (OC) by Schwartz (1999) to facilitate comparisons among sediment guidelines and because of the important role of OC in determining PAH bioavailability, and are as follows:

- threshold effects concentration: 290 µg/g OC
- median effects concentration: 1,800 µg/g OC
- extreme effects concentration: 10,000 µg/g OC

Based on the toxicity database with which the above consensus guidelines were generated, total PAH concentrations less than the threshold effects concentration are unlikely to cause adverse effects on benthic ecosystems, while values greater than the extreme effects concentration indicate virtual certainty of adverse effects (Schwartz, 1999). The region of greatest uncertainty lies between the threshold effects concentration and the extreme effects concentration, where a broad gradient of sediment contamination occurs along which effects are increasingly more probable. The median effects concentration is simply a point near the middle of this gradient and is not intended to separate acceptable from unacceptable conditions (Schwartz, 1999).

Total organic carbon (TOC) in Noisette Creek samples ranged from 25,000 mg/kg to 37,000 mg/kg (Table 4-2), which equates to 2.5 to 3.7 percent. Total PAHs in the same samples ranged from about 4,230 µg/kg to 7,464 µg/kg on a whole-sediment basis (Table 7-2). On an OC basis, total PAH concentrations in Noisette Creek samples ranged from 114 µg/g to 299 µg/g (Table 7-5). Total PAH concentrations in samples NOIM000403 (193 µg/g OC) and NOIM001103 (114 µg/g OC) were considerably less than the 290 µg/g OC threshold effects concentration, indicating that PAHs in the vicinity of these two samples are unlikely to pose risks to benthic organisms. The total PAH concentration in sample NOIM001203 (299 µg/g OC) slightly exceeded the threshold effects concentration, while the total PAH concentration in the duplicate of sample NOIM001203 (254 µg/g OC) and the average of the sample and its duplicate (277 µg/g OC) were less than the threshold effects concentration. Thus, based on the average total PAH value in NOIM001203 and its duplicate, potential risk is unlikely. An additional indication of negligible PAH-related risks is that the Schwartz (1999) guidelines are based on 13 PAH compounds [acenaphthene, acenapththylene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene], while total PAHs in Table 7-5 are based on 17 PAH compounds (the 13 above plus 2-methylnaphthalene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene). Excluding concentrations of these last four compounds, the total PAH concentration in NOIM001203 would be 6,920 µg/kg whole sediment, which equates to 277 µg/g OC, less than the 290 µg/g OC threshold effects concentration.

In summary, although some PAH ESVs were exceeded in Noisette Creek samples, maximum screening HQs for COPCs were not particularly elevated, with a maximum HQ of 4.5 (Table 7-2). When normalized on an organic carbon basis, the sediment data indicate that PAHs at the three Noisette Creek locations are unlikely to cause adverse effects to benthic communities.

BEHP

BEHP was detected in Noisette Creek sample NOIM001103 (240 µg/kg), but was not detected in the two other samples (Table 7-2). Phthalates are common environmental contaminants due to their use in plastics, and are relatively persistent in the environment (Gibbons and Alexander, 1989). Phthalates can also be an artifact of the laboratory analytical methods. The value in sample NOIM001103 exceeded the 166 µg/kg background value and the 182 µg/kg ESV, but the screening HQ was relatively low (HQ = 1.3, Table 7-2). The ESV is a threshold effects level (TEL) value established by MacDonald (1994). The TEL is defined as the concentration below which sediment-associated contaminants are not considered to represent significant hazards, the Probable Effects Level (PEL) is the concentration above which adverse effects are probable, and concentrations between the TEL and the PEL represent a range in which adverse biological effects are possible, but it is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL (MacDonald, 1994). The PEL for BEHP is 2647 µg/kg (MacDonald, 1994). Because bis(2-ethylhexyl)phthalate was not detected in the two most downstream samples, and since the single detected value on slightly exceeded the TEL and was well below the PEL, potential risk posed by this compound is probably minimal.

7.5.4.1.2 Pesticides

The pesticide 4,4'-DDD was detected at all three sample locations with concentrations exceeding the 3.3 µg/kg ESV in two samples, and a maximum screening HQ of 1.8 (Table 7-6). 4,4'-DDE was detected in only one sample, and its concentration (3.6 µg/kg) barely exceeded the 3.3 µg/kg ESV. 4,4'-DDT was not detected in any Noisette Creek sample, and MDLs for this compound were low relative to the 3.3 µg/kg ESV, ranging from 0.67 to 0.97 µg/kg (Appendix O). Total DDT (the sum of detected concentrations of individual DDT isomers) ranged from 3.8 to 6.4 µg/kg, exceeding the ESV in all three samples, with a maximum screening HQ of 1.9 (Table 7-6). Total DDT concentrations using one-half the sample-specific MDLs to represent non-detected samples are not shown in Tables 7-2 or 7-6, but calculating total DDT using this method (see Appendix O for MDLs) yielded total DDT values ranging from 4.6 to 7.0 µg/kg. Because MDLs were low and the data set is comprised of only four samples (three plus a duplicate), total DDT concentrations using non-detected compounds are similar to values derived using detected concentrations only.

DDT isomers were not detected at sample location JNOIM0004 in 1997 or 2005, but detection limits were higher in 1997 and 2005 than in 2008 (Table 4-3).

DDT isomers were not detected in sediment at any of the 10 locations in Charleston Harbor that were sampled to determine regional reference (background) values. MDLs for 4,4'-DDD and 4,4'-DDE in

background samples ranged from 4.3 to 11 µg/kg (Table 7-1); detected concentrations of these compounds in Noisette Creek ranged from 2.8 to 6 µg/kg. Therefore, the Noisette Creek values are not elevated relative to background detection limits, but a precise comparison of Noisette Creek concentrations of these pesticides to background values is hindered by the slightly higher detection limits in the background samples.

In the absence of background values for Charleston Harbor, comparing sediment contaminant data to the National Status and Trends/Mussel Watch (NS&T/MW) data is useful. Daskalakis and O'Connor (1995) used the NS&T/MW data to compile a coastal sediment database of chemical concentrations for nearly 13,500 sediment samples collected along the continental US coast, and generated "high" sediment reference values. The "high" reference values were set as the geometric mean plus one standard deviation in the NS&T/MW database. The NS&T/MW "high" value for total DDT in sediment is 22 µg/kg (Daskalakis and O'Connor, 1995); this value is considered to be an elevated concentration for total DDT (Daskalakis and O'Connor, 1995). Similar reference values for individual DDT isomers were not established by Daskalakis and O'Connor (1995). Total DDT values in Noisette Creek samples ranged from 3.8 to 6.4 µg/kg (using detects only) or 4.6 to 7.0 µg/kg (using one-half MDLs to represent non-detects), which are considerably less than the 22 µg/kg NS&T/MW "high" value for total DDT.

MacDonald's (1994) PEL values for 4,4'-DDD, 4,4'-DDE, and total DDT are 7.81 µg/kg, 374 µg/kg, and 51.7 µg/kg, respectively. Noisette Creek concentrations were less than these PELs; and for 4,4'-DDE and total DDT, concentrations were much less than the PELs. As mentioned previously, it is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL, which is the case for Noisette Creek pesticide data.

In summary, maximum screening HQs for DDT isomers were low in Noisette Creek samples, with a maximum HQ of 1.9. All concentrations of DDT isomers in Noisette Creek were less than or within the range of detection limits (4.3 to 11 µg/kg) in background samples from Charleston Harbor, and the maximum total DDT value using one-half the MDLs to represent non-detected isomers (7.0 µg/kg) was well below 22 µg/kg, a value considered to represent elevated concentrations in the NS&T/MW coastal data set. Thus, potential risks to benthic receptors are probably not significant, and are indicative of regional conditions due to historical usage in the vicinity of Charleston Harbor.

7.5.4.1.3 <u>Inorganics</u>

Copper, mercury, selenium, thallium, and zinc were COPCs in sediment (Table 7-2).

Copper

The copper concentration was less than the ESV in sample NOIM001103 (the most upstream sample). The concentration in sample NOIM000403 (the center sample) was 19.9 mg/kg, which was similar to the value at the same location in 2005 and considerably less than in 1997 (Table 4-3). The 2008 value of 19.9 mg/kg barely exceeded the 18.7 mg/kg ESV (HQ = 1.06).

The copper concentration in the most downstream sample (NOIM001203) was 42.8 mg/kg and was 39.7 mg/kg in the duplicate, with a maximum screening HQ of 2.3 (Figure 4-1 and Table 7-2). The 18.7 mg/kg ESV is the TEL, the PEL for copper is 108 mg/kg (MacDonald, 1994). The 42.8 mg/kg maximum concentration was well below the PEL value for copper. The maximum screening HQ of 2.3 is not especially high, but since the maximum concentration was between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain.

Mercury

Mercury concentrations exceeded the ESV, which is the TEL (MacDonald, 1994), only in the duplicate of NOIM001203 (the most downstream sample). Concentrations were similar to background values and were less than the ESV in other samples (Table 7-6). The mercury concentration in sample NOIM001203 was 0.1 mg/kg (Table 4-2); the eleven-fold difference between the analytical results of this sample compared to its duplicate (1.1 mg/kg) cannot be explained. The 1.1 mg/kg value exceeds the 0.696 mg/kg PEL of MacDonald (1994). The average of this sample and its duplicate is 0.6 mg/kg, which is less than the PEL.

In summary, mercury poses no risk to benthic receptors in the vicinity of samples NOIM001103 and NOIM000403. The mercury concentration in the most downstream sample (NOIM001203) was less than the ESV in the original sample, exceeded the PEL in the sample duplicate, and the average of the original sample and duplicate was less than the PEL. The difference between the concentration in the original sample and the concentration in the duplicate sample results in uncertainty regarding potential mercury-related risk in the vicinity of sample NOIM001203.

Selenium and Thallium

There are no Region 4 ESVs for selenium or thallium. Selenium was detected in two Noisette Creek samples (0.23 and 0.32 mg/kg), and thallium was detected in one sample (0.19 mg/kg). Neither of these metals was detected at any of the 10 background locations. MDLs for selenium in background samples ranged from 1.2 to 3.3 mg/kg, and MDLs for thallium in background samples ranged from 1.8 to 4.7 mg/kg (Table 7-1). The NS&T/MW “high” value for selenium in coastal sediment is 0.92 mg/kg

(Daskalakis and O'Connor, 1995); a "high" value for thallium was not provided by Daskalakis and O'Connor (1995).

Screening values for evaluating direct toxicity to marine benthic receptors are limited for selenium and thallium. Buchman (2008) has reviewed numerous sources and generated NOAA's Screening Quick Reference Tables (SQuiRTs). The SQuiRTs provide a spectrum of screening concentrations for inorganic and organic contaminants in various environmental media. The only marine sediment guideline provided by Buchman (2008) for selenium is an apparent effects threshold (AET) for marine amphipods of 1.0 mg/kg. The AET is the concentration of a given chemical above which biological effects are always expected to occur. AETs are not meant to be used as screening values, because toxicity might have been observed in some samples at values below the AET. Nevertheless, it should be noted that selenium values in Noisette Creek were less than the AET. Buchman (2008) did not provide sediment guidelines for thallium so impacts from thallium could not be determined.

The absence of sediment ESVs and toxicity thresholds for selenium and thallium precludes an evaluation of potential adverse effects on benthic receptors. However, selenium concentrations were less than the NS&T/MW "high" value and the AET, and maximum concentrations of both metals were less than the lowest MDLs in background samples, suggesting that concentrations in Noisette Creek are not elevated relative to background conditions.

Zinc

Like mercury, zinc concentrations exceeded the ESV in the duplicate of NOIM001203, and were less than the ESV in other samples. The zinc concentration in sample NOIM001203 was 62.7 mg/kg and was 158 mg/kg in the duplicate sample (Table 4-2). The duplicate concentration did not greatly exceed the ESV (HQ = 1.3). The ESV is the TEL; the PEL for zinc is 271 mg/kg (MacDonald, 1994). The average of sample NOIM001203 and its duplicate is 110 mg/kg, which is less than the ESV.

The sediment data indicate that zinc poses no risk to benthic receptors in the vicinity of samples NOIM001103 and NOIM000403. The zinc concentration in the most downstream sample (NOIM001203) was less than the ESV in the original sample and in the average of the sample and its duplicate, and only slightly exceeded the ESV in duplicate sample (HQ = 1.3). Thus, potential risk to benthic receptors is negligible.

7.5.4.2 Potential Risks to Wildlife via the Food Chain

Bioaccumulative COPCs in Noisette Creek sediment consisted of 4,4'-DDD, 4,4'-DDE, total DDT, copper, mercury, selenium, and zinc. Food-chain modeling was conducted to evaluate potential risks to

representative piscivorous receptors from ingested doses of these chemicals. See Appendix Q1 for methodology used to evaluate risk via the food chain, and for a description of the conservative and average scenarios used in the evaluation.

Based on maximum detected concentrations and conservative assumptions for body weights and ingestion rates, food chain HQs based on No Observed Adverse Effects Levels (NOAELs) exceeded 1.0 for copper, mercury, and zinc (Table 7-7). HQs were highest for mercury, with an HQ of 77.8 for the green heron and an HQ of 12.6 for the mink. The elevated food chain HQs for mercury are driven largely by the 1.1 mg/kg maximum concentration that was detected in the duplicate of sample NOIM001203. As discussed in Section 7.5.4.1.3, the mercury concentration was eleven times higher in the duplicate than in the corresponding sample NOIM001203. In the average scenario, all food chain HQs were less than 1.0 for the mink, while copper and mercury NOAEL HQs exceeded 1.0 for the green heron (Table 7-8). All green heron Lowest Observed Adverse Effects Level (LOAEL) HQs were less than 1.0 in the average scenario.

The average food chain scenario (Table 7-8) provides a less conservative evaluation of risk compared to the maximum food chain scenario, although it is still conservative. The food chain HQs in Table 7-7 and the food chain HQs exceeding 1 in Table 7-8 assume an area use factor (AUF) of 1.0, meaning the representative receptors are assumed to forage exclusively in the area where samples were collected. Piscivorous birds and mammals forage over large areas and would obtain only a fraction of their food from the Noisette Creek area where samples were collected. With this in mind, and since all food chain HQs were less than 1.0 for the mink in the average scenario, potential risks via the food chain to piscivorous mammals represented by the mink are negligible.

In the average food chain scenario, and assuming an AUF of 1.0, copper and mercury HQs exceeded 1.0 for piscivorous birds represented by the green heron (Table 7-8). An animal's AUF can be defined as the ratio of the area of contamination to the area used by the animal (USEPA, 1997c). An estimate of the AUF for a green heron foraging in Noisette Creek can be determined as follows. A "worst case" approximation of the area of contamination for mercury, which is the COPC with the highest food chain HQ for the green heron, would be that the area of mercury-contaminated sediment extends from sample NOIM001203 (the location of the maximum mercury sediment concentration) all the way to the confluence of the creek and the Cooper River. Note that mercury concentrations in three Cooper River sediment samples (Figure 4-3 and Table 4-6) were less than the sediment ESV for mercury. Thus, any potential source of sediment mercury contamination in Noisette Creek has not resulted in contamination in the Cooper River, which justifies using the mouth of Noisette Creek (rather than farther into the river) to determine the maximum extent of potential mercury contaminated-sediment when calculating an AUF for the green heron. Sediment mercury concentrations were less than background and less than the ESV in

the two samples collected immediately upstream of sample NOIM001203 (Table 4-2). Thus, a conservative estimate of the area of mercury contamination in sediment is the area from sample NOIM001203 to the mouth of Noisette Creek. A piscivorous bird such as the green heron could forage in Noisette Creek as well as in the marsh on either side of the creek. With this in mind, an aerial photograph of the area in question was obtained from Google Earth (Appendix Q2, Figure Q-1. The meandering boundary on Figure Q-1 represents the approximate upland edge of the estuarine marsh along the north and south shorelines of the creek. The diagonal line comprising the western boundary of the area on Figure Q-1 represents the upstream extent of potential mercury contamination. The acreage of the area in Figure Q-1 is approximately 7.5 acres, or 8.0 acres when the small triangular area at the mouth of the creek is included. As shown in Figure Q-1, the precise location of the confluence of Noisette Creek and the Cooper River is difficult to determine, so as a conservative measure, it will be assumed that the area of marsh and creek from NOIM001203 to the mouth of the creek is 8 acres. The estimated home range for a green heron is 245 acres (Appendix Q1). An AUF for the green heron would therefore be 8 acres ÷ 245 acres, or 0.033.

Although precise AUFs for piscivorous birds foraging in Noisette Creek cannot be determined, and any assigned AUFs are speculative, the AUF described above is a reasonably conservative estimate based on available literature. All green heron HQs in Table 7-8 are less than 1.0 when the above AUF is incorporated.

In summary, all food chain HQs for DDT isomers and selenium were less than 1.0 in the maximum scenario, so these COPCs pose no risk to piscivorous receptors represented by the mink and green heron. In the average scenario, all food chain HQs were less than 1.0 for the mink, and for the green heron, HQs greater than 1.0 were limited to copper (HQ = 1.3) and mercury (HQ = 6.3). The green heron food chain HQs for copper and mercury were low considering that piscivorous birds forage over much larger areas than that represented by the area from which samples were collected. There is some uncertainty in the evaluation of mercury due to the difference between the concentrations in the original sample NOIM001203 and the duplicate sample, but because piscivorous receptors forage over large areas, and because mercury concentrations were much lower in other Noisette Creek samples, the resulting uncertainty is not significant, and potential risk to piscivorous birds and mammals posed by mercury and other bioaccumulative COPCs is minor.

7.5.4.3 Summary and Conclusions

Concentrations of several chemicals in Noisette Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs, pesticides, PCBs, and inorganics are minimal. Bioaccumulative COPCs do not pose risks to piscivorous birds and mammals in Noisette Creek.

7.5.5 Step 3A Risk Characterization and Discussion: Shipyard Creek

Potential risks to benthic receptors in Shipyard Creek are discussed in Section 7.5.5.1 and potential risks to piscivorous wildlife via the food chain are discussed in Section 7.5.5.2.

7.5.5.1 Potential Risks to Benthic Organisms

7.5.5.1.1 Semivolatile Organic Compounds

PAHs

Nine individual PAHs plus total PAHs were COPCs (Table 7-3). PAH concentrations tended to be lowest in sample 009M001603, which was the most downstream of the three samples (Figure 4-2). PAH concentrations in the center sample (009M000403) tended to be similar to those in the upstream sample (009M001703), with the most notable exception being that that benzo(b)fluoranthene was higher in sample 009M001703 (1,500 µg/kg) than in sample 009M000403 (950 µg/kg) (Table 4-4). Although some PAH ESVs were exceeded, screening HQs greater than 1.0 were not particularly elevated, ranging from 1.7 to 3.8 (Table 7-3).

Concentrations of the nine PAHs that were COPCs were greater at sample location H009M0004 in 2008 than in 2005, with differences between years being greatest for pyrene, at 1,200 µg/kg in 2008 compared to 230 µg/kg in 2005 (Table 4-5). Detection limits in the sample collected from the same location in 1994 were so high that comparisons to 1994 data are not possible, except for fluoranthene, which was the only PAH detected in 1994 from location H009M0004. The fluoranthene concentration in 1994 was 9,500 µg/kg, and was lower at the same location in 2005 and 2008 (Table 4-5).

The three sediment samples collected in Shipyard Creek were silty and high in organic carbon, with OC values of 4.7 to 9.1 percent (Table 7-5). On an OC basis, total PAH concentrations in Shipyard Creek samples ranged from 45 to 114 µg/g (Table 7-5); these values are less than the 290 µg/g OC threshold effects concentration, indicating that PAHs in the Shipyard Creek samples are unlikely to pose risks to benthic organisms. See Section 7.5.4.1.1 for an explanation of toxicity guidelines for total PAHs based on organic carbon.

BEHP

BEHP was detected in all three Shipyard Creek samples. Concentrations ranged from 540 to 750 µg/kg, compared to an ESV of 182 µg/kg and a background value of 166 µg/kg (Table 7-9). The ESV is a TEL value established by MacDonald (1994). The PEL for bis(2-ethylhexyl)phthalate is 2,647 µg/kg

(MacDonald, 1994). All concentrations in Shipyard Creek fall in the region of values in which "it is difficult to predict the occurrence and/or severity of effects" (MacDonald, 1994).

Phthalates are common environmental contaminants due to their use in plastics, and are relatively persistent in the environment. The Shipyard Creek data indicate that potential risk to benthic receptors cannot be ruled out, but the maximum HQ of 4.1 is not especially high.

7.5.5.1.2 Pesticides and PCBs

4,4'-DDE

4,4'-DDE was detected in all three samples. Concentrations ranged from 6.6 to 25 µg/kg (Table 7-3), compared to an ESV of 3.3 µg/kg, with a maximum screening HQ of 7.6 (Table 7-3). Other DDT isomers were not detected in Shipyard Creek samples; MDLs for DDT isomers are provided in Appendix O.

DDT isomers were not detected in background sediment, and MDLs for 4,4'-DDE in background samples ranged from 4.3 to 11 µg/kg (Table 7-1). 4,4'-DDE concentrations in Shipyard Creek samples were 6.6 µg/kg, 12 µg/kg, and 25 µg/kg (Table 4-4), so two of the Shipyard Creek values (especially the maximum value of 25 µg/kg in sample 009M001603) were elevated relative to MDLs in background samples. The 25 µg/kg value was also slightly elevated relative to the NS&T/MW "high" reference value for total DDT in sediment of 22 µg/kg (Daskalakis and O'Connor, 1995).

In summary, 4,4'-DDE was the only DDT isomer detected in Shipyard Creek. The maximum HQ was 7.6. The maximum detected concentration of 25 µg/kg was elevated relative to background data from Charleston Harbor and NS&T/MW data. The 4,4'-DDE concentration in all three samples exceeded the 3.3 µg/kg ESV and the 2.07 µg/kg TEL of MacDonald (1994). The maximum concentration of 25 µg/kg was considerably less than the 374 µg/kg PEL, but it is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL. DDT isomers were not detected at sample location H009M0004 in 2005, and MDLs for DDT isomers in the sample from that location ranged from 7.3 to 8.1 µg/kg. The 4,4'-DDE concentration from sample location H009M0004 in 1994 was 110 µg/kg and the 4,4'-DDD concentration in 1994 was 41 µg/kg in the same sample (Table 4-5). Thus, concentrations of DDT isomers were much lower in 2008 less than in 1994.

Dieldrin

Dieldrin was detected only in sample 009M000403, which was the central of three samples in Shipyard Creek. The non-detects in the nearby upstream and downstream samples indicate that contamination is limited to a small area.

Dieldrin was not detected in background samples, but the range of MDLs in background samples (5 to 13 µg/kg) encompassed the 9.1 µg/kg detected value, preventing a complete comparison to background conditions in Charleston Harbor. The 9.1 µg/kg value is elevated, however, relative to the NS&T/MW "high" value for total dieldrin (sum of aldrin plus dieldrin) in sediment of 2.9 µg/kg (Daskalakis and O'Connor, 1995). Dieldrin was not detected at sample location H009M0004 in 1994 and 2005, but detection limits in the earlier samples exceeded 9.1 µg/kg, which prevents conclusions regarding comparisons to the earlier sampling events.

The single detected concentration (9.1 µg/kg) exceeded the 3.3 µg/kg ESV. The 9.1 µg/kg concentration is approximately 450 times greater than the 0.02 µg/kg Effects Range-Low (ER-L) value derived by Long and Morgan (1991) and is 12.7 times greater than the 0.715 µg/kg TEL of MacDonald (1994). The detected value also exceeds the 8 µg/kg ER-M (Long and Morgan, 1991) and the 4.3 µg/kg PEL (MacDonald 1994).

The 9.1 µg/kg concentration exceeds the ER-M and PEL, which normally indicates probable adverse effects to benthic receptors. However, the bioavailability of dieldrin is reduced in the presence of higher concentrations of organic carbon. With this in mind, USEPA (2003) has developed sediment benchmarks for dieldrin using an equilibrium partitioning approach that accounts for the varying biological availability of chemicals in different sediments. Using the final chronic value from the Water Quality Criterion for dieldrin as the toxicity benchmark, USEPA (2003) derived dieldrin concentrations in freshwater sediment and saltwater sediment that are intended to be protective of benthic organisms. This concentration is 12 µg/g OC for dieldrin in freshwater sediments and 28 µg/g OC for dieldrin in saltwater sediments; these benchmarks are concentrations below which adverse effects to benthic organisms are not expected (USEPA, 2003). Because organic carbon is the factor controlling the bioavailability of nonionic organic compounds (such as dieldrin) in sediments, the dieldrin sediment benchmarks were developed on an organic carbon basis rather than on a dry weight basis. When the chemical concentrations in sediments are reported as dry weight concentrations and organic carbon data are available, it is best to convert the sediment concentrations to µg chemical/g OC (USEPA, 2003). As explained on page 5-2 of the USEPA (2003) dieldrin document, the conversion from dry weight to organic carbon–normalized concentration can be made using the following formula: µg dieldrin/g OC = µg dieldrin/g dry wt × 100 ÷ % OC. Using this formula, and an OC value of 47,000 mg/kg (or 4.7 percent) in sample 009M000403 (Table 7-5), and a dieldrin concentration of 9.1 µg/kg (which equates to 0.0091 µg/g) in the same sample, the 9.1 µg/kg concentration equates to 0.194 µg dieldrin/g OC. This value is well below the 28 µg/g OC benchmark for dieldrin in saltwater sediments. Therefore, adverse effects to benthic organisms are not expected from dieldrin in sample 009M000403.

In summary, dieldrin is an organochlorine insecticide that is no longer used but is known to be extremely persistent in soil and sediment. Dieldrin was detected only in sample 009M000403, which was the center-most of three samples in Shipyard Creek. The non-detects in the nearby upstream and downstream samples indicate that contamination is limited to a small area. Shipyard Creek sediment samples are high in organic carbon, which reduces the bioavailability of dieldrin. Based on USEPA's (2003) guidance document for dieldrin sediment benchmarks, adverse effects to benthic organisms are not expected from dieldrin in sample 009M000403.

PCBs

Aroclor-1260 was the only PCB detected in Shipyard Creek. It was detected in all three samples, and concentrations ranged from 150 to 210 µg/kg, with a maximum HQ of 6.4 (Table 7-3). Detected concentrations of Aroclor-1260 in all three samples exceeded the 21.6 µg/kg TEL for total PCBs, and concentrations in two samples (H009M0016 and H009M0017) exceeded the 189 µg/kg PEL for total PCBs (MacDonald, 1994). Thus, the data indicates probable adverse effects to benthic receptors in the vicinity of these two samples. There are no TELs or PELs for individual Aroclors.

PCBs were not detected in background samples, but MDLs for Aroclor-1260 in background samples ranged from 92 to 240 µg/kg; this range encompasses the detected values in Shipyard Creek, precluding a complete comparison to background conditions in Charleston Harbor. All three Shipyard Creek values are elevated, however, relative to the NS&T/MW "high" value for total PCBs in sediment of 80 µg/kg (Daskalakis and O'Connor, 1995).

The Aroclor-1260 concentration at sample location H009M0004 in 2008 was 150 µg/kg. Aroclor-1260 was not detected at the same location in 2005, but the MDL in 2005 (170 µg/kg) was higher than the detected value in 2008. In 1994, the Aroclor-1260 concentration at the same location was 770 µg/kg, and three other Aroclors were also detected there in 1994, at concentrations ranging from 200 to 3000 µg/kg (Table 4-5).

In summary, Aroclor-1260 was the only PCB detected in Shipyard Creek. Detected concentrations in two samples (H009M0016 and H009M0017) exceeded the PEL, which is a value above which probable effects to benthic receptors are indicated. PCBs are no longer manufactured or used in the United States, but the higher chlorinated PCBs (such as Aroclor-1260) are extremely persistent in sediment. Aroclor-1260 concentrations in 2008 are less than one-third of the concentration from the same vicinity in 1994, and three other Aroclors that were elevated in 1994 were not detected in 2008 (Table 4-5).

7.5.5.1.3 Inorganics

Fourteen metals were COPCs in sediment (Table 7-3) and are discussed below.

Arsenic

Arsenic concentrations exceeded the background value only in sample 009M001703 (the most upstream sample), with a screening HQ of 2.7 (Table 7-9). The 7.24 mg/kg ESV is the TEL, the PEL for arsenic is 41.6 mg/kg (MacDonald, 1994). The maximum screening HQ of 2.7 is not especially high, and the maximum concentration of 19.8 mg/kg is well below the PEL, but since the maximum concentration is between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain. The 19.8 mg/kg maximum concentration was not substantially higher than the maximum concentration in background samples of 15 mg/kg (Table 7-1).

Chromium

Chromium concentrations exceeded the ESV and background value in all three samples, with a maximum screening HQ of 6.4 (Table 7-9). The concentration in sample H009M0004 (the center sample) was 89.5 mg/kg, compared to 160 mg/kg in 2005 and 291 mg/kg in 1994 at the same location (Table 4-5). Chromium concentrations in two samples (H009M0016 at 219 mg/kg and H009M0017 at 336 mg/kg) exceeded the 160 mg/kg PEL (MacDonald, 1994). Thus, the data indicates probable adverse effects to benthic receptors in the vicinity of these two samples.

Copper

Copper concentrations exceeded the ESV and background value in all three samples, with a maximum screening HQ of 7.1 (Table 7-9). The concentration in sample H009M0004 (the center sample) was 56.4 mg/kg, which was similar to the value at the same location in 2005 and slightly less than one-half of the concentration in 1994 (Table 4-5). The copper concentration in the upstream sample (H009M00017) was 133 mg/kg, which exceeded the 108 mg/kg PEL value (MacDonald, 1994). Thus, the data indicates probable adverse effects to benthic receptors in the vicinity of this sample.

Lead

Lead concentrations exceeded the ESV and background value in all three samples, with a maximum screening HQ of 4.7 (Table 7-9). The concentration in sample H009M0004 (the center sample) was 55.7 mg/kg, which was similar to the value at the same location in 2005 and about one-half of the concentration in 1994 (Table 4-5). The lead concentration in the upstream sample (H009M00017) was

142 mg/kg, which exceeded the 112 mg/kg PEL value (MacDonald, 1994). Thus, the data indicate probable adverse effects to benthic receptors in the vicinity of this sample.

Mercury

Mercury concentrations ranged from 0.22 to 0.45 mg/kg and exceeded the ESV (which is the TEL) and background value in all three samples, with a maximum screening HQ of 3.5 (Table 7-9). Concentrations in all three samples collected in 2008 were similar to the value at location H009M0004 in 1994 (Table 4-5) and were less than the 0.696 mg/kg PEL of MacDonald (1994). The maximum screening HQ of 3.5 is not especially high, but since the mercury concentrations in all three samples are between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain.

Nickel

Nickel concentrations exceeded the ESV and background value in two samples, with a maximum screening HQ of 2.1 (Table 7-9). Concentrations in all three samples collected in 2008 were similar to the value at location H009M0004 in 1994 and 2005 (Table 4-5) and were less than the 42.8 mg/kg PEL of MacDonald (1994). As was the case for mercury, the maximum screening HQ of 2.1 is not especially high, but since the nickel concentrations in two samples are between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain.

Zinc

Zinc concentrations ranged from 150 to 494 mg/kg and exceeded the ESV (which is the TEL) and background value in all three samples, with a maximum screening HQ of 4.0 (Table 7-9). The concentration in sample H009M0004 (the center sample) was less than concentrations at the same location in 1994 and 2005 (Table 4-5). The zinc concentration in the upstream sample (H009M0017 at 494 mg/kg exceeded the 271 mg/kg PEL of MacDonald (1994). Thus, the data indicate probable adverse effects to benthic receptors in the vicinity of this sample.

Other Inorganics

USEPA Region 4 does not have ESVs for aluminum, barium, cobalt, iron, selenium, thallium, and vanadium, which were COPCs in Shipyard Creek. Screening values for evaluating direct toxicity to marine benthic receptors are sparse for these metals. NOAA's SQuiRT tables provide a threshold effects level of 130.1 mg/kg for barium in marine sediment (Buchman, 2008). The maximum barium in Shipyard Creek sediment was 86.6 mg/kg (Table 7-9), indicating negligible risk to benthic receptors for barium.

Buchman (2008) did not provide sediment guidelines for thallium. Detected concentrations of thallium in Shipyard Creek ranged from 0.28 to 0.42 mg/kg. Thallium was not detected in background samples, but MDLs in background samples ranged from 1.8 to 4.7 mg/kg, so thallium was not elevated relative to background MDLs.

SQuiRT tables provide AETs of 18,000 mg/kg for aluminum, 10 mg/kg for cobalt, 220,000 mg/kg for iron, 1.0 mg/kg for selenium, and 57 mg/kg for vanadium (Buchman, 2008). The AET is the concentration of a given chemical above which biological effects are always expected to occur. AETs are not meant to be used as screening values, because toxicity might have been observed in some samples at values below the AET. Nevertheless, it should be noted that concentrations of cobalt, iron, and selenium in all three Shipyard Creek samples were less than their respective AETs. Vanadium concentrations exceeded the 57 mg/kg AET in one sample, at 62.2 mg/kg; this was the only sample that exceeded the 48.8 mg/kg background value, but it only barely exceeded the maximum background concentration of 61 mg/kg. Iron concentrations exceeded the 23,600 mg/kg background value in only one sample, at 33,900 mg/kg, compared to a maximum background concentration of 33,000 mg/kg. Aluminum concentrations exceeded the 21,440 mg/kg background value in two samples, but it exceeded the maximum background concentration (27,000) mg/kg in only one sample.

Concentrations of cobalt exceeded the background value (6.4 mg/kg) in one Shipyard Creek sample (H009M0017 at 7.4 mg/kg), but were within the range of background values (0.49 to 8.4 mg, Table 7-1).

Selenium was not detected in background samples, but MDLs for selenium in background samples ranged from 1.2 to 3.3 mg/kg (Table 7-1), which exceeded the range of detected values in Shipyard Creek of 0.53 to 0.89 mg/kg (Table 7-9). The NS&T/MW “high” value for selenium in coastal sediment is 0.92 mg/kg (Daskalakis and O’Connor, 1995); selenium concentrations in Shipyard Creek were less than this value. Daskalakis and O’Connor (1995) did not provide “high” values for the other six metals discussed in this section.

In summary, sediment toxicity thresholds are limited for aluminum, cobalt, iron, selenium, thallium, and vanadium, resulting in uncertainty regarding potential risks to benthic receptors posed by these inorganics. However, concentrations of cobalt, selenium, and thallium in Shipyard Creek do not appear to be site-related, and instead are indicative of regional conditions in the vicinity of Charleston Harbor. Maximum concentrations of aluminum, iron, and vanadium exceeded background values, but were not notably greater than maximum background concentrations, so there is uncertainty regarding whether potential risks posed by these inorganics are site-related.

7.5.5.2 Potential Risks to Wildlife via the Food Chain

Bioaccumulative COPCs in Shipyard Creek sediment consisted of 4,4'-DDE, dieldrin, Aroclor-1260, arsenic, chromium, copper, lead, mercury, nickel, selenium, and zinc. Based on maximum detected concentrations and conservative assumptions for body weights and food ingestion, food chain NOAEL HQs exceeded 1.0 for arsenic, chromium, copper, lead, mercury, nickel, and zinc (Table 7-10). Food chain NOAEL HQs in the average scenario exceeded 1.0 for chromium, copper, mercury, and zinc, and all LOAEL HQs in the average scenario were less than 1.0 (Table 7-11).

The food chain HQs in Table 7-10 and the food chain HQs exceeding 1 in Table 7-11 are based on AUFs of 1.0, meaning the representative receptors are assumed to forage exclusively in the area where samples were collected. However, piscivorous birds and mammals forage over large areas and would obtain only a small fraction of their food from the area within which the Shipyard Creek samples were collected.

NOAEL HQs for chromium, copper, mercury, and zinc exceeded 1.0 for the green heron in the average scenario assuming an AUF of 1, with HQs ranging from 1.2 for zinc to 9.3 for mercury (Table 7-11). Shipyard Creek originates at the eastern edge of a marsh approximately 1400 feet upstream from where sediment samples were collected in 2008 (see Google Earth printout in Appendix Q3). Because sediment samples have not been recently collected upstream of where the 2008 samples were collected, a "worst case" approximation of the area of contamination for chromium, copper, mercury, and zinc assumes that that contaminated sediment extends from the three locations sampled in 2008 all the way to the headwaters of the creek, a distance of 1400 feet. A piscivorous bird such as the green heron could forage in the creek as well as in the marsh on either side of the creek. The width of the creek and adjacent marsh is approximately 25 to 30 feet at the headwaters of the creek and widens to approximately 70 feet where sediment samples were collected in 2008. The acreage of the creek and adjacent marsh in the area in question is approximately 57,650 square feet, or 1.32 acres. The estimated home range for a green heron is 245 acres (Appendix Q1). An AUF for the green heron would be 1.32 acres ÷ 245 acres, or 0.01. All green heron HQs in Tables 7-10 and 7-11 would be less than 1.0 if the AUF of 0.01 was incorporated. Therefore, bioaccumulative COPCs in Shipyard Creek pose minimal potential risks to piscivorous receptors represented by the green heron.

In the average scenario, the copper HQ of 1.05 (based on an AUF of 1) only slightly exceeded 1.0 for the mink, and other HQs were less than 1.0 for the mink (Table 7-11). As discussed in Appendix Q1, the smallest home range reported for a mink is 19 acres, but mink home ranges typically vary from 640 to over 4,000 acres. Using a 19 acre home range, the mink AUF would be 1.32 acre ÷ 19 acres, or 0.07. Appendix Q1 also presents mink foraging data in terms of streamside length. Specifically, mink typically forage within approximately 0.6 to 1.9 miles of streamside habitats. The midpoint of this range is

1.25 miles, or 6,600 feet. A mink AUF using stream length instead of area for Shipyard Creek can be calculated as 1400 feet ÷ 6,600 feet, or approximately 0.21. The copper NOAEL HQ for mink would be well below 1.0 if either the 0.07 AUF or the 0.21 AUF was incorporated (Table 7-11).

In a technical memorandum entitled *Preliminary Results of Zone J Sampling* (EnSafe, 1997), the Navy presented the results of initial sampling activities in various water bodies at CNC, including sediment analytical data for samples 009M000201 and 009M000301, which were located upstream of where samples were collected in 2008 for the current RFI. The data for the two upstream samples from the EnSafe (1997) report are included in Appendix Q3 and a portion of the data for those two samples is summarized in Table Q3-1 of Appendix Q3. Inclusion of sediment data from the two upstream samples (009M000201 and 009M000301) would not significantly alter the results of the average food chain model scenario.

In summary, all food chain HQs for pesticides and PCBs were less than 1.0 in the conservative scenario (Table 7-10) were less than 1.0, so these COPCs pose no risks to piscivorous receptors represented by the mink and green heron. In the average scenario, food chain NOAEL HQs greater than 1.0 were limited to copper for the mink, and chromium, copper, mercury, and zinc for the green heron (Table 7-11). All food chain HQs for the mink and green heron were low considering that piscivorous mammals and birds forage over much larger areas than the area of potential sediment contamination, and all food chain HQs in the average scenario would be less than 1.0 if AUFs were incorporated. With this in mind, bioaccumulative COPCs in Shipyard Creek pose minimal potential risks to piscivorous receptors represented by the mink and green heron.

7.5.5.3 Summary and Conclusions

7.5.5.3.1 Potential Risks to Benthic Organisms

Concentrations of several chemicals in Shipyard Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs are minimal. The maximum detected concentration of 4,4'-DDE (25 µg/kg) exceeds background data, and falls between the 2.07 µg/kg TEL and the 374 µg/kg PEL, so the degree of potential risk is uncertain. A factor for risk managers to consider is that concentrations of DDT isomers in Shipyard Creek in 2008 are much lower than in 1994. Dieldrin was detected in one sample, but based on USEPA's (2003) guidance document for dieldrin sediment benchmarks, adverse effects to benthic organisms are not expected from dieldrin.

Concentrations of Aroclor-1260, chromium, copper, lead, and zinc exceeded their respective PEL values in one or two samples, suggesting probable adverse effects to benthic receptors. Aroclor-1260

concentrations in 2008 are less than one-third of the concentration from the same vicinity in 1994, and three other Aroclors that were elevated in 1994 were not detected in 2008 (Table 4-5). Concentrations of chromium, lead, and zinc in 2008 were less than concentrations from the same location in 1994 and 2005; the copper concentration in 2008 was less than in 1994 and was about the same as in 2005 (Table 4-5). There is some uncertainty in the evaluation of potential risks posed by some inorganics, especially aluminum, iron, and vanadium, due to the absence of toxicity guidelines.

7.5.5.3.2 Considerations Regarding Contaminant Sources

The decision of whether to carry the ERA for Shipyard Creek beyond Step 3A involves risk management and thus will be determined by risk managers. This section presents information regarding sites that were previously known or probable sources of sediment contamination in Shipyard Creek, and is intended to assist the risk managers so that a decision regarding further assessment or no further action can be made.

The Macalloy Corporation ferrochromium manufacturing facility, located on the west bank of Shipyard Creek, operated from 1941 until 1998. Wastes generated by the facility during the ferrochromium manufacturing process included chromium, arsenic, lead, barium, manganese, mercury, and zinc (EnSafe, 2003a; 2003d). Macalloy maintained four surface water discharge points into Shipyard Creek under an NPDES permit, and repeatedly exceeded its NPDES permit limits for total chromium and hexavalent chromium (USEPA, 1999b) as well as for lead and other contaminants (EnSafe, 2003a). Cleanup of the Macalloy site was completed in 2006 (NOAA, 2009).

The following SWMUs and AOCs at CNC are located in drainage basins that discharge surface water runoff, either through outfalls or sheetflow, into Shipyard Creek: SWMUs 8, 9, 11, 19, 20, 24, 121, 159, and 196; and AOCs 633, 634, 636, 637, 649, 650, 651, 654, 670, 689, 690, and 706 (EnSafe, 2003a; 2003d). These sites have been remediated, but could have previously contributed contaminants to Shipyard Creek. SWMUs and AOCs with chemicals of concern (COCs) consisting of Aroclor-1260, chromium, copper, lead, and/or zinc are discussed below.

SWMU 8, located about 800 feet north of the upper portion of Shipyard Creek, contained three unlined oil sludge pits. In 1997, 26,533 tons of contaminated soil were removed from SWMU 8. Surface soil COCs at SWMU 8 included Aroclor-1260 and chromium (CH2M-Jones, 2004a).

SWMU 9 includes a 120-acre closed landfill. Approximately 2400 feet of the former landfill borders the upper portion of Shipyard Creek (CH2M-Jones, 2004b). SWMUs 19, 20, and 121, and AOCs 637, 649, 650, and 651 are located within the landfill footprint. The SWMU 9 landfill was used for the disposal of industrial and domestic solid wastes generated at CNC from the 1930s until the early 1970s. The landfill

was closed by placing a soil cover over the entire landfill area. PCBs, including Aroclor-1260, were COCs in SWMU 9 soil. The RFI report for SWMU 19 (Solid Waste Transfer Station) identified Aroclor-1260, copper, zinc, and other metals as surface soil COCs (CH2M-Jones, 2004b).

AOC 670 is a former outdoor trap and skeet range within SWMU 14, and is approximately 1200 feet northeast of the middle portion of Shipyard Creek. A portion of AOC 670 lies within a drainage basin that discharges to Shipyard Creek (EnSafe, 2003a). Soil COCs included Aroclor-1260 and lead. Removal of contaminated soil occurred in 2002 (CH2M-Jones, 2004a).

AOC 633, located approximately 1000 feet north of the upper reach of Shipyard Creek, consists of an electrical substation and surrounding area. Several historical releases of PCBs have been reported for the site. Soil contaminated by PCBs (including Aroclor-1260) was removed during 2001 and 2002 (CH2M-Jones, 2004c).

In summary, COPCs posing the greatest potential risks to benthic receptors in Shipyard Creek are Aroclor-1260, chromium, copper, lead, and zinc, since sediment concentrations of these chemicals exceeded their respective PEL values in one or two samples. However, the presumed sources of these COPCs have been remediated, and sediment concentrations of these COPCs were lower in 2008 than concentrations from the same location in 1994. With this in mind, and since sediment contamination is limited to a small area, further evaluation of Shipyard Creek sediment does not appear to be warranted.

7.5.5.3.3 Potential Risks to Wildlife via the Food Chain

Bioaccumulative COPCs do not pose significant risks to piscivorous birds and mammals in Shipyard Creek.

7.5.6 Step 3A Risk Characterization and Discussion: Cooper River

Potential risks to benthic receptors in the Cooper River are discussed in Section 7.5.6.1 and potential risks to piscivorous wildlife via the food chain are discussed in Section 7.5.6.2.

7.5.6.1 Potential Risks to Benthic Organisms

7.5.6.1.1 Semivolatile Organic Compounds

PAHs

Thirteen individual PAHs plus total PAHs were COPCs (Table 7-4). PAH concentrations were highest in sample 556M000503, which was the southernmost of the three samples in the Cooper River, and were

lowest in sample 054M000103, the northernmost of the three samples (Table 4-6 and Figure 4-3). Concentrations of some PAHs were quite high in sample 556M000503; for example, the concentration of fluoranthene in this sample was 41,000 µg/kg, with a screening HQ of 124 (Table 7-12). The high concentrations of PAHs in sample 556M000503 and corresponding sample dilutions required for laboratory analysis resulted in detection limits being elevated in this sample compared to other samples (Table 4-6).

Comparisons of PAH concentrations over time at the three Cooper River locations are hindered by high detection limits in previous samples, but overall, concentrations at location E054M0001 and E556M0007 were highest in 1995 (Tables 4-7 and 4-9) and concentrations at location E556M0005 were highest in 2008 (Table 4-8).

The gross physical characteristics of sediment sample 054M000103 (the northern river sample) were different than the other two river samples. The sample, collected in shallow water about 40 feet offshore, was brownish-grey silty sand. Samples 556M000703 and 556M000503, on the other hand, were black and very silty, with a “jelly-like” consistency and petroleum odor. Sample 556M000703 was collected near dry dock #5 about five feet from the concrete seawall/dock at a depth of 20 feet. Sample 556M000503 was collected adjacent to a concrete piling at a depth of 12 feet. The different physical characteristics of sample 054M000103 compared to the other two samples are reflected by the organic carbon content and solids content in the three samples. The TOC was 7,100 mg/kg (0.7 percent) in sample 054M000103 but was 46,000 mg/kg and 56,000 mg/kg (4.6 and 5.6 percent) in the other two samples (Table 7-5). Sample 054M000103 was 78 percent total solids, while the other two samples were 24 percent solids (Appendix O and Table 4-6).

On an organic carbon basis, total PAH concentrations in Cooper River samples ranged from 158 to 2462 µg/g (Table 7-5); concentrations in samples 054M000103 and 556M000703 were less than the Schwartz (1999) threshold effects concentration of 290 µg/g OC, indicating that PAHs in these two samples are unlikely to pose risks to benthic organisms. The 2,462 µg/g OC value in sample 556M000503 exceeded the 290 µg/g OC threshold effects concentration and the 1800 µg/g OC median effects concentration (Schwartz, 1999), indicating that PAHs in this sample pose potential risks to benthic organisms. The 2,462 µg/g OC value in this sample was well below the 10,000 µg/g OC extreme effects concentration (Schwartz, 1999). See Section 7.5.4.1.1 for an explanation of toxicity guidelines for total PAHs based on organic carbon.

7.5.6.1.2 Pesticides and PCBs

4,4'-DDD

4,4'-DDD was detected in sample 556M000503 at a concentration of 4.8 µg/kg (HQ = 1.5), and was not detected in the other two samples (Table 7-4). Other DDT isomers were not detected in Cooper River samples.

DDT isomers were not detected in background sediment, and MDLs for 4,4'-DDD in background samples ranged from 4.3 to 11 µg/kg (Table 7-1). The 4,4'-DDD concentration of 4.8 µg/kg in sample 556M000503 is not elevated relative to the background MDLs, and the total DDT concentration in this sample calculated using one-half the sample-specific MDLs to represent non-detected isomers would be 6.5 µg/kg. This value is well below the NS&T/MW "high" value for total DDT in sediment of 22 µg/kg (Daskalakis and O'Connor, 1995).

The single detected value of 4.8 µg/kg in sample 556M000503 exceeded the 1.22 µg/kg TEL but was less than the 7.81 µg/kg PEL of MacDonald (1994). It is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL. DDT isomers were not detected at the same sample location in 1995 or 2005, but detection limits were much higher than in 2008 (Table 4-8), precluding a comparison to previous sampling events.

In summary, 4,4'-DDD was the only DDT isomer detected in the Cooper River; its maximum screening HQ of 1.5 was not particularly high. The detected concentration of 4.8 µg/kg was within the range of detection limits (4.3 to 11 µg/kg) in background samples from Charleston Harbor, and the estimated total DDT value (6.5 µg/kg) was well below 22 µg/kg, a value considered to represent elevated concentrations in the NS&T/MW coastal data set. Thus, potential risks to benthic receptors are not significant, and any potential risks are not site-related and are probably related to historical usage of DDT in the watershed.

PCBs

Aroclor-1260 was detected in sample 054M000103 at a concentration of 94 µg/kg (HQ = 2.8), and was not detected in the other two samples (Table 7-4). Other Aroclors were not detected in Cooper River samples. The 94 µg/kg concentration of Aroclor-1260 exceeded the 21.6 µg/kg TEL for total PCBs, so risk to benthic receptors cannot be ruled out, but the concentration was less than the 189 µg/kg PEL (MacDonald, 1994).

Aroclors were not detected at the same sample location in 2005, but detection limits were much higher in 2005 than in 2008, and Aroclors were not analyzed at this location in 1995 (Table 4-7), hindering a comparison to previous sampling events.

PCBs were not detected in background samples, but MDLs for Aroclor-1260 in background samples ranged from 92 to 240 µg/kg; this range encompasses the single detected value of 94 µg/kg in the Cooper River, precluding a complete comparison to background conditions in Charleston Harbor. However, the 94 µg/kg value is slightly elevated relative to the NS&T/MW "high" value of 80 µg/kg for total PCBs in sediment (Daskalakis and O'Connor, 1995).

In summary, Aroclor-260 was detected in one of three Cooper River samples and was the only PCB detected in the river. The 94 µg/kg value is elevated relative to data collected from coastal US locations, and fell between the TEL and the PEL, which indicates potential risk to benthic receptors. PCBs are no longer manufactured or used in the United States, but the higher chlorinated PCBs (such as Aroclor-1260) are extremely persistent in sediment.

7.5.6.1.3 Inorganics

Thirteen metals were COPCs in sediment (Table 7-4) and are discussed below.

Arsenic

Arsenic concentrations exceeded the 12.0 mg/kg background value in sample 556M000703 (17.6 mg/kg) and sample 556M000503 (20.5 mg/kg). The concentrations in the two associated sample locations were approximately the same as in 2005 and greater than in 1995 (Tables 4-8 and 4-9). Although the maximum screening HQ of 2.8 is not especially high, the two detected concentrations exceed the 7.24 mg/kg TEL, so potential risk to benthic receptors cannot be ruled out. Concentrations were less than the 41.6 mg/kg PEL (MacDonald, 1994).

Chromium

Chromium concentrations exceeded the ESV and background value in two samples, with a maximum screening HQ of 1.3 (Table 7-12). The two highest concentrations were 57.9 and 68.4 mg/kg, compared to a background value of 43.5 mg/kg and a 56 mg/kg maximum value in background samples (Table 7-1). The relatively low maximum HQ and similarity to background values suggest that site-related risk posed by chromium is probably not significant.

Copper

Copper concentrations exceeded the ESV and background value in all three samples, with a maximum screening HQ of 20.6 (Table 7-12). Copper concentrations in 1995 and 2005 versus 2008 show no clear trends (Tables 4-7 through 4-9). The copper concentration in the upstream sample (054M000103 at 386 mg/kg) and the middle sample (556M000703 at 148 mg/kg) exceeded the 108 mg/kg PEL value (MacDonald, 1994). Thus, the data indicates probable adverse effects to benthic receptors in the vicinity of these two samples.

Lead

Lead concentrations exceeded the ESV and background value in two samples, with a maximum screening HQ of 4.9 (Table 7-12). The lead concentration in the south sample (556M000503) was 40.5 mg/kg, which slightly exceeded the TEL of 30.2 mg/kg. The concentration in the north sample (054M000103) was 147 mg/kg, which exceeded the 112 mg/kg PEL value. Thus, the data indicate probable adverse effects to benthic receptors in the vicinity of this sample.

Nickel

Nickel concentrations exceeded the ESV and background value in three samples, with a maximum screening HQ of 2.1 (Table 7-9). Concentrations in all three samples were less than the 42.8 mg/kg PEL of MacDonald (1994). As was the case for chromium and arsenic, the maximum screening HQ of 2.1 is not especially high, but since the nickel concentrations in three samples are between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain.

Zinc

Zinc concentrations exceeded the ESV and background value in two samples, with a maximum screening HQ of 6.7 (Table 7-12). The zinc concentration in the middle sample (556M000703) was 144 mg/kg, which only slightly exceeded the TEL of 124 mg/kg. The concentration in the north sample (054M000103) was 826 mg/kg, which exceeded the 271 mg/kg PEL value. Thus, the data indicate probable adverse effects to benthic receptors in the vicinity of this sample.

Other Inorganics

USEPA Region 4 does not have ESVs for aluminum, barium, cobalt, iron, manganese, selenium, and vanadium, which were COPCs in Cooper River. Screening values for evaluating direct toxicity to marine benthic receptors are sparse for these metals. NOAA's SQuiRT tables provide a threshold effects level of

130.1 mg/kg for barium in marine sediment (Buchman, 2008). The maximum barium in river sediment was 85.7 mg/kg (Table 7-12), indicating negligible risk to benthic receptors for barium.

SQuiRT tables provide AETs of 18,000 mg/kg for aluminum, 10 mg/kg for cobalt, 220,000 mg/kg for iron, 260 mg/kg for manganese, 1.0 mg/kg for selenium, and 57 mg/kg for vanadium (Buchman, 2008). AETs are not meant to be used as screening values, because toxicity might have been observed in some samples at values below the AET, which is the concentration above which biological effects are expected to occur. Nevertheless, it should be noted that concentrations of cobalt, iron, and selenium in all three Cooper River samples did not exceed their respective AETs. Concentrations of aluminum, manganese, and vanadium exceeded their respective AETs in samples 556M000503 and 556M000703. Vanadium concentrations in these two samples (66 mg/kg and 80.1 mg/kg) only slightly exceeded the maximum background concentration of 61 mg/kg.

Selenium was not detected in background samples, but MDLs for selenium in background samples ranged from 1.2 to 3.3 mg/kg (Table 7-1), which exceeded the range of detected values in the Cooper River of 0.65 to 0.77 mg/kg (Table 7-12). The NS&T/MW “high” value for selenium in coastal sediment is 0.92 mg/kg (Daskalakis and O’Connor, 1995); selenium concentrations in Cooper River were less than this value. Daskalakis and O’Connor (1995) did not provide “high” values for the other six metals discussed in this section.

In summary, sediment toxicity thresholds are limited for aluminum, cobalt, iron, manganese, selenium, and vanadium, resulting in uncertainty regarding potential risks to benthic receptors posed by these inorganics. However, selenium concentrations do not appear to be site-related, and instead are indicative of regional conditions in the vicinity of Charleston Harbor. Concentrations of aluminum, manganese, and vanadium in samples 556M000503 and 556M000703 exceeded their background values and their AETs, which are concentrations above which adverse effects are could occur.

7.5.6.2 Potential Risks to Wildlife via the Food Chain

Bioaccumulative COPCs in Cooper River sediment consisted of 4,4’-DDD, Aroclor-1260, arsenic, chromium, copper, lead, nickel, selenium, and zinc. Based on maximum detected concentrations and conservative assumptions for body weights, food consumption, and sediment ingestion, food chain NOAEL HQs for the mink and green heron exceeded 1.0 for arsenic, chromium, copper, lead, nickel, and zinc (Table 7-13). Food chain NOAEL HQs in the average scenario (assuming an AUF of 1) exceeded 1.0 for copper (mink and green heron) and zinc (green heron), and the green heron LOAEL HQ exceeded 1.0 for copper (Table 7-14).

The highest HQs were for copper, with a NOAEL HQ of 45 for the mink and 78 for the green heron (Table 7-13); these HQs are based on the maximum copper concentration of 386 mg/kg in sample 054M000103 (Figure 4-3). The copper concentration was 148 mg/kg in sample 556M000703 and 43.5 mg/kg in 556M000503.

The food chain HQs in Table 7-13 and the food chain HQs exceeding 1 in Table 7-14 incorporate AUFs of 1.0, meaning the representative receptors are assumed to forage exclusively in the contaminated area where samples were collected. Site-specific AUFs for the Cooper River samples cannot be estimated using the same approach used for the Noisette and Shipyard data sets. Sample location E054M0001 is approximately 2,000 feet from sample location E556M0007, which is about 3,000 feet from location E556M0005 (Figures 1-4 and 4-3). Thus, the three Cooper River samples represent three discrete areas, unlike the Noisette and Shipyard data sets, which each represent a single area. Another difference between the Cooper River data set and the Noisette and Shipyard data sets is that two of the three river sample locations (E556M007 and E556M0005) are in heavily industrialized areas where foraging by piscivorous birds is uncommon, and foraging by piscivorous mammals is rare or non-existent. Furthermore, samples from these two locations were collected in deep water (12 feet and 20 feet deep), where there would be little or no exposure to sediment contaminants by piscivorous birds and mammals. Because of the depth and surrounding industrial conditions, sediment contaminants at sample locations E556M007 and E556M0005 do not pose significant risks to piscivorous birds and mammals.

Sample 054M000103, the most upstream of the three river samples, was in shallower water and in a less industrialized area where exposure by piscivorous birds and mammals to sediment contaminants could occur. Any estimated AUF associated with the sample from location E054M00001 is speculative, especially since only a single sample was collected here, but as an example, if the contaminated area at location E054M00001 is one acre in size, a mink AUF could be calculated as 1 acre ÷ 19 acres (see Section 7.5.4.2), or 0.05. Similarly, an AUF for the green heron would be 1 acre ÷ 245 acres, or 0.004. All HQs in Table 7-14 would be less than 1.0 using these AUFs.

As mentioned above, the water depth and surrounding industrial conditions prevent significant exposure of piscivorous birds and mammals to sediment contaminants in benthic organisms at sample locations E556M007 and E556M0005. With this in mind, an alternate approach to evaluating risks to piscivorous receptors using the food chain model would be to use only the sediment data from sample 054M000103, the sample in shallow water and in a less industrialized area where exposure by piscivorous birds and mammals to sediment contaminants is more likely to occur. This sample was responsible for the maximum Cooper River concentrations of COPCs such as copper, lead, nickel, and zinc (Table 4-6). Using only the data from sample 054M000103, an AUF of 1, and conservative assumptions for body weight, food consumption, and sediment ingestion, chemicals with food chain HQs greater than 1.0

consisted of chromium, copper, lead, nickel, and zinc (Table 7-15). Note that the food chain HQ values with an AUF of 1 in Table 7-15 for copper, lead, nickel, and zinc are the same as food chain HQ values in Table 7-13, because Table 7-13 is based on maximum Cooper River sediment concentrations, which were measured in sample 054M000103. Using the data from sample 054M000103, an AUF of 1, and less conservative assumptions for body weight, food consumption, and sediment ingestion, chemicals with food chain NOAEL HQs greater than 1.0 consisted of copper for the mink, and copper, lead, and zinc for the green heron (Table 7-16). All HQs in Table 7-15 would be less than 1.0 using the AUFs discussed in the preceding paragraph, except the mink NOAEL HQ for copper in the conservative scenario would be 45.4 x 0.05 = 2.3. All HQs in Table 7-16 would be less than 1.0 using the AUFs discussed in the previous paragraph. A contaminated area of more than one acre at location E054M00001 would result in proportionately higher HQs while a contaminated area of less than one acre would result in proportionately lower HQs.

7.5.6.3 Summary and Conclusions

Concentrations of several chemicals in Cooper River sediment exceeded ecological screening values, indicating potential risk to benthic receptors. PAHs pose potential risks to benthic invertebrates in sample 556M000503, the southernmost (farthest downstream) sample. Aroclor-1260 was detected only in sample 054M000103, the northernmost (farthest upstream) sample. The Aroclor-1260 concentration (94 µg/kg) is elevated relative to data collected from coastal US locations, and falls between the 21.6 µg/kg TEL and the 189 µg/kg PEL, so the degree of potential risk is uncertain.

Concentrations of copper, lead, and zinc exceeded their respective PEL values in one or two samples, indicating probable adverse effects to benthic receptors. Specifically, copper concentrations exceeded the PEL in samples 054M000103 and 556M000703, and concentrations of lead and zinc exceeded their PELs in sample 054M000103. There is some uncertainty in the evaluation of potential risks posed by some inorganics, especially aluminum, manganese, and vanadium due to the absence of toxicity guidelines.

Bioaccumulative COPCs do not pose significant risks to piscivorous birds and mammals in the Cooper River.

A factor for risk managers to consider is that Cooper River samples 054M000103, 556M000703 and 556M000503 are located in an industrial shipyard that is periodically dredged for ship traffic (see Section 1.4). Dredged sediments from the shipyard at CNC are typically placed in an upland confined disposal facility (CDF) on Clouter Island. Therefore, any potential ecological risk posed by sediment contamination in the vicinity of these three samples will be mitigated by maintenance dredging. However, some animals (especially birds) forage in the Clouter Island CDF, so contaminated dredge spoil from the

vicinities of samples 054M000103, 556M000703 and 556M000503 could conceivably pose risks to birds and mammals that forage in the Clouter Island CDF. Potential risks to foraging animals would be reduced if contaminated dredge material that is deposited on Clouter Island is mixed with dredge spoil from less-contaminated areas. This would have the effect of diluting concentrations of contaminants.

To evaluate the likelihood of dilution, copies of three documents were obtained that were prepared as part of the USACE dredge permit application process. Portions of all three documents are included in Appendix Q4. GEL (2010) presents sediment data collected from the vicinities of seven piers (Piers C, D, F, H, S, T, and U). Piers C, D, F, and H correspond, roughly, to sample locations 054M0001 and 556M0007. Pier J is approximately 800 feet north (upstream) of sample location 556M0005. WPC (2011) presents sediment data collected from the vicinities of six piers at the Veterans Terminal, which is slightly south of sample location 556M0005. ANAMAR (2011) presents sediment data collected from the vicinity of Pier P, which is approximately 3,000 feet downstream of sample location 556M0005. The sediment data from GEL (2010), WPC (2011), and ANAMAR (2011), as well as the data from samples 054M000103, 556M000703 and 556M000503, are summarized in Table Q4-1 of Appendix Q4. Table Q4-1 indicates that for most chemicals, concentrations in sediment samples collected for the dredge permits were lower (often greatly so) than in samples 054M000103, 556M000703, and 556M000503. Arsenic and chromium concentrations in samples 054M000103, 556M000703, and 556M000503 overlapped somewhat with samples collected for the dredge permits, but for other chemicals, concentrations tended to be much less in samples collected for the dredge permits. PAHs, copper, lead, and zinc were the COPCs of greatest concern in Cooper River samples collected for the RFI (concentrations in one or more samples exceeded PEL values), and concentrations of these COPCs were lower in samples collected for the dredge permits than in Cooper River samples 054M000103, 556M000703, and 556M000503 collected for the RFI. With this information in mind, it is likely that dredge spoil from the vicinity of 054M0001, 556M0007, and 556M0005 would be diluted by sediments (dredge spoil) from other (less contaminated) areas when dredge spoil is deposited on Clouter Island, and therefore, exposure by ecological receptors to contaminated dredge spoil from the vicinities of sample locations 054M0001, 556M0007, and 556M0005 would be mitigated by this dilution. Estimating final concentrations (after dilution) of dredge spoil is beyond the scope of this study.

7.6 UNCERTAINTIES

Uncertainty is associated with all aspects of the ecological assessment methodology presented in the preceding sections. Some uncertainties were discussed in Sections 7.5.4 through 7.5.6. This section provides a summary of the uncertainties, and focuses on those that have not been previously discussed.

A notable uncertainty for the Zone J ecological risk assessment is the source of the sediment COPCs, especially for the Cooper River data set. Most of the CNC waterfront along the Cooper River is

industrialized, consisting of numerous piers and dry docks. CNC currently supports several private and federal facilities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., NOAA, and the U.S. Coast Guard. Concentrations of COPCs such as PAHs could be related to discharges from vessels rather than contaminants associated with upland SWMUs and AOCs at CNC.

Grain size was not measured in sediment samples collected in 2008. Sediment grain size is related to water velocity; as velocity decreases, smaller particles settle out. Therefore, grain size indicates whether samples were collected from areas where fine particles (clays and silts) have settled. Many contaminants adhere to particle surfaces, so fine particles are likely to contain more contaminants per unit of mass, and grain size can be an indicator whether samples were collected from areas of expected contamination. In general, sediment in a depositional area will have more than 50 percent fines. The lack of grain size data is not a significant shortcoming for the current Zone J evaluation. Previous studies at Zone J have documented the fact that the five areas sampled in 2008 are areas of maximum sediment contamination.

Surface water samples were not collected concurrently with the sediment samples collected in 2008. Because of wind action, tides, and currents, the surface waters of Zone J are mixed to some extent, and less variability in contaminant concentrations among surface water samples would be expected. Sediments integrate pollutants over time and often indicate a history of contamination to a greater extent than surface water. Furthermore, evaluations of surface water samples collected during previous investigations have indicated that surface water concentrations at Zone J are similar to surface water concentrations throughout the harbor, and ecological risks posed by CNC-related chemicals in surface water are negligible (see Section 4.0). Therefore, the BCT decided that sampling activities conducted in 2008 would not include surface water. The uncertainty resulting from the absence of current surface water data is not significant in the ecological risk assessment.

Most sediment ESVs are not based on toxicity to reptiles and amphibians. As a result, there is uncertainty regarding potential risks to reptiles and amphibians.

There is uncertainty involving potential cumulative toxicity when concentrations of multiple chemicals exceed their ESVs. In Shipyard Creek for example, concentrations of several metals were highest in sample 009M001703. Hazard indices for metals were not calculated since the toxic mechanisms of metals are complex and it is difficult to ascertain the degree to which metals ”produce effects by the same toxic mechanism” (USEPA, 1997c). In summary, the potential for cumulative toxicity to benthic receptors exists in some sample locations at Zone J. The sample locations represent small areas, however.

The potential for cumulative toxicity for wide-ranging receptors such as piscivorous birds and mammals can be a concern, especially when data sets are evaluated separately, such as at Zone J. Nine samples were collected at Zone J and were evaluated as three data sets of three samples each rather than one data set of nine samples. Birds and mammals could be exposed to contaminants at multiple sample locations. Nevertheless, the resulting uncertainty associated with the food chain HQs at Zone J is believed to be minor since the nine samples represent a very small area relative to the home range or foraging area of piscivorous birds and mammals.

There is no standard approach for calculating total PAH concentrations when some PAHs are not detected, and uncertainty will exist if non-detected PAHs are assigned values of 0, one-half the reporting limit, or any other commonly used value. In addition, there is no standard list of PAHs with which to calculate total PAH concentrations. Total PAHs values were calculated using two methods for the Zone J ecological risk assessment. In one method, total PAHs are the sum of detected PAH concentrations (non-detected PAH compounds were ignored). In the second method, total PAHs were calculated as the sum of concentrations of the 17 individual PAH compounds that were included in the laboratory analysis, and one-half the sample specific MDL was to represent nondetected compounds. Due to the low MDLs in the laboratory analyses, there was very little difference in the resulting calculations of total PAHs, so the resulting uncertainty is minimal.

The choice of representative receptors for the food chain modeling results in some uncertainty. The Cooper River at Zone J provides poor habitat for piscivorous birds and mammals, and the extent to which such receptors utilize the area is uncertain. Under current habitat conditions, the food chain HQs for the Cooper River data set are believed to overestimate risk to piscivorous birds and mammals.

Laboratory-derived NOAELs and LOAELs might not adequately represent toxicity thresholds for piscivorous receptors under field conditions. In addition, NOAELs and LOAELs for species used in toxicity tests and reported in the literature might not adequately represent toxicity thresholds for other species. These uncertainties may overestimate or underestimate potential risks.

The chemical dose to piscivorous wildlife was calculated using an equation that incorporated ingestion rates, body weights, and other factors. These factors were obtained from literature studies or predicted using various equations. Ingestion rates and body weights vary between species, especially between species inhabiting different areas.

Site-specific tissue samples from fish and benthic invertebrates were not collected as part of this investigation. Therefore, chemical concentrations in tissues of these receptors were estimated using BSAFs in order to obtain exposure point concentrations in food items of piscivorous receptors. These

bioaccumulation factors were derived from the literature, and do not take into account site-specific factors such as pH that can affect bioaccumulation. The estimated tissue concentrations of organic chemicals, however, do incorporate lipid contents and sediment TOC into the estimation of chemical concentrations in tissue. Even so, there are uncertainties as to the actual bioaccumulation of organic chemicals in tissue samples.

Sediment ESVs used in the screening level ecological risk assessment were “screening values” established by USEPA Region 4 (USEPA, 2001c). Some Region 4 sediment screening values are “effects values” and some are contract laboratory program practical quantification limits (CLP PQLs) (USEPA, 2001c). Specifically, if the CLP PQL is greater than the effects value, the CLP PQL is used as the screening value. Following USEPA Region 4 guidance, the screening step uses the “screening values” in Table 3 of USEPA (2001c). Effects values (e.g., TELs, ER-Ls) were used to evaluate COPCs in the COPC Refinement Step of the Zone J ecological risk assessment, as per USEPA Region 4 guidance, so any uncertainty resulting from this methodology is minimal.

There is uncertainty in the likelihood of risk to benthic receptors when contaminant concentrations exceed a particular toxicity threshold (such as a TEL) but are less than a probable effects threshold (such as a PEL). A rough guide for determining the likelihood of risk is to examine whether a concentration slightly exceeds the TEL or greatly exceeds the TEL; obviously, higher concentrations pose more risk than lower concentrations. Nevertheless, is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL.

TABLE 7-1

BACKGROUND (REFERENCE LOCATION) SEDIMENT DATA[1]
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical[2]	Range of Detected Values	Average Value[3]	Range of Nondetects[4]	ESV	BSLM000101		BSLM000201		BSLM000301		BSLM000401		BSLM000501		BSLM000601		BSLM000701		BSLM000801		BSLM000901		BSLM001001	
Inorganics (mg/kg)																								
Aluminum	1600-27000	10720	-	NA	27000		19000		7700		1600		7900		4300		8300		14000		12000		5400	
Arsenic	0.98-15	6.0	-	7.24	15		11		3.8		0.98	J	5.9		2.4		3.6		9		5.2		3.2	
Barium	8.8-30	17.3	-	NA	30		27		9.7		9.4		11		18		18		25		16		8.8	
Calcium	3000-140000	26630	-	NA	3100		16000		19000		3000		40000		6400		4800		140000		19000		15000	
Chromium	4.5-56	21.8	-	52.3	56		42		16		4.5		17		10		15		21		23		13	
Cobalt	0.49-8.4	3.2	-	NA	7.4		8.4		1.8		0.49	J	2		1.2	J	1.9		3.4		3.9		1.3	J
Copper	1.1-16	7.5	-	18.7	7.7		16		5.9		1.1	J	4.3		3.2		5.9		15		13		2.4	J
Iron	1800-33000	11800	-	NA	33000		22000		7900		1800		8900		5000		8600		14000		11000		5800	
Lead	2.7-21	9.0	-	30.2	14		15		6.7		2.7		4.9		4.3		8.6		21		9.8		3.4	
Magnesium	530-7100	3213	-	NA	7100		6300		2200		530		2800		1600		2100		3900		3700		1900	
Manganese	33-240	108	-	NA	240		180		74		33		97		41		57		160		140		58	
Mercury	0.0053-0.11	0.036	-	0.13	0.035	J	0.059	J	0.031	J	0.0053	J	0.016	J	0.018	J	0.034		0.11		0.045		0.0078	J
Nickel	1.1-15	6.2	-	15.9	15		12	J	5.2	J	1.1	J	4.8	J	2.4	J	4.6	J	6.9	J	6.9	J	3.2	J
Potassium	240-4200	1523	-	NA	4200		2800		970		240		1200		690		1000		1800		1500		830	
Selenium	ND	0.9	1.2 - 3.3	NA	2.3	U	3.3	U	1.5	U	1.2	U	1.4	U	1.4	U	1.4	U	1.9	U	1.8	U	1.3	U
Sodium	2000-14000	6940	-	NA	10000		14000		5100		2000		6400		4600		5300		9900		7900		4200	
Thallium	ND	1.3	1.8 - 4.7	NA	3.3	U	4.7	U	2.1	U	1.8	U	2.1	U	2.1	U	2.0	U	2.7	U	2.7	U	1.9	U
Vanadium	4.2-61	24.4	-	NA	61		43		17		4.2		18		11		21		32		25		12	
Zinc	9.7-64	35.8	-	124	53		64		25		9.7		21		18		40		60		43		24	
Pesticides and PCBs (µg/kg)																								
4,4'-DDD	ND	3.1	4.3 - 11	3.3	8.5	U	11	U	5.6	U	4.3	U	5.1	U	4.8	U	5.0	U	6.3	U	6.9	U	4.4	U
4,4'-DDE	ND	3.1	4.3 - 11	3.3	8.5	U	11	U	5.6	U	4.3	U	5.1	U	4.8	U	5.0	U	6.3	U	6.9	U	4.4	U
4,4'-DDT	ND	2.8	3.9 - 10	3.3	7.6	U	10	U	5	U	3.9	U	4.6	U	4.4	U	4.5	U	5.7	U	6.2	U	4.0	U
Dieldrin	ND	3.6	5 - 13	3.3	9.9	U	13	U	6.5	U	5.0	U	5.9	U	5.6	U	5.9	U	7.4	U	8.0	U	5.2	U
PCB-1260	ND	66.4	92 - 240	33	180	U	240	U	120	U	92	U	110	U	100	U	110	U	130	U	150	U	95	U
Semivolatile Organic Compounds (µg/kg)																								
2-Methylnaphthalene	ND	25	35 - 90	330	68	U	90	U	44	U	35	U	41	U	39	U	40	U	51	U	55	U	36	U
Acenaphthene	ND	20	27 - 71	330	54	U	71	U	35	U	27	U	32	U	31	U	32	U	40	U	44	U	28	U
Acenaphthylene	69	23	24 - 64	330	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	69	J	25	U
Anthracene	88	30	33 - 86	330	65	U	86	U	43	U	33	U	39	U	37	U	39	U	48	U	88	J	34	U
Benzo[a]anthracene	230	52	45 - 120	330	87	U	120	U	57	U	45	U	53	U	50	U	52	U	65	U	230	J	46	U
Benzo[a]pyrene	140-380	68	27 - 71	330	54	U	71	U	35	U	27	U	32	U	31	U	32	U	140	J	380	J	28	U
Benzo[b]fluoranthene	170-420	80	37 - 98	NA	73	U	98	U	48	U	37	U	44	U	42	U	44	U	170	J	420	J	38	U
Benzo[g,h,i]perylene	69-200	46	33 - 86	NA	65	U	86	U	43	U	33	U	39	U	37	U	39	U	69	J	200	J	34	U
Benzo[k]fluoranthene	140-330	77	52 - 140	NA	100	U	140	U	67	U	52	U	61	U	58	U	60	U	140	J	330	J	53	U
Bis(2-ethylhexyl)phthalate	58-180	83	61 - 80	182	140	J	170	J	70	U	58	J	65	U	61	U	65	J	80	U	180	J	81	J
Chrysene	94-120	73	36 - 71	330	71	U	94	J	46	U	36	U	42	U	40	U	42	U	120	J	360	J	37	U
Dibenz(a,h)anthracene	ND	25	35 - 90	330	78	U	90	U	44	U	35	U	41	U	39	U	40	U	51	U	55	U	36	U
Fluoranthene	52-380	71	37 - 73	330	73	U	110	J	48	U	37	U	52	J	42	U	44	U	55	U	380	J	38	U
Fluorene	ND	23	32 - 83	330	62	U	83	U	41	U	32	U	37	U	36	U	37	U	46	U	50	U	33	U
Indeno[1,2,3-cd]pyrene	61-190	46	37 - 98	NA	73	U	98	U	48	U	37	U	44	U	42	U	44	U	61	J	190	J	38	U
Naphthalene	ND	20	27 - 71	330	54	U	71	U	35	U	27	U	32	U	31	U	32	U	40	U	44	U	28	U
Phenanthrene	ND	30	42 - 110	330	82	U	110	U	54	U	42	U	49	U	47	U	49	U	61	U	66	U	43	U
Pyrene	50-510	89	29 - 56	330	56	U	170	J	37	U	29	U	50	J	32	U	34	U	52	J	510	J	30	U
Total PAHs (detects only)[5]	-	438.5	27 - 140	1684	-		374		-		-		102		-		-		752		3157		-	
Total PAHs (ND=½ MDL)[6]	-	796.6	27 - 140	1684	581.5		1013		378		294		409.5		330.5		344.5		998.5		3314		302.5	

Notes
ESV: Ecological screening value.
NA: Ecological screening value not available.
ND: Not detected in background samples.
U: Non Detect; U values shown here are method detection limits (MDLs); see footnote #1.
J: Estimated value; the analyte was positively identified but its concentration was less than the reporting limit (RL) but greater than MDL.

TABLE 7-1

BACKGROUND (REFERENCE LOCATION) SEDIMENT DATA[1]
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

(1) Data are from Table 3-1 of Spectra Tech (2006) except U values shown here are MDLs from Appendix A of the Spectra Tech (2006) report; U values in Table 3-1 of Spectra Tech (2006) are RLs.
(2) Chemicals in this table are those detected in Zone J samples collected in April 2008, except that 4,4'-DDT was not detected in Zone J samples in 2008; 4,4'-DDT is included here to indicate sample-specific MDLs of this compound . See Table 3-1 of Spectra Tech (2006) and Appendix A of Spectra Tech (2006) for full background analytical dataset.
(3) Average of all samples calculated using ½ the sample specific MDL for nondetected samples.
(4) Sample-specific MDLs in nondetect samples.
(5) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(6) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.

TABLE 7-2

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
NOISETTE CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations[1]		Location of Maximum Concentration	Range of Nondetects[2]	Background Value[3]	Ecological Screening Value	Hazard Quotient [4]	COPC (Yes/No)	Rationale for COPC Selection [5]
		Minimum	Maximum							
Semivolatile Organic Compounds (µg/kg)										
2-METHYLNAPHTHALENE	1/3	16	16	JNOIM0011	19 - 27	ND	330	0.05	No	BSV
ACENAPHTHENE	1/3	18	18	JNOIM0004	7.1 - 14	ND	330	0.05	No	BSV
ACENAPHTHYLENE	3/3	15	34	JNOIM0004	-	45.1	330	0.1	No	BSV
ANTHRACENE	3/3	58	170	JNOIM0012	-	60	330	0.5	No	BSV
BENZO(A)ANTHRACENE	3/3	460	810	JNOIM0012	-	103.5	330	2.5	Yes	ASV & ABG
BENZO(A)PYRENE	3/3	330	540	JNOIM0012	-	135	330	1.6	Yes	ASV & ABG
BENZO(B)FLUORANTHENE	3/3	790	1200	JNOIM0004	-	160.4	NA	NA	Yes	ABG
BENZO(G,H,I)PERYLENE	3/3	150	250	JNOIM0012	-	91.4	NA	NA	Yes	ABG
BENZO(K)FLUORANTHENE	3/3	170	380	JNOIM0012	-	153.1	NA	NA	Yes	ABG
BIS(2-ETHYLHEXYL)PHTHALATE	1/3	240	240	JNOIM0011	16 - 23	166.4	182	1.3	Yes	ASV & ABG
CHRYSENE	3/3	390	690	JNOIM0012	-	146.2	330	2.1	Yes	ASV & ABG
DIBENZO(A,H)ANTHRACENE	1/3	76	76	JNOIM0012	18 - 37	ND	330	0.2	No	BSV
FLUORANTHENE	3/3	720	1500	JNOIM0012	-	142.1	330	4.5	Yes	ASV & ABG
FLUORENE	3/3	11	30	JNOIM0012	-	ND	330	0.1	No	BSV
INDENO(1,2,3-CD)PYRENE	3/3	170	260	JNOIM0012	-	92.6	NA	NA	Yes	ABG
PHENANTHRENE	3/3	160	370	JNOIM0012	-	ND	330	1.1	Yes	ASV
PYRENE	3/3	770	1200	JNOIM0004	-	178.2	330	3.6	Yes	ASV & ABG
TOTAL PAHs (detects only)[6]	3/3	4210	7414	JNOIM0012	-	877	1684	4.4	Yes	ASV & ABG
TOTAL PAHs (ND = ½ MDL)[7]	3/3	4230	7464	JNOIM0012	-	1593	1684	4.4	Yes	ASV & ABG
Pesticides/PCBs (µg/kg)										
4,4'-DDD	3/3	2.8	6	JNOIM0012	-	ND	3.3	1.8	Yes	ASV
4,4'-DDE	1/3	3.6	3.6	JNOIM0011	0.69 - 0.93	ND	3.3	1.1	Yes	ASV
TOTAL DDT	3/3	3.8	6.4	JNOIM0011	-	-	3.3	1.9	Yes	ASV
Inorganics (mg/kg)										
ALUMINUM	3/3	6540	14000	JNOIM0012	-	21440	NA	NA	No	BBG
ARSENIC	3/3	5	9.2	JNOIM0012	-	12.0	7.24	1.3	No	BBG
BARIUM	3/3	8.5	22.1	JNOIM0012	-	34.6	NA	NA	No	BBG
CALCIUM	3/3	5330	47700	JNOIM0004	-	53260	NA	NA	No	Nutrient
CHROMIUM	1/3	27	27	JNOIM0012	0.03	43.5	52.3	0.5	No	BSV
COBALT	2/3	2.8	4.1	JNOIM0012	0.02	6.4	NA	NA	No	BBG
COPPER	3/3	10.3	42.8	JNOIM0012	-	14.9	18.7	2.3	Yes	ASV & ABG
IRON	3/3	6310	11900	JNOIM0012	-	23600	NA	NA	No	BBG

TABLE 7-2

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
NOISETTE CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations(1)		Location of Maximum Concentration	Range of Nondetects(2)	Background Value(3)	Ecological Screening Value	Hazard Quotient (4)	COPC (Yes/No)	Rationale for COPC Selection (5)
		Minimum	Maximum							
LEAD	3/3	10.9	28.9	JNOIM0012	-	18.1	30.2	0.96	No	BSV
MAGNESIUM	3/3	1600	2700	JNOIM0012	-	6426	NA	NA	No	Nutrient
MANGANESE	3/3	39.4	78.5	JNOIM0012	-	216	NA	NA	No	BBG
MERCURY	3/3	0.05	1.1	JNOIM0012	-	0.07	0.13	8.5	Yes	ASV & ABG
NICKEL	3/3	3.5	8.3	JNOIM0012	-	12.4	15.9	0.5	No	BSV
POTASSIUM	3/3	661	1300	JNOIM0012	-	3046	NA	NA	No	Nutrient
SELENIUM	2/3	0.23	0.32	JNOIM0012	0.19	ND	NA	NA	Yes	ESV & BG NA
SODIUM	3/3	4350	6940	JNOIM0012	-	13880	NA	NA	No	Nutrient
THALLIUM	1/3	0.19	0.19	JNOIM0004	0.17 - 0.23	ND	NA	NA	Yes	ESV & BG NA
VANADIUM	3/3	11.4	21.8	JNOIM0012	-	48.8	NA	NA	No	BBG
ZINC	3/3	29.7	158	JNOIM0012	-	71.5	124	1.3	Yes	ASV & ABG

Footnotes:
NA: Ecological screening value not available.
(1) Sample NOIM0012 and its duplicate were considered as two separate samples when determining the minimum and maximum concentrations, but as one sample when determining the frequency of detection.
(2) Sample-specific method detection limits.
(3) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(4) Hazard quotient = maximum detected concentration ÷ ecological screening value.
(5) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 3).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

TABLE 7-3

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SHIPYARD CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Background Value[2]	Ecological Screening Value	Hazard Quotient [3]	COPC (Yes/No)	Rationale for COPC Selection [4]
		Minimum	Maximum							
Semivolatile Organic Compounds (µg/kg)										
2-METHYLNAPHTHALENE	3/3	18	30	009M001703	-	ND	330	0.09	No	BSV
ACENAPHTHENE	3/3	9.6	44	009M000403	-	ND	330	0.1	No	BSV
ACENAPHTHYLENE	3/3	20	56	009M001703	-	45.1	330	0.2	No	BSV
ANTHRACENE	3/3	48	110	009M000403	-	60	330	0.3	No	BSV
BENZO(A)ANTHRACENE	3/3	260	580	009M001703	-	103.5	330	1.8	Yes	ASV & ABG
BENZO(A)PYRENE	3/3	170	560	009M001703	-	135	330	1.7	Yes	ASV & ABG
BENZO(B)FLUORANTHENE	3/3	460	1500	009M001703	-	160.4	NA	NA	Yes	ABG
BENZO(G,H,I)PERYLENE	3/3	99	330	009M001703	-	91.4	NA	NA	Yes	ABG
BENZO(K)FLUORANTHENE	3/3	100	400	009M001703	-	153.1	NA	NA	Yes	ABG
BIS(2-ETHYLHEXYL)PHTHALATE	3/3	540	750	009M001603	-	166.4	182	4.1	Yes	ASV & ABG
CHRYSENE	3/3	190	560	009M001703	-	146.2	330	1.7	Yes	ASV & ABG
FLUORANTHENE	3/3	370	860	009M001703	-	142.1	330	2.6	Yes	ASV & ABG
FLUORENE	3/3	13	33	009M000403	-	ND	330	0.1	No	BSV
INDENO(1,2,3-CD)PYRENE	3/3	100	320	009M001703	-	92.6	NA	NA	Yes	ABG
NAPHTHALENE	1/3	7.5	7.5	009M001603	13 - 16	ND	330	0.02	No	BSV
PHENANTHRENE	3/3	90	280	009M000403	-	ND	330	0.8	No	BSV
PYRENE	3/3	620	1200	009M000403	-	178.2	330	3.6	Yes	ASV & ABG
TOTAL PAHs (detects only)[5]	3/3	2579	6426	009M001703	-	877	1684	3.8	Yes	ASV & ABG
TOTAL PAHs (ND = ½ MDL)[6]	3/3	2586	6447	009M001703	-	1593	1684	3.8	Yes	ASV & ABG
Pesticides/PCBs (µg/kg)										
4,4'-DDE	3/3	6.6	25	009M001603	-	ND	3.3	7.6	Yes	ASV
AROCLOR-1260	3/3	150	210	009M001603	-	ND	33[7]	6.4	Yes	ASV
DIELDRIN	1/3	9.1	9.1	009M000403	1.3 - 1.4	ND	3.3	2.8	Yes	ASV
Inorganics (mg/kg)										
ALUMINUM	3/3	12700	32900	009M001703	-	21440	NA	NA	Yes	ABG
ARSENIC	3/3	6.9	19.8	009M001703	-	12.0	7.24	2.7	Yes	ASV & ABG
BARIUM	3/3	44.1	86.6	009M001703	-	34.6	NA	NA	Yes	ABG
CALCIUM	3/3	24800	37200	009M001703	-	53260	NA	NA	No	Nutrient
CHROMIUM	3/3	89.5	336	009M001703	-	43.5	52.3	6.4	Yes	ASV & ABG
COBALT	3/3	2.5	7.4	009M001703	-	6.4	NA	NA	Yes	ABG
COPPER	3/3	56.4	133	009M001703	-	14.9	18.7	7.1	Yes	ASV & ABG
IRON	3/3	11800	33900	009M001703	-	23600	NA	NA	Yes	ABG

TABLE 7-3

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SHIPYARD CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects(1)	Background Value(2)	Ecological Screening Value	Hazard Quotient (3)	COPC (Yes/No)	Rationale for COPC Selection (4)
		Minimum	Maximum							
LEAD	3/3	55.7	142	009M001703	-	18.1	30.2	4.7	Yes	ASV & ABG
MAGNESIUM	3/3	3230	9300	009M001703	-	6426	NA	NA	No	Nutrient
MANGANESE	3/3	78.3	201	009M001703	-	216	NA	NA	No	BBG
MERCURY	3/3	0.22	0.45	009M000403	-	0.07	0.13	3.5	Yes	ASV & ABG
NICKEL	3/3	12.3	32.8	009M001703	-	12.4	15.9	2.1	Yes	ASV & ABG
POTASSIUM	3/3	1280	3540	009M001703	-	3046	NA	NA	No	Nutrient
SELENIUM	3/3	0.53	0.89	009M001603	-	ND	NA	NA	Yes	ESV & BG NA
SODIUM	3/3	5700	16400	009M001703	-	13880	NA	NA	No	Nutrient
THALLIUM	2/3	0.28	0.42	009M001603	0.38	ND	NA	NA	Yes	ESV & BG NA
VANADIUM	3/3	22.6	62.2	009M001703	-	48.8	NA	NA	Yes	ABG
ZINC	3/3	150	494	009M001703	-	71.5	124	4.0	Yes	ASV & ABG

Footnotes:
NA: Ecological screening value not available.
(1) Sample-specific method detection limits.
(2) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(3) Hazard quotient = maximum detected concentration ÷ ecological screening value
(4) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 2).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.
(5) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(6) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.
(7) ESV for total PCBs.

TABLE 7-4

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
COOPER RIVER SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Background Value[2]	Ecological Screening Value	Hazard Quotient [3]	COPC (Yes/No)	Rationale for COPC Selection [4]
		Minimum	Maximum							
Semivolatile Organic Compounds (µg/kg)										
2-METHYLNAPHTHALENE	1/3	5.2	5.2	054M000103	46 - 580	ND	330	0.02	No	BSV
ACENAPHTHENE	2/3	7	1400	556M000503	24	ND	330	4.2	Yes	ASV
ACENAPHTHYLENE	2/3	3.9	72	556M000703	280	45.1	330	0.2	No	BSV
ANTHRACENE	3/3	64	2400	556M000503	-	60	330	7.3	Yes	ASV & ABG
BENZO(A)ANTHRACENE	3/3	190	5800	556M000503	-	103.5	330	17.6	Yes	ASV & ABG
BENZO(A)PYRENE	3/3	120	2500	556M000503	-	135	330	7.6	Yes	ASV & ABG
BENZO(B)FLUORANTHENE	3/3	250	5400	556M000503	-	160.4	NA	NA	Yes	ABG
BENZO(G,H,I)PERYLENE	3/3	51	780	556M000503	-	91.4	NA	NA	Yes	ABG
BENZO(K)FLUORANTHENE	3/3	82	1200	556M000503	-	153.1	NA	NA	Yes	ABG
CHRYSENE	3/3	170	5100	556M000503	-	146.2	330	15.5	Yes	ASV & ABG
DIBENZO(A,H)ANTHRACENE	2/3	11	68	556M000703	780	ND	330	0.2	No	BSV
FLUORANTHENE	3/3	330	41000	556M000503	-	142.1	330	124.2	Yes	ASV & ABG
FLUORENE	2/3	14	2200	556M000503	27	ND	330	6.7	Yes	ASV
INDENO(1,2,3-CD)PYRENE	2/3	50	280	556M000703	910	92.6	NA	NA	Yes	ABG
NAPHTHALENE	1/3	2.7	2.7	054M000103	30 - 370	ND	330	0.01	No	BSV
PHENANTHRENE	3/3	97	18000	556M000503	-	ND	330	54.5	Yes	ASV
PYRENE	3/3	300	26000	556M000503	-	178.2	330	78.8	Yes	ASV & ABG
TOTAL PAHs (detects only)[5]	3/3	1761	111780	556M000503	-	877	1684	66.4	Yes	ASV & ABG
TOTAL PAHs (ND = ½ MDL)[6]	3/3	1761	113240	556M000503	-	1593	1684	67.2	Yes	ASV & ABG
Pesticides/PCBs (µg/kg)										
4,4'-DDD	1/3	4.8	4.8	556M000503	0.73 - 2.4	ND	3.3	1.5	Yes	ASV
AROCLOR-1260	1/3	94	94	054M000103	29	ND	33[7]	2.8	Yes	ASV
Inorganics (mg/kg)										
ALUMINUM	3/3	5900	47700	556M000503	-	21440	NA	NA	Yes	ABG
ARSENIC	3/3	2.1	20.5	556M000503	-	12.0	7.24	2.8	Yes	ASV & ABG
BARIUM	3/3	44.6	85.7	054M000103	-	34.6	NA	NA	Yes	ABG
CALCIUM	3/3	9330	31200	556M000703	-	53260	NA	NA	No	Nutrient
CHROMIUM	3/3	37	68.4	556M000503	-	43.5	52.3	1.3	Yes	ASV & ABG
COBALT	3/3	8.4	10	054M000103	-	6.4	NA	NA	Yes	ABG
COPPER	3/3	43.5	386	054M000103	-	14.9	18.7	20.6	Yes	ASV & ABG
IRON	3/3	10200	36700	556M000503	-	23600	NA	NA	Yes	ABG

TABLE 7-4

ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
COOPER RIVER SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Frequency of Detection	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects(1)	Background Value(2)	Ecological Screening Value	Hazard Quotient (3)	COPC (Yes/No)	Rationale for COPC Selection (4)
		Minimum	Maximum							
LEAD	3/3	21	147	054M000103	-	18.1	30.2	4.9	Yes	ASV & ABG
MAGNESIUM	3/3	2040	10600	556M000503	-	6426	NA	NA	No	Nutrient
MANGANESE	3/3	196	494	556M000503	-	216	NA	NA	Yes	ABG
MERCURY	3/3	0.06	0.11	054M000103	-	0.07	0.13	0.8	No	BSV
NICKEL	3/3	20	32.6	054M000103	-	12.4	15.9	2.1	Yes	ASV & ABG
POTASSIUM	3/3	634	4540	556M000503	-	3046	NA	NA	No	Nutrient
SELENIUM	2/3	0.65	0.77	556M000703	0.14	ND	NA	NA	Yes	ESV & BG NA
SODIUM	3/3	2220	25300	556M000703	-	13880	NA	NA	No	Nutrient
VANADIUM	3/3	5	80.1	556M000503	-	48.8	NA	NA	Yes	ABG
ZINC	3/3	95.8	826	054M000103	-	71.5	124	6.7	Yes	ASV & ABG

Footnotes:
NA: Ecological screening value not available.
(1) Sample-specific method detection limits.
(2) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(3) Hazard quotient = maximum detected concentration ÷ ecological screening value.
(4) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 2).
ASV: Maximum detected concentration exceeded the ecological screening value; analyte was not detected in any of 10 reference samples.
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.
(5) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(6) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.
(7) ESV for total PCBs.

TABLE 7-5

TOTAL PAH CONCENTRATIONS ON AN ORGANIC CARBON BASIS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample	Total PAHs (µg/kg dry weight)(1)	Total Organic Carbon (mg/kg)	Total PAHs (µg/g Organic Carbon)(2)
Noisette Creek			
NOIM000403	6164	32000	193
NOIM001103	4230	37000	114
NOIM001203	7464	25000	299
NOIM001203-Dup	6612	26000	254
Shipyard Creek			
009M000403	5360	47000	114
009M001603	2586	58000	45
009M001703	6447	91000	71
Cooper River			
054M000103	1761	7100	248
556M000503	113240	46000	2462
556M000703	8824	56000	158

Footnotes:

(1) Total PAHs = the sum of concentrations of 17 individual compounds, using ½ the sample specific method detection limit (MDL) for non-detected compounds.

(2) Calculated as total PAH concentration (µg/kg dry wt) ÷ total organic carbon (mg/kg), then multiplying by 1000 to convert to µg/g.

TABLE 7-6

DATA SUMMARY FOR ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
NOISETTE CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	FOD[1]	Range of Detected Concentrations[2]		Location of Maximum Concentration	Range of Nondetects[3]	Average Conc.[1,4]	Background Value[5]	ESV	HQ[6]	Number of Detects > Background Value	Number of Nondetects > ESV	Number of Detects > ESV
		Min.	Max.									
Semivolatile Organic Compounds (µg/kg)												
BENZO(A)ANTHRACENE	3/3	460	810	JNOIM0012	-	650	103.5	330	2.5	3	-	3
BENZO(A)PYRENE	3/3	330	540	JNOIM0012	-	455	135	330	1.6	3	-	3
BENZO(B)FLUORANTHENE	3/3	790	1200	JNOIM0004	-	1047	160.4	NA	NA	3	-	-
BENZO(G,H,I)PERYLENE	3/3	150	250	JNOIM0012	-	198	91.4	NA	NA	3	-	-
BENZO(K)FLUORANTHENE	3/3	170	380	JNOIM0012	-	273	153.1	NA	NA	3	-	-
BIS(2-ETHYLHEXYL)PHTHALATE	1/3	240	240	JNOIM0011	16 - 23	87	166.4	182	1.3	1	0	1
CHRYSENE	3/3	390	690	JNOIM0012	-	527	146.2	330	2.1	3	-	3
FLUORANTHENE	3/3	720	1500	JNOIM0012	-	1023	142.1	330	4.5	3	-	3
INDENO(1,2,3-CD)PYRENE	3/3	170	260	JNOIM0012	-	215	92.6	NA	NA	3	-	-
PHENANTHRENE	3/3	160	370	JNOIM0012	-	203	ND	330	1.1	-	-	0[7]
PYRENE	3/3	770	1200	JNOIM0004	-	1023	178.2	330	3.6	3	-	3
TOTAL PAHs (detects only)[8]	3/3	4210	7414	JNOIM0012	-	5792	877	1684	4.4	3	-	3
TOTAL PAHs (ND = ½ MDL)[9]	3/3	4230	7464	JNOIM0012	-	5811	1593	1684	4.4	3	-	3
Pesticides/PCBs (µg/kg)												
4,4'-DDD	3/3	2.8	6	JNOIM0012	-	4.2	ND	3.3	1.8	-	-	2
4,4'-DDE	1/3	3.6	3.6	JNOIM0011	0.69 - 0.93	1.4	ND	3.3	1.1	-	0	1
TOTAL DDT	3/3	3.8	6.4	JNOIM0011	-	5.4	-	3.3	1.9	-	-	3
Inorganics (mg/kg)												
COPPER	3/3	10.3	42.8	JNOIM0012	-	23.3	14.9	18.7	2.3	2	-	2
MERCURY	3/3	0.05	1.1	JNOIM0012	-	0.24	0.07	0.13	8.5	1	-	1
SELENIUM	2/3	0.23	0.32	JNOIM0012	0.19	0.21	ND	NA	NA	-	-	-
THALLIUM	1/3	0.19	0.19	JNOIM0004	0.17 - 0.23	0.13	ND	NA	NA	-	-	-
ZINC	3/3	29.7	158	JNOIM0012	-	75.6	71.5	124	1.3	2	-	0[7]

Footnotes:
FOD: Frequency of detection
ESV: Ecological screening value
NA: Ecological screening value not available.
(1) Sample NOIM0012 and its duplicate were considered as one sample.
(2) Sample NOIM0012 and its duplicate were considered as two separate samples when determining the minimum and maximum concentrations.
(3) Sample-specific method detection limits in non-detect samples.
(4) Average of all samples calculated using ½ the sample-specific method detection limit for nondetected samples.
(5) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(6) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value.
(7) Detected concentrations exceeded the ESV in sample NOIM0012 but were less than the ESV in the duplicate sample and in the average of the sample and duplicate.
(8) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(9) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.

TABLE 7-7

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO
NOISETTE CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
Pesticides				
4,4'-DDD	0.006	0.0002	0.005	0.0004
4,4'-DDE	0.1	0.002	0.1	0.01
Total DDT	0.2	0.004	0.1	0.01
Inorganics				
Copper	5.0	0.3	8.7	1.0
Mercury	12.6	2.5	77.8	7.8
Selenium	0.3	0.1	0.2	0.1
Zinc	2.0	0.5	2.8	1.1

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE 7-8

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - AVERAGE SCENARIO
NOISETTE CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL} (1)	Mink HQ_{LOAEL} (1)	Green Heron HQ_{NOAEL} (1)	Green Heron HQ_{NOAEL} (2)	Green Heron HQ_{LOAEL} (1)
Pesticides					
4,4'-DDD	0.001	0.00003	0.003	-	0.0002
4,4'-DDE	0.01	0.0003	0.03	-	0.002
Total DDT	0.04	0.001	0.1	-	0.01
Inorganics					
Copper	0.3	0.02	1.3	0.04	0.2
Mercury	0.4	0.1	6.3	0.2	0.6
Selenium	0.1	0.01	0.1	-	0.04
Zinc	0.1	0.02	0.3	-	0.1

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
(1) HQs in this column incorporate an area use factor (AUF; the ratio of the contaminated area to the area used by the animal) of 1. Thus, the HQs in this column are based on the assumption that the representative receptors forage exclusively in the contaminated area where samples were collected.
(2) HQs in this column were calculated using a site-specific green heron AUF of 0.033 (see fourth paragraph of Section 7.5.4.2). Example for mercury HQ_{NOAEL}: $6.3 \times 0.033 = 0.2$.
HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.

TABLE 7-9

DATA SUMMARY FOR ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
SHIPYARD CREEK SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	FOD	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Average Conc.[2]	Background Value[3]	ESV	HQ[4]	Number of Detects > Background Value	Number of Nondetects > ESV	Number of Detects > ESV
		Min.	Max.									
Semivolatile Organic Compounds (µg/kg)												
BENZO(A)ANTHRACENE	3/3	260	580	009M001703	-	443	103.5	330	1.8	3	-	2
BENZO(A)PYRENE	3/3	170	560	009M001703	-	383	135	330	1.7	3	-	2
BENZO(B)FLUORANTHENE	3/3	460	1500	009M001703	-	970	160.4	NA	NA	3	-	-
BENZO(G,H,I)PERYLENE	3/3	99	330	009M001703	-	210	91.4	NA	NA	3	-	-
BENZO(K)FLUORANTHENE	3/3	100	400	009M001703	-	233	153.1	NA	NA	2	-	-
BIS(2-ETHYLHEXYL)PHTHALATE	3/3	540	750	009M001603	-	640	166.4	182	4.1	3	-	3
CHRYSENE	3/3	190	560	009M001703	-	370	146.2	330	1.7	3	-	2
FLUORANTHENE	3/3	370	860	009M001703	-	683	142.1	330	2.6	3	-	3
INDENO(1,2,3-CD)PYRENE	3/3	100	320	009M001703	-	200	92.6	NA	NA	3	-	-
PYRENE	3/3	620	1200	009M000403	-	940	178.2	330	3.6	3	-	3
TOTAL PAHs (detects only)[5]	3/3	2579	6426	009M001703	-	4780	877	1684	3.8	3	-	3
TOTAL PAHs (ND = ½ MDL)[6]	3/3	2586	6447	009M001703	-	4798	1593	1684	3.8	3	-	3
Pesticides/PCBs (µg/kg)												
4,4'-DDE	3/3	6.6	25	009M001603	-	14.5	ND	3.3	7.6	-	-	3
AROCLOR-1260	3/3	150	210	009M001603	-	187	ND	33[7]	6.4	-	-	3
DIELDRIN	1/3	9.1	9.1	009M000403	1.3 - 1.4	3.5	ND	3.3	2.8	-	0	1
Inorganics (mg/kg)												
ALUMINUM	3/3	12700	32900	009M001703	-	23667	21440	NA	NA	2	-	-
ARSENIC	3/3	6.9	19.8	009M001703	-	12.9	12.0	7.24	2.7	1	-	2
BARIUM	3/3	44.1	86.6	009M001703	-	60.5	34.6	NA	NA	3	-	-
CHROMIUM	3/3	89.5	336	009M001703	-	214.8	43.5	52.3	6.4	3	-	3
COBALT	3/3	2.5	7.4	009M001703	-	4.8	6.4	NA	NA	1	-	-
COPPER	3/3	56.4	133	009M001703	-	89.4	14.9	18.7	7.1	3	-	3
IRON	3/3	11800	33900	009M001703	-	23100	23600	NA	NA	1	-	-
LEAD	3/3	55.7	142	009M001703	-	86.5	18.1	30.2	4.7	3	-	3
MERCURY	3/3	0.22	0.45	009M000403	-	0.4	0.07	0.13	3.5	3	-	3
NICKEL	3/3	12.3	32.8	009M001703	-	22.5	12.4	15.9	2.1	2	-	2
SELENIUM	3/3	0.53	0.89	009M001603	-	0.76	ND	NA	NA	-	-	-
THALLIUM	2/3	0.28	0.42	009M001603	0.38	0.30	ND	NA	NA	-	-	-
VANADIUM	3/3	22.6	62.2	009M001703	-	43.8	48.8	NA	NA	1	-	-
ZINC	3/3	150	494	009M001703	-	283	71.5	124	4.0	3	-	3

Footnotes:
FOD: Frequency of detection
ESV: Ecological screening value
NA: Ecological screening value not available.
(1) Sample-specific method detection limits.
(2) Average of all samples calculated using ½ the sample-specific method detection limit for nondetected samples.
(3) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(4) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value
(5) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(6) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.
(7) ESV for total PCBs.

TABLE 7-10

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO
SHIPYARD CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
Pesticides and PCBs				
4,4'-DDE	0.3	0.01	0.2	0.02
Dieldrin	0.3	0.003	0.1	0.01
Aroclor-1260	0.6	0.1	0.6	0.1
Inorganics				
Arsenic	1.8	0.4	1.02	0.5
Chromium	9.7	0.4	10.2	1.7
Copper	15.6	1.1	27.0	3.1
Lead	2.6	0.1	8.9	0.3
Mercury	5.1	1.03	31.8	3.2
Nickel	5.7	0.7	1.8	0.6
Selenium	0.8	0.2	0.5	0.2
Zinc	6.2	1.6	8.8	3.4

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE 7-11

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - AVERAGE SCENARIO
SHIPYARD CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL} (1)	Mink HQ_{NOAEL} (2)	Mink HQ_{LOAEL} (1)	Green Heron HQ_{NOAEL} (1)	Green Heron HQ_{NOAEL} (3)	Green Heron HQ_{LOAEL} (1)
Pesticides and PCBs						
4,4'-DDE	0.1	-	0.001	0.1	-	0.01
Dieldrin	0.03	-	0.0004	0.02	-	0.002
Aroclor-1260	0.2	-	0.04	0.5	-	0.1
Inorganics						
Arsenic	0.1	-	0.03	0.2	-	0.1
Chromium	0.7	-	0.03	1.7	0.02	0.3
Copper	1.05	0.2	0.1	5.0	0.1	0.6
Lead	0.1	-	0.003	0.9	-	0.03
Mercury	0.5	-	0.1	9.3	0.1	0.9
Nickel	0.3	-	0.04	0.3	-	0.1
Selenium	0.2	-	0.1	0.4	-	0.1
Zinc	0.3	-	0.1	1.2	0.01	0.5

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
(1) HQs in this column incorporate an area use factor (AUF; the ratio of the contaminated area to the area used by the animal) of 1. Thus, the HQs in this column are based on the assumption that the representative receptors forage exclusively in the contaminated area where samples were collected.
(2) HQs in this column were calculated using a site-specific mink AUF of 0.21 (see fourth paragraph of Section 7.5.5.2). Example for copper HQ_{NOAEL}: $1.05 \times 0.21 = 0.2$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.
(3) HQs in this column were calculated using a site-specific green heron AUF of 0.01 (see third paragraph of Section 7.5.5.2). Example for mercury HQ_{NOAEL}: $9.3 \times 0.01 = 0.09$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.

TABLE 7-12

DATA SUMMARY FOR ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
COOPER RIVER SEDIMENT
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	FOD	Range of Detected Concentrations		Location of Maximum Concentration	Range of Nondetects[1]	Average Conc.[2]	Background Value[3]	ESV	HQ[4]	Number of Detects > Background Value	Number of Nondetects > ESV	Number of Detects > ESV
		Min.	Max.									
Semivolatile Organic Compounds (µg/kg)												
ACENAPHTHENE	2/3	7	1400	556M000503	24	473	ND	330	4.2	-	0	1
ANTHRACENE	3/3	64	2400	556M000503	-	888	60	330	7.3	3	-	1
BENZO(A)ANTHRACENE	3/3	190	5800	556M000503	-	2210	103.5	330	17.6	3	-	2
BENZO(A)PYRENE	3/3	120	2500	556M000503	-	1153	135	330	7.6	2	-	2
BENZO(B)FLUORANTHENE	3/3	250	5400	556M000503	-	2450	160.4	NA	NA	3	-	-
BENZO(G,H,I)PERYLENE	3/3	51	780	556M000503	-	367	91.4	NA	NA	2	-	-
BENZO(K)FLUORANTHENE	3/3	82	1200	556M000503	-	614	153.1	NA	NA	2	-	-
CHRYSENE	3/3	170	5100	556M000503	-	2050	146.2	330	15.5	3	-	2
FLUORANTHENE	3/3	330	41000	556M000503	-	13960	142.1	330	124.2	3	-	2
FLUORENE	2/3	14	2200	556M000503	27	742	ND	330	6.7	-	0	1
INDENO(1,2,3-CD)PYRENE	2/3	50	280	556M000703	910	262	92.6	NA	NA	1	-	-
PHENANTHRENE	3/3	97	18000	556M000503	-	6069	ND	330	54.5	-	-	1
PYRENE	3/3	300	26000	556M000503	-	9633	178.2	330	78.8	3	-	2
TOTAL PAHs (detects only)[5]	3/3	1761	111780	556M000503	-	40766	877	1684	66.4	3	-	3
TOTAL PAHs (ND = ½ MDL)[6]	3/3	1761	113240	556M000503	-	41275	1593	1684	67.2	3	-	3
Pesticides/PCBs (µg/kg)												
4,4'-DDD	1/3	4.8	4.8	556M000503	0.73 - 2.4	2.1	ND	3.3	1.5	-	0	1
AROCLOR-1260	1/3	94	94	054M000103	29	41	ND	33[7]	2.8	-	0	1
Inorganics (mg/kg)												
ALUMINUM	3/3	5900	47700	556M000503	-	30467	21440	NA	NA	2	-	-
ARSENIC	3/3	2.1	20.5	556M000503	-	13.4	12.016	7.24	2.8	2	-	2
BARIUM	3/3	44.6	85.7	054M000103	-	58.3	34.58	NA	NA	3	-	-
CHROMIUM	3/3	37	68.4	556M000503	-	54.4	43.5	52.3	1.3	2	-	2
COBALT	3/3	8.4	10	054M000103	-	9.2	6.4	NA	NA	3	-	-
COPPER	3/3	43.5	386	054M000103	-	192.5	14.9	18.7	20.6	3	-	3
IRON	3/3	10200	36700	556M000503	-	25800	23600	NA	NA	2	-	-
LEAD	3/3	21	147	054M000103	-	69.5	18.08	30.2	4.9	3	-	2
MANGANESE	3/3	196	494	556M000503	-	358	216	NA	NA	2	-	0
NICKEL	3/3	20	32.6	054M000103	-	25.2	12.4	15.9	2.1	3	-	3
SELENIUM	2/3	0.65	0.77	556M000703	0.14	0.50	ND	NA	NA	-	-	-
VANADIUM	3/3	5	80.1	556M000503	-	50.4	48.8	NA	NA	2	-	-
ZINC	3/3	95.8	826	054M000103	-	355.3	71.5	124	6.7	3	-	2

Footnotes:
FOD: Frequency of detection
ESV: Ecological screening value
NA: Ecological screening value not available.
(1) Sample-specific method detection limits.
(2) Average of all samples calculated using ½ the sample-specific method detection limit for nondetected samples.
(3) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(4) Hazard quotient (HQ) = maximum detected concentration ÷ ecological screening value.
(5) Total PAHs = the sum of detected concentrations of individual PAH compounds (non-detected compounds ignored).
(6) Total PAHs = the sum of concentrations of individual PAH compounds using ½ the sample specific MDL to represent nondetected compounds.
(7) ESV for total PCBs.

TABLE 7-13

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO
COOPER RIVER - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
Pesticides and PCBs				
4,4'-DDD	0.004	0.0001	0.003	0.0003
Aroclor-1260	0.5	0.1	0.5	0.05
Inorganics				
Arsenic	1.9	0.4	1.05	0.5
Chromium	2.0	0.1	2.1	0.4
Copper	45.4	3.1	78.3	9.1
Lead	2.7	0.1	9.2	0.3
Nickel	5.7	0.7	1.8	0.6
Selenium	0.7	0.2	0.4	0.2
Zinc	10.3	2.6	14.7	5.7

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE 7-14

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - AVERAGE SCENARIO
COOPER RIVER - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL} (1)	Mink HQ_{NOAEL} (2)	Mink HQ_{LOAEL} (1)	Green Heron HQ_{NOAEL} (1)	Green Heron HQ_{NOAEL} (3)	Green Heron HQ_{LOAEL} (1)	Green Heron HQ_{LOAEL} (3)
Pesticides and PCBs							
4,4'-DDD	0.001	-	0.00002	0.001	-	0.0001	-
Aroclor-1260	0.1	-	0.01	0.2	-	0.02	-
Inorganics							
Arsenic	0.1	-	0.03	0.2	-	0.1	-
Chromium	0.2	-	0.01	0.4	-	0.1	-
Copper	2.3	0.1	0.2	10.8	0.04	1.3	0.01
Lead	0.1	-	0.002	0.7	-	0.03	-
Nickel	0.3	-	0.04	0.3	-	0.1	-
Selenium	0.2	-	0.03	0.3	-	0.1	-
Zinc	0.4	-	0.1	1.5	0.01	0.6	-

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
(1) HQs in this column incorporate an area use factor (AUF; the ratio of the contaminated area to the area used by the animal) of 1. Thus, the HQs in this column are based on the assumption that the representative receptors forage exclusively in the contaminated area where samples were collected.
(2) HQs in this column were calculated using a site-specific mink AUF of 0.05 (see fourth paragraph of Section 7.5.6.2). Example for copper (mink) HQ_{NOAEL}: $2.3 \times 0.05 = 0.1$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.
(3) HQs in this column were calculated using a site-specific green heron AUF of 0.004 (see fourth paragraph of Section 7.5.6.2). Example for copper (green heron) HQ_{NOAEL}: $10.8 \times 0.004 = 0.04$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.

TABLE 7-15

FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO(1)
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL} (2)	Mink HQ_{NOAEL} (3)	Mink HQ_{LOAEL} (2)	Mink HQ_{LOAEL} (3)	Green Heron HQ_{NOAEL} (2)	Green Heron HQ_{NOAEL} (4)	Green Heron HQ_{LOAEL} (2)	Green Heron HQ_{LOAEL} (4)
Pesticides and PCBs								
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.5	-	0.1	-	0.5	-	0.05	-
Inorganics								
Arsenic	0.2	-	0.04	-	0.11	-	0.1	-
Chromium	1.1	0.1	0.04	-	1.1	0.004	0.2	-
Copper	45.4	2.3	3.1	0.2	78.3	0.3	9.1	0.04
Lead	2.7	0.1	0.1	-	9.2	0.04	0.3	-
Nickel	5.7	0.3	0.7	-	1.8	0.01	0.6	-
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	10.3	0.5	2.6	0.1	14.7	0.1	5.7	0.02

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
ND - Chemical not detected in this sample.
(1) Using conservative assumptions for body weight, food consumption, and sediment ingestion (see Appendix Q1).
(2) HQs in this column incorporate an area use factor (AUF; the ratio of the contaminated area to the area used by the animal) of 1. Thus, the HQs in this column are based on the assumption that the representative receptors forage exclusively in the contaminated area where sample 054M000103 was collected.
(3) HQs in this column were calculated using a site-specific mink AUF of 0.05 (see fourth paragraph of Section 7.5.6.2). Example for copper (mink) HQ_{NOAEL}: $45.4 \times 0.05 = 2.3$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.
(4) HQs in this column were calculated using a site-specific green heron AUF of 0.004 (see fourth paragraph of Section 7.5.6.2). Example for copper (green heron) HQ_{NOAEL}: $78.3 \times 0.004 = 0.3$. HQs are shown only for chemicals with HQs greater than 1 in the preceding column.

TABLE 7-16

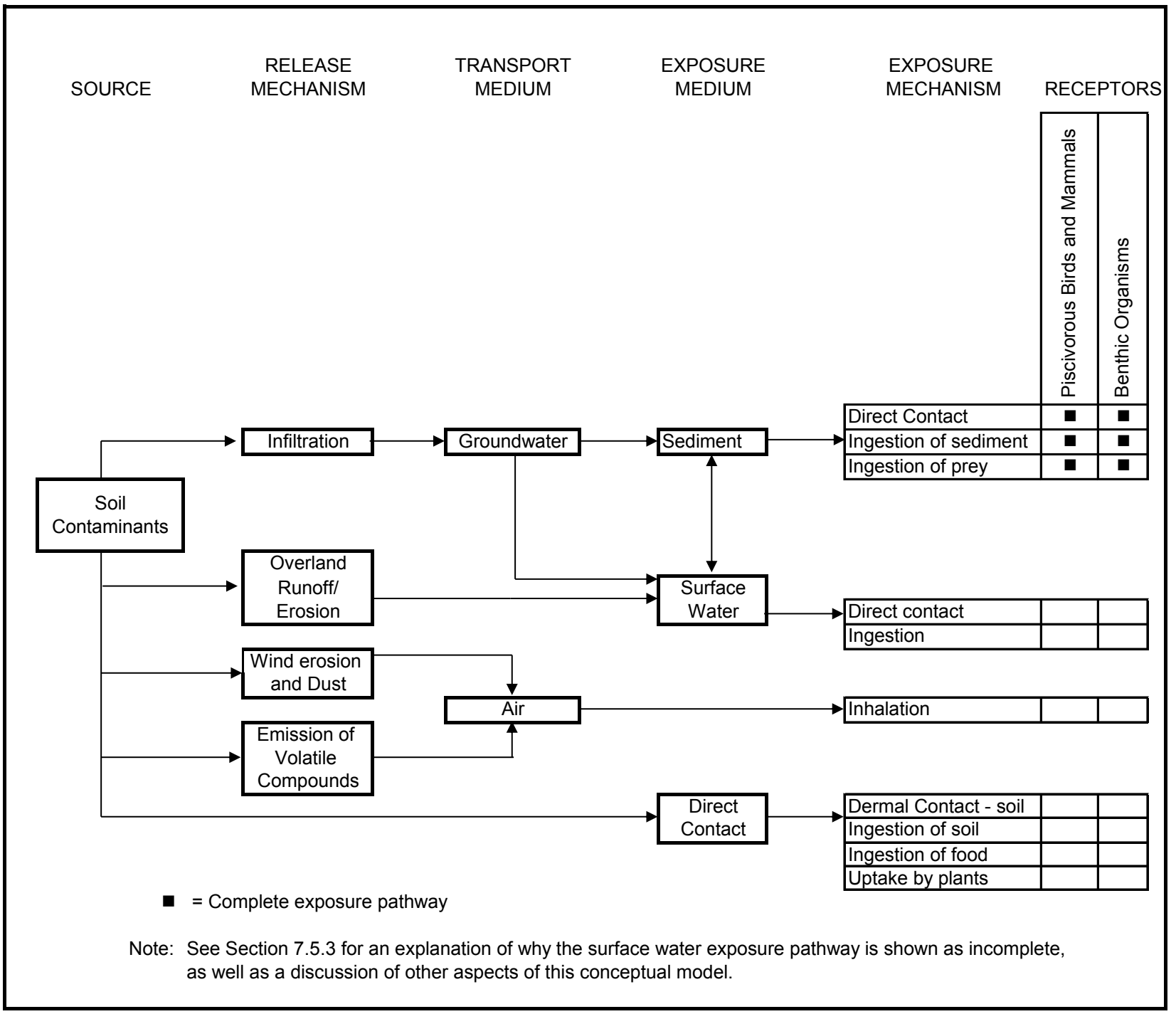
FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - AVERAGE SCENARIO(1)
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL} (2)	Mink HQ_{NOAEL} (3)	Mink HQ_{LOAEL} (2)	Green Heron HQ_{NOAEL} (2)	Green Heron HQ_{NOAEL} (4)	Green Heron HQ_{LOAEL} (2)	Green Heron HQ_{LOAEL} (4)
Pesticides and PCBs							
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.2	-	0.03	0.5	-	0.05	-
Inorganics							
Arsenic	0.02	-	0.00	0.03	-	0.01	-
Chromium	0.1	-	0.005	0.3	-	0.1	-
Copper	4.5	0.2	0.3	21.7	0.09	2.5	0.01
Lead	0.2	-	0.005	1.5	0.01	0.06	-
Nickel	0.4	-	0.05	0.4	-	0.1	-
Selenium	ND	ND	ND	ND	ND	ND	ND
Zinc	0.9	-	0.2	3.5	0.01	1.4	0.01

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
ND - Chemical not detected in this sample.
(1) Using less conservative assumptions for body weight, food consumption, and sediment ingestion (see Appendix Q1).
(2) HQs in this column incorporate an area use factor (AUF; the ratio of the contaminated area to the area used by the animal) of 1. Thus, the HQs in this column are based on the assumption that the representative receptors forage exclusively in the contaminated area where sample 054M000103 was collected.
(3) HQs in this column were calculated using a site-specific mink AUF of 0.05 (see fourth paragraph of Section 7.5.6.2). Example for copper (mink) HQ_{NOAEL}: $4.5 \times 0.05 = 0.2$. HQs are shown in this column only for chemicals with HQs greater than 1 in the preceding column.
(4) HQs in this column were calculated using a site-specific green heron AUF of 0.004 (see fourth paragraph of Section 7.5.6.2). Example for copper (green heron) HQ_{NOAEL}: $21.7 \times 0.004 = 0.09$. HQs are shown only for chemicals with HQs greater than 1 in the preceding column.

FIGURE 7-1

ECOLOGICAL CONCEPTUAL SITE MODEL
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA



Note: See Section 7.5.3 for an explanation of why the surface water exposure pathway is shown as incomplete, as well as a discussion of other aspects of this conceptual model.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 SUMMARY OF HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS

8.1.1 Baseline Human Health Risk Assessment Summary

The baseline HHRA for Zone J was performed to characterize the potential risks to likely human receptors under current and potential future land use scenarios. Potential receptors retained for quantitative evaluation consisted of current/future recreational fishermen. Fish tissue concentrations (estimated using sediment concentrations) were evaluated in the assessment.

8.1.1.1 Summary of Cancer and Non-Cancer Risk Estimates – Reasonable Maximum Exposure Scenario

Cumulative HIs for recreational fishermen under the RME scenario for Noisette Creek and Shipyard Creek are less than unity (1). The cumulative HI for the recreational fisherman (HI = 2) in Cooper River exceeded unity. However, the HIs calculated on a target organ/target effect specific basis were all less than unity. Consequently, adverse non-carcinogenic effects are not anticipated for recreational fishermen consuming fish form Noisette Creek, Shipyard Creek, or the Cooper River under the conditions defined in the exposure assessment.

Cumulative ILCRs for recreational fisherman consuming fish from Noisette Creek and Shipyard Creek were less than or within the USEPA's target risk range of 10^{-4} to 10^{-6}. The cumulative ILCR for Cooper River is 1×10^{-4}.

8.1.1.2 Summary of Cancer and Non-Cancer Risk Estimates – Central Tendency Exposure Scenario

Cumulative HIs for the recreational fisherman under the CTE scenario for Noisette Creek, Shipyard Creek, and the Cooper River are less than or equal to unity. Consequently, adverse non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under the conditions defined in the exposure assessment.

Cumulative ILCRs for recreational fisherman at Noisette Creek, Shipyard Creek, and Cooper River were less than or within the USEPA's target risk range of 10^{-4} to 10^{-6}.

8.1.1.3 Summary of Risks from Lead

Lead was not a COPC in Noisette Creek sediment. Recreational fishermen's exposures to lead in Shipyard Creek and Cooper River fish were evaluated using a version of the USEPA's Technical Review Workgroup (TRW) Adult Lead Model (ALM) adapted for fish ingestion. The average fish lead concentration of 1.54 µg/g for Shipyard Creek results in a geometric mean blood lead level of approximately 3.2 µg/dL. The average fish lead concentration of 1.23 µg/g for Cooper River results in a geometric mean blood lead level of approximately 2.8 µg/dL. These results do not exceed the USEPA benchmark goal of 10 µg/dL. The probability that the blood lead levels of a fetus of a childbearing female angler would exceed 10 µg/L is 4.2 percent for Shipyard Creek and 2.9 percent for Cooper River.

8.1.2 Ecological Risk Assessment Summary

The ERA for Zone J consisted of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ERA process described by USEPA (1997). These three steps are as follows:

- Step 1 Screening-Level Problem Formulation and Ecological Effects Evaluation
- Step 2 Screening-Level Exposure Estimate and Risk Calculation
- Step 3A Refinement of Preliminary COPCs

Zone J consists of the portions of Noisette Creek, Shipyard Creek, and the Cooper River that adjoin CNC. Noisette Creek and Shipyard Creek are tidal tributaries of the Cooper River, and all three water bodies are within the Charleston Harbor estuary. Zone J does not include terrestrial habitat. The portions of Noisette and Shipyard Creeks that are adjacent to CNC provide habitat for a variety of fish, crustaceans, mollusks, as well as wildlife such as birds and mammals. Most of the CNC waterfront along the Cooper River is industrialized, consisting of piers and dry docks, and the waterfront along the Cooper River in these areas is protected by a wooden and/or concrete seawall.

Numerous contaminant sources have been associated with CNC and have potentially contributed to sediment contamination in Noisette Creek, Shipyard Creek, and the Cooper River. The former Charleston Navy Base operated major industrial shops and generated waste materials such as paint wastes, solvents, boiler cleaning solutions, acids, and sludge from metal plating at the ship pretreatment facility. CNC currently supports several private and federal facilities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., NOAA, and the U.S. Coast Guard. The Zone J water bodies receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several NPDES outfalls.

Benthic invertebrates in Zone J water bodies could be exposed to site-related chemicals through direct contact with sediment. Wildlife such as piscivorous birds and piscivorous mammals could feed on biota that have accumulated contaminants from sediment and could incidentally ingest contaminated sediment while foraging. Thus, the ecological endpoints evaluated in the ecological risk assessments were benthic receptors (i.e., sediment-dwelling invertebrates), and piscivorous birds and mammals.

Evaluations of surface water samples collected during previous investigations at Zone J have indicated that surface water concentrations at Zone J are similar to surface water concentrations throughout the harbor, and ecological risks posed by CNC-related chemicals in Zone J surface water are negligible (see Section 4). Therefore, the ecological risk assessment did not include an evaluation of surface water data.

Previous evaluations indicated that a potential for adverse ecological effects potentially linked to CNC landside sites exists in five areas at Zone J, and the BRAC Cleanup Team determined that a more thorough assessment was warranted for these areas. The five areas consist of three locations in the Cooper River, one location in Noisette Creek, and one location in Shipyard Creek. A total of nine sediment samples and one field duplicate were collected on April 30, 2008 from the five areas for the current sediment evaluation. Three samples were collected from the Cooper River, three samples and a field duplicate were collected in Noisette Creek, and three samples were collected in Shipyard Creek. Separate ecological risk assessments were conducted for the Cooper River, Shipyard Creek, and Noisette Creek. The ecological risk assessment methodology was the same for each of the three water bodies.

8.1.2.1 Noisette Creek

Concentrations of several chemicals in Noisette Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs, pesticides, PCBs, and inorganics are minimal. Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in Noisette Creek.

8.1.2.2 Shipyard Creek

Concentrations of several chemicals in Shipyard Creek sediment exceeded ecological screening values, indicating potential risk to benthic receptors. Based on considerations in the COPC refinement step, potential risks to benthic invertebrates posed by SVOCs are minimal.

Concentrations of two pesticides (dieldrin and 4,4'-DDE) exceeded ecological screening values. Dieldrin was detected in one sample, but based on USEPA's (2003) guidance document for dieldrin sediment benchmarks, adverse effects to benthic organisms are not expected from dieldrin. The maximum

detected concentration of 4,4'-DDE (25 µg/kg) exceeded background data, and falls between the 2.07 µg/kg TEL and the 374 µg/kg PEL, so the degree of potential risk is uncertain. Concentrations of DDT isomers in Shipyard Creek in 2008 were much lower than in 1994.

Concentrations Aroclor-1260, chromium, copper, lead, and zinc exceeded their respective PEL values in one or two samples, suggesting probable adverse effects to benthic receptors. Aroclor-1260 concentrations in 2008 were less than one-third of the concentration from the same vicinity in 1994, and three other Aroclors that were elevated in 1994 were not detected in 2008. Concentrations of chromium, lead, and zinc in 2008 were less than concentrations from the same location in 1994 and 2005; the copper concentration in 2008 was less than in 1994 and was about the same as in 2005. A review of reports describing remediation activities at sites in the Shipyard Creek drainage basin (Section 7.5.5.3.2) indicates that the likely sources of Aroclor-1260, chromium, copper, lead, zinc, and other COPCs in Shipyard Creek have been remediated. Because the of this, and since sediment data indicate that concentrations of the primary COPCs have decreased since the 1990s, impacts to the marsh and aquatic habitat that would result from sediment remediation might represent more of a threat to ecological communities than existing contamination.

Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in Shipyard Creek.

8.1.2.3 Cooper River

Concentrations of several chemicals in Cooper River sediment exceeded ecological screening values, indicating potential risk to benthic receptors. PAHs pose potential risks to benthic invertebrates in sample 556M000503, the southernmost (farthest downstream) sample. Aroclor-1260 was detected only in sample 054M000103, the northernmost (farthest upstream) sample. The Aroclor-1260 concentration (94 µg/kg) is elevated relative to data collected from coastal US locations, and falls between the 21.6 µg/kg TEL and the 189 µg/kg PEL, so the degree of potential risk is uncertain.

Copper concentrations exceeded the PEL in samples 054M000103 and 556M000703, while concentrations of lead and zinc exceeded their PELs in sample 054M000103; the PEL exceedances indicate probable adverse effects to benthic receptors. There is some uncertainty in the evaluation of potential risks posed by some inorganics, especially aluminum, manganese, and vanadium, due to the absence of toxicity guidelines.

A factor for risk managers to consider is samples that all three Cooper River sample locations (054M0001, 556M0007 and 556M0005) are in an industrial shipyard that is periodically dredged for ship traffic. It is likely that dredge spoil from the vicinity of 054M0001, 556M0007, and 556M0005 would be mixed with sediments (dredge spoil) from other (less contaminated) areas when dredge spoil is deposited

on Clouter Island (see Section 7.5.6.3), effectively diluting contamination in sediment. Therefore, exposure of ecological receptors to contaminated dredge spoil from the vicinities of samples 054M0001, 556M0007, and 556M0005 would be mitigated by this dilution. Due to the periodic dredging of these locations, further sediment evaluation based on potential risks to benthic receptors or remediation of sediments is not warranted.

Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in the Cooper River.

8.2 CONCLUSIONS AND RECOMMENDATIONS

The HHRA for Zone J indicates the following:

- Carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River, under the CTE and RME scenarios.

- Non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under the CTE and RME scenarios.

The ERA for Zone J indicates the following:

- Potential risks to benthic invertebrates, piscivorous birds, and piscivorous mammals in Noisette Creek are minimal.

- Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in Shipyard Creek. Some COPCs (particularly, Aroclor-1260, chromium, copper, lead, and zinc) pose risks to benthic receptors in Shipyard Creek. The probable sources of these COPCs have been remediated, and sediment concentrations of COPCs in Shipyard Creek tended to be lower in 2008 than in 1994. In addition, sediment contamination is limited to a small area.

- Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in the Cooper River. Some COPCs (particularly, PAHs, copper, and zinc) pose risks to benthic receptors in the Cooper River. All three Cooper River sample locations are in an industrial shipyard that is periodically dredged for ship traffic.

In conclusion, the Zone J HHRA and ERA indicate that further evaluation or remedial action based on human health or ecological risks is not warranted for sediment in Noisette Creek, Shipyard Creek, or the Cooper River (Table 8-1). With this in mind, further evaluation or remedial action is not warranted for

potential, historical sediment contamination resulting from wastes associated with AOCs, 555, 556, 557, 691, and 692 (see Section 1.3.2).

Finally, wastes associated with AOC 695 in Zone K pose negligible risks to human health or the environment (see Appendix R), so further evaluation or remedial action based on human health or ecological risks is not warranted for sediment at AOC 695.

TABLE 8-1

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Human Health Risk Assessment Summary	Carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River, under both the CTE and RME scenarios.
	Non-carcinogenic effects are not anticipated for recreational fishermen consuming fish from Noisette Creek, Shipyard Creek, or the Cooper River under both the CTE and RME scenarios.
Ecological Risk Assessment Summary	Potential risks to benthic invertebrates, piscivorous birds, and piscivorous mammals in Noisette Creek are minimal.
	Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in Shipyard Creek. Some COPCs (particularly, Aroclor-1260, chromium, copper, lead, and zinc) pose risks to benthic receptors in Shipyard Creek. The probable sources of these COPCs have been remediated, and sediment concentrations of COPCs in Shipyard Creek tended to be less in 2008 than in 1994. In addition, sediment contamination is limited to a small area.
	Bioaccumulative COPCs pose minimal risks to piscivorous birds and mammals in the Cooper River. Some COPCs (particularly, PAHs, copper, and zinc) pose risks to benthic receptors in the Cooper River. All three Cooper River sample locations are in an industrial shipyard that is periodically dredged for ship traffic.
Conclusions	Further evaluation or remedial action based on human health or ecological risks is not warranted for sediment in Noisette Creek, Shipyard Creek, or the Cooper River. Thus, further evaluation or remedial action is not warranted for potential, historical sediment contamination resulting from wastes associated with AOCs, 555, 556, 557, 691, and 692 (see Section 1.3.2).
	Wastes associated with AOC 695 in Zone K pose negligible risks to human health or the environment (see Appendix R), so further evaluation or remedial action based on human health or ecological risks is not warranted for sediment at AOC 695.

Abbreviations:
AOC: Area of Concern
COPC: Contaminant of Potential Concern
CTE: Central Tendency Exposure
RME Reasonable Maximum Exposure
COPC: Contaminant of Potential Concern
PAH Polycyclic Aromatic Hydrocarbon

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APPENDIX A

EVALUATION OF REFERENCE VALUES OF OFF-SITE LOCATIONS FOR ZONE J STORM WATER EFFLUENT EVALUATION REPORT AT CNC

Evaluation of Reference Values of Off-Site Locations for Zone J Stormwater Effluent Evaluation Report at CNC

PREPARED FOR: CNC BCT and Zone J Trustees

PREPARED BY: EnSafe Inc.

DATE: May 6, 2002

Introduction

As central components of the local watershed, the Zone J water bodies receive stormwater runoff and other inputs from the majority of surrounding upland areas, including the Charleston Naval Complex (CNC), via numerous point and non-point source discharges. Point source discharge means a discharge which is released to the waters by a discernible, confined and discrete conveyance, including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which waste is or may be discharged and regulated under the National Pollutant Discharge Elimination System (NPDES) program. Runoff pollution (technically known as non-point source pollution) occurs when rain or irrigation water flowing over hard surfaces, or loose soil, picks up pollutants and deposits them into the nearest lake, creek, estuary or groundwater supply. Currently, most non-point source discharges are not subjected to regulatory oversight.

According to USEPA (Guidance Manual for Preparations of NPDES Permit, 1991), it is recognized that stormwater runoff carries pollutants draining off streets and parking lots, construction and industrial sites, and mining, logging, and agricultural areas. Through natural or manmade conveyances, the runoff is channeled into and transported by gravity flow through a wide variety of drainage facilities. Runoff may purge accumulated pollutants out of gutters, catch basins, storm sewers, and drainage channels. Runoff eventually ends up in surface waters such as creeks, rivers, estuaries, bays and oceans. Runoff from urban and industrial areas has been considered as a non-point source of pollution.

In the Zone J Point of Entry Effluent Sampling Work Plan, it was determined that data from 18 non-point source stormwater samples from watersheds not influenced by CNC would be evaluated and used to calculate reference (background) concentration values as part of the stormwater effluent migration pathway scenario. The non-point source stormwater samples results are of naturally occurring conditions and/or associated with anthropogenic activities, and will be used to establish a baseline data set for comparison to CNC stormwater effluent samples to delineate contaminants that are attributable to CNC contamination of the water bodies. The goal was to collect stormwater for analysis from reference locations within these areas displaying similar watershed characteristics, i.e., types, sizes, sources, land uses and discharges, to those observed on the CNC property. The data collected from the reference locations are to be used as screening criteria/action levels during Step 3 of the Baseline Ecological Risk Assessment (ERA).

Tidal Excursion Zone/Map

Due to the dynamic estuarine system around Charleston Harbor, tide currents around the CNC were studied to determine the tidal excursion zones and areas for possible reference point locations. A tidal excursion is the net horizontal distance traversed by a water particle during a tide cycle of one flood and one ebb. Through hydrodynamic modeling, an excursion zone was established for the Charleston Harbor. During a tidal cycle, a particle released at CNC into the Cooper River at peak low tide can travel upstream for six hours. Similarly, a particle released at peak high tide can travel downstream for six hours. The estimated upstream tidal excursion into the Cooper River is about 4.5 miles and the downstream excursion will reach the entrance of the harbor, meaning that some particles released at CNC can be flushed out of the harbor during one tidal cycle. The upstream limit of tidal excursion on the Cooper River is located between the U.S. Naval Weapons Station and the discharge point of Goose Creek into the Cooper River. In addition to the Cooper River tidal excursion, a particle released at CNC can be transported into the Wando and Ashley Rivers by the tides with the limits of the upstream transport into the rivers of about five miles from their entrances. The zone extends up the Wando River towards the north side of Daniel Island and upstream on the Ashley River just north of the James Island connector

and Highway 17. Conversely, the water bodies associated with Zone J can also be receptors of particles from Ashley and Wando Rivers and Charleston Harbor. Figures 1 and 2 show the ebb and flow tide currents within the tidal excursion zone for the rivers around Charleston Harbor.

Reference Location Selection

Public Works officials identified 58 stormwater discharge displaying similar watershed characteristics to those observed on CNC property. Maps obtained from these municipalities indicated that the following water bodies are potentially influenced by stormwater runoff: Goose Creek, Filbin Creek, Noisette Creek, Shipyard Creek, Cooper River, Ashley River, Hobcaw Creek, Wando River, and Shem Creek. An offsite reconnaissance/field survey was conducted to evaluate the 58 potential reference-sampling locations identified during the interviews with Public Works officials. A site visit was made to each location in order to collect information concerning physical characteristics impacting sampling potential. A ranking system was implemented and characteristics evaluated included: structure type, structure size, location, surrounding land use, tidal influence, presence of an alternate structure, time of day sample may be collected, traffic influence, accessibility, and presence of retention structure.

The following sites, shown in Table 1, were chosen as reference locations for the effluent stormwater. These locations were evaluated to determine acreage size, discharge to specific water body, land use classification, and types of businesses in operation relative to CNC past operations.

Table 1
Reference Locations

Municipality	Reference Location	Water Body Receiving Discharge	Acres	Landuse	Sample ID	Date of Rain Event
City of Hanahan	Dominion Drive	Goose Creek/Cooper River	20.67	Residential	REF001	1-6-02
	Bankton Drive	Goose Creek/Cooper River	41.46	Commercial/Industrial	REF002	1-14-02
	Remount Road/ Commerce Circle	Cooper River	63.75	Commercial/Industrial	REF003	1-25-02
	North Rhett (East)	Filbin Creek/Cooper River	18.66	Residential/Commercial	REF004	1-25-02
City of North Charleston	Rivers Avenue at Lillie's Game Room	Noisette Creek/Cooper River	344.72	Residential/Commercial	REF005	1-14-02
	Charleston Heights/ Food Bank	Cooper River	71.86	Residential/Commercial	REF009	1-6-02
	Charleston Heights/ Success Street	Cooper River	11.53	Residential/Commercial	REF010	1-25-02
	Bainbridge Avenue/ Spruill Avenue	Shipyard Creek/Cooper River	88.17	Residential/ Commercial/Industrial	REF011	2-7-02
City of Charleston	Ashley Marina	Ashley River	58.13	Commercial	REF012	2-7-02
	City Marina	Ashley River	53.65	Commercial	REF013	1-14-02
	King Street/ Meeting Street	Charleston Harbor	132.08	Residential/Commercial	REF014	1-14-02
	Market Street	Charleston Harbor	69.55	Residential/Commercial	REF015	1-14-02
Town of Mount Pleasant	Coleman Boulevard	Shem Creek/Charleston Harbor	62.44	Residential/Commercial	REF016	1-14-02
	Blockbuster Video/ Hwy. 17	Shem Creek/Charleston Harbor	97.81	Commercial	REF017	1-6-02
	Hidden Cove	Hobcaw Creek/ Wando River	54.28	Residential/Industrial	REF018	1-6-02

Table 1
Reference Locations

Municipality	Reference Location	Water Body Receiving Discharge	Acres	Landuse	Sample ID	Date of Rain Event
Charleston Naval Complex	Drainage Basin 6	Cooper River	3.94	Industrial	REF006	1-6-02
	Drainage Basin 9	Noisette Creek/Cooper River	3.07	Industrial	REF007	3-2-02
	Drainage Basin 28 – North Charleston Discharge	Cooper River	20.63	Industrial	REF008	1-6-02

Analytical Results

A third party validator has validated the data for the 18 reference samples. Appendix A summarizes the results of the analytical data for the reference locations. Results for organic constituents were of low frequency and detection levels; therefore, background values for organic constituents were not calculated. Data for the inorganic constituents shows that six different reference locations had the maximum concentrations reported, with REF014 reporting the most values: 16 out of 23 detected constituents. Of the 23 constituents detected, seven (copper, cyanide, lead, mercury, nickel, silver and zinc) have saltwater surface water screening values. Maximum concentrations for copper, lead, mercury, and nickel were reported at REF014, and maximum concentrations for cyanide, silver and zinc were reported at REF013, REF015, and REF008, respectively, with detections exceeding corresponding regulatory values. Frequencies of detections for mercury, silver, and nickel were low; mercury and silver each had one detection and nickel had two.

Of particular note is the inorganic data from the King/Meeting Street location (REF014) that has the most COPCs identified. City of Charleston Public Works Department was unclear whether stormwater lines between established drainage basins for King and Meeting Streets connected with each other. Therefore, a composite of the two outfalls was collected. On January 14, 2002, during a low tide rainfall event, field personnel observed a low tide water line several feet below the outfall discharge from the seawall, and a steady outbound flow of stormwater effluent was discharging from the outfall pipes. Personnel also noted that the stormwater effluent discharging from the King Street outfall was clear in color with some suspended sediment; however, the discharge at the Meeting Street outfall was black in color with suspended sediment resembling dissolved marsh clay. During the preliminary site evaluations prior to the January 2002 rainfall, it was also noted that dark water was discharging from the Meeting Street outfall and clear water from the King Street outfall.

Statistical Approach

Background concentrations for surface water samples collected for Zone J at the Charleston Naval Complex were calculated using the "2 times the mean concentration method" ("2 X mean") outlined in Region IV's *Supplemental Guidance to Risk Assessment Guidance for Superfund* (RAGS) (USEPA, 1995) and the upper tolerance limit (UTL) method presented in *Statistical Guidance for Groundwater Monitoring Data at RCRA Facilities* (USEPA, 1989; 1992). The text below describes each method.

Data Evaluation

Prior to calculation of the "2 X mean" and UTLs, summary statistics were calculated on the 18 stormwater effluent reference samples. Table 2 summarizes the following statistics for this data group: minimum/maximum concentrations, average detected concentrations, average concentrations calculated using detected concentrations and one-half the quantitation limit, detection frequency, and percentage of nondetects. These statistics were used to determine the best data distribution.

Handling of Nondetect Data

The percentage of nondetect values (data with "U" or "UJ" qualifiers) was calculated for each inorganic in the data set to determine the statistical method to be used to obtain the UTL. The procedures for handling nondetects are as follows:

- If less than 50% of all values in a data set are nondetect, then each nondetect is replaced by half its reported detection limit (i.e., half of the U-qualified value). The statistical distribution of the data was then examined for normality. If the original or log-transformed data values were normally distributed, a parametric UTL was calculated; if not, a nonparametric UTL was determined.

- If nondetects exceeded 50%, a nonparametric UTL (i.e., a tolerance limit not based on a normal distribution) was used. To obtain the desired levels of coverage and confidence, the highest observed value in the data set was used as the nonparametric UTL (USEPA, 1992).

For background concentrations calculated using Region IV guidance ("2 times the mean concentration method"), one-half the quantitation limit was used for all nondetect values before the mean was calculated. Table 3 shows the "2 times the mean concentration method".

Tests for Normality

As explained above, if less than 50% of all reported values of an inorganic analyte in a data set are nondetect, calculation of a parametric UTL may be possible. After replacing each nondetect value by half its reported quantitation limit, the most representative distribution of the data was determined (nontransformed or log-transformed). These tools are used to determine normality, but results are questionable with small sample sizes, i.e., less than 20 to 30 observations (USEPA, 1992). As a result, professional judgment was the final arbiter of whether a data set was determined to be normally or lognormally distributed. Each statistical tool used is defined below.

Shapiro-Wilk Test

The Shapiro-Wilk test indicates whether a data set has a normal distribution by comparing a calculated W-statistic with an appropriate tabulated value of W. The null hypothesis is that the data set is normally distributed, while the alternate hypothesis is that the population is non-normal. Details concerning the calculation of the W-statistic are presented in Gilbert, 1987 and WDOE, 1992. The Washington Department of Ecology (WDOE) program MTCAStat Version 3.0 was used to determine whether data sets were normally or lognormally distributed. The program can be obtained at http://www.ecy.wa.gov/programs/tcp/tools/toolmain.html.

Table 2
Chemicals Detected in Stormwater Reference Samples
Charleston Naval Complex, South Carolina

Chemical	Detected Concentration Range	Detection Frequency	Average Detected Concentration	Average Concentration (½ SQLs)[1]	Data Distribution[2]	Percent Nondetect
Aluminum	79 – 11000	18 / 18	1639	1639	lognormal	0
Antimony	3.3 – 5.1	3 / 18	4.2	3.0	undetermined	83
Arsenic	5.6 – 13	4 / 18	7.9	3.4	undetermined	78
Barium	3.4 – 170	18 / 18	30.2	30.2	lognormal	0
Beryllium	0.1 – 0.48	2 / 18	0.290	0.207	undetermined	89
Cadmium	0.89 – 2.2	2 / 18	1.5	0.6	undetermined	89
Calcium	3400 – 130000	18 / 18	26728	26728	lognormal	0
Chromium	0.98 – 21	18 / 18	6.5	6.5	lognormal	0
Cobalt	1 – 3.200	3 / 18	2.1	1	undetermined	83
Copper	4.5 – 70	10 / 18	34.7	21	lognormal	44
Iron	290 – 9700	18 / 18	2067	2067	lognormal	0
Lead	1.8 – 100	16 / 18	18.6	16.8	lognormal	11
Magnesium	310 – 290000	18 / 18	24628	24628	lognormal	0
Manganese	4.4 – 100	18 / 18	37.3	37.3	lognormal	0
Nickel	1.7 – 9.1	11 / 18	3.8	2.6	undetermined	39
Potassium	310 – 120000	18 / 18	11839	11839	lognormal	0
Silver	4.4 – 4.4	1 / 18	4.4	1.2	undetermined	94
Sodium	1900 – 2300000	18 / 18	197667	197667	lognormal	0
Thallium	4.6 – 4.6	1 / 18	4.6	2.9	undetermined	94
Vanadium	1.5 – 32	18 / 18	7.8	7.8	lognormal	0
Zinc	13 – 1300	18 / 18	154	154	lognormal	0
Mercury	0.18 – 0.18	1 / 18	0.180	0.057	undetermined	94
Cyanide, Total	5.6 – 49	5 / 18	16.4	8	undetermined	72

Notes:
All units are micrograms per liter (µg/L).

[1] Average concentration calculated using the detected concentration and ½ the sample quantitation limit (SQL).

[2] Data distribution determined using probability plots and/or the Shapiro-Wilk test (Gilbert, 1987).
Data distribution definitions:
Lognormal indicates the logtransformed data are normally distributed.
Undetermined indicates that nonparametric UTL considered because nondetects exceed 50%.

Table 3
Summary of the "2 Times the Mean Concentration Method" for Stormwater Reference Samples
Charleston Naval Complex, South Carolina

Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel
REF001	380	1.5	1.75	9	0.05	0.25	14000	1.6	0.5	1.3	290	1.9	1600	11	0.65
REF002	2500	1.5	1.75	14	0.05	0.25	18000	5.3	0.5	1.2	2300	4.4	560	21	3.6
REF003	1600	1.9	1.35	46	0.15	0.25	51000	3.7	0.4	8.3	1600	3.55	2500	76	3.2
REF004	3100	4.3	2.45	170	0.15	0.89	27000	14	0.4	44	4900	47	1500	62	8.3
REF005	1300	1.5	6.1	44	0.05	0.25	24000	9.9	0.5	12	2200	22	3300	51	2.3
REF006	310	1.5	1.75	3.4	0.05	0.25	7400	1.2	0.5	1.7	440	2.8	13000	7.8	0.65
REF007	760	1.9	1.35	5.7	0.15	0.25	9600	1.1	0.4	4.500	660	1.1	1000	4.4	0.85
REF008	970	1.5	1.75	16	0.05	2.2	4900	4.3	0.5	12	1400	21	530	28	2.6
REF009	79	1.5	1.75	29	0.05	0.25	37000	0.98	0.5	2.2	1300	1.8	2000	35	0.65
REF010	1100	1.9	1.35	21	0.15	0.25	18000	2.9	0.4	40	4000	15	14000	80	1.7
REF011	1250	10	5	28.5	0.1	2.5	44500	20.5	5	9.850	1650	12	27000	36.5	2.55
REF012	750	10	5	30	2	2.5	33000	6.4	1	27	1300	7.9	46000	36	2.4
REF013	660	1.5	6.7	12	0.05	0.25	5500	6.3	0.5	66	730	8.2	2600	19	2.5
REF014	11000	3.3	13	55	0.48	0.25	130000	21	3.2	70	9700	100	290000	100	9.1
REF015	1300	5.1	5.6	26	0.05	0.25	34000	6.9	2.2	65	1700	44	36000	36	3.3
REF016	550	1.5	1.75	14	0.05	0.25	6800	5.9	0.5	8.5	810	3.1	610	16	0.65
REF017	290	1.5	1.75	6.2	0.05	0.25	3400	1.6	0.5	2.1	330	4.9	310	12	0.65
REF018	1600	1.5	1.75	13	0.05	0.25	13000	3.4	0.5	2.2	1900	2	790	39	0.65
Frequency of Hits	18/18	3/18	4/18	18/18	2/18	2/18	18/18	18/18	3/18	10/18	18/18	16/18	18/18	18/18	11/18
Mean	1639	2.97	3.44	30.2	0.21	0.64	26728	6.5	1	21	2067	16.8	24628	37.3	2.57
2× Mean	3278	5.93	6.88	60.3	0.41	1.29	53456	13	2	42	4134	33.6	49256	74.5	5.14

Notes:
All units are micrograms per liter (µg/L).

Table 3
Summary of the "2 Times the Mean Concentration Method" for Stormwater Reference Samples
Charleston Naval Complex, South Carolina

Sample ID	Potassium	Silver	Sodium	Thallium	Vanadium	Zinc	Mercury	Cyanide
REF001	2500	0.35	11000	4.6	2.2	13	0.05	5
REF002	910	0.35	2000	2.25	9.1	63	0.05	5
REF003	1900	0.7	6500	3.15	6.2	86	0.05	5
REF004	3400	0.7	8900	3.15	14	240	0.05	5
REF005	2500	0.35	20000	2.25	6.2	140	0.05	6.8
REF006	6300	0.35	120000	2.25	4.2	69	0.05	5
REF007	1400	0.7	1900	3.15	2.6	19	0.05	5
REF008	740	0.35	3600	2.25	11	1300	0.05	5
REF009	2100	0.35	9900	2.25	1.5	35	0.05	5
REF010	6200	0.7	100000	3.15	6.2	120	0.05	5
REF011	17000	5	250000	5	5.85	85.5	0.05	5.6
REF012	22000	5	400000	5	5.8	91	0.05	8.6
REF013	2100	0.35	23000	2.25	9.5	94	0.05	49
REF014	120000	0.35	2300000	2.25	32	99	0.18	5
REF015	22000	4.4	290000	2.25	8.4	150	0.05	5
REF016	770	0.35	6200	2.25	4.2	59	0.05	12
REF017	310	0.35	2000	2.25	2.7	57	0.05	5
REF018	980	0.35	3000	2.25	8.7	50	0.05	5
Frequency of Hits	18/18	1/18	18/18	1/18	18/18	18/18	1/18	5/18
Mean	11839	1.17	197667	2.89	7.8	154	0.06	8.17
2× Mean	23679	2.34	395333	5.77	15.6	308	0.11	16.3

Notes:
All units are micrograms per liter (µg/L).

The MTCAStat program performs the W test on both the untransformed and log-transformed values if the sample size does not exceed 50.

Probability Plot Method

The probability plot of a normally or lognormally distributed data set should follow a straight line, i.e., correlation coefficient (r^2) should be greater than 0.90. If the line is curved, the data set is non-normal. The MTCAStat program evaluates data for lognormality and normality using the normal probability plot method. As a measure of how well the log-transformed and untransformed data fit a straight line, the r^2 values are calculated and displayed. A good fit (defined as $r^2 \geq 0.900$) for the logtransformed data is consistent with the default assumption of a lognormal distribution. If this criterion is not met, the r^2 for the untransformed data is used to test for a normal distribution. An r^2 is not calculated and displayed if the regression analysis of variance F-value is non-significant at the $p = 0.05$ level or cannot be calculated.

Output from the MTCA*Stat* program can be provided upon request for all sample data. Each metal has the normality output as a table and two figures that graph the probability plots for the normal and lognormal cases.

Calculation of UTL

After the transformation of the data has been established and the data set is determined to be normally distributed, a parametric UTL is calculated for each analyte. The UTL represents the upper limit of a tolerance interval for a given data set. The tolerance limits calculated in this background study represent one-sided UTLs with 95% coverage and 95% confidence. A one-sided UTL with 95% coverage and 95% confidence allows the user to assume that there is a 95% certainty that a given value is higher than 95% of the possible sample values from the population.

A one-sided UTL is calculated as shown in Equation 1, where x is the mean of the data, s is the standard deviation, and K is the one-sided normal tolerance factor based on the frequency of the

data set. K is found in several statistical handbooks, including Gilbert (1987, Table A3); α is 0.05, p is 0.95. K is 2.54 for 18 samples. Equation 1: $UTL_{1-\alpha}(x) = \bar{x} + sK_{1-\alpha,p}$.

The calculated UTLs for Zone J are shown in Table 4. REF014 was initially evaluated for exclusion from the reference value data set; however, the results showed that except for calcium, magnesium, manganese, and sodium, the removal of the sample data did not cause an order of magnitude change in "the 2 times the mean" or UTL calculations.

Table 4
Summary of the UTLs for Stormwater Reference Samples
Charleston Naval Complex, South Carolina

Chemical	n	Mean (X) (µg/L)	Data Transformation	Type of UTL Calculated[a]	Standard Deviation (s) (unitless)	Tolerance Factor (k) (unitless)	UTL (µg/L)
Aluminum	18	1,639	lognormal	parametric	2,461	2.543	7,896
Antimony	18	2.97	undetermined	nonparametric	NA	NA	5.1
Arsenic	18	3.44	undetermined	nonparametric	NA	NA	13
Barium	18	30.2	lognormal	parametric	37.9	2.543	127
Beryllium	18	0.21	undetermined	nonparametric	NA	NA	0.48
Cadmium	18	0.64	undetermined	nonparametric	NA	NA	2.2
Calcium	18	26,728	lognormal	parametric	29,519	2.543	101,795
Chromium	18	6.50	lognormal	parametric	6.17	2.543	22.2
Cobalt	18	1	undetermined	nonparametric	NA	NA	3.2
Copper	18	21.0	lognormal	parametric	24.7	2.543	83.8
Iron	18	2,067	lognormal	parametric	2,255	2.543	7,802
Lead	18	16.8	lognormal	parametric	24.9	2.543	80.2
Magnesium	18	24,628	lognormal	parametric	67,617	2.543	196,577
Manganese	18	37.3	lognormal	parametric	27.1	2.543	106
Nickel	18	2.57	undetermined	nonparametric	NA	NA	9.1
Potassium	18	11,839	lognormal	parametric	27,922	2.543	82,844
Silver	18	1.17	undetermined	nonparametric	NA	NA	4.4
Sodium	18	197,667	lognormal	parametric	537,918	2.543	1,565,591
Thallium	18	2.89	undetermined	nonparametric	NA	NA	4.6
Vanadium	18	7.80	lognormal	parametric	6.88	2.543	25.3
Zinc	18	154	lognormal	parametric	291	2.543	894
Mercury	18	0.06	undetermined	nonparametric	NA	NA	0.18
Cyanide	18	8.2	undetermined	nonparametric	NA	NA	49

Notes:

a = The parametric UTL for lognormally distributed data calculated using equation: UTL = X + k(s). where X is the mean concentration, k is the tolerance factor (a = 0.05, p = 0.95), and s is the standard deviation. Nonparametric UTLs were set equal to the maximum detected concentration.

n = number of samples

Conclusions

Conceptual Approach

- The overall determination of reference values for Zone J had to take a unique approach from conventional methods. Because a goal of the RFI is to determine the CNC's contribution to contamination of the surrounding water bodies through stormwater runoff, it was necessary to identify other possible routes of stormwater contaminant migration, to quantify stormwater runoff from these routes, and to eventually compare results to runoff from CNC migration routes.

Tidal Excursion

- Providing one set of reference values is more defensible because of the tidal excursion zones of the surrounding water bodies. Though distribution of the data shows a majority of the maximum concentrations and the number of Saltwater-Surface Water Screening Values are located in the City of Charleston, the water bodies surrounding CNC can be receptors of particles from the rivers surrounding the City of Charleston.

Statistical Approach

- Review of the background concentrations in Table 5 generally shows the "2 X mean" values are more conservative for the two methods. Values for antimony, thallium, and cyanide are higher using the "2 X mean" method, but the rate of frequency of these constituents for stormwater effluent samples collected to date (36 samples, detections only), as shown in Table 6, is low. Antimony, which does not have a Saltwater-Surface Water Screening Value, was detected in two samples and exceeded background in one sample (EFF005); and cyanide, which has a screening value of 1 μg/L, was detected in one sample and did not exceed background. The screening value for thallium is 21.3 μg/L, and none of the results exceeded the screening value.

Data Comparison

- Table 6 summarizes the CNC stormwater effluent onsite constituents detected, compares the results to Region IV Saltwater Surface Water Chronic Screening Values, identifies COPCs, and compares the results to inorganic reference values. Based on the information provided in this memorandum and the fact that the "2 X the mean" method is more conservative, "2 X mean" reference values should be utilized in the screening process during the COPC refinement stage of the ERA.

Table 5
Comparison of Calculated Background Concentrations
Charleston Naval Complex, South Carolina

Chemical	2× Mean	UTLs
Aluminum	3277.67	7896.48
Antimony	5.93	5.10
Arsenic	6.88	13.00
Barium	60.31	126.50
Beryllium	0.41	0.48
Cadmium	1.29	2.20
Calcium	53455.56	101795.06
Chromium	13.00	22.19
Cobalt	2.00	3.20
Copper	41.98	83.83
Iron	4134.44	7801.59
Lead	33.63	80.21
Magnesium	49255.56	196576.60
Manganese	74.52	106.18
Nickel	5.14	9.10
Potassium	23678.89	82844.16
Silver	2.34	4.40
Sodium	395333.33	1565591.49
Thallium	5.77	4.60
Vanadium	15.59	25.30
Zinc	307.83	893.78
Cyanide, Total	16.33	0.18

Notes: All units are microgram per liter (µg/L).

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
2,4-Dimethylphenol	EFF043	*1.3*	NV	*3*	NV	*3*
	EFF014	*1*				
	EFF040	*0.53*				
2-Methylphenol (o-Cresol)	EFF045	*5.2*	NV	*6*	NV	*6*
	EFF013	*4.3*				
	EFF041	*0.9*				
	EFF047	*0.8*				
	EFF042	*0.7*				
	EFF040	*0.38*				
3&4-Methylphenol (m&p-cresol)	EFF041	*0.75*	NV	*1*	NV	*1*
4,4'-DDD	EFF044	*0.065*	0.025	*1*	NV	*1*
Acenaphthene	EFF058	6.4	9.7	*0*	NV	*0*
Aluminum	EFF011	*13000*	NV	*36*	3278	*3*
	EFF004	*4500*				
	EFF014	*3600*				
	EFF040	*2300*				
	EFF002	*1700*				
	EFF006	*1200*				
	EFF010	*1200*				
	EFF013	*1200*				
	EFF035	*970*				
	EFF068	*930*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Aluminum	EFF065	***900***				
	EFF066	***810***				
	EFF069	***570***				
	EFF005	***520***				
	EFF067	***520***				
	EFF034	***440***				
	EFF041	***320***				
	EFF044	***320***				
	EFF048	***260***				
	CAP001	***250***				
	EFF057	***250***				
	EFF058	***240***				
	EFF012	***230***				
	EFF064	***220***				
	EFF001	***200***				
	EFF007	***200***				
	EFF009	***170***				
	EFF008	***140***				
	EFF043	***140***				
	EFF063	***140***				
	EFF003	***120***				
	EFF019	***98***				
	EFF042	***86***				
	EFF045	***84***				
	EFF031	***51***				
	EFF047	***36***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Antimony	EFF005	*6*	NV	*2*	5.93	*1*
	EFF012	*4.4*				
Arsenic	EFF011	*190*	36	*1*	6.88	*1*
	CAP001	35				
	EFF019	15				
	EFF012	5.2				
	EFF034	4.8				
	EFF014	4				
	EFF013	3.9				
	EFF048	3.4				
Barium	EFF011	*120*	NV	*36*	60.3	*2*
	EFF067	*100*				
	EFF068	*44*				
	EFF014	*44*				
	EFF012	*41*				
	EFF066	**26**				
	EFF065	**26**				
	EFF004	**25**				
	EFF002	**23**				
	EFF010	**22**				
	EFF064	**20**				
	EFF035	**20**				
	EFF001	**19**				
	EFF006	**17**				
	EFF069	**13**				
	EFF058	**13**				
	EFF042	**13**				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Barium	EFF003	**12**				
	EFF040	**11**				
	EFF048	**9.9**				
	EFF013	**9.9**				
	EFF041	**8.7**				
	EFF007	**8.5**				
	EFF009	**8.2**				
	EFF034	**8.1**				
	EFF063	**7.6**				
	EFF005	**7.6**				
	EFF057	**7.1**				
	CAP001	**5.6**				
	EFF043	**5**				
	EFF019	**4.2**				
	EFF031	**3.6**				
	EFF008	**3.6**				
	EFF044	**3.4**				
	EFF045	**3.3**				
	EFF047	**2.6**				
Benzo(a)pyrene	EFF041	***1.3***	NV	***2***	NV	***2***
	EFF040	***0.95***				
Benzo(b)fluoranthene	EFF041	***1.5***	NV	*3*	NV	***3***
	EFF040	***1.2***				
	EFF008	***0.39***				
Benzo(g,h,i)perylene	EFF041	***0.75***	NV	***1***	NV	***1***

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Benzo(k)fluoranthene	EFF041	***1.6***	NV	***2***	NV	***2***
	EFF040	***1.1***				
Beryllium	EFF011	***4.5***	NV	***3***	0.41	***1***
	EFF004	***0.16***				
	EFF014	***0.15***				
bis(2-Ethylhexyl)phthalate	EFF019	***16***	NV	***11***	NV	***11***
	EFF005	***4***				
	EFF002	***2.6***				
	EFF014	***2.6***				
	CAP001	***1.4***				
	EFF040	***1.2***				
	EFF058	***1.1***				
	EFF042	***0.69***				
	EFF057	***0.66***				
	EFF009	***0.63***				
	EFF041	***0.62***				
Cadmium	EFF011	3.3	9.3	***0***	1.29	***0***
	EFF012	2.7				
	EFF067	0.61				
	EFF006	0.6				
	EFF005	0.52				
Calcium	EFF011	***260000***	NV	***36***	53456	***6***
	EFF012	***160000***				
	EFF067	***70000***				
	EFF006	***66000***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Calcium	EFF013	*66000*				
	EFF058	*61000*				
	EFF014	*50000*				
	EFF010	*47000*				
	EFF068	*44000*				
	EFF057	*43000*				
	EFF063	*42000*				
	EFF065	*40000*				
	EFF035	*39000*				
	EFF009	*34000*				
	EFF001	*29000*				
	EFF004	*29000*				
	EFF066	*24000*				
	EFF034	*23000*				
	EFF048	*23000*				
	EFF069	*23000*				
	EFF002	*20000*				
	EFF005	*20000*				
	EFF007	*20000*				
	EFF064	*20000*				
	CAP001	*19000*				
	EFF003	*16000*				
	EFF042	*14000*				
	EFF040	*12000*				
	EFF045	*9300*				
	EFF043	*9200*				
	EFF031	*6900*				
	EFF019	*5800*				
	EFF044	*5700*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Calcium	EFF041	***3500***				
	EFF008	***3200***				
	EFF047	***2900***				
Carbazole	EFF040	***0.56***	NV	***1***	NV	***1***
Chromium	EFF011	31	50	***0***	13	***0***
	CAP001	11				
	EFF014	11				
	EFF040	6.6				
	EFF002	5.9				
	EFF004	5.6				
	EFF006	4.7				
	EFF019	4.6				
	EFF068	3.3				
	EFF065	3				
	EFF010	2.9				
	EFF066	2.6				
	EFF005	2.4				
	EFF034	2.4				
	EFF035	2.3				
	EFF013	2.2				
	EFF041	2				
	EFF048	2				
	EFF058	2				
	EFF064	2				
	EFF069	1.7				
	EFF012	1.5				
	EFF067	1.5				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Chromium	EFF001	1.2				
	EFF043	1.1				
	EFF042	0.96				
	EFF057	0.95				
Chrysene	EFF040	***2.2***	NV	***2***	NV	***2***
	EFF041	***2.1***				
Cobalt	EFF011	***2.8***	NV	***4***	2	***1***
	EFF006	***1.4***				
	EFF014	***1.2***				
	EFF048	***0.96***				
Copper	EFF011	***130***	2.9	***29***	42	***1***
	EFF012	***37***				
	EFF014	***35***				
	EFF031	***35***				
	EFF006	***34***				
	EFF008	***30***				
	EFF068	***25***				
	EFF019	***16***				
	EFF048	***14***				
	EFF004	***13***				
	EFF005	***12***				
	EFF065	***12***				
	EFF035	***10***				
	EFF044	***10***				
	EFF066	***10***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Copper	EFF067	*10*				
	EFF003	*9.5*				
	EFF013	*8.7*				
	EFF047	*7.1*				
	EFF010	*6.9*				
	EFF058	*6.5*				
	EFF064	*5.8*				
	EFF045	*5.4*				
	EFF069	*5.2*				
	EFF034	*5*				
	EFF007	*4.8*				
	EFF009	*4.5*				
	EFF057	*4.5*				
	EFF063	*3.8*				
Cyanide, Total	CAP001	*5.4*	1	*1*	16.3	*0*
Dibenzofuran	EFF058	*0.94*	NV	*1*	NV	*1*
Endosulfan sulfate	EFF040	*0.053*	NV	*1*	NV	*1*
Fluoranthene	EFF040	*4.1*	1.6	*3*	NV	*3*
	EFF041	*4.1*				
	EFF058	*1.7*				
Fluorene	EFF058	*0.4*	NV	*1*	NV	*1*
Heptachlor	EFF012	*0.014*	0.0036	*1*	NV	*1*

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Indeno(1,2,3-cd)pyrene	EFF041	*0.62*	NV	*2*	NV	*1*
	EFF008	*0.59*				
Iron	EFF011	*180000*	NV	*36*	4134	*2*
	EFF014	*5100*				
	EFF006	*2100*				
	EFF040	*1800*				
	EFF004	*1600*				
	EFF013	*1500*				
	EFF002	*1300*				
	EFF068	*1000*				
	EFF010	*910*				
	EFF005	*870*				
	EFF065	*790*				
	EFF066	*780*				
	EFF035	*710*				
	EFF063	*670*				
	EFF064	*580*				
	EFF034	*520*				
	EFF069	*520*				
	EFF067	*510*				
	EFF001	*440*				
	EFF007	*300*				
	EFF048	*290*				
	EFF058	*290*				
	EFF009	*280*				
	EFF041	*280*				
	EFF012	*270*				
	EFF043	*220*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Iron	CAP001	***190***				
	EFF003	***190***				
	EFF019	***190***				
	EFF057	***190***				
	EFF044	***160***				
	EFF042	***140***				
	EFF045	***95***				
	EFF008	***92***				
	EFF031	***74***				
	EFF047	***55***				
Lead	EFF006	***80***	8.5	7	33.6	***2***
	EFF014	***38***				
	EFF041	***25***				
	EFF002	***18***				
	EFF005	***15***				
	EFF012	***15***				
	EFF040	***9.6***				
	EFF008	7.8				
	EFF068	7.5				
	EFF035	6.1				
	EFF004	5.5				
	EFF065	5.4				
	EFF011	4.9				
	EFF066	4.9				
	EFF013	4.7				
	EFF001	4.5				
	EFF048	4.4				
	CAP001	4.3				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Lead	EFF019	3.3				
	EFF064	3.1				
	EFF042	2.7				
	EFF034	2.5				
	EFF069	2.5				
	EFF057	2.4				
Magnesium	EFF012	***100000***	NV	***36***	49256	***2***
	EFF013	***93000***				
	EFF058	***47000***				
	EFF057	***40000***				
	EFF035	***36000***				
	EFF011	***34000***				
	EFF063	***28000***				
	EFF042	***25000***				
	EFF048	***18000***				
	EFF067	***18000***				
	EFF068	***18000***				
	EFF009	***16000***				
	EFF006	***10000***				
	EFF014	***10000***				
	EFF034	***7100***				
	EFF066	***6900***				
	EFF005	***6300***				
	EFF019	***6000***				
	EFF065	***4700***				
	EFF010	***4200***				
	EFF064	***3800***				
	EFF043	***2900***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Magnesium	EFF069	***2500***				
	EFF007	***2100***				
	EFF040	***2100***				
	EFF044	***1800***				
	EFF004	***1600***				
	EFF003	***1300***				
	EFF001	***1200***				
	EFF031	***960***				
	EFF002	***840***				
	CAP001	***560***				
	EFF045	***520***				
	EFF008	***370***				
	EFF041	***310***				
	EFF047	***290***				
Manganese	EFF011	***900***	NV	***36***	74.5	5
	EFF063	***140***				
	EFF014	***110***				
	EFF067	***98***				
	EFF012	***85***				
	EFF040	***73***				
	EFF058	***49***				
	EFF006	***41***				
	EFF013	***39***				
	EFF068	***37***				
	EFF009	***32***				
	EFF064	***32***				
	EFF066	***27***				
	EFF010	***25***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Manganese	EFF035	*23*				
	EFF005	*20*				
	EFF048	*17*				
	EFF069	*17*				
	EFF002	*16*				
	EFF043	*16*				
	EFF065	*16*				
	EFF001	*14*				
	EFF034	*13*				
	EFF004	*9.9*				
	EFF057	*9.4*				
	EFF041	*8.7*				
	EFF042	*8.2*				
	EFF019	*7.2*				
	EFF003	*6.5*				
	EFF007	*6.3*				
	EFF031	*5.1*				
	EFF008	*5*				
	EFF044	*4.6*				
	CAP001	*4.2*				
	EFF047	*3.2*				
	EFF045	*3.1*				
Mercury	CAP001	*0.22*	0.025	*2*	0.11	*2*
	EFF013	*0.12*				
Methoxychlor	EFF047	*0.17*	0.03	*1*	NV	*1*
Nickel	EFF011	*18*	8.3	*2*	5.14	*2*

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Nickel	EFF012	***8.5***				
	EFF014	6				
	EFF006	4.5				
	CAP001	3.1				
	EFF068	2.6				
	EFF042	2.6				
	EFF010	2.3				
	EFF013	2.1				
	EFF058	2				
	EFF009	1.8				
	EFF005	1.8				
	EFF004	1.7				
	EFF065	1.3				
Pentachlorophenol	EFF005	***14***	7.9	***3***	NV	***3***
	EFF006	***14***				
	EFF067	***14***				
Phenanthrene	EFF040	***2.6***	NV	***2***	NV	***2***
	EFF041	***2.1***				
Potassium	EFF013	***41000***	NV	***36***	23679	***3***
	EFF012	***38000***				
	EFF058	***24000***				
	EFF035	***18000***				
	EFF057	***17000***				
	EFF011	***14000***				
	EFF063	***13000***				
	EFF068	***13000***				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Potassium	EFF067	*11000*				
	CAP001	*10000*				
	EFF009	*10000*				
	EFF042	***9200***				
	EFF048	***8200***				
	EFF010	***7700***				
	EFF066	***5800***				
	EFF006	***5100***				
	EFF014	***4400***				
	EFF044	***4300***				
	EFF034	***3700***				
	EFF069	***3500***				
	EFF004	*3100*				
	EFF019	*3000*				
	EFF005	*2500*				
	EFF065	*2500*				
	EFF003	*2400*				
	EFF007	*2400*				
	EFF064	*2300*				
	EFF040	*1700*				
	EFF043	*1700*				
	EFF001	*1100*				
	EFF008	*1000*				
	EFF002	*900*				
	EFF031	*770*				
	EFF045	*670*				
	EFF047	*360*				
	EFF041	*300*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Pyrene	EFF040	*3.1*	NV	*3*	NV	*3*
	EFF041	*2.6*				
	EFF058	*0.97*				
Selenium	EFF064	5.6	71	*0*	NV	*0*
Sodium	EFF013	*800000*	NV	*36*	395333	*2*
	EFF012	*770000*				
	EFF035	*320000*				
	EFF058	*310000*				
	EFF057	*300000*				
	EFF067	*260000*				
	EFF011	*220000*				
	EFF042	*210000*				
	EFF068	*190000*				
	EFF063	*170000*				
	EFF048	*140000*				
	EFF009	*130000*				
	EFF006	*81000*				
	EFF066	*75000*				
	EFF014	*74000*				
	EFF065	*74000*				
	EFF034	*59000*				
	EFF005	*51000*				
	EFF019	*48000*				
	EFF064	*33000*				
	EFF010	*30000*				
	CAP001	*21000*				
	EFF043	*20000*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Sodium	EFF069	*14000*				
	EFF044	*9500*				
	EFF031	*8100*				
	EFF040	*6500*				
	EFF007	*6000*				
	EFF003	*4700*				
	EFF001	*3100*				
	EFF045	*2600*				
	EFF008	*2400*				
	EFF004	*2300*				
	EFF047	*2100*				
	EFF002	*1600*				
	EFF041	*1600*				
Thallium	EFF014	*5.5*	21.3	***0***	5.77	***0***
	CAP001	*5.2*				
	EFF008	*4.6*				
Tin	EFF009	*5*	NV	***2***	NV	***2***
	EFF010	*4.7*				
Vanadium	CAP001	*21*	NV	***36***	15.6	***1***
	EFF014	*14*				
	EFF006	*8.8*				
	EFF040	*8.7*				
	EFF005	*8.5*				
	EFF004	*8.1*				
	EFF045	*6.6*				
	EFF010	*6.1*				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Vanadium	EFF002	5.9				
	EFF065	5.4				
	EFF013	5.3				
	EFF011	5				
	EFF068	4.7				
	EFF047	4.2				
	EFF067	4.1				
	EFF008	4				
	EFF035	4				
	EFF034	3.8				
	EFF057	3.5				
	EFF058	3.4				
	EFF066	3.4				
	EFF042	3.2				
	EFF031	2.9				
	EFF001	2.6				
	EFF064	2.4				
	EFF009	2.3				
	EFF043	2.3				
	EFF069	2.3				
	EFF048	2.2				
	EFF063	2.2				
	EFF041	1.9				
	EFF007	1.7				
	EFF012	1.7				
	EFF044	1.6				
	EFF003	1.4				
	EFF019	1.4				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Zinc	EFF011	***530***	86	***12***	308	***3***
	EFF014	***530***				
	EFF012	***460***				
	EFF001	***150***				
	EFF002	***140***				
	EFF009	***130***				
	EFF040	***120***				
	EFF058	***110***				
	EFF065	***110***				
	EFF010	***100***				
	EFF007	***99***				
	EFF067	***91***				
	EFF019	74				
	EFF005	73				
	EFF003	66				
	EFF048	58				
	EFF031	57				
	EFF066	55				
	EFF006	51				
	EFF068	50				
	EFF008	47				
	EFF057	46				
	EFF013	44				
	EFF063	38				
	EFF034	35				
	EFF035	33				
	EFF064	33				
	CAP001	28				
	EFF004	19				

Table 6
Summary of COPCs of Stormwater Effluent Samples

COMPOUND NAME	SAMPLE ID	RESULTS (µg/L)	SCREENING VALUE	# OF COPCs	REFERENCE VALUE	# OF EXCEEDANCES REMAINING
Zinc	EFF069	18				
	EFF044	16				

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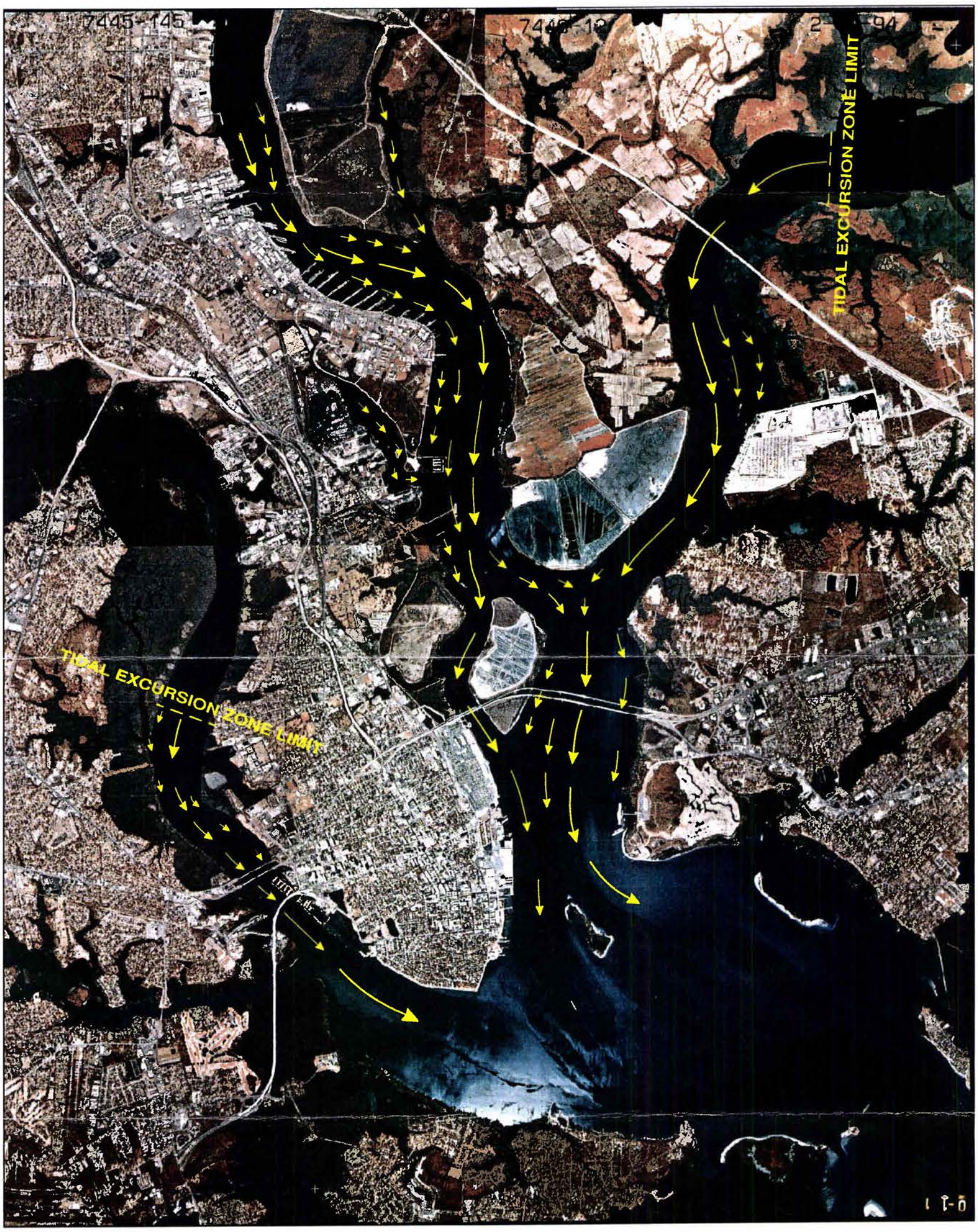

FIGURE 1
ILLUSTRATION OF EBB TIDE CURRENTS

0154C006

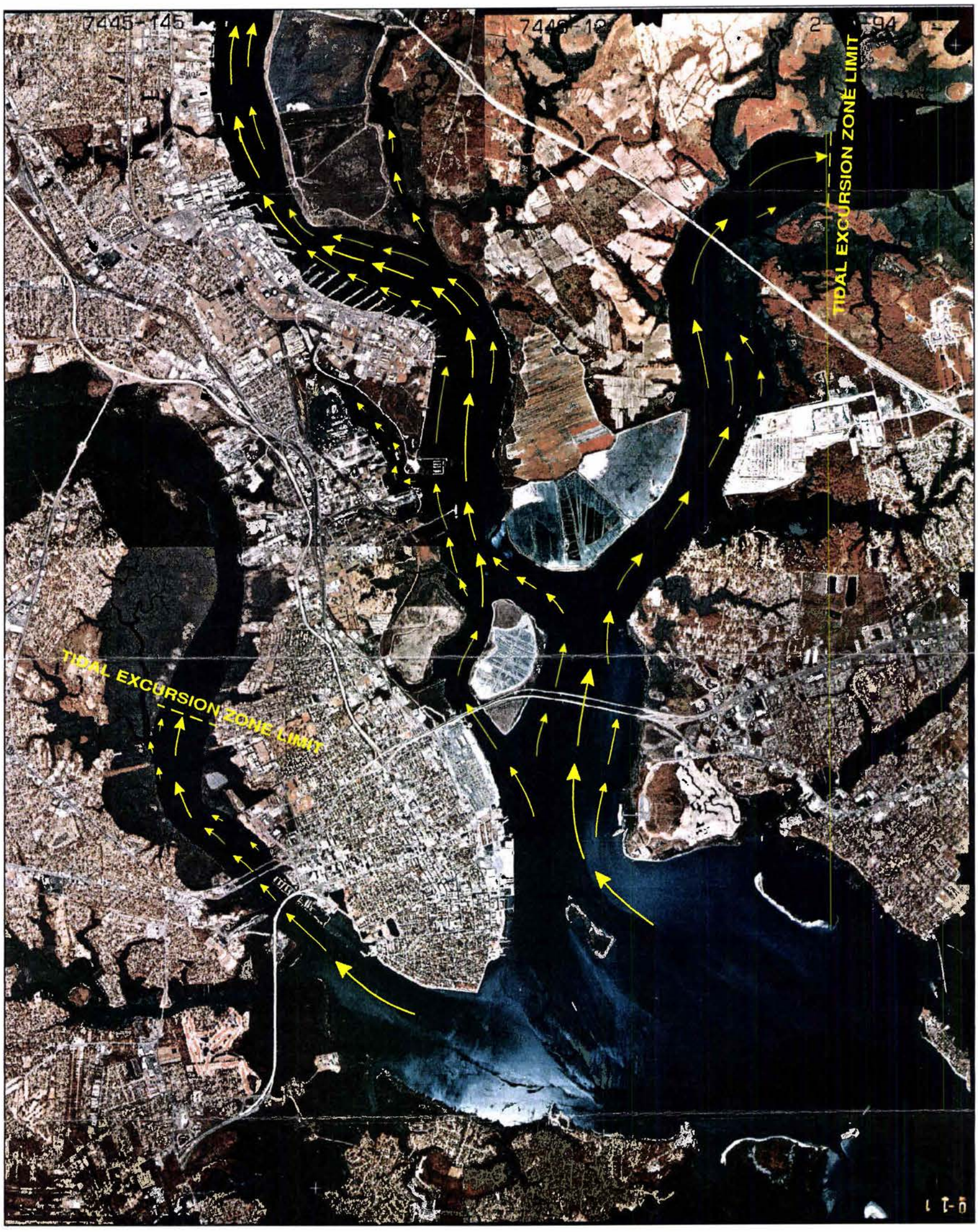

FIGURE 2
ILLUSTRATION OF FLOOD TIDE CURRENTS

0154C006

ENSAFE
313 Wingo Way
Mt. Pleasant, SC 29464

Phone: (843) 884-0029
Fax: (843) 856-0107

LETTER OF TRANSMITTAL

DATE 5/6/02	JOB NO. 0154-001-11-00-00
ATTENTION	
RE: Zone J	

TO Rob Harrell - SouthDiv
2155 Eagle Drive
N. Charleston SC 29418

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

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1	5/6/02		Evaluation of Reference Values of Offsite Locations for Zone J Stormwater Effluent Evaluation Report at CNC

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REMARKS
Please review prior to BCT meeting next week.

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APPENDIX B

ZONE J STORM WATER EFFLUENT EVALUATION REPORT

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT
REVISION: 1

VOLUME I OF II - SECTIONS 1 TO 10

SOUTHDIV Contract Number:
N62467-89-D-0318

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

ENSAFE INC.
313 WINGO WAY
MOUNT PLEASANT, SOUTH CAROLINA 29464
(843) 884-0029

July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

CERTIFICATION PAGE

REGISTERED SOUTH CAROLINA PROFESSIONAL ENGINEER CERTIFICATION.

I certify that the data and interpretations presented in this *Zone J Storm Water Effluent Evaluation Report* are true and accurate to the best of my knowledge as a registered South Carolina Professional Engineer.

Henry L. Fellers

Henry Fellers, P.E.

Registration Number 19318

27 Sept. 2002

Date

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER NO 19318 HENRY L. FELLERS JR.

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT
REVISION: 1

SOUTHDIV Contract Number:
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NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

ENSAFE INC.
313 WINGO WAY
MOUNT PLEASANT, SOUTH CAROLINA 29464
(843) 884-0029

The Contractor, EnSafe Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0318 is complete, accurate, and complies with all requirements of the contract.

Date:	July 2003
Signature:	
Name:	Charles A. Vernoy
Title:	Task Order Manager

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Appendix A Chains of Custody, Analytical Data, Data Validation Reports

ABBREVIATIONS, ACRONYMS, AND SYMBOLS

The following abbreviations, acronyms, and units of measurement are used in this report.

AA	Atomic Absorption
AOC	Area of Concern
AST	Aboveground Storage Tank
AWQC	Ambient Water Quality Criteria
BCT	Base Closure Team
BEQ	Benzo(a)pyrene Equivalent Quotient
BKG	Background Concentration
BOD	Biochemical Oxygen Demand
CAS	Chemical Abstract Service
CCC	Calibration Check Compound
CH4	Methane
CLP	Contract Laboratory Program
CMS	Corrective Measures Study
CNC	Charleston Naval Complex
CNSY	Charleston Naval Shipyard
CO2	Carbon Dioxide
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CPW	Commissioner of Public Works
CSAP	Comprehensive Sampling and Analysis Plan
CWA	Clean Water Act
CY	Cubic Yard
DANC	Warfare Decontamination Agents
DB	Drainage Basin
DET	Navy Environmental Detachment
DMA	Dredge Material Area
DO	Dissolved Oxygen
DQO	Data Quality Objective
DRO	Diesel Range Organics
E/A&H	EnSafe/Allen and Hoshall
EBS	Environmental Baseline Survey
ECT	Environmental Consulting and Technology, Inc.
EPA	Environmental Protection Agency
ESDSOPQAM	*Environmental Services Division, Standard Operating Procedures and Quality Assurance Manual*
FDS	Fuel Distribution System
FEIS	Final Environmental Impact Statement

FPS	Feet Per Second
FT	Feet
FWPCA	Federal Water Pollution Control Act
G	Gram
GRO	Gasoline Range Organics
HVAC	Heating, Ventilating and Air-Conditioning
ICAP	Inductively Coupled Argon Plasma
ICP	Inductively Coupled Plasma
IM	Interim Measure
IMS	Interim Stabilization Measure
LCS	Laboratory Control Sample
M	Meter
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
μg/kg	Micrograms per Kilogram
μg/L	Micrograms per Liter
MHW	Mean High Water
mL	Milliliter
MLW	Mean Low Water
MNA	Monitored Natural Attenuation
MPF	Maritime Prepositioning Force
MSL	Mean Sea Level
MS4	Municipal Separate Storm Water Sewer System
NA	Not Applicable
NCSD	North Charleston Sewer District
NFA	No Further Action
ng	Nanogram
NL	No Listed SWMU/AOC
NL	Not Listed
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NR	Not Reported
NR	Not Required
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
ODMDS	Ocean Dredge Material Disposal Site

OP	Organophosphorous
OSWER	Office of Solid Waste and Emergency Response
PAH	Poly Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PE	Performance Evaluation
POL	Petroleum, Oil, and Lubricant
PPT	Parts Per Thousand
PQL	Practical Quantitation Limit
%D	Percent Difference
%RSD	Percent Relative Standard Deviation
QA/QC	Quality Assurance/Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RDA	Redevelopment Authority
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RO/RO	Roll On/Roll Off
RRF	Relative Response Factor
S	Second
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCPSA	South Carolina Public Service Authority
SCS	Soil Conservation Service
SLERA	Screening-Level Ecological Risk Assessment
SPA	State Ports Authority
SPCC	Spill Prevention, Control, and Countermeasures
SPLP	Synthetic Precipitation Leaching Procedure
SRT	Shipyard River Terminal
SSV	Sediment Screening Value
STDEV	Standard Deviation
STL	Severn Trent Laboratories
SVOC	Semi-volatile Organic Compound
SWMU	Solid Waste Management Unit
SWSV	Saltwater Screening Value
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leachate Procedure
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons

USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTL	Upper Tolerance Limit
WDOE	Washington Department of Ecology
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

The environmental investigation and remediation activities at Charleston Naval Complex (CNC) are required by the Hazardous and Solid Waste Amendments portion of the Resource, Conservation and Recovery Act (RCRA), Part B permit. For management purposes, CNC has been geographically divided into 12 investigative "zones" identified as A through L. Zone J consists of portions of the Cooper River, Shipyard Creek, Noisette Creek, and associated marsh areas. Characterizations include evaluations of storm water discharge, sediments below the mean high water mark, and the water bodies surrounding CNC. The main objective of the Zone J RCRA Facility Investigation (RFI) is to assess impacts from CNC-related discharges to receptors within Zone J.

The Navy completed preliminary sampling of the water bodies in September 1997, using the protocols and methods outlined in the *Final Comprehensive Sampling and Analysis Plan* (EnSafe/Allen & Hoshall (E/A&H) July 1996) and the *Zone J RFI Work Plan* (E/A&H December 1996). In a December 1997 technical memorandum entitled *Preliminary Results of Zone J Sampling* (EnSafe), the Navy presented the investigative approach, deviations from the Zone J work plan, applied sampling protocols, and presented analytical results of the Zone J sampling. Numerous zone-specific investigations of upland areas of concern/solid waste management units (AOCs/SWMUs) were still ongoing when the 1997 Zone J sampling was completed. Therefore, correlations between the constituents detected in Zone J and potential CNC sources were not attempted. However, the 1997 technical memorandum did present a preliminary list of chemicals of potential concern (COPCs) in Zone J sediments and surface waters, and a map of contaminant distributions.

EnSafe submitted the *Zone J Draft RFI Report - Part One* on April 24, 2000 to the South Carolina Department of Health and Environmental Control (SCDHEC), the South Carolina Department of Natural Resources (SCDNR), the National Oceanic and Atmospheric Administration (NOAA), the United States Environmental Protection Agency (USEPA), and the United States Fish and Wildlife Service (USFWS) for their review and comment. The Part One report presented a screening-level ecological risk assessment (SLERA) using the preliminary results of Zone J sampling and the

protocols outlined in the USEPA1997 guidance document for Superfund, Process for Designing and Conducting Ecological Risk Assessments.

Comments from reviewing agencies on the Part One report addressed general approach, document preparation, approach in evaluating lines of evidence for eliminating COPCs from further investigation, more in-depth evaluation of linkages between CNC and Zone J and a clearer determination of reference concentrations.

EnSafe and the Navy presented the migration pathway evaluation process to the Base Closure Team (BCT) in September 2000, along with checklists desired to yield a more definitive assessment of potential contaminant migration pathways and the scope of work required to complete the next phase of the Zone J RFI. EnSafe and the Navy concluded that CNC storm water effluent data were required to produce a reasonably definitive evaluation of the migration pathway scenarios, particularly for contaminant transport via storm water drainage pipelines and effluent.

At the May 2001 BCT project team meeting, EnSafe presented the conceptual approach for collecting effluent samples from CNC and reference samples from non-point-source locations offsite. The approach was agreed upon by the project team, which decided that a scoping package would be presented to the BCT project team prior to submittal of the Point of Entry Effluent Sampling Work Plan to incorporate comments from the SCDHEC. The scoping package was presented at the August 2001 project team meeting where a consensus was reached that a number of reference locations should also come from areas on base that were not influenced by an AOC/SWMU, if possible.

Evaluation of CNC storm water effluent is an interim phase of the Zone J RFI. The investigation will continue until sufficient data is obtained to determine whether COPCs are present from the other migration pathways and if the COPCs can be attributed to a Navy source. Data will be used to characterize the associated impact to the receiving waters and potential receptors.

This report focuses on the CNC outfalls associated with Noisette and Shipyard Creeks. CNC outfalls associated with the Cooper River will be addressed in the addendum report. Storm water effluent

sample detections were evaluated for COPCs and compared with CNC site data to evaluate upland source linkages for Scenario 1 (Transport to Zone J via Storm Water Drainage Pipeline), which describes a release from a SWMU or AOC resulting in either:

1a) Waste being introduced directly into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1b) Storm water runoff transporting contaminated media into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1c) Contaminated groundwater being intercepted by and entering a low-integrity storm sewer pipeline and migrating via the storm sewer pipeline to Zone J; or

1d) Waste discharging directly to Zone J via sanitary/storm sewer cross connects.

Much of the CNC storm water system is influenced by tidal activity and is inundated by surface water to some degree during high tide. Storm water effluent was collected from outfalls that discharge into Shipyard and Noisette Creeks during periods of precipitation that occurred at low tide to prevent inclusion of surface water in the sample. The storm water drainage basins sampled for this report are:

Noisette Creek

- Drainage Basin 1-A
- Drainage Basin 1-B
- Drainage Basin 1-C
- Drainage Basin 10
- Drainage Basin 10-A
- Drainage Basin 10-B
- Drainage Basin 10-C

Shipyard Creek

- Drainage Basin 51-H
- Drainage Basin 52
- Drainage Basin 52-A

Storm water effluent sample detections were compared against storm water effluent reference and screening criteria, upland surface soil detections, groundwater detections, and environmental incident and sewer cross-connect reports in determining COPCs for further evaluation and linkages to CNC sites. Storm water Drainage Basin 10-B was the only basin with soil and groundwater linkages to a CNC site (SWMU 44). COPCs with upland linkages at Drainage Basin 10-B consist of arsenic (soil and groundwater), barium (groundwater), beryllium (soil), chromium (soil), cobalt (soil), copper (soil) iron (soil and groundwater), and zinc (soil). Further investigation of these COPCs and linkages at Drainage Basin 10-B is recommended.

Hydrodynamic evaluations of Shipyard Creek and Noisette Creek were performed as part of this study to determine transport of CNC and non-CNC contaminants in these water bodies. This evaluation has determined that pollutants released into the water bodies are transported both up and down stream with the flood and ebb tides, although there is a net downstream component towards the ocean. The tidal flushing capacity of Noisette Creek during one tidal cycle was approximated to be 88% while the diluting capacity ranged from approximately 3.7 to 1 to approximately 14.7 to 1. The tidal flushing capacity of Shipyard Creek during one tidal cycle was approximately 9% while the diluting capacity ranged from 8.4 to 1 to approximately 117 to 1. It was also found that Noisette Creek is a high tidal energy environment with less hydraulic retention time than Shipyard Creek which is a low tidal energy environment. Consequently, sediments and contaminants in Noisette Creek tend to be flushed into the Cooper River and distributed throughout the estuary more quickly than similar materials in Shipyard Creek which tend to be deposited and remain within the Shipyard Creek basin. It was also determined that sediments carried into Shipyard Creek by flood tides in the Cooper River may also be deposited within the Shipyard Creek basin.

1.0 INTRODUCTION

The purpose of the Zone J RFI is to assess Navy-related impacts to the water bodies adjacent to the CNC as part of the overall basewide assessment. Zone J, which consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek and their associated marsh areas, is one of CNC's 12 interdependent RFI zones. Zone J characterizations include evaluations of storm water discharge, sediments beyond the mean high water mark and the water bodies surrounding CNC. It is also the only zone that is entirely within an estuarine system and with only rivers, creeks, and marshes, the investigated components are more ecological than industrial. As such, standard industrial site investigative protocols (monitoring well and soil boring installation, etc.) are inappropriate, necessitating the use of a variety of preliminary investigative techniques.

To date, the Zone J RFI techniques included unbiased offshore sampling to assess the nature and extent of sediment contamination, screening-level ecological risk assessments to determine potential adverse effects of detected contaminants to aquatic receptors, and conceptual site models to define potential routes of exposure. These approaches have not yielded a complete and comprehensive evaluation of CNC impacts to the Zone J water bodies since such a broad evaluation requires a thorough analysis of contaminant migration pathways between suspected CNC sources and Zone J. Site-specific analytical data collected from AOCs/SWMUs during RFI and Corrective Measures Study (CMS) activities are being evaluated and screened against ecological screening values to complete migration pathway evaluations and determine if a possible linkage exists to the contribution of contamination to Zone J water bodies. This report evaluates the storm water migration pathways and off-site storm water effluent values and identifies COPCs, hydrodynamics of the Zone J estuary system, and data gaps that will be addressed in future.

The remainder of this section presents the history of the Zone J investigation, current status, and a description of the Charleston Harbor and Cooper River Watershed estuaries. Section 2 presents the approach used to evaluate the potential pathways between upland CNC sites and Zone J, the conceptual site model, the various migration pathway scenarios, and the set of screening criteria used to identify upland contaminants that may be a Zone J concern.

Section 3 describes the investigative objectives, sampling procedures, protocols, and analyses implemented during data collection within Zone J. Section 4 details the data quality objectives (DQOs) and the appropriate guidance for the RFI at CNC. Section 5 describes the approach and technical methods used to determine and evaluate reference concentrations for samples collected off-site.

Section 6 includes discussions on CNC drainage basin evaluations for Shipyard and Noisette Creeks, respectively. Evaluations will include descriptions of drainage basins and associated AOCs/SWMUs, previous site investigations, storm water effluent data evaluation, COPCs and upland terrestrial unit source identification, and possible data gaps.

Section 7 describes transportation mechanisms of contaminants in Noisette and Shipyard Creeks. Preliminary hydrodynamic modeling will also aid in the predictions of contaminant fate and transport entering Zone J water bodies. Section 8 summarizes the conclusion of each drainage basin summary relating to storm water evaluations, and Section 9 is a compilation of references.

1.1 Zone J RFI Investigation

Zone J is the only zone that is part of an estuarine system with its rivers, creeks, and marshes having more ecological than industrial components. As such, standard industrial site investigative protocols (monitoring well and soil boring installation, etc.) are inadequate and necessitated the use of a variety of preliminary investigative techniques for the Zone J RFI. To date, these techniques included unbiased offshore sampling to assess the nature and extent of sediment contamination, preliminary screening-level ecological risk assessments of offshore sediments to determine potential adverse effects of detected contaminants to aquatic receptors, and conceptual site models to define potential routes of exposure.

To date, these approaches have not yielded a complete and comprehensive evaluation of CNC impacts to the Zone J water bodies since such an evaluation requires a thorough analysis of contaminant migration pathways between suspected CNC sources and Zone J.

As a majority of the upland zone investigations reached their final phases, more investigation-derived data has been made available, enabling the evaluation of contaminant migration pathways and possible linkages between CNC sources and Zone J. Preliminary hydrodynamic modeling will also aid in the predictions of contaminant fate and transport upon entering the Zone J water bodies.

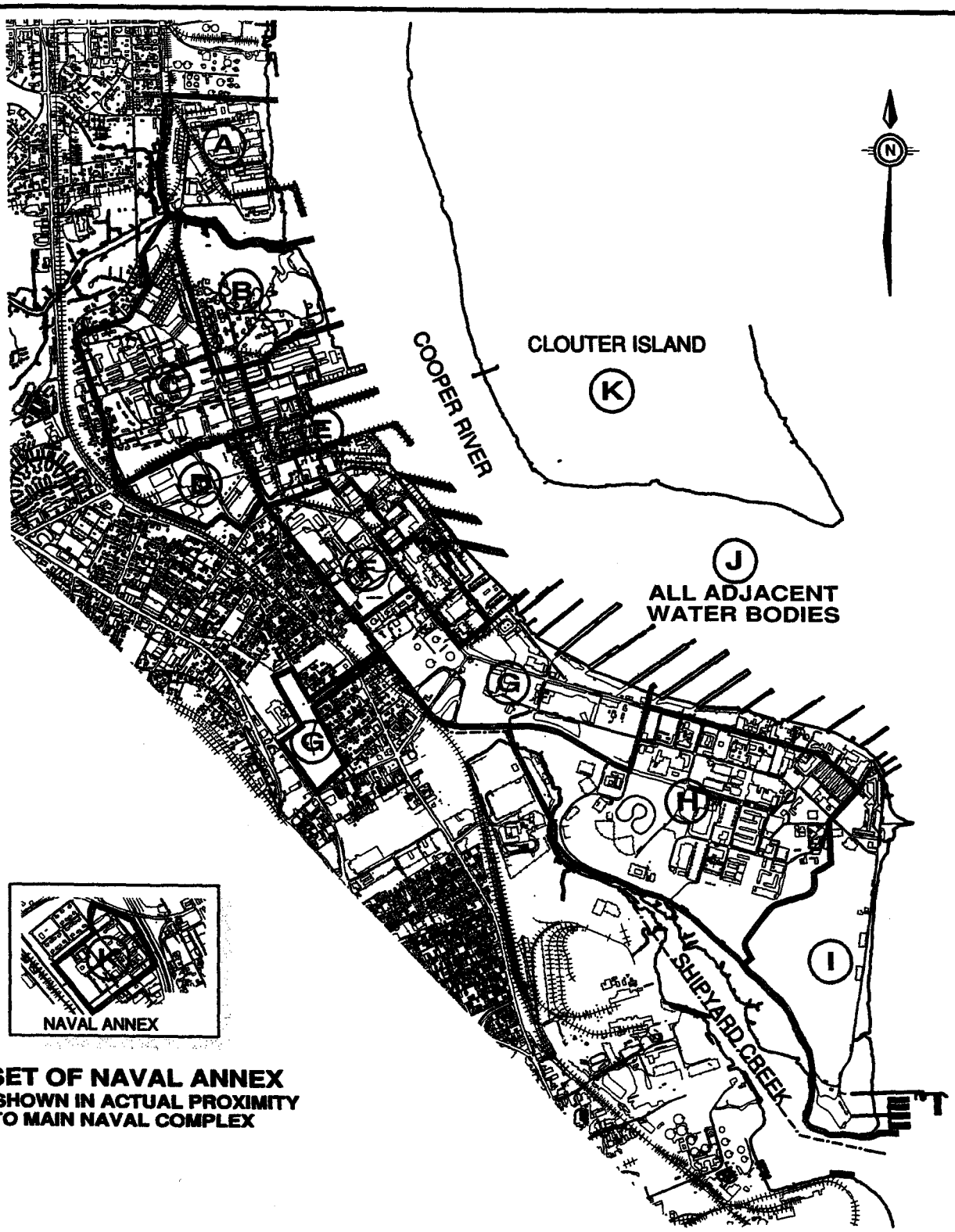
1.2 Site Investigation Background and Strategy

With respect to assessing contaminant sources and fate and transport issues, Zone J is perhaps the most complex of the RFI zones. As central components of the local watershed, the Zone J water bodies receive storm water runoff and other inputs from the majority of surrounding upland areas, including the CNC, via numerous point and nonpoint source discharges, including several permitted National Pollutant Discharge Elimination System (NPDES) industrial discharges. The main objective of the Zone J RFI is to assess impacts from CNC-related discharges to receptors within Zone J. Given the large number and distribution of potential CNC sources, the Zone J RFI to date has relied heavily upon a single round of extensive offshore sampling, existing data generated by upland zone-specific investigations (see Figure 1-1), various studies conducted in the Charleston Harbor, and a single round of CNC storm water effluent runoff sampling at multiple locations.

The large scope and extended schedule of the CNC RFIs necessitated zones being investigated and sampled independent of other zones. With some of the larger zone investigations, it was not uncommon for months or even years to pass between zone-specific sampling phases, which affected the sequence of data availability for use during the Zone J investigation. Prior to the scope of the Zone J RFI being defined as the assessment of the surrounding water bodies, several of the initial upland site investigations conducted small-scale, offshore sampling, adding to the complexity of the Zone J data set.

A series of small scale, unconnected, and temporally sporadic offshore sampling events would generate an inconsistent data set since water quality parameters such as temperature, dissolved oxygen, salinity, pH, and total suspended solids change constantly with the tide, season, and flow rates and often have a direct correlation to contaminants. Therefore, the Navy proceeded with the large scale Zone J investigation to ensure a consolidated data set for the water bodies. Sampling

would also prevent RFI delays caused by postponing offshore sampling until the completion of the upland investigations.



INSET OF NAVAL ANNEX
NOT SHOWN IN ACTUAL PROXIMITY TO MAIN NAVAL COMPLEX

2000 1000 0 2500 5000
2500 1500 500
SCALE IN FEET

ZONE J
RFI STORM WATER
EFFLUENT EVALUATION REPORT
CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

FIGURE 1-1
ZONE LOCATION MAP
CHARLESTON NAVAL COMPLEX

Date: 09/24/02 | DWG Name: 0154C010

With only a portion of the upland zone-specific investigations completed or ongoing, the Navy completed the preliminary sampling of the water bodies in September 1997, using the protocols and methods outlined in the *Final Comprehensive Sampling and Analysis Plan* (E/A&H July 1996) and the *Zone J RFI Work Plan* (E/A&H December 1996). In a December 1997 technical memorandum entitled *Preliminary Results of Zone J Sampling* (EnSafe), the Navy presented the investigative approach, deviations from the Zone J work plan, applied sampling protocols, and presented analytical results of the Zone J sampling. Numerous zone-specific investigations of upland AOCs/SWMUs were still ongoing when the 1997 Zone J sampling was completed, therefore correlations between the constituents detected in Zone J and potential CNC sources were not attempted. The 1997 technical memorandum did, however, present a preliminary list of COPCs in Zone J sediments and surface waters and a map of contaminant distributions.

The data set in this preliminary report, which also included results from the small-scale, offshore sampling conducted as part of other zone-specific RFIs, was not intended to be a complete assessment but did conclude that after the analysis of 126 offshore sediment samples, concentrations at numerous locations in the Cooper River, Shipyard Creek, and Noisette Creek exceeded the USEPA's 1995 Region IV Waste Management Division's Sediment Screening Values (SSVs) for semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and/or inorganic compounds.

On April 24, 2000, EnSafe submitted the *Zone J Draft RFI Report - Part One* to the SCDHEC, the SCDNR, the NOAA, the USEPA, and the USFWS for their review and comment. The Part One report presented a SLERA using the preliminary results of Zone J sampling and the protocols outlined in the USEPA's 1997 guidance document for Superfund, Process for Designing and Conducting Ecological Risk Assessments. The SLERA included a screening-level problem formulation, conceptual model, ecological effects evaluation, exposure estimates, and risk calculations.

In accordance with the USEPA, a SLERA may exclude those COPCs believed to lack a complete exposure pathway between the site and receptor species. In a preliminary attempt to determine if a

correlation did exist between the COPCs at CNC's upland sites and COPCs in Zone J, the Part One report reviewed the cross-media transport (migration) discussions from relevant zone-specific RFI reports. Based on the site-specific fate and transport evaluations in these reports, sites with the following pathways were suspect: soil-to-groundwater, groundwater-to-surface water, and soil-to-sediment.

The RFI reports qualitatively classified upland groundwater and soil COPCs with regards to their anticipated potential for migrating from groundwater to surface water. A groundwater COPC was designated as a possible surface water migrant if the maximum concentration exceeded the chronic ambient water quality criteria (chronic Ambient Water Quality Criteria (AWQC)) for saltwater in the USEPA's *Supplemental Guidance to Risk Assessment Guidance for Superfund: Region IV Bulletins, Ecological Risk Assessment*, (November 1995). Soil-to-sediment pathways also were addressed if storm water runoff traveled across a site and entered an open, unlined drainage feature or storm sewer, which ultimately discharged into a Zone J water body.

Under these conditions, surface soil concentrations at the site exceeding the USEPA's SSVs (November 1995) were considered a potential migration concern. Data gaps during this preliminary assessment included parameters without a valid chronic AWQC or SSV and AOCs/SWMUs lacking cross-media transport information.

The Part One report also presented a compilation of Zone J figures correlating the location of the AOCs/SWMUs identified as having potential migration pathways to the Zone J sediment sample locations with concentrations exceeding a particular SSV. This approach, however, was not intended to confirm any linkage between a CNC site and Zone J, but merely to provide a screening level evaluation of possible connections suggested by mutually detected contaminants.

General comments from reviewing agencies on the Part One report regarded the preparation of the document and the Navy's general approach, as well as specific comments evaluating the lines of evidence the Navy proposed for eliminating COPCs from further investigation. Several comments on the report regarded the need for the Zone J RFI to include a more in-depth evaluation of linkages

between CNC sites and Zone J, including a thorough evaluation of potential contaminant migration pathways. A clearer determination of Zone J reference concentrations was also requested along with calculation of mean ER-M quotients for the reference samples to better define baseline toxicity.

1.3 Current Status

Since the Navy's submittal of the 1997 Technical Memorandum and prior to the implementation of the evaluation, storm water effluent samples were collected as part of the Zone J RFI. Upland zone-specific investigations across CNC, however, have generated additional data for various AOCs/SWMUs, allowing for better source and contaminant migration pathway determination to be conducted. In September 2000, EnSafe and the Navy presented the migration pathway evaluation process to the BCT along with checklists desired to yield a more definitive assessment of potential contaminant migration pathways and the scope of work required to complete the next phase of the Zone J RFI.

After reviewing the findings of the upland RFIs and preliminary offshore sampling in Zone J, EnSafe began evaluating potential contaminant migration pathways from known AOCs/SWMUs to Zone J. After further refinement of the conceptual exposure model and completion of approximately half of the drainage basin evaluations, EnSafe and the Navy concluded that CNC storm water effluent data were required to produce a reasonably definitive evaluation of the migration pathway scenarios, particularly for contaminant transport via storm water drainage pipelines and effluent.

At the May 2001 BCT project team meeting, EnSafe presented the conceptual approach for collecting effluent samples from CNC and reference samples from non-point-source locations offsite. The approach was agreed upon by the project team, which decided that a scoping package would be presented to the BCT project team prior to submittal of the Point of Entry Effluent Sampling Work Plan to incorporate comments from the SCDHEC. The scoping package was presented at the August 2001 project team meeting where a consensus was reached that a number of reference locations should also come from areas on base that were not influenced by an AOC/SWMU, if possible.

Using detailed sewer system maps, aerial photographs, and site topography, the suspected paths of storm water runoff were traced from known AOCs/SWMUs to a particular Zone J discharge point/area. Analysis of effluent samples from these discharge points would determine if CNC-related contaminants are being transported to Zone J, and if so, would provide relevant data to identify potential source(s).

As a basis of comparison, effluents from several reference locations were also sampled to establish a baseline data set representative of non-Navy related inputs to Zone J or similar water bodies. As part of the Zone J SLERA, effluent concentrations will also be compared to recommended ecological screening concentrations for surface water. Effluent COPCs that exceed both the established reference concentration and the ecological benchmark will be retained for further evaluation and risk assessment during the remainder of the Zone J RFI.

The evaluation of CNC effluent is an interim phase of the Zone J RFI. The investigation will continue until sufficient data is obtained to determine whether COPCs are present from the other migration pathways, and if so, whether the COPCs can be attributed to a Navy source. Data will be used to characterize the associated impact to the receiving waters and potential receptors.

1.4 Overview of the Charleston Harbor/Cooper River Watershed

The Charleston Harbor, located in the central portion of South Carolina's coastline, is formed by the confluence of the Ashley, Cooper and Wando Rivers and their tributaries. Figure 1-2 shows the Charleston Harbor and identifies the major water bodies and other points of interest, including the location of the CNC. The harbor is the third largest estuarine drainage area in South Carolina. It comprises more than 26,000 hectares of coastal marshlands and open-water habitat. The Cooper River, Ashley River, Wando River, Town Creek and Shipyard Creek are major navigable waters forming the Charleston Harbor. Noisette Creek, Clouter Creek, Goose Creek, Plum Creek and other smaller creeks also feed into the Charleston Harbor system. The Atlantic Ocean entrance to the Charleston Harbor is shaped by barrier islands and the channel jetties. This section will provide a general description of the harbor and its surroundings as a whole, followed by information specific to

each of the major water bodies comprising the harbor. Information is provided on the hydrodynamic behavior of the rivers, engineering modifications impacting them, key industries that may impact the rivers and creeks, NPDES permits and violations, surrounding marinas and boat landings and the United States Army Corps of Engineers (USACE) permitted dredging activities.

1.4.1 The Charleston Harbor Estuary

As shown in Figure 1-2, the urban areas of Greater Charleston flank the majority of the harbor. Of the three rivers that form the Charleston Harbor Estuary, the Cooper River has the densest urban development and the largest number of industrial and port facilities. These urban areas and industrial facilities are located primarily on the western shore and include Naval Weapons Station Charleston, the former U. S. Navy Base (CNC), commercial facilities associated with the State Ports Authority (SPA), and numerous private companies. The Ashley River has the second largest number of industrial and commercial facilities, most of them located along its eastern shoreline. The Wando River presently has the least upland development compared to the other two rivers, except in its lower reaches. In that area on the eastern shore, the SPA maintains the Wando Terminal facility. Several residential communities are also present and/or being developed on the eastern shore.

Large dredged material disposal areas are located on southern tip of Daniel Island, on Drum Island and on Clouter Island. Some dredged materials have also been placed on the southern portion of the CNC, in Zone I. The USACE also maintains a large offshore disposal site of materials dredged from the Charleston Harbor.

The Charleston Harbor system provides habitat for both saltwater and freshwater organisms. Intertidal wetlands are found on the margins of the rivers and creeks forming the harbor and support a diverse population of flora and fauna, including more than 80 species of macrophytes, 580 planktonic taxa, and over 570 macroinvertebrate and finfish species (VanDolah et al., 1990). According to the SCDHEC, water quality for the harbor, including the Zone J water bodies, is rated "SB", which applies to tidal saltwaters suitable for primary and secondary contact recreation, crabbing, and fishing, except harvesting of clams, mussels, or oysters for market purposes or human

consumption, and suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora (SCDHEC Regulation 61-68).

The harbor supports large populations of commercially harvested white and brown shrimp and blue crab as well as important recreational species, including red drum, spotted sea trout, flounder, spot, Atlantic croaker, and catfish. Habitat types such as mud flats, Spartina marshes, and cattail marshes are found, especially at the southern end of the base. Palustrine forested wetlands were identified along Shipyard and Noisette Creeks. Most of the areas were identified as having some estuarine influence. Less pervasive wetland habitats found on the base include palustrine scrub-shrub and palustrine emergent wetlands.

1.4.2 Dynamics of the Charleston Harbor

The harbor estuary is a mixing zone where fresh water from upland areas flows into the sea and meets salt water. The twice-daily ebb and flow of the tides drive mixing of salt and fresh water, as well as the transport of sediments and potential pollutants discharged into the estuary. For the purposes of this study, it was important to determine the area where tidal mixing could disperse potential pollutants discharged from the CNC. Through hydrodynamic modeling, a tidal excursion zone was established for the Charleston Harbor (Ivan Chou, Environmental Consulting Technology, 1999). The net horizontal distance traversed by a hypothetical particle placed in the water at a point during a tide cycle of one flood tide and one ebb tide defines the tidal excursion zone for that point. The tidal excursion zone defines the areas in the harbor that could potentially be impacted by CNC discharges. Conversely, potential pollutants released into the excursion zone by other sources along the Ashley, Cooper and Wando Rivers, Shipyard Creek and Charleston Harbor can also impact the waters adjacent to the CNC.

Figure 1-2 shows yellow dashed lines indicating the upstream limits of tidal excursion zones for the rivers in the Charleston Harbor. A particle released into the Cooper River at the CNC at low tide can travel upstream for six hours, traveling about 4.5 miles to a point located between the U.S. Naval Weapons Station and the discharge point of Goose Creek. Similarly, a particle released at peak high

tide can travel downstream for six hours, reaching the entrance of the harbor. Additionally, a particle released at CNC at low tide can be transported about five miles into the Wando and Ashley Rivers by the tides. The tidal excursion zone extends up the Wando River toward the north side of Daniel Island and upstream on the Ashley River just north of the James Island connector and Highway 17. The tidal excursion zone also extends up the entire length of Shipyard Creek and Noisette Creek.

1.4.3 Development Impacting the Charleston Harbor/Cooper River

Industrial development has modified the hydrodynamics and environmental quality of the rivers comprising the Charleston Harbor Estuary to a significant extent. Prior to any engineering modifications, the Ashley, Cooper and Wando Rivers were relatively small tidal rivers with natural channels that were essentially self-maintaining. The Ashley River and the Wando River have been modified the least, primarily by dredging deeper channels in the lower reaches of the rivers, while the Cooper River has seen the most significant modifications of its natural state.

1.4.3.1 Cooper River Diversion/Rediversion Project

In 1942, the South Carolina Public Service Authority (SCPSA) completed the first diversion project of the Cooper River, which was to provide hydroelectric power to the Santee-Cooper area. This project involved construction of the Wilson Dam on the Santee River to form Lake Marion, construction of the Pinopolis Dam at the headwaters of the Cooper River to form Lake Moultrie, and construction of a 7.5-mile canal between the two lakes through which approximately 88% of the freshwater flow from the Santee River was directed to the Cooper River (Little, 1974a; Kjerfve, 1976; Kjerfve and Magill, 1990; USACE, 1975). Prior to this project, the Cooper River was a small tidal river with brackish water with a flow volume less than 417 feet^3 (ft) /second (s) (10 meters^3 (m) /s). This change increased the fresh water flow into the Cooper River to approximately 15,600 ft^3/sec (442 m^3/s) (Kjerfve, 1976) and reduced salinity in the harbor from 30.0 ppt to 16.8 ppt. Another consequence of this massive freshwater input was the change from a tidal circulation mode to a gravitational circulation mode with a stratified, partially mixed salinity structure.

Prior to 1942, dredging activities in the Cooper River were minimal. Gross annual maintenance dredging in the river channels of approximately 110,000 cubic yards (cy) was needed to maintain the 30 ft channel. However, with the change in the river's hydrodynamics, a significant increase in the sedimentation occurred in the Charleston Harbor, which led the USACE to expand dredging activities for the Cooper River area. Also, in 1988 the navigation channel was deepened from 9.1 meters (m) (30 ft) to 10.6 m (35 ft). The combined effects of the increased flow and the deeper channels resulted in greater landward transport of marine sands (Van Dolah, 1990), an increase in suspended sediment from upland sources, scour of river bed and banks, and the disruption of the estuarine hydrography. Due to greatly increased shoaling in the harbor system in the early 1960's as much as 10,000,000 cy had to be dredged per year. By 1982, 7,500,000 cy of sediment was being removed to maintain navigation channels, costing over $5 million a year.

To alleviate the shoaling problems attributed to the 1942 diversion project but still maintain the potential for hydroelectric power, the USACE completed the "Cooper River Rediversion Project" in August 1985. This project redirected approximately 70% of the water flow from the Cooper River back into the Santee River through a new 11.5-mile canal in the vicinity of St. Stephens, South Carolina. A new 84-megawatt capacity powerhouse on the rediversion canal was completed in 1985.

Since rediversion, the monthly mean flow into the Cooper River has been reduced to approximately 4500 ft^3/s. The USACE estimated shoaling to diminish by 40% to 70% after the rediversion project was complete. The net effects of the rediversion upon sedimentation were not expected to be evident for approximately 10 years (USACE, 1983).

Between 1985 and 1994 the USACE performed an analysis of the shoaling rates. This study consisted of conducting bank to bank depth profiles at 117 stations in the harbor and Cooper River and monitoring the dredging records during that period. Shoaling rates initially decreased approximately 71% compared to the 1982 baseline and maintenance dredging decreased 70%. However, after the Charleston Harbor and Cooper River channels were deepened in 1988, the amount of shoaling and the maintenance dredging increased somewhat. After the deepening project,

the shoaling rate was reduced 48% and maintenance dredging was reduced 57% from the 1982 baseline. These reductions are roughly in line with expectation for the rediversion project (USACE, March 1998).

1.4.3.2 Ports of Charleston

The Charleston Harbor is a modern transportation hub. Cargo shipped through Charleston's four state terminals disburses throughout the world. It is the second largest container port on the East and Gulf Coasts and the fourth largest in the nation. In 2001, the Port of Charleston SPA handled 1.5 million 20-ft. equivalent units of cargo, as well as 520,391 tons of bulk cargo and over 68,000 tons of grain with approximately 1,500 ships and barges passing through the port. Top commodities include automobiles and grains, food items and forest products, consumer goods and machinery, metals, chemicals and clay products. The harbor also handles significant volumes of petroleum products, coal, and iron ore at private terminals. The volume of cargo handled by the port has increased from 8 % to 15% annually in past years.

Projected growth for the port indicates that additional facilities will be needed. The SPA is planning a fifth container ship terminal to supplement the existing terminals. This terminal was planned for the southern end of Daniel Island and would have covered both the Cooper River and Wando River sides of lower Daniel Island. However, community support for this plan never developed and other alternatives are now being considered. The proposal that currently seems most widely supported is to locate the terminal on the southern portion of the CNC. Also, in late 2001, the United States Congress approved a study to evaluate the need to deepen the harbor channels beyond 45 ft. (Charleston Post and Courier, December 3, 2001). As these plans advance and as more and larger ships utilize the Charleston Harbor, additional channel enlargement projects involving dredging portions of the channel in and around the CNC will likely occur.

1.4.3.3 Charleston Naval Complex

When active, the former Charleston Navy Base was the Navy's third largest home port, supporting more than 70 surface vessels and submarines until 1996 when the base was officially closed. The

CNC currently supports a number of private and federal facilities that use the docks and piers such as Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., the United States Coast Guard (USCG), and the NOAA.

1.4.3.4 Naval Weapons Station

Naval Weapons Station Charleston, located north of the CNC, is currently an active federal installation and a homeport to the Maritime Prepositioning Force (MPF). The MPF is a self-sustained task force that can provide equipment and supplies for up to 17,000 Marine Corps personnel for 30 days. The MPF ships are typically similar in size to container ships that use the terminals at the SPA.

1.4.3.5 Urban/Industrial Development

Urban and industrial development in the Greater Charleston area impacts the Charleston Harbor water bodies through the discharge of treated sewage, industrial effluents and storm water carrying nonpoint source contaminants. The lower harbor section receives point source effluents from two large secondary sewage/wastewater treatment facilities, Plum Island and Mount Pleasant. Additionally, numerous active industrial facilities discharge industrial effluents and storm water as authorized by environmental permits. Other possible sources of pollution affecting the harbor include marina facilities and boat landings, waste and bilge water from ships and runoff from disposal areas for dredged materials.

National Pollutant Discharge Elimination System

In 1972, Congress passed amendments to the Federal Water Pollution Control Act (FWPCA), commonly known as the Clean Water Act (CWA), to prohibit the discharge of any pollutant to waters of the United States from a point source, unless the discharge is authorized by a NPDES permit. Under the NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. Early efforts to improve water quality under the NPDES program focused on reducing pollutants in discharges of industrial process wastewater and from municipal sewage treatment plants. In 1975, the SCDHEC Bureau of Water received authority

from the United States Environmental Protection Act to administer the NPDES Permit Program in South Carolina. The Bureau is responsible for the permitting, compliance, monitoring, and enforcement of the program, and NPDES permits are issued by the SCDHEC to a discharger pursuant to regulations for all point source discharges into surface waters.

The FWPCA Amendments contained four important principles:

- The discharge of pollutants to navigable waters is not a right.
- A discharge permit is required to use public resources for waste disposal and limits the amount of pollutants that may be discharged.
- Wastewater must be treated with the best treatment technology economically achievable, regardless of the condition of the receiving water.
- Effluent limits must be based on treatment technology performance, but more stringent limits may be imposed if the technology-based limits do not prevent violations of water quality standards in the receiving water.

In response to the need for comprehensive NPDES requirements for discharges of storm water, in 1990 Congress amended the CWA to require the USEPA to establish phased NPDES requirements for storm water discharges. The Phase I program addressed sources of storm water runoff that had the greatest potential to negatively impact water quality. The regulations require municipal separate storm water sewer systems (MS4s) located in municipalities of a population of 100,000 and greater and all categories of discharges associated with industrial activity to obtain storm water NPDES permits. Operators of the facilities, systems, and construction sites regulated under the Phase I NPDES Storm Water Program can obtain permit coverage under an individually-tailored NPDES permit (developed for MS4s and some industrial facilities) or a general NPDES permit (used by most operators of industrial facilities and construction sites).

According to the USEPA (*Guidance Manual for Preparations of NPDES Permit*, 1991), it is recognized that storm water runoff carries pollutants draining off streets and parking lots,

construction and industrial sites, and mining, logging, and agricultural areas. Through natural or manmade conveyances, the runoff is channeled into and transported by gravity flow through a wide variety of drainage facilities. Runoff may purge accumulated pollutants out of gutters, catch basins, storm sewers, and drainage channels. Runoff eventually ends up in surface waters such as creeks, rivers, estuaries, bays and oceans. Runoff from urban and industrial areas has been considered as a nonpoint source of pollution. However, most urban runoff is discharged through conveyances such as separate storm sewers or other conveyances and depending on the size of the municipality can be considered point sources under the CWA and are, therefore, subject to the NPDES program.

In 1999, Phase II of the storm water NPDES program was finalized and stated: construction activities disturbing between 1 and 5 acres of land (i.e., small construction activities) and municipalities with urbanized areas that have a population greater that 50,000 may be required to comply with the new regulations by March 2003. Under this new regulation, the cities of Charleston and North Charleston and the Town of Mount Pleasant, which are located within the Charleston Harbor estuary, may have to comply with the new program.

In addition to expanding the NPDES Storm water Program, the Phase II Final Rule revises the "no exposure" exclusion and the temporary exemption for certain industrial facilities under Phase I of the NPDES storm water program. The industrial facility or site can obtain a "No Exposure Certification for Exclusion from NPDES Storm water Permitting". If a discharger can certify that a condition of "no exposure" exists at the industrial facility or site, then NPDES permit coverage is not required for discharge of storm water associated with industrial activities identified at 40CFR 122.26(b)(14)(i)-(ix) and (xi).

South Carolina has about 1,200 active NPDES permits, and according to the SCDHEC in 2001, there were 29 permitted NPDES locations to the Cooper River watershed within the excursion zone: 15 to the Cooper River, two to Goose Creek, three to Filbin Creek, four to Shipyard Creek, three in the Charleston Harbor, and two to the Wando River. There was no information from the SCDHEC on any permitted NPDES locations for the Ashley River within the tidal excursion zone. Through the

Freedom of Information Act, the SCDHEC was contacted in order to receive a list of NPDES violations located within those areas. The SCDHEC provided a list of violations from January 1, 1996 to March 29, 2001, and the above NPDES permits reported the following list of parameters:

- Oil and Grease Freon
- Flow in Conduit
- pH
- Biological Oxygen Demand 5-Day
- Hexavalent Chromium
- Fecal Coliform
- Total Cyanide
- 48 Hour Acute Toxicity Test
- Total Suspended Solids
- Naphthalene
- Total Chromium
- Total Residual Chlorine
- Total Lead
- Water Temperature
- Ammonia-Nitrogen
- Dissolved Oxygen

Additional information regarding main industries and permit violations will be discussed in Sections 1.5 for the Cooper River/Charleston Harbor and its tributaries, 1.7 for the Wando River, and 1.8 for Shipyard Creek.

Nonpoint Source (NPS) Pollution Control

As defined in the 2002 Section 305(b) *Water Quality Assessment Report for South Carolina* (SCDHEC, Bureau of Water), NPS water pollution comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria-containing water from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest water body or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries and wetlands. Nonpoint source pollution may also impact groundwaters when it is allowed to seep or percolate into aquifers. The adverse effects of NPS pollution include: physical destruction of aquatic habitat, fish die-offs, interference with or elimination of recreational uses of a water body (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and

increased potential for flooding because water bodies become choked with sediment.

Nine categories of NPS pollution that impact South Carolina's waters are identified and described: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands disturbance, land disposal/groundwater impacts, and atmospheric deposition. Technology-based controls, or management measures, are employed to address these categorical impacts. The NPS control program describes specific management measures for each category as well as implementation schedules. South Carolina has the legal authority to implement all of the necessary management measures.

In South Carolina in 2002, 79% of rivers and streams, 83% of lakes and 81% of estuaries fully support aquatic life use. Additionally 58% of rivers and streams, 99% of lakes and 99% of estuaries fully support recreational use. The 2002 Section 305(b) *Water Quality Assessment Report for South Carolina* states that nonpoint sources, rather than point sources, are most responsible for partial support or nonattainment of classified uses. Shellfish waters are estuarine which require especially high water quality. In 2002, 65.9% of the total shellfishing waters were approved, 2.4% were conditionally approved while 18.5% were restricted and 13.2% were prohibited for shellfishing.

1.5 Cooper River

The Cooper River Watershed is located in Berkeley and Charleston counties and consists primarily of the Cooper River and its tributaries. This complex watershed extends approximately 50 miles from the Pinopolis Dam to the mouth of the Charleston Harbor and lies entirely within the Lower Coastal Plain and Coastal Zone region of South Carolina. Approximately 17 miles north of its junction with the Charleston Harbor, the Cooper River divides into two branches: West Branch Cooper River and East Branch Cooper River. The West Branch Cooper River is 17 miles long and is a meandering natural channel flanked by extensive tidal marshes, levees and old rice fields in various states of disrepair. The East Branch Cooper River is a 7.6 miles long tidal slough that flows from its headwaters in Hell Hole Bay to its junction with the West Branch Cooper River, commonly referred to as the "Tee". The water quality for the Cooper River is rated "SB" like the Charleston Harbor.

Within the excursion zone, the Cooper River receives flow from several creeks: Goose Creek, Filbin Creek, Noisette Creek, and Shipyard Creek. Shipyard and Noisette Creeks are Zone J waterbodies and will be discussed in detail in sections 1.8 and 1.9.

Filbin Creek is located in Charleston County. This watershed is unable to be used for recreational activities due to fecal coliform bacteria excursions, but aquatic life is fully supported. Goose Creek is located in Berkeley, Charleston, and Dorchester Counties. The headwaters are dammed into the Goose Creek Reservoir, which is used for recreation and water supply. Old Goose Creek drains into Goose Creek as do several ponds before it flows into the Cooper River. The entire watershed is within the boundaries of the U.S. Naval Weapons Station, Charleston. There are a total of 52.7 stream miles in this watershed and 2.7 square miles of estuarine areas.

The Cooper River, the largest Zone J water body, flows south past CNC with several areas of fringe wetland and salt marsh bordering the less industrialized northern and southern portions of the CNC. These sensitive wetland areas, some of which are quite expansive, are remnants of the marshland, which once occupied the entire CNC peninsula. Instead of a quay wall, riprap has been used to control erosion along the nonindustrialized portions of the CNC shoreline.

The Cooper River has the broadest concentration of industrial and port facilities among the three river networks forming the Charleston Harbor estuary. The majority of the facilities are positioned on the western shoreline and include: U.S. Navy port facilities, commercial facilities associated with the SPA, and private companies. To accommodate the ship traffic, a navigation channel is maintained by the USACE. The eastern shoreline of the Cooper River is largely undeveloped, although there are several large diked disposal areas along the length of the maintained channel (Clouter Island and Daniel Island).

Key Industries, Port Terminals, Recreation Areas (Boat Landings, Marinas)

Along the western shoreline of the Cooper River, several large industrial complexes and port terminals are located within the established excursion zone. Some of the major industries include

Westvaco/Sheppard Trucking, Amerada Hess, Detyens Shipyard, Allied Terminals/Charleston, Commissioner of Public Works (CPW) water treatment plants and the North Charleston Sewer District (NCSD)/Felix C. Davis Waste Water Treatment Plant (WWTP).

- Mead-Westvaco specializes in: packaging, coated and specialty papers, consumer and office products and specialty chemicals.

- Amerada Hess, a petroleum products company, ships and receives quantities of petroleum products from their terminal facilities.

- RM Engineered Products specializes in: automotive insulation, sealing products, braided packings, gasket sheets, insulation sleeving, thermal insulation, rubber sheet, missile insulation, ablative rubber, missel insulation, pump packings, valve packings, pump and valve packings, compression packings, exhaust insulation, insulation sleeving, abrasion resistant sleeving, insulation tape, silicone rubber, tadpole tape, door seals, gasket sheet, coated cloth, coated fabric, slit rubber, rocket motor insulation, aircraft seals, teflon, viton, fluorel, heat shields, fluid sealing, industrial textiles, neoprene, valve rings, hot gas seals, firewall, firewall seals, vee-rings, v-rings, firesleeving, fire sleeving, epdm rubber, high temperature, sleeving, tape, welding cloth, conveyor belting, asbestos substitute, asbestos replacement, aerospace, elastomers, stretch tape, stretchtape, fiberglass, exhaust, gasket fabricator, hostile environment protection, anti-corrosion, anti-heat, anti-cold, and flame retardant fabric.

- Equilon/Motiva has a lubricant plant located in Charleston. Motiva Enterprises refines and markets gasoline and other petroleum products under both the Shell and Texaco brand names in all or parts of 26 Eastern and Gulf Coast states and Washington, D.C. Motiva Commercial is a leading marketer of distillate fuels, petroleum coke, and sulfur. It offers a full range of diesel fuel and heating oil products at a network of terminals throughout the East Coast and Gulf Coast areas of the United States. Motiva Commercial also offers mobile fleet fueling.

- Koch companies are involved in trading, refining, asphalt, natural gas, gas liquids, chemicals, plastics, chemical technology equipment, minerals, fertilizers, ranching, and finance businesses, as well as a host of new, technology-oriented ventures. In Charleston, Koch maintains a materials refining company.

- Charleston Shipbuilders, Inc. subleases property along the water front of the former Navy Shipyard. Their operations included ship repairs, overhaul, and maintenance.

- Allied Terminals, Inc. is a bulk liquid terminal and tank storage industry. This facility has several large tanks for liquid storage (capacity 24,000 tons) and can unload up to 10 tank cars at a time on two railroad tracks with truck service available.

- The NCSD/Felix C. Davis WWTP is located near the mouth of the Cooper River.

- Romney Street Landfill is also located near the mouth of the Cooper River.

- Columbus Street Terminal is the SPA's largest terminal with 3,875 continuous feet of berth space located on the Charleston Peninsula. The terminal handles container, common breakbulk, bulk, rolling stock, heavy-lift, and project cargo.

- Union Pier Terminal is located on the Charleston Peninsula and has 2,470 continuous feet of berth space. The terminal is dedicated to breakbulk and Roll On/Roll Off (RO/RO) cargo.

- North Charleston Terminal is located north of CNC and has 2,500 feet of berth space and handles breakbulk and RO/RO cargo and one dedicated grain elevator berth.

In addition to the industrial areas, there are six public and private marina and boat landings with access to Cooper River. Table 1.1 below lists the marinas and boat landings to the Cooper River.

Table 1.1
Marinas and Boat Landings
with Access to the Cooper River

Marina/Boat Landing	Water Body Location	Within Excursion Zone?
Charleston Harbor Marina at Patriots Point	Cooper River	Yes
Charleston Maritime Center	Cooper River	Yes
Cooper River Marina	Cooper River	Yes
Virginia Avenue Park (a.k.a. Filbin Creek Boat Landing, Plymouth Park, Ralph M. Hendricks Park)	Filbin Creek	Yes
John R. Bettis Boat Landing	Goose Creek	Yes
Bushy Park, Dam #1 Boat Landing	Cooper River	No

NPDES Locations Discharging to the Charleston Harbor, Cooper River and its Tributaries

Within the excursion zone, there are 21 permitted NPDES locations on the Cooper River, six others on the tributaries to the Cooper River, and five NPDES locations to Charleston Harbor. Table 1.2 below lists the active NPDES permits for the Cooper River and its tributaries.

Table 1.2
Permitted NPDES Locations
Charleston Harbor, Cooper River and Tributaries

Industry/Company	Discharges To	Within the Excursion Zone?
City of Hanahan/ Berkeley County Water & Sanitation Authority	Goose Creek	Yes
Commissioner of Public Works (CPW) / Hanahan Water Treatment Plant (WTP)	Goose Creek	Yes
Allied Terminals	Cooper River	Yes
Westvaco	Cooper River	Yes
Amerada Hess/North	Cooper River	Yes
Amerada Hess/South	Cooper River	Yes
Equilon Lubricants	Cooper River	Yes
Koch Refining	Cooper River	Yes
U.S.Navy-CNC	Cooper River	Yes
RM Engineering Prod.	Cooper River	Yes

Table 1.2
Permitted NPDES Locations
Charleston Harbor, Cooper River and Tributaries

Industry/Company	Discharges To	Within the Excursion Zone?
NCSD/Felix C. Davis WWTP	Cooper River	Yes
Marathon Ashland	Filbin Creek	Yes
Defense Fuel Support Point Facility / Charleston	Filbin Creek	Yes
Westvaco Corp./Chas.	Filbin Creek	Yes
Charleston Shipbuilders, Inc.	Cooper River	Yes
U.S. Navy/Naval Weapons Station Charleston	Cooper River	Yes
Detyens Shipyard-Dry Dock#5	Cooper River	Yes
CPW/Daniel Island WWTP	Cooper River	Yes
Evening Post Publishing Co.	Cooper River Tributary	Yes
Bayer Corp. / Bushy Park	Cooper River	No
U.S. Navy/Weapons Station	Cooper River	No
E. I. Dupont/Cooper River	Cooper River	No
Jacobs Applied Technology, Inc.	Cooper River	No
Amoco Chemicals/Cooper River	Cooper River	No
BCW&SA/Lower Berkeley WTP	Cooper River	No
Nucor Steel/Berkeley Plant	Cooper River	No
Mt. Pleasant WTP #2	Charleston Harbor	Yes
Mt. Pleasant WTP #1	Charleston Harbor	Yes
Mt. Pleasant WTP #3	Charleston Harbor	Yes
Mt. Pleasant/Center Street	Charleston Harbor	Yes
CPW/Plum Island WWTP	Charleston Harbor	Yes

NPDES Permit Violations for the Charleston Harbor and Cooper River Estuary

Various pollution sources are affecting the Charleston Harbor system. Table 1.3 below lists the violations reported by the SCDHEC at the various locations within the excursion zone during the time period of January 1, 1996 through March 29, 2001.

Table 1.3
Permitted NPDES Locations with Violations within the CNC Excursion Zone of the Charleston Harbor and the Cooper River Estuary
Violation Dates: 01/01/96 to 03/29/01

Industry/Company	Discharges To	Violation Parameter	Number of Violations
Chevron Products	Cooper River	Oil and Grease Freon	10
Allied Terminals	Cooper River	Oil and Grease Freon	8
Westvaco	Cooper River	Flow in Conduit	14
		pH	2
		Total Suspended Solids	3
		BOD-5 Day	1
Amerada Hess/North	Cooper River	Naphthalene	2
Equilon Lubricants	Cooper River	Oil and Grease Freon	1
Koch Refining	Cooper River	Oil and Grease Freon	4
U.S. Navy-CNC	Cooper River	Oil and Grease Freon	2
		pH	1
		Total Suspended Solids	5
RM Engineering Prod.	Cooper River	Oil and Grease Freon	1
		pH	2
		Total Suspended Solids	6
		BOD-5 Day	4
NCSD/Felix C. Davis WWTP	Cooper River	Fecal Coliform	12
		Flow in Conduit	2
		48-Hour Acute	2
		pH	2
Mt. Pleasant WTP	Charleston Harbor	pH	1
Charleston Shipbuilders, Inc.	Cooper River	pH	4
		Total Suspended Solids	2
Detyens Shipyard-Dry Dock#5	Cooper River	Oil and Grease Freon	3
		pH	2
		Total Suspended Solids	11

Table 1.3
Permitted NPDES Locations with Violations within the CNC Excursion Zone of the Charleston Harbor and the Cooper River Estuary
Violation Dates: 01/01/96 to 03/29/01

Industry/Company	Discharges To	Violation Parameter	Number of Violations
CPW-Daniel Island WWTP	Cooper River	BOD-5 Day	2
		Fecal Coliform	8
		pH	1
		Flow in Conduit	3
		BOD-5 Day	5
		Dissolved Oxygen	4
		Ammonia-Nitrogen	4

1.6 Ashley River

The Ashley River flows approximately 31 miles from its headwaters in Cypress Swamp in Berkeley County to its junction with the Intracoastal Waterway on the south side of the Charleston Peninsula where it empties into the lower harbor basin. The river basin drains a 216 square-mile area of marsh and lowlands spread out over Berkeley and Charleston Counties. Depths of the natural channel in the river range from 5.9 feet to 36 feet and are influenced by tidal action throughout the river's entire length. Water quality in the Ashley River is rated "SA" throughout the study area. This rating applies to tidal salt waters suitable for aquatic life support and primary and secondary recreation, except harvesting clams, mussels, or oysters for human consumption. "SA" waters must maintain an average daily dissolved oxygen concentration of 5 milligrams per liter (mg/L) or higher and have median coliform concentrations of 200 colonies/100 ml or less.

The Ashley River has the second largest number of industrial and commercial facilities, which are located on the eastern shoreline. Much of the remaining upland areas on both sides of the river support residential developments.

The Ashley River was not affected by the rediversion project above its juncture with the harbor basin because it is not connected to the Cooper River at any point. The shoaling problems on the Cooper River are not experienced on the Ashley River; however, the tidal excursion zone for the Ashley River extends just north of Shipyard Creek on the Cooper River. Particles could be transported from the Ashley River to the Cooper River area during a tide cycle and vice versa.

Key Industries, Ports Terminals, Recreation Areas (Boat Landings, Marinas)

The Ashley River has the second largest number of industrial and commercial facilities, most of them located along the eastern shoreline. Much of the remaining upland area on both sides of the river supports residential developments. The river flows past Old Dorchester State Park, Middleton Gardens, Magnolia Garden and Charles Towne Landing State Park. It also receives flow from the Charleston U.S. Air Force Base and the Charleston Municipal Airport. Within the excursion zone, development consists of residential, light commercial and recreational facilities (marinas and boat landings). Table 1.4 below lists the marinas and boat landings with access to the Ashley River.

Table 1.4
Marinas and Boat Landings
with Access to the Ashley River

Marina/Boat Landing	Water Body Location	Within Excursion Zone?
Ashley Marina	Ashley River	Yes
Charleston Municipal Marina (City Marina)	Ashley River	Yes
Ripley's Light Marina	Ashley River	Yes
Country Farm Boat Landing	Ashley River	No
Dolphin Cove Marina	Ashley River	No
Duncan's Boat Harbor	Ashley River	No
Wando Woods Boat Landing	Ashley River	No
Pier Point Boat Landing	Church Creek	No
Riverland Terrance Boat Landing (aka, W. Lloyd Fleming Landing)	Elliot Cut	No
Wappoo Cut Boat Landing	Wappoo Cut	No

NPDES Locations

Three municipal sources (Town of Summerville, Charleston CPW, Dorchester Public Works), the Middleton Inn, and four industrial are located on the Ashley River, none of which fall within the excursion zone.

1.7 Wando River

The Wando River flows approximately 24 miles from its headwaters in Iron (I'on) Swamp in Charleston County to its junction with the Cooper River on the north side of the Charleston Peninsula. The river basin drains a 194 square mile area of marsh and lowlands, and its depth ranges from 5 ft to 42 ft within its natural channel. The Wando River is influenced by tidal action throughout its entire length, and estuarine waters extend into the creeks, which form the upper limits of this river. Water quality in the Wando River was recently upgraded to "SA" above the Wando Terminal. This rating applies to tidal salt waters suitable for aquatic life support and primary and secondary recreation, except harvesting clams, mussels, or oysters for human consumption. "SA" waters must maintain an average daily dissolved oxygen concentration of 5 mg/L or higher and have median coliform concentrations of 200 colonies/100 ml or less. Water quality in the lower portion of the Wando River is rated "SB" with daily average dissolved oxygen concentrations at 4 mg/L or greater. At the base of the watershed near the Town of Mount Pleasant, Hobcaw Creek (Lake Woodlawn) and Molasses Creek enter the Wando River. The water quality rating for these creeks is "SFH". "SFH" waters must maintain a daily dissolved oxygen concentration of 5 mg/L and have median fecal coliform concentrations of 14 colonies/100 ml or less. Mostly residential and some minor industrial areas discharge to Hobcaw and Molasses Creeks.

The Wando River has the least number of upland developments. Its lower reaches support a port terminal, but the majority remains residential communities with some recreational uses. The Wando River was minimally affected by the rediversion project of the Cooper River; however, its hydrography is greatly influenced by the Cooper River as a result of mixing at the confluence of these two rivers and from Beresford Creek.

Key Industrials, Port Terminals, Recreation Areas (Boat Landings, Marinas)

This river presently has the least upland development compared to the other two river systems, except in its lower reaches. In that area, the SPA maintains the Wando Terminal Facility, which is located on the eastern shoreline and has 3,800 continuous feet of berth space. The Wando Terminal is the port's largest terminal in terms of volume and physical size. Several residential developments also exist, which are either already present or being developed on this shoreline. Large diked disposal areas are located on Daniel Island, which forms the western shoreline of the Wando River. The only other industrial facility on this river is Detyens Shipyard located in Cainhoy beyond the excursion zone upper limits. Table 1.5 below lists the marinas and boat landings with access to the Wando River.

Table 1.5
Marinas and Boat Landings
with Access to the Wando River

Marina/Boat Landing	Water Body Location	Within Excursion Zone?
Hobcaw View Marina	Hobcaw Creek	Yes
Remley's Point Boat Landing	Wando River	Yes
Daniel Island Marina	Wando River	Yes
Paradise Island Boat Landing	Wando River	No
Halsey Cannon Boatyard	Wando River	No

NPDES Locations

Table 1.6 below lists the two active NPDES permits located on the Wando River, and both are minor industrial effluent discharges. Molasses Creek, a tributary to the Wando River, receives discharge from the NPDES permit for Cooper Hall Retirement facility's heating, ventilating and air-conditioning (HVAC) system. This is the only permitted location within the excursion zone. The other permit is for Detyens Shipyard in Cainhoy, which is located beyond the boundaries of the excursion zone for the Wando River.

Table 1.6
Permitted NPDES Locations
Wando River and Tributaries

Industry/Company	Discharges To	Within Excursion Zone?
Cooper Hall Retirement	Molasses Creek	Yes
Detyens Shipyard/Wando Yard	Wando River	No

1.8 Shipyard Creek

Shipyard Creek is a 61-acre drainage creek that discharges to the lower Cooper River. The southwestern property boundary of CNC is bordered by the eastern shoreline of Shipyard Creek. Several industrial sites border the western shoreline of Shipyard Creek. The water quality within Shipyard Creek is "SB".

The estuarine intertidal and subtidal marsh habitat along the shorelines of this half-mile creek is as large as the open water habitat with areas of unconsolidated shore and bottom. Marsh vegetation is typical for the area and consists primarily of cordgrass (*Spartina* spp.). The mudflats and scrub-shrub vegetation of the wetland and intertidal zone provide foraging habitat for numerous avian species, including northern harriers (*Circus cyaneus*), black-crowned night herons (*Nycticorax nycticorax*), marsh wrens (*Cistothorus palustris*), egrets (*Egretta* spp.), white ibis (*Eudocimus albus*), as well as fiddler crabs (*Uca* spp.).

Along the creek are several points of tidal conveyance to and from onshore wetlands and drainageways at CNC. Fewer such areas were present on the opposite shore. The southern wetlands were also less widespread due to the construction of the shipyard and several industrial piers.

In addition to the cordgrass wetland within the creek, riparian vegetation is present along both shorelines, including southern hackberry, mulberry, wax myrtle, and tallowtrees. Wildlife observed in or near the creek during site visits included numerous wading birds, such as green-backed heron, snowy egret, and great blue heron. Seagulls, brown pelicans, kingfisher, red-tailed hawks, and osprey also forage in the open waters and nest in surrounding treetops. Boat-tailed grackle and red-

wing blackbirds forage throughout the wetland vegetation. Small fish and turtles were seen in the open water portions, and fiddler crabs were abundant in the wetland mudflats during low tide. Mammals such as muskrats, river otters, marsh rabbits, raccoons, and opossums also forage amidst the riparian areas.

Key Industries, Port Terminals, Recreation Areas (Boat Landings, Marinas)

Shipyard Creek has several large industrial facilities and several recreational docks located on its waters. The CNC comprises the eastern shore line. Portions of Zones G, H, and I drain to the creek. Currently there is a marina located at the southern most tip of the CNC where Shipyard Creek and the Cooper River converge. Along the western shoreline of Shipyard Creek, Macalloy and Foster Wheeler are the major industrial facilities. Other industrial businesses include Chevron Products and Kinder Morgan Bulk Terminal.

- The Macalloy Corporation facility is situated on 125 acres at the headwaters of Shipyard Creek. Surface water runoff from the Macalloy facility enters Shipyard Creek. The ferro-chrome manufacturing facility was operated continuously by various owners from 1941 until 1998 when alloy production ceased. The wastes generated from the facility during the ferro-chrome manufacturing process include the following: chromium; arsenic; lead; barium; manganese; mercury; and zinc.

- Foster Wheeler Resource Recovery Plant, the largest incinerator of municipal solid waste in South Carolina, began providing the former Charleston Naval Shipyard with the majority of its process steam in 1989 until the shipyard closed in 1996.

- Chevron Products Co. operates a lubrication plant located along the western shore of Shipyard Creek. The plant is a part of the Chevron/Texaco Corporation. The Charleston Plant produces lubricants with additives.

- Kinder Morgan Bulk Terminal, known locally as Shipyard River Terminal (SRT), is a dry and liquid bulk products terminal, including coal and petroleum coke. Product can be handled from truck to rail to storage to ship or from ship to storage to truck to rail. The annual capacity for this location is 2,500,000 tons with a design system rate of 2,500 tons/hour for coal and petroleum coke. Storage consists of 250,000 tons open and 50,000 tons covered storage. SRT was modified for the transfer of cement for a dedicated customer. Product is transferred from oceangoing vessels to storage at an average rate of 7,000 tons per weather working day and transfer of product from storage to rail cars or trucks at an average rate of 200 tons per hour per loading spout. The annual capacity for cement will be approximately 1,500,000 tons. Two storage domes were constructed to store the cement.

In addition to the industrial areas, the Cooper River Marina is located at the confluence of the Cooper River and Shipyard Creek.

NPDES Locations Discharging to Shipyard Creek

Table 1.7 below lists the four permitted NPDES locations on Shipyard Creek, which are industrial discharges.

Table 1.7
Permitted NPDES Locations
Shipyard Creek

Industry/Company	Discharges To	Within the Excursion Zone?
Chevron Products	Shipyard Creek	Yes
Macalloy Corporation	Shipyard Creek	Yes
Kinder Morgan Bulk Terminal	Shipyard Creek	Yes
Foster Wheeler Resource Recovery	Shipyard Creek	Yes

NPDES Permit Violations for Shipyard Creek

Three locations on Shipyard Creek have reported permitted NPDES violations from January 1, 1996 through March 29, 2001. Table 1.8 below lists the violations.

Table 1.8
Permitted NPDES Locations with Violations
Shipyard Creek
Violation dates: 01/01/96 to 03/29/01

Industry/Company	Discharges To	Violation Parameter	Number of Violations
Chevron Products	Shipyard Creek	Oil and Grease Freon	10
Foster Wheeler	Shipyard Creek	Oil and Grease Freon	4
		pH	4
		Water Temperature	4
		Total Suspended Solids	1
Macalloy	Shipyard Creek	pH	45
		Hexavalent Chromium	86
		Total Chromium	**25**
		Oil and Grease Freon	2
		Fecal Coliform	4
		Total Suspended Solids	45
		Total Residue Chlorine	8
		Total Cyanide	**5**
		Total Lead	**14**

1.9 Noisette Creek

Noisette Creek is a small, tidally influenced tributary that flows eastward through the CNC's abandoned golf course to the Cooper River. It is not a navigable water body and is not dredged. A small pond and several acres of wetlands are associated with the creek. According to base drainage maps, Noisette Creek receives surface and storm water runoff from the golf course as well as off-base properties and roadways upstream in North Charleston.

Vegetation in the riparian zone along both banks is dominated by southern hackberry trees and wax myrtle, with fewer specimens of live oak (*Quercus virginiana*), privet (*Ligustrum sp.*), eastern red cedar (*Juniperus silicicola*), yaupon (*Ilex vomitoria*), saw palmetto (*Serenoa repens*), mulberry

(*Morus sp.*), chokecherry (*Prunus virginiana*), french tamarisk (*Tamarix gallica*), and black willow trees. The wetland vegetation is typical of estuarine emergent habitats with smooth cordgrass, black needlerush, and cattail. Bird species observed include barn swallow, white egret, red-wing blackbird, osprey, and pied-billed grebe (*Podilymbus podiceps*). Raccoon tracks were also observed along the muddy shoreline. Pilings beneath the bridges accommodated numerous clusters of remnant oyster shells.

Noisette Creek is heavily influenced by the tides with several undercut areas along the bank where tidal flow has accelerated erosion. The banks are on average 3 to 6 feet above the water depending on the tide. High tides occasionally combine with heavy rains to cause the tidal creek to spill over banks and flood portions of the surrounding golf course. The brackish water in the creek is often turbid and the creek bottom visible only at its confluence with the Cooper River and then only at low tide. Visible substrate within the creek consists of marl, gravel, and muck with some detritus and debris.

Both the National Wetland Inventory and the Final Environmental Impact Statement (FEIS) (1995) indicate that several wetland types are associated with Noisette Creek: estuarine subtidal, estuarine intertidal, and palustrine forested. The subtidal wetlands consist of the open-water, nonvegetated portion of Noisette Creek that remains submerged at low tide. This wetland type has been classified as having unconsolidated bottom substrate (FEIS 1995). The intertidal wetland consists of the frequently flooded marshes and mud flats on the margins of Noisette Creek. The near-shore areas within these wetlands support dense stands of halophytic vegetation including smooth cordgrass (*Spartina alterniflora*) with patches of saltmeadow cordgrass (*Spartina patens*) and black needlerush (*Juncus roemerianus*).

An area at the mouth of Noisette Creek has been identified as a palustrine forested wetland. This area abuts frequently flooded Spartina marsh and is dominated by willow and oak. Estuarine influence in this tidal drainage is indicated by the high number of periwinkle and snail shells on the ground. Little herbaceous vegetation is present, indicating extended inundation. A defined drainage

channel is also present. Information regarding physical attributes, such as mean depth, was not determined during the preliminary basewide habitat and biota survey.

1.10 Charleston Harbor and Cooper River Dredging

The shipping channels of the Charleston Harbor and the Cooper River have been dredged periodically since colonial times. Since World War II, the Cooper River Diversion project and the activity of both the commercial and naval port facilities have resulted in much more frequent and extensive dredging in the Charleston Harbor, the Cooper River, Wando River, Town Creek and Shipyard Creek. It is important to describe dredging activities as thoroughly as possible to support future Contaminant Fate and Transport evaluations. Many of the contaminants discharged to the Charleston Harbor system ultimately become bound to solid particles of clay or sand and are deposited as sediment in the Zone J water bodies. Dredging activities in the Charleston Harbor Channel system have a major impact on the transport and fate of these contaminants.

For the purposes of this evaluation, dredging activities conducted from 1985 to the present are the primary focus. The USACE permit system provides good records for this time period and covers the USACE harbor enlargement projects, maintenance dredging by the USACE and other miscellaneous dredging projects conducted by the U.S. Navy, the Redevelopment Authority (RDA), and other commercial and private entities. For this study, a thorough search was made of the USACE permit records and other data provided by the USACE. This data presented here, although probably not all inclusive, shows the location, frequency and extent of recent major dredging activities which affect the Charleston Harbor in general and the Cooper River, Shipyard Creek.

<u>Harbor Enlargement Projects:</u>

The USACE constructed the harbor's navigation channels, turning basins, and access channels. The main channels are from 200 to 800 feet wide and extend approximately 16 miles up the Cooper River with extension channels serving users on the Wando River, Shipyard Creek, and Town Creek. Figure 1-3 shows the current harbor ship channels.

Major enlargements or expansions of the harbor channel system have occurred in the past and are planned in the future. These projects involve removal of sediments from all areas, over the entire length of the channel system shown in Figure 1-3. Deepening of the main channel to a project depth of 40 feet was started in 1986 and completed in 1991. The deepening of the Wando River Extension was completed in 1994 and Shipyard Creek in 1996. Engineering studies of the Charleston Harbor found the design of existing channels inadequate to accommodate the dramatic changes in Charleston's vessel fleet and the rapid growth of commodity traffic that have occurred during the last decade. The volume of containerized cargo shipped through Charleston has increased from 8% to 15% annually, greatly exceeding all projections. Container ships now using the harbor are much larger than in the past, requiring wider, deeper channels and longer turning radii at bends in the rivers. For these reasons, a study to determine the feasibility of improving navigation in Charleston Harbor was completed in February 1996.

The recommended plan called for deepening the harbor's main channels from 40 feet to 45 feet with a 2 foot overage. The plan also provided for removal of the existing contraction dike at the southern tip of Daniel Island, deepening 16.3 miles of the Cooper River channel to 45 feet, deepening of interior channels and turning basins to 45 feet, realigning the channel in the Shutes Folly reach in the lower harbor, reducing the Town Creek Channel from the Cooper River bridges to Myers Bend to a depth of 16 feet and a width of 250 feet, widening the Daniel Island Reach of the Cooper River to 875 feet at Myers Bend and tapering to a width of 600 feet at Daniel Island Bend. Additions of a contraction dike just north of Shipyard Creek and restoration of the two existing contraction dikes were also planned.

Implementation of this project began in March 1999 with the award of a contract to deepen the ocean entrance of the main channel. This work was completed in 2001. The lower harbor channels, downstream from the Cooper River Bridges, were deepened and realigned between July 1999 and June 2001. The widening of the Daniel Island Reach was accomplished between November 1999 and September 2000. Dredging of Shipyard Creek was completed in May 2002. Future work planned under this phase of harbor enlargement includes dredging the upper harbor channels in 2003

and 2004. These dredging activities are detailed in Table 1-9.

Table 1.9
Charleston Harbor Enlargement Dredging
Charleston Harbor, Cooper River, Wando River and Shipyard Creek

Reach	Date Completed	Cubic Yards	Channel Depth (ft)	Disposal Site
Ocean entrance - main channel	Sept-01	9,738,000	47	ODMDS
Ocean entrance -main channel	Sept-01	1,734,000	47	Daniel Island
Lower Harbor – channels below bridges	June-01	9,931,178	47	ODMDS
Lower Harbor – channels below bridges	June-01	902,000	47	Daniel Island
Daniel Island Reach	Sept-00	2,194,000	47	ODMDS
Shipyard Creek	May-02	1,500,000	47	Clouter Island
Wando River	May-02	3,100,000	47	Clouter Island
Upper Harbor –channels above bridges	Planned-03	3,600,000	47	Clouter Island
Upper Harbor –channels above bridges	Planned-04	2,400,000	47	Clouter Island

Notes:
ODMDS = Ocean Dredge Material Disposal Site

The SPA is planning a fifth container ship terminal to supplement the existing terminals. The proposal that currently seems most widely supported is to locate the terminal on the southern portion of the CNC. Also, in late 2001, the United States Congress approved a study to evaluate the need to deepen the harbor channels beyond 45 ft (Charleston Post and Courier, December 3, 2001). As these plans advance, and as more and larger ships utilize the Charleston Harbor, additional channel enlargement dredging projects could take place. Removal of the existing finger piers and construction of quays and turning basins for a terminal on the southern portion of the CNC will result in removal of large amounts of sediment for the area around the CNC.

Harbor Maintenance and Miscellaneous Dredging:

The USACE also conducts periodic maintenance dredging of shoaling areas within the harbor channels. Dredging of shoals is conducted on an as-needed basis. The primary areas where shoaling

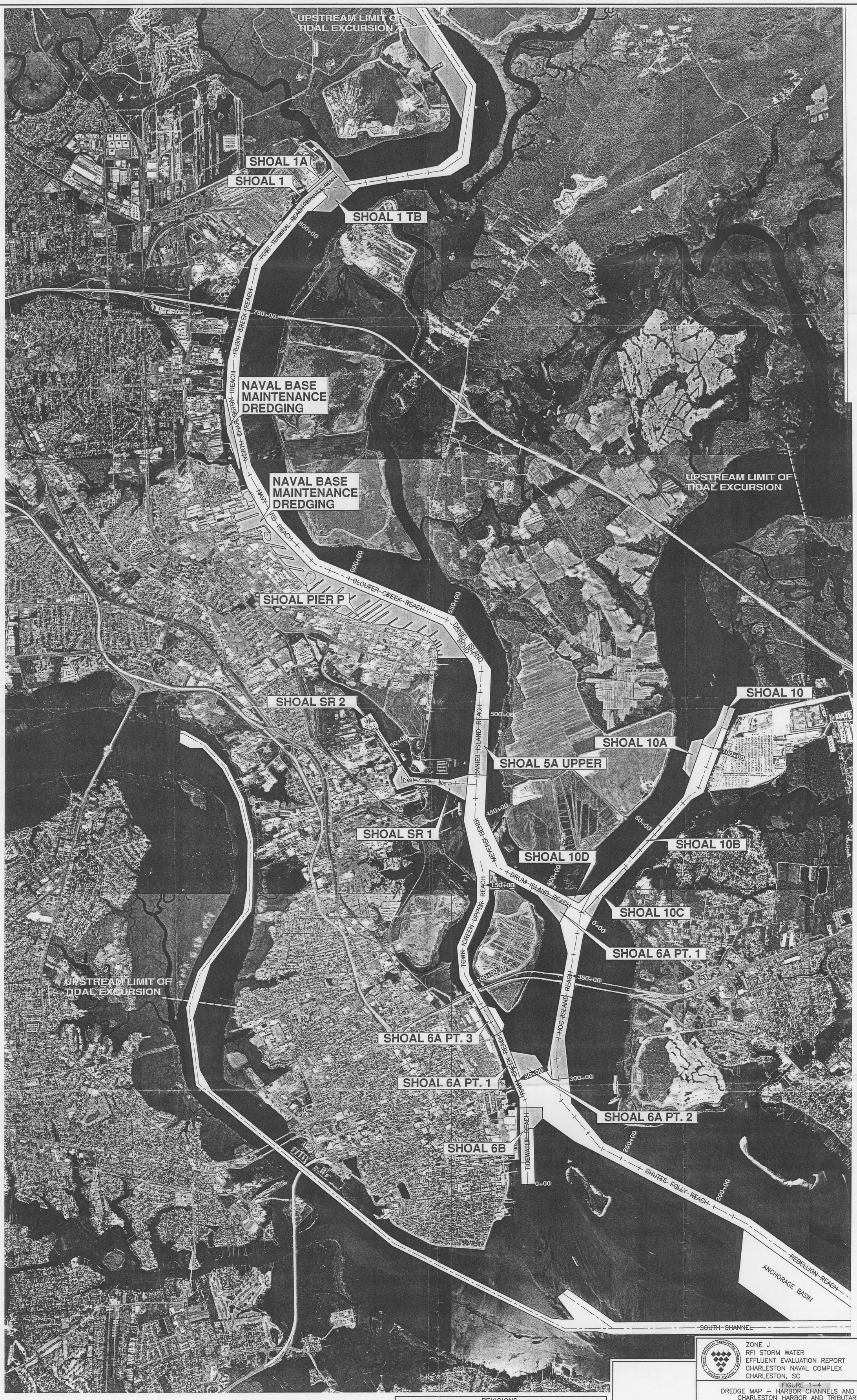
has typically been a problem are shown in green on Figure 1-4. The shoal number identifies these areas. Table 1.10 below provides the dredging dates and the volume of material removed from each shoal in the USACE maintenance dredging projects. The depth of sediment materials removed during maintenance dredging varies across the length and width of the channel shoal area. Typically 1 to 4 feet of sediment is removed on the average; however, at some points the depth of removal may be significantly greater. If it was provided in the USACE data, the disposal area used for the spoils is also given.

Table 1.10
Maintenance Dredging
Charleston Harbor and Cooper River

Shoal Number	River Station	Reach	Date Completed	Cubic Yards	Channel Depth (ft)	Disposal Site
Cooper River						
6	548+90 TO 617+11	Clouter Creek	10-Aug-91	304,947	43	Daniel Island
1 A	804+00 TO 828+91	Ordnance Reach	27-Oct-99	162,243	46	Clouter Island
1 A	807+70 TO 828+91	Ordnance Reach	27-Oct-99	297,510	46	Clouter Island
1 A	812+90 TO 828+91	Ordnance Reach Dock	15-Nov-99	44,331	46	Clouter Island
1	804+00 TO 828+91	Ordnance Reach	11-Aug-98	215,052	46	Clouter Island
1	807+70 TO 828+91	Ordnance Reach Turning Basin	16-Jul-98	337,321	46	Clouter Island
1 A	812+90 TO 828+91	Ordnance Reach Dock	11-Aug-98	45,917	42	Clouter Island
1	804+00 TO 828+91	Ordnance Reach Turning Basin	9-Dec-96	735,617	44	Clouter Island
1 A	812+90 TO 828+91	Ordnance Reach Dock	9-Dec-96	57,259	42	Clouter Island
1	805+00 TO 828+91	Ordnance Reach	2-Mar-95	557,001	Not Listed	Clouter Island
1 A	812+90 TO 828+91	Ordnance Reach Dock	27-Feb-95	49,401	42	Clouter Island
1	805+00 TO 828+91	Ordnance Reach	30-Oct-92	152,176	44	Clouter Island
2	809+42 TO828+91	Ordnance Reach Turning Basin	30-Oct-92	210,126	44	Clouter Island
1	800+00 TO 831+83	Ordnance Reach	8-Feb-88	145,699	40	Yellow House

Table 1.10
Maintenance Dredging
Charleston Harbor and Cooper River

Shoal Number	River Station	Reach	Date Completed	Cubic Yards	Channel Depth (ft)	Disposal Site
2	809+07 TO 826+50	Ordnance Reach Turning Basin	3-Mar-88	55,956	39	Yellow House
1 A	774+00 TO 788+00	Port Terminal	8-Mar-88	34,538	39	Yellow House
4	644+00 TO 671+26	Navy Yard	28-Sep-87	132,214	39	Clouter Creek Highway
4	652+00 TO 668+00	Navy Yard.	14-Oct-92	61,326	44	Clouter Island
5 A	468+00 TO 496+00	Daniel Island	7-Nov-87	180,290	39	Daniel W.
5 AL	447+00 TO 458+00	Daniel Island 1	29-May-91	18,913	43	Daniel W.
5 AL	468+00 TO 500+00	Daniel Island 2	17-Jun-91	335,547	43	Daniel W.
5 AL	470+00 TO 500+00	Daniel Island Bend	3-Oct-85	167,077	42	Not provided
5	500+00 TO 548+90	Daniel Island 3 and Daniel Island Bend	10-Aug-91	118,707	43	Daniel W.
6	388+02 TO 408+00	Drum Island	22-Oct-87	127,043	39	Daniel Island
6 C	310+00 TO 340+00	Drum Island	20-Oct-87	152,366	39	Daniel Island
6 Pt 1	388+00 TO 405+00	Drum Island	31-Oct-94	159,126	44	Daniel Isl. Wando Cell
6 Pt 1	388+00 TO 404+00	Drum Island	15-Nov-93	183,031	44	Daniel Isl. Wando Cell
6	388+00 TO 425+00	Drum Island	3-Oct-85	256,874	40	Not provided
6 C	304+00 TO 356+00	Drum Island	27-Aug-85	496,583	40	Not provided
Town Creek						
6 A	24+00 TO 72+00	Town Creek	30JULY87	347,232	40	Daniel Island
6 A	45+00 TO 86+00	Town Creek	15-Nov-85	573,445	39	Not provided
6 A	52+00 TO 67+00	Town Creek	15-Nov-85	112,811	39	Not provided



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Naval Facilities Engineering Command · Southern Division

ZONE J
RFI STORM WATER
EFFLUENT EVALUATION REPORT
CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

FIGURE 1-4
DREDGE MAP – HARBOR CHANNELS AND SHOALS
CHARLESTON HARBOR AND TRIBUTARIES
NEAR CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

Dr by: W. FAULK		Tr by: –	
Ck by: H. FELLERS		Appr by: C. VERNOY	Sheet 1
Date: 09/24/02		DWG Name: 0154C007	Of 1

Additionally, the USACE, the U.S. Navy, and later the CNC RDA conducted maintenance dredging of the areas between the CNC piers and the channel. A 10-year dredging permit, P/N 85-4D-324, was issued to the Navy in March 1986. This permit allowed the Navy to perform dredging, with estimated annual removal of 3,525,000 CY from the area around the piers and out to the channel. The authorized depth was 30 to 35 feet. Most of the piers were dredged annually; however, piers F - J were dredged up to three times a year. Figure 1-5 shows the dredge areas around the CNC piers and out to the main channel. Records from 1994, the last year the CNC operated, are presented in Table 1.11. This permit also allowed the Navy to dredge some portions of Goose Creek and the Cooper River above Goose Creek adjacent to the Naval Weapons Stations. Removal of 1,500,000 CY of sediment annually was anticipated in these areas.

Table 1.11
Maintenance Dredging: Charleston Naval Complex Piers

Pier	Stations	Date	Cubic Yards Dredged	Channel Depth (ft)	Disposal Area
N TO P	4+10 TO 0+00	29-Oct-86	137,732	37	Yellow House
T NORTH	0+25 TO 2+35	25-Oct-86	49,406	32	Not provided
S NORTH	0+00 TO 2+75	2-Dec-86	91,434	32	Not provided
S SOUTH	2+35 TO 4+95	25-Oct-86	66,407	32	Not provided
T SOUTH	2+45 TO 4+90	18-Nov-86	56,234	32	Not provided
U NORTH	0+25 TO 2+45	18-Nov-86	68,454	32	Not provided
U SOUTH	1+40 TO 3+00	25-Nov-86	50,977	32	Not provided
M TO N	0+00 TO 5+30	6-Nov-86	145,014	37	Not provided
C AND D	Not Applicable	2-Nov-87	27,091	35	Clouter Island
D-F	Not Applicable	18-Jan-94	89,722	35	Not provided
4	Not Applicable	14-Feb-94	15,822	35	Not provided
K North	Not Applicable	14-Feb-94	20,615	35	Not provided
Z	Not Applicable	14-Feb-94	29,250	35	Not provided
M	Not Applicable	14-Feb-94	50,925	35	Not provided
Z	Not Applicable	17-Mar-94	31,000	35	Not provided
P-Q	Not Applicable	17-Mar-94	101,475	35	Not provided
R	Not Applicable	17-Mar-94	33,703	35	Not provided
G	Not Applicable	19-Apr-94	58,000	35	Not provided
K South	Not Applicable	19-Apr-94	30,000	35	Not provided
Q	Not Applicable	19-Apr-94	30,000	35	Not provided
C-D	Not Applicable	23-May-94	90,500	35	Not provided

Table 1.11
Maintenance Dredging: Charleston Naval Complex Piers

Pier	Stations	Date	Cubic Yards Dredged	Channel Depth (ft)	Disposal Area
N-P	Not Applicable	15-Jun-94	70,370	35	Not provided
Z-M	Not Applicable	18-Jul-94	31,481	35	Not provided
N-P	Not Applicable	18-Jul-94	21,296	35	Not provided
L-Z	Not Applicable	15-Aug-94	40,000	35	Not provided
M	Not Applicable	15-Aug-94	29,166	35	Not provided
P-Q	Not Applicable	15-Sep-94	52,500	35	Not provided
R North	Not Applicable	17-Oct-94	25,185	35	Not provided
R South	Not Applicable	17-Oct-94	17,777	25	Not provided
K	Not Applicable	9-Nov-94	20,833	36	Not provided
K South	Not Applicable	9-Nov-94	10,370	36	Not provided
5-G	Not Applicable	19-Dec-94	30,851	35	Not provided

The RDA was issued a 10-year permit, P/N 98-1T-219-P, to continue the dredging around the CNC piers with an annual removal of up to 3,525,000 CY of sediment. Dredging has been conducted under this permit in the last several years; however, the area around the piers is reportedly not being dredged as often as it was while the CNC was in operation and much sediment has accumulated over the past few years. Pier P has been dredged three times since 1998. Approximately 240,000 CY were removed each time. Two areas around the dry docks under the control of Detyens Shipyard have been dredged once in this time period. A total of approximately 170,000 CY was removed from the two areas. The areas around piers controlled by Charleston International Ports have been dredged twice, and approximately 120,000CY was removed each time. (Personal communication, June 26, 2002, Mr. Ham Johnson, Marinex Corporation)

Due to the proximity of these channel renovations and periodic dredging projects to the CNC, it is likely that the physical and chemical properties of sediments in the Zone J water bodies have been, and will continue to be, significantly altered.

Ashley River Dredging

The Ashley River channel ranges in depth from 19 ft at the south channel entrance to the harbor, to 14 ft at the upper end of the channel. The channel is primarily for intercoastal navigation and pleasure boating. Large commercial ships do not use the Ashley River channel. The channel is largely stable and is rarely dredged. The last dredging by the USACE was in 1940.

Wando River Dredge Maintenance

As part of the 1996 harbor enlargement project discussed above, the USACE deepened the Wando River channel to 45 ft in 2002. Approximately 3,100,000 cy were removed. Figure 1-3, Figure 1-4 and Table 1.12 provide information on maintenance dredging activities in the Wando River. A dredge spoil area is located on the southern most portion of Daniel Island located at the mouth of the Wando River. The USACE conducts maintenance dredging of shoaling areas when needed. The South Carolina SPA conducts its own maintenance dredging for the Wando Terminal and its turning basin on an as-needed basis.

Table 1.12
Maintenance Dredging: Wando River

River Station	Reach	Date Completed	Cubic Yards	Channel Depth (FT)	Disposal Site
86+56 TO 106+72	Wando Turning Basin	2-Apr-98	240,923	46	Not provided
114+50 TO 125+00	Wando Extension	24-Mar-98	167,928	44	Not provided
86+56 TO 106+72	Wando Turning Basin	29-Apr-96	293,547	46	Daniel Island Wando Cell
109+20 TO 125+00	Wando Extension	14-May-96	274,357	44	Daniel Island Wando Cell
88+10 TO 105+80	Wando Turning Basin	7-Jan-91	174,854	42	Daniel Island Middle Cell
9+00 TO 30+00	Wando Entrance	7-Jan-91	126,819	42	Daniel Island Middle Cell
14+45 TO 27+00	Wando River	15-Apr-88	45,745	39	Daniel Island
88+50 TO 107+25	Wando Turning Basin	15-Apr-88	150,967	37	Daniel Island
106+50 TO 110+00	Wando Extension	7-Mar-88	31,302	37	Daniel Island
34+00 TO 60+00	Wando River	31-Mar-88	83,610	39	Daniel Island

Shipyard Creek Dredging Maintenance

The downstream portion of Shipyard Creek is considered a navigable water body, maintained to an USACE-authorized depth of 45 ft below mean-low water level to give large ships access. This dredging was completed in May 2002 as part of the harbor enlargement project. Figure 1-3, Figure 1-4 and Table 1.13 below provide information on harbor enlargement and maintenance dredging activities in Shipyard Creek. According to the USACE, maintenance dredging of Shipyard Creek is permitted annually or as needed. Dredge spoils from this event were reportedly discharged onto Clouter Island, a designated upland dredge material area (DMA) on non-Navy property. The last dredge from Shipyard Creek deposited into the Navy's DMA was in reportedly in 1986.

Table 1.13
Maintenance Dredging: Shipyard Creek

Shoal Number	River Station	Reach	Date Completed	Cubic Yards	Channel Depth (ft)	Disposal Site
1 A SR	11+73 TO 26+23	Northern edge of Reach running west to first turning basin	9-Oct-96	112,640	44	Daniel Isl. Wando Cell
1 SR	2+85 TO	Reach running west to first	14-Mar-00	380,974	44	Clouter Island

Table 1.13
Maintenance Dredging: Shipyard Creek

Shoal Number	River Station	Reach	Date Completed	Cubic Yards	Channel Depth (ft)	Disposal Site
	37+92	turning basin				
1 SR	2+85 TO 37+92	Northern edge of Reach running west to first turning basin	24-Sep-98	21,645	44	Drum Island
1 SR	2+85 TO 37+92	Reach running west to first turning basin	9-Oct-96	542,282	44	Daniel Isl. Wando Cell
1 SR	7+00 TO 37+92	Reach running west to first turning basin	18-Jan-95	315,005	42	Daniel Isl. Wando Cell
1 SR Ext.	2+85 TO 37+92	Reach running west to first turning basin	24-Sep-98	407,352	44	Drum Island
Shipyard TANG1	9+00 TO 37+92	Shipyard River to second turning basin (Macalloy)	16-Sep-93	501,275	42	Daniel Isl. Wando Cell
SR	26+50 TO 67+00	Shipyard River PT 2	1-Feb-88	473,171	36	Not provided
SR	6+00 TO 27+90	Shipyard River PT 1	24-Sep-85	113,002	38	Not provided
SR	26+50 TO 67+00	Shipyard River PT 2	24-Sep-85	415,001	38	Not provided
SR	6+00 TO 27+90	Shipyard River PT 1	1-Feb-88	158,867	36	Not provided
N.A.	N.A.	Shipyard Creek	Planned - 02	1,500,000	47	Clouter Island

Commercial docking facilities and other entities with property along Shipyard Creek have also been issued permits to dredge specific areas around their property. These permits typically involve the removal of relatively small quantities of sediment, although some permits are 10-year maintenance permits. Figure 1-4 and Table 1.14 below show these miscellaneous dredging projects.

Table 1.14
Miscellaneous Dredging: Shipyard Creek

Facility	Location	Date	Cubic Yards	Channel Depth (ft)	Disposal Area
Gulf Oil Terminal		Feb-86	164,000	Not provided	Not provided
Macalloy Dock		Apr-88	1,000	Not provided	Not provided
Union Carbide Corp.	Upper Basin	Apr-80	15,000	30	Not provided
Massey Coal Terminal	next to Gulf Oil Formerly Etiwan Fertilizer	Aug-81	37,860	35	Not provided
Etiwan Fertilizer Co.		Jun-85	12,000	36	Daniel Island
Shipyard River Terminal	mouth of creek	Apr-99	1,000	Not provided	Clouter Island
Metal Trades Inc.	s. of Macalloy	Apr-00	60,000	44	Clouter Island
Kinder Morgan Bulk Terminals	w side of lower turning basin	Sep-00	30,000	45	Clouter Island

Table 1.14
Miscellaneous Dredging: Shipyard Creek

Facility	Location	Date	Cubic Yards	Channel Depth (ft)	Disposal Area
Kinder Morgan Bulk Terminals		Jul-99	2,500	Not provided	Clouter Island

Periodic dredging can adversely affect the benthic communities and probably had a significant effect on the physical and chemical properties of sediments in the Shipyard Creek. Shipyard Creek sediments have been, and will continue to be, significantly altered.

2.0 ESTABLISHING MIGRATION PATHWAY SCENARIOS

2.1 Conceptual Site Model

The strategy for completing the Zone J investigation included an evaluation of the existing documentation/data for each AOC and SWMU to determine its potential as a source for contamination found in the Zone J water bodies. This process will create a list of suspected sources with contaminants possibly related to those detected in the water bodies, thus identifying evidence of a potential linkage between a CNC site and Zone J. River hydrodynamics and its effects on contaminant fate and transport are discussed in Section 3.

2.1.1 Conceptual Contamination Migration Pathway Models

The fundamental premise on which the source identification process is based is that a site cannot be considered a source unless a release has occurred and that a complete contaminant migration pathway exists between the source of the release and the Zone J water body. AOC/SWMUs previously designated as requiring "no further action" were not re-evaluated during the Zone J migration pathway.

2.1.2 Migration Scenarios

Described in this section are conceptual models for three primary scenarios illustrating how a contaminant released from a site at the CNC could migrate to Zone J. Following the scenario descriptions is a set of screening criteria used to guide the evaluation of the RFI data during the source identification process. Using the criteria, potential sources were confirmed, rejected, or retained due to data gaps which prevent completion of the evaluation process. The term *contaminated* used in the context of these models refers to media containing hazardous constituents above appropriate risk based screening criteria. It should be noted that under current Navy contractual processes, EnSafe is responsible for data evaluation for Scenario 1 and CH2M-Jones is responsible for data evaluation for Scenarios 2 and 3. The following outline describes the scenario pathways, though this report concentrates on the Scenario 1 evaluation only.

Scenario 1: Transport to Zone J Via Storm Water Drainage Pipeline

This scenario describes a release from a SWMU or AOC which resulted in either:

1a) Waste being introduced directly into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1b) Storm water runoff transporting contaminated media into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1c) Contaminated groundwater being intercepted by and entering a low-integrity storm sewer pipeline and migrating via the storm sewer pipeline to Zone J; or

1d) Waste discharging directly to Zone J via sanitary/storm sewer cross connects.

Scenario 2: Overland Transport to Zone J Via Sheet Flow

This scenario describes a release from a SWMU or AOC which resulted in either:

2a) Overland flow of waste directly into Zone J; or

2b) Contaminated media transported by sheet flow directly into Zone J.

Scenario 3: Transport to Zone J Via Groundwater to Surface Water Discharge

This scenario describes a release from a SWMU or AOC, which resulted in contaminated groundwater being discharged to Zone J as a result of either:

3a) Contaminants leaching from soil to groundwater that subsequently discharged to Zone J; or

3b) Exfiltration of contaminated storm water from a leaking storm sewer line impacting groundwater that subsequently discharged to Zone J.

2.2 Storm Water Migration Pathway Checklist and Screening Criteria

As part of the site screening process, a variety of questions were developed that would complete the storm water migration pathway evaluation for each drainage basin. To provide complete answers, a subset of related questions was also required. The entire set of screening questions was compiled into a standardized checklist format, which provided necessary backup documentation and explanations to support the conclusions reached.

The screening began with the identification of associated drainage basins and storm water outfalls based on the detailed information presented in *Evaluation of Drainage System Serving Charleston Naval Complex* (Davis & Floyd, 1998), a report prepared to address persistent flooding problems at the base. During their drainage evaluation, Davis & Floyd delineated storm water drainage basins across the CNC and identified and inspected the associated storm drains, sewer lines, cross-connects, and outfalls. The site screening included a review of site characteristics within each drainage basin (AOC/SWMU number(s), name(s), basic activities, and type(s) of ground cover) and current status in the RFI process.

Additional criteria used to evaluate the storm water migration pathway to Zone J were available site-specific spill/release history, hazardous material storage/handling/disposal practices, and identified COPCs for source identification. For the primary migration scenarios, consideration was given to the site's proximity to storm drains, surface conditions surrounding storm drains, sample locations, groundwater plumes, sewer line integrity, cross-connects, surface and groundwater flow direction, and COPC concentrations in monitoring wells that may infiltrate into the storm water sewer lines.

Upon completion of approximately 50 percent of the drainage basin checklists, the evaluations revealed that data gaps existed predominately in the storm water migration scenario pathway and it was determined by the CNC project team that collection of storm water effluent data from relevant drainage basins would commence.

2.3 Migration Pathway Evaluation

The evaluation of the various migration pathway scenarios was guided by the layout of CNC drainage basins. The *Zone J RFI* is primarily concerned with the transport of contaminants suspended in either surface water runoff or groundwater, therefore a "watershed-based" approach, which evaluates all potential sources within a drainage basin, is considered more appropriate than a site-by-site assessment. Using this strategy, multiple sites located within a common drainage basin (as defined by surface water drainage maps) and with a single known storm water outfall (point source) could be consolidated and assessed simultaneously. Conversely, if several smaller drainage basins are each host to a single, larger AOC or SWMU,

they too may be combined and assessed with regard to particular outfalls. Sites were assessed by CH2M-JONES on an individual basis if they had a migration scenario that did not involve the storm sewers system (Scenarios 2a, 2b, and 3a) or were outside the influence of a delineated storm water drainage basin.

As shown in Figures 2-1, 2-2, 2-3 the CNC consists of 98 delineated drainage basins and associated storm water outfalls (drainage basins and their outfalls are numbered alike). Details regarding basin size and drainage features were obtained primarily from the CH2M-JONES ArcView Project, the 1998 Davis & Floyd report, and site visits. Table 2.1 lists the CNC drainage basins, associated water body, land use, and total drainage basin area.

Since the drainage basin diagrams show only the areas serviced by a particular network of storm drains, undeveloped and remote areas, which lie outside a service area, are considered to drain into the nearest water body unless there is evidence to the contrary. The relationships between the CNC drainage basins, upgradient AOCs and SWMUs, and the Zone J water bodies are discussed in the Drainage Basin Evaluations subsections, beginning with Noisette Creek.

Table 2.1
Charleston Naval Complex Drainage Basin/Storm Water System
Land Use and Area

Drainage Basin	Zone	SWMU/ AOC	Water Body	Land Use	Area (ft^2)	Acres	Total DB Area	Total DB Acres (ft^2)	% Land Use
1	A	2, 38,39	Cooper River	Industrial/Commercial	283346.854	6.505	303461.24	6.97	93.37
1A	A	39	Noisette Creek	Industrial/Commercial	320087.051	7.348	327184.87	7.51	97.83
1B	A	42, 504	Noisette Creek	Industrial/Commercial	165318.700	3.795	165318.70	3.79	100.00
1C	A	42, 504, 505	Noisette Creek	Industrial/Commercial	162242.862	3.725	162242.86	3.73	100.00
2	A	2	Cooper River	Industrial/Commercial	152508.621	3.501	152508.62	3.50	100.00
3	A	2,504	Cooper River	Industrial/Commercial	715495.959	16.426	715495.96	16.43	100.00
4	A	2, 506	Cooper River	Industrial/Commercial	121565.621	2.791	121565.62	2.79	100.00
5	NONE	NONE	Cooper River	Industrial/Commercial	236267.396	5.424	236267.40	5.42	100.00
6	NONE	NONE	Cooper River	Industrial/Commercial	171595.525	3.939	171595.52	3.94	100.00
7	NONE	NONE	Cooper River	Industrial/Commercial	73688.926	1.692	73688.93	1.69	100.00
8	NONE	NONE	Cooper River	Industrial/Commercial	94479.105	2.169	94479.10	2.17	100.00
8A	A	37	Cooper River	Industrial/Commercial	6215.634	0.143	6215.63	0.14	100.00
9	NONE	NONE	Noisette Creek	Industrial/Commercial	133663.392	3.068	133663.39	3.07	100.00
10	A	37, 42, 43	Noisette Creek	Industrial/Commercial	342107.114	7.854	342107.11	7.85	100.00
10A	C	44,504	Noisette Creek	Industrial/Commercial	1012232.061	23.238	1275022.43	29.27	79.39
		512		Residential	261801.859	6.010	1275022.43	29.27	20.53
10B	C	37, 44, 700	Noisette Creek	Industrial/Commercial	141916.293	3.258	142828.62	3.28	99.36
10C	B	504	Noisette Creek	Industrial/Commercial	518890.169	11.912	585545.27	13.44	88.62
	C	47	Noisette Creek	Residential	48414.562	1.111	585545.27	13.44	8.27
10D	NONE	NONE	Noisette Creek	Industrial/Commercial	329840.875	7.572	432025.55	9.92	76.35
	NONE	NONE	Noisette Creek	Residential	45115.085	1.036	432025.55	9.92	10.44
10E	NONE	NONE	Noisette Creek	Industrial/Commercial	428172.455	9.829	620102.57	14.24	69.05
	NONE	NONE	Noisette Creek	Residential	129217.939	2.966	620102.57	14.24	20.84
11	NONE	NONE	Noisette Creek/Cooper River	Industrial/Commercial	90583.589	2.080	245491.93	5.64	36.90
12	NONE	NONE	Noisette Creek/Cooper River	Industrial/Commercial	16129.847	0.370	16418.24	0.38	98.24
13	NONE	NONE	Noisette Creek/Cooper River	Industrial/Commercial	49524.476	1.137	68785.32	1.58	72.00
14	NONE	NONE	Noisette Creek/Cooper River	Industrial/Commercial	19826.894	0.455	20499.46	0.47	96.72
15	NONE	NONE	Cooper River	Industrial/Commercial	29172.184	0.670	29541.19	0.68	98.75
16	NONE	NONE	Cooper River	Industrial/Commercial	6593.429	0.151	7020.54	0.16	93.92
17	NONE	NONE	Cooper River	Industrial/Commercial	37541.181	0.862	43607.37	1.00	86.09
18	B	507	Cooper River	Industrial/Commercial	177429.274	4.073	367634.21	8.44	48.26
				Residential	178716.239	4.103	367634.21	8.44	48.61
19	NONE	NONE	Cooper River	Residential	576464.079	13.234	576464.08	13.23	100.00
20	C	47	Cooper River	Residential	1228888.195	28.211	3308913.09	75.96	37.14
	C	508, 511, 513, 515, 516, 517, 518, 519	Cooper River	Industrial/Commercial	2079071.643	47.729	3308913.09	75.96	62.83

Table 2.1
Charleston Naval Complex Drainage Basin/Storm Water System
Land Use and Area

Drainage Basin	Zone	SWMU/ AOC	Water Body	Land Use	Area (ft^2)	Acres	Total DB Area	Total DB Acres (ft^2)	% Land Use
	E	53, 525, 526	Cooper River						
21	E	54, S21	Cooper River	Industrial/Commercial	35995.912	0.826	36467.24	0.84	98.71
22	E	54	Cooper River	Residential	3309.997	0.076	326829.18	7.50	1.01
	E	528, S21	Cooper River	Industrial/Commercial	318624.920	7.315	326829.18	7.50	97.49
23	E	22, 23, 25, 37, 63, 65, 67, 70, 530, 531, 538, 540, 541, 542, 543, 544, 548, 549, 550, 554	Cooper River	Industrial/Commercial	963909.131	22.128	963909.13	22.13	100.00
24	NONE	NONE	Cooper River	Industrial/Commercial	52263.920	1.200	52263.92	1.20	100.00
25	NONE	NONE	Cooper River	Industrial/Commercial	75670.277	1.737	75670.28	1.74	100.00
26	E	65, 550	Cooper River	Industrial/Commercial	97131.217	2.230	97131.22	2.23	100.00
27	E	25, 549, 551, 552, 559	Cooper River	Industrial/Commercial	370075.258	8.496	370075.26	8.50	100.00
28	C	520	Cooper River	Industrial/Commercial	3008518.856	69.066	3254844.36	74.72	92.43
	C	522, 523	Cooper River	Residential	186965.971	4.292	3254844.36	74.72	5.74
	E	559	Cooper River						
28A	E	170, 171, 559	Cooper River	Industrial/Commercial	180299.976	4.139	180299.98	4.14	100.00
29	NONE	NONE	Cooper River	Industrial/Commercial	115298.639	2.647	115298.64	2.65	100.00
30	E	83, 84, 87, 145, 170, 171, 172, 173, 559, 560, 562, 563, 564, 566, 567, 569, 570, 572, 573, 574, 576, 579, 580	Cooper River	Industrial/Commercial	1444519.053	33.162	1462411.67	33.57	98.78
30A	E	567	Cooper River	Industrial/Commercial	9475.169	0.218	9475.17	0.22	100.00
30B	NONE	NONE	Cooper River	Industrial/Commercial	8667.056	0.199	8667.06	0.20	100.00
30C	NONE	NONE	Cooper River	Industrial/Commercial	7564.993	0.174	7564.99	0.17	100.00
31	E	566, 567	Cooper River	Industrial/Commercial	133239.300	3.059	133239.30	3.06	100.00
32	E	145, 576, 583	Cooper River	Industrial/Commercial	285961.646	6.565	285961.65	6.57	100.00
33	E	37, 97, 586	Cooper River	Industrial/Commercial	217355.518	4.990	217355.52	4.99	100.00
33A	NONE	NONE	Cooper River	Industrial/Commercial	26623.561	0.611	26623.56	0.61	100.00
34	E	100, 102, 504, 109	Cooper River	Industrial/Commercial	1588257.931	36.461	1588257.93	36.46	100.00
	F	109, 607, 609	Cooper River						

Table 2.1
Charleston Naval Complex Drainage Basin/Storm Water System
Land Use and Area

Drainage Basin	Zone	SWMU/ AOC	Water Body	Land Use	Area (ft^2)	Acres	Total DB Area	Total DB Acres (ft^2)	% Land Use
34A	NONE	NONE	Cooper River	Industrial/Commercial	24327.524	0.558	24327.52	0.56	100.00
34B	E	102	Cooper River	Industrial/Commercial	36457.782	0.837	36457.78	0.84	100.00
35	E	102, 590, 596	Cooper River	Industrial/Commercial	831536.964	19.089	831536.96	19.09	100.00
	F	504, 613	Cooper River						
36	E	596, 598	Cooper River	Industrial/Commercial	130307.864	2.991	130307.86	2.99	100.00
37	E	504	Cooper River	Industrial/Commercial	384764.247	8.833	384764.25	8.83	100.00
	F	613	Cooper River						
37A	G	37, FDS	Cooper River	Industrial/Commercial	411835.148	9.454	411835.15	9.45	100.00
37B	F	611	Cooper River	Industrial/Commercial	502251.954	11.530	502251.95	11.53	100.00
	G	3, 24, FDS	Cooper River						
37C	F	607, 609, 611, 613	Cooper River	Industrial/Commercial	271341.201	6.229	271341.20	6.23	100.00
37D	NONE	NONE	Cooper River	Industrial/Commercial	277764.871	6.377	277778.25	6.38	100.00
38	E	504, 602, 603	Cooper River	Industrial/Commercial	955851.287	21.943	955851.29	21.94	100.00
	F	4, 504, 613, 616, 617, 619, 620	Cooper River						
	G	37, 633, FDS	Cooper River						
39	E	106	Cooper River	Industrial/Commercial	23873.045	0.548	23873.04	0.55	100.00
40	E	106, 602,603	Cooper River	Industrial/Commercial	111499.114	2.560	111499.11	2.56	100.00
41	E	5, 18, 604, 605	Cooper River	Industrial/Commercial	254970.729	5.854	254970.80	5.85	100.00
	F	36, 620	Cooper River						
	G	FDS	Cooper River						
42	NONE	NONE	Cooper River	Industrial/Commercial	21357.859	0.490	21357.86	0.49	100.00
42A	G	FDS	Cooper River	Industrial/Commercial	34490.398	0.792	34511.86	0.79	99.94
43	F	36, 619, 620	Cooper River	Industrial/Commercial	899542.560	20.651	899542.56	20.65	100.00
	G	6, 7, 628, 633, 635, FDS	Cooper River						
43A	G	008	Cooper River	Industrial/Commercial	251802.812	5.781	251802.81	5.78	100.00
43B	G	120, 638, FDS	Cooper River						
44	G	8, 636, 638, FDS	Cooper River	Industrial/Commercial	349147.787	8.015	349147.79	8.02	100.00
45	G	642, 643, FDS	Cooper River	Industrial/Commercial	470700.020	10.806	470700.02	10.81	100.00
46	NONE	NONE	Cooper River	Industrial/Commercial	190044.049	4.363	190044.05	4.36	100.00
44/46-A	G	37, 643, FDS	Cooper River	Industrial/Commercial	418660.247	9.611	418660.25	9.61	100.00
46B	NONE	NONE	Cooper River	Industrial/Commercial	21884.007	0.502	22107.44	0.51	98.99
47	H	13, 17, 19, 37,	Cooper River	Undeveloped	11585.668	0.266	3906370.55	89.68	0.30

Table 2.1
Charleston Naval Complex Drainage Basin/Storm Water System
Land Use and Area

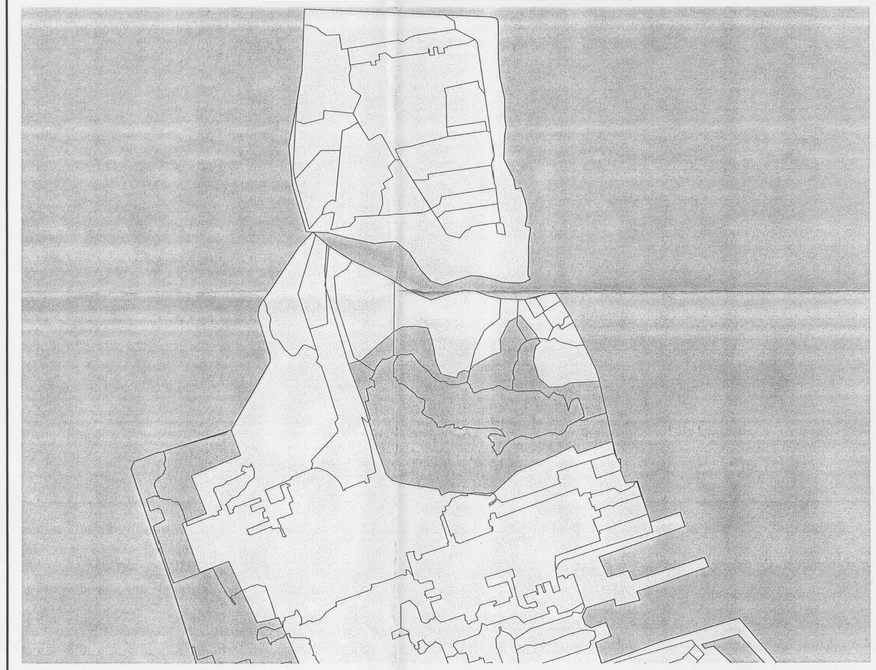
Drainage Basin	Zone	SWMU/ AOC	Water Body	Land Use	Area (ft^2)	Acres	Total DB Area	Total DB Acres (ft^2)	% Land Use
		653, 655, 656, 659, G07, G38, SGC							
	I	671, 672, 673	Cooper River						
47A	I	177, RTC	Cooper River	Industrial/Commercial	66769.134	1.533	67001.65	1.54	99.65
47B	I	37	Cooper River	Industrial/Commercial	72193.127	1.657	72193.13	1.66	100.00
48	H	13, 37, 136, 178, 660, 663, 665, G80, SGC	Cooper River	Industrial/Commercial	1200978.840	27.571	1200978.84	27.57	100.00
	I	679, RTC	Cooper River						
48/48-G	I	675, 676, 677, 678, 679, 680	Cooper River	Industrial/Commercial	472318.228	10.843	472318.23	10.84	100.00
48-I/48M	NONE	NONE	Cooper River	Industrial/Commercial	78568.858	1.804	78868.49	1.81	99.62
48H	I	681	Cooper River	Industrial/Commercial	108476.184	2.490	108476.18	2.49	100.00
49	H	37, 666, G80	Cooper River	Industrial/Commercial	896362.022	20.578	896362.02	20.58	100.00
	I	37, 680, 681	Cooper River	Industrial/Commercial					
49-A/49-C	NONE	NONE	Cooper River	Industrial/Commercial	317368.151	7.286	321119.64	7.37	98.83
50	NONE	NONE	Cooper River	Undeveloped	17418.625	0.400	141756.78	3.25	12.29
	NONE	NONE	Cooper River	Undeveloped	124338.151	2.854	141756.78	3.25	87.71
51	H	17, 138, 661, 662, 667	Cooper River	Industrial/Commercial	155428.234	3.568	1245239.02	28.59	12.48
51A	I	685	Cooper River	Undeveloped	130125.698	2.987	143580.47	3.30	90.63
51B	NONE	NONE	Cooper River	Undeveloped	159626.169	3.665	170622.40	3.92	93.56
	NONE	NONE	Cooper River	Industrial/Commercial	19139.680	0.439	170622.40	3.92	11.22
51C	I	687	Cooper River	Industrial/Commercial	39180.231	0.899	399245.93	9.16	9.81
	I	DMA	Cooper River	Undeveloped	360590.165	8.278	399245.93	9.16	90.32
51D	I	688	Cooper River	Undeveloped	108624.121	2.494	108654.29	2.49	99.97
	I	688	Cooper River	Industrial/Commercial	20332.072	0.467	108654.29	2.49	18.71
51E	I	688	Cooper River	Undeveloped	178671.641	4.102	178671.64	4.10	100.00
	I	688	Cooper River	Industrial/Commercial	12244.321	0.281	178671.64	4.10	6.85
51F	I	12	Shipyard Creek/Cooper River	Industrial/Commercial	14674.963	0.337	1136621.74	26.09	1.29
	I	690, DMA	Shipyard Creek/Cooper River	Undeveloped	1105113.638	25.370	1136621.74	26.09	97.23
51G	I	690	Shipyard Creek/Cooper River	Undeveloped	741180.322	17.015	821531.06	18.86	90.22
	I	690	Shipyard Creek/Cooper River	Industrial/Commercial	189637.684	4.353	821531.06	18.86	23.08
51H	H	670	Shipyard Creek	Undeveloped	8430.522	0.194	340721.98	7.82	2.47

Table 2.1
Charleston Naval Complex Drainage Basin/Storm Water System
Land Use and Area

Drainage Basin	Zone	SWMU/ AOC	Water Body	Land Use	Area (ft^2)	Acres	Total DB Area	Total DB Acres (ft^2)	% Land Use
	H	670	Shipyard Creek	Industrial/Commercial	332291.455	7.628	340721.98	7.82	97.53
511	H	14	Cooper River	Undeveloped	339797.398	7.801	699600.33	16.06	48.57
	H	15, 37, 670, 684,	Cooper River	Industrial/Commercial	359560.259	8.254	699600.33	16.06	51.40
	I	684, 685, DMA	Cooper River						
52	G	8, 633, 634, 636, 637, 706, FDS	Shipyard Creek	Industrial/Commercial	1976101.772	45.365	2000225.01	45.92	98.80
52A	G	11, 24, FDS	Shipyard Creek	Industrial/Commercial	1188116.198	27.276	1455633.89	33.42	81.63
53	F	611, FDS	Retaining Pond	Industrial/Commercial	388357.804	8.915	436591.75	10.02	88.95
	G	FDS	Retaining Pond						
54	NONE	NONE	Shipyard Creek	Undeveloped	2623.994	0.060	253900.07	5.83	1.03
	NONE	NONE	Shipyard Creek	Industrial/Commercial	251276.072	5.769	253900.07	5.83	98.97
54A	H	159	Shipyard Creek	Undeveloped	638388.083	14.655	1037401.37	23.82	61.54
	H	654	Shipyard Creek	Industrial/Commercial	408801.507	9.385	1037401.37	23.82	39.41
	I	690	Shipyard Creek						
55	H	19	Shipyard Creek	Undeveloped	834881.353	19.166	3531825.73	81.08	23.64
	H	20, 121, 649, 650	Shipyard Creek	Industrial/Commercial	2609439.713	59.904	3531825.73	81.08	73.89
	I	690	Shipyard Creek						
56	I	690	Shipyard Creek	Undeveloped	1428896.973	32.803	1683776.67	38.65	84.86
	I	690	Shipyard Creek	Industrial/Commercial	25434.562	0.584	1683776.67	38.65	1.51

CNC North Storm Water Drainage Basins

CNC North Landuse



CNC North Storm Water Drainage Basins
LEGEND

Drainage Basins

Outfalls

CNC North Landuse
LEGEND

Drainage Basins

Landuse Classification
INDUSTRIAL / COMMERCIAL
UNDEVELOPED
RESIDENTIAL

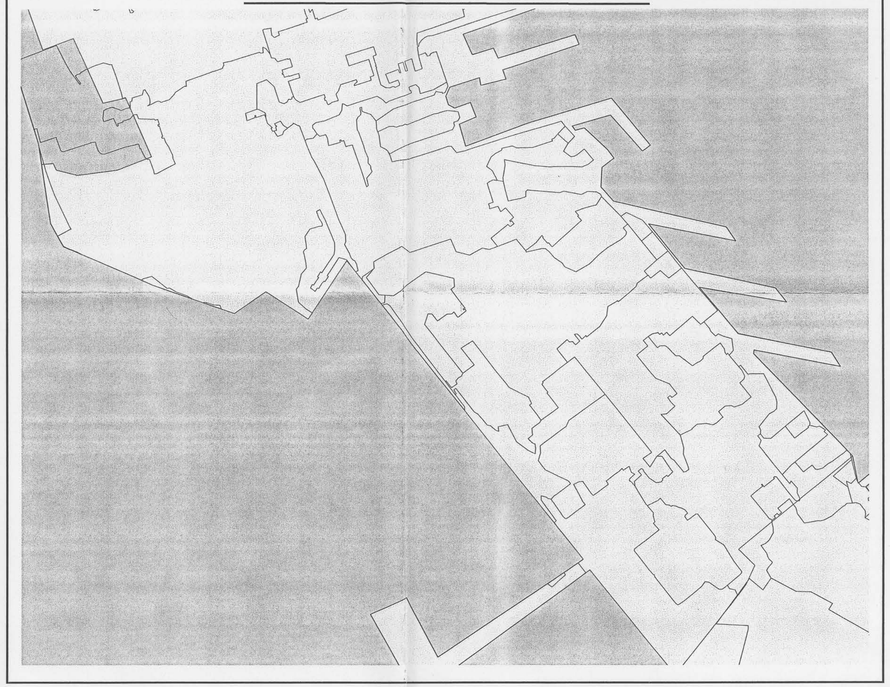
Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 2-1
Storm Water Drainage Basins
CNC North

Date: October 2002 | RFI Storm Water Reference Locations.apr

CNC Central Storm Water Drainage Basins

CNC Central Landuse



CNC Central Storm Water Drainage Basins
LEGEND

Drainage Basins

Outfalls

CNC Central Landuse
LEGEND

Drainage Basins

Landuse Classification
INDUSTRIAL / COMMERCIAL
UNDEVELOPED
RESIDENTIAL

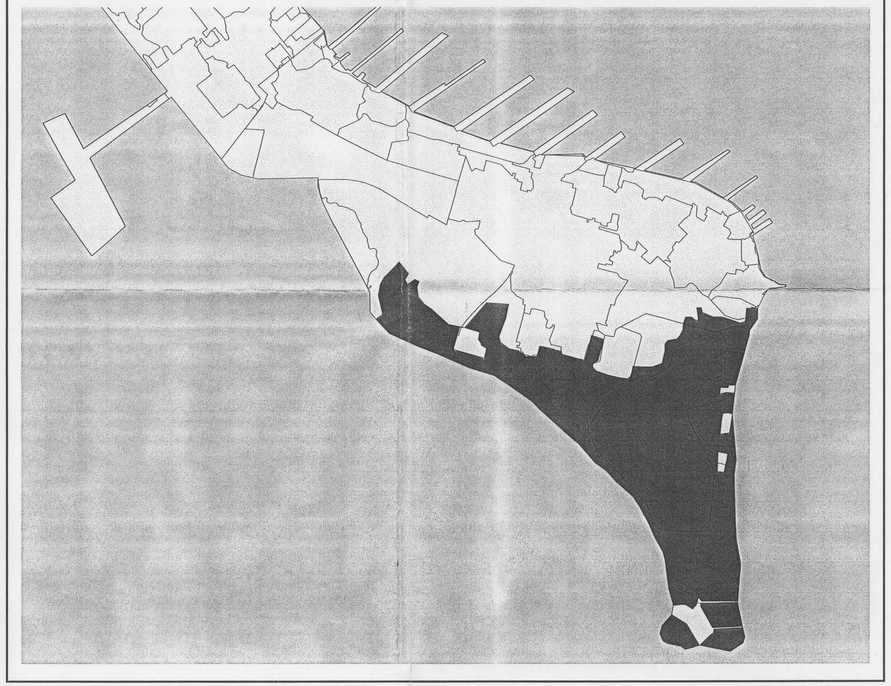
Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 2-2
Storm Water Drainage Basins
CNC Central

Date: October 2002 | RFI Storm Water Reference Locations.apr

CNC South Storm Water Drainage Basins

CNC South Landuse



CNC South Storm Water Drainage Basins
LEGEND

Drainage Basins

Outfalls

CNC South Landuse
LEGEND

Drainage Basins

Landuse Classification
INDUSTRIAL / COMMERCIAL
UNDEVELOPED
RESIDENTIAL

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 2-3
Storm Water Drainage Basins
CNC South

Date: October 2002

RFI Storm Water Reference Locations.apr

3.0 FIELD INVESTIGATION

The following section lists the field investigation objectives and describes the technical sampling methods, procedures, and protocols implemented during data collection within Zone J. Field work was conducted in accordance with the *Final Comprehensive Sampling and Analysis Plan (CSAP)* (E/A&H, July 1996), the USEPA Region IV Environmental Services Division, *Standard Operating Procedures and Quality Assurance Manual (ESDSOPQAM)* (USEPA, February 1991), and the *Zone J Point of Entry Work Plan* (EnSafe, 2001). Sampling and investigatory methods used in the Zone J storm water investigation are summarized in this section. Any deviations from the approved work plan, such as the number of samples collected, modified locations, or procedures, etc., were documented in the field and are detailed in Section 6, Noisette Creek and Shipyard Creek Drainage Basin Evaluations.

3.1 Investigation Objectives

The sampling strategy for the *Zone J Point of Entry Work Plan* was designed to collect sufficient storm water runoff data to accomplish the following:

- Characterize the storm water runoff from listed RCRA sites throughout the CNC.
- Define contaminant migration pathways and potential receptors (on and offsite, where applicable).
- Define the nature and extent of contamination, if any.
- Characterize reference values.
- Identify storm water COPCs.

3.2 Sampling Procedures, Protocols, and Analyses

3.2.1 Sample Identification

All storm water samples collected during this investigation were identified using a 6 or 7-character alphanumeric system denoting samples by site. The first three characters identified whether the sample was collected on/off site. Samples with IDs that began with *EFF* were collected within the CNC boundary and samples with IDs that began with *REF* were collected off site as reference locations. The next three characters identify the location. Some sample

locations contain a seventh character. This character is the letter D which identifies that sample as a duplicate. Appendix A is the complete data report for all samples collected in Zone J.

3.2.2 Storm Water Effluent Sampling

The following subsections summarize those storm water effluent sampling methods as they applied to Zone J field activities.

3.2.2.1 Storm Water Effluent Sample Locations

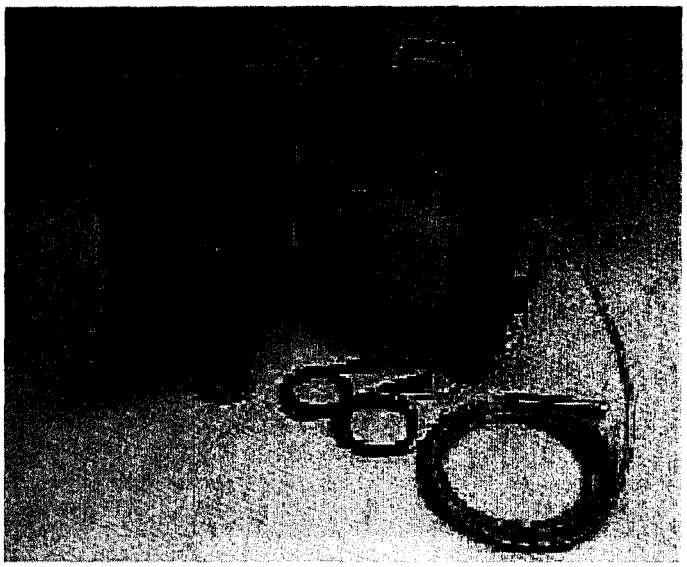
The storm sewer system at the CNC collects rainfall from approximately 1,325 acres. Detailed storm sewer diagrams, prepared by the engineering and architectural firms of SEC Donahue (1993), RUST Environmental and Infrastructure (1994), and Davis and Floyd (1998), delineate 98 distinct drainage basins across the CNC serviced by a dedicated system of catch basins, sewer lines, ditches and outfalls. Of these 98, 59 drainage basins were targeted for evaluation based on the presence of AOCs/SWMUs within basin boundaries. The objective of the evaluation was to determine the potential transport, via surface flow to storm sewer structures, and discharge of contaminants from the AOC/SWMU areas to Zone J water bodies. For purposes of this report, only data from the 10 drainage basins associated with Noisette and Shipyard Creeks and the 18 reference locations will be reported. Cooper River storm water effluent related data will be provided in an addendum report. Figures 3-1 through 3-5 illustrates off- site storm water effluent reference locations and CNC on-site storm water effluent and reference locations.

3.2.2.2 Storm Water Effluent Sample Collection

Ideally, an effluent sample would be collected from the end-of-pipe discharge point, but at CNC, the sewer outfalls, especially those along the seawall, are under water even at low tide. Following the strategy used in the previous effluent evaluations by SEC Donahue and RUST, effluent samples from tidally influenced outfalls were collected from upgradient manholes/catch basins on the sewer system lines that are not inundated (drain line elevation is above mean low tide). Effluent samples were collected as close to low tide influence as possible and only during outward flow.

Where possible, discrete effluent samples were collected using automatic storm water samplers that were installed in advance of a rain event and set to automatically collect a sample when sensors detect adequate flow and/or rainfall. If automatic storm water samplers cannot be used due to access issues, a grab sample was manually collected from the designated points using the storm water sampler's "Sample Now" feature, by submerging a sample container, or using other acceptable surface water sampling device (peristaltic pump, horizontal-style bottle, etc.).

The *Global Water SS101 Storm water Sampler* takes a discrete sample (approximately 2.5 liters) based on two variables: rainfall accumulation (using the rain sensor) and water discharge. The rain sensors can also be used independently (by using a sensor bypass plug). The sampler's "Sample Now" switch verifies if the battery discharged and the unit was set up correctly and a backflush function clears the pickup hose and strainer after a sample is complete. The sampler's rechargeable battery will power the sampler for at least four months, including five 24-hour storm events, without requiring recharging.



Appropriate effluent sampling locations were installed as close as possible to the storm water pipe's terminal discharge point or ditch. Because the pump can only draw water from as deep as 22 feet, it must be installed fairly close to the sampling point. If the terminal discharge point was inaccessible or otherwise unsuitable for sampling (underwater, in a prohibited area, etc.) or the pump could not be properly situated, the nearest suitable upgradient point with access to storm water flow was sampled. To avoid disturbance or loss of samplers, locations were removed from public areas whenever possible and sampler cases locked and secured to a post or other immobile object.

3.2.2.3 Storm Water Effluent Sample Preparation, Packaging, and Shipment

Section 3.2.2.3 of the *Zone A RFI Report* (EnSafe, April 1998) details the procedures for preparing, packaging, and shipping water samples during CNC RFI and those same procedures were followed for the storm water effluent samples collected during the Zone J RFI. The samples were shipped priority overnight via FedEx to Severn Trent Laboratories (STL)-Savannah in Savannah, Georgia.

3.2.2.4 Storm Water Effluent Analysis

A total of 16 storm water effluent samples were analyzed per the USEPA Method SW-846 and DQO Level III unless otherwise noted, as follows:

- SVOCs — USEPA Method 8270C
- Pesticides/PCBs — USEPA Method 8081A/8082
- Cyanide — USEPA Method 9012
- Metals — USEPA Method 6010B7470A

3.2.3 Decontamination Procedures

Section 3.2.10 of the *Zone A RFI Report* discusses the relevant decontamination procedures used during the Zone J Storm Water Effluent Evaluation Investigation. Dedicated clear PVC tubing was used for each automatic storm water sample and disposed of after use. Automatic sampler containers, pumps, and intake valves were decontaminated after each sample collection before using at the next location.

4.0 DATA VALIDATION

4.1 Introduction

Section 4.1 of the *Zone A RFI Report* (EnSafe, April 1998) defines the DQOs used for the Zone J investigation. For the RFI at Zone J, analytical Level III data for semivolatiles, pesticides, PCBs, target analyte list (TAL) metals, and cyanide were deemed appropriate for the intended data uses: drainage basin storm water characterization, ecological risk assessment, and corrective measure determinations/design. For the Zone J Storm Water Effluent Evaluation Report, 16 samples from the Noisette and Shipyard Creeks associated drainage basins and 18 reference locations samples were analyzed.

Appendix A includes the complete analytical data reports, data validation reports and chain of custodies for the Zone J RFI.

It should be noted that in September 1993, the USEPA replaced the 1987 guidance with an updated manual, *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA/540/G-93/071 (USEPA, September 1993), which stated, "This guidance replaces the earlier guidance EPA 540/G-87/003, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-7B and the five analytical levels introduced in that document." As a result, the five analytical data levels were reduced to two — screening data and definitive data.

Definitive data (formerly Levels III and IV) are defined as analytical data generated using rigorous analytical methods, such as approved USEPA reference methods. These data are analyte-specific, with confirmation of analyte identity and concentration. These approved methods produce tangible raw data (e.g., chromatograms, spectra, digital values, etc.) in paper printouts or computer-generated electronic files. Analytical or total measurement error (precision) must be determined for data to be definitive (USEPA, September 1993). As a result, the data collected at Zone J were defined as definitive data per the most recent USEPA guidance but will still be referred to as Level III throughout the report to avoid confusion.

4.2 Validation Summary

This section presents the quality assurance/quality control (QA/QC) evaluation of the data produced from the analysis of storm water effluent samples collected in Zone J during the RFI. This evaluation will verify that the appropriate QA/QC elements were followed and/or completed (e.g., method requirements, documentation, etc.) to identify and/or characterize any problems with the data set, and ultimately to determine the usability of the analytical data for site characterization, risk assessment, and corrective measure determinations.

Examples of definitive data (formerly Level III and IV) QA/QC elements are as follows:

- Sample documentation (verified time of sample receipt, extraction and holding times)
- Chain of custody
- Initial and continuing calibration
- Determination and documentation of detection limits
- Analyte(s) identification
- Analyte(s) quantification
- QC blanks (trip, method, rinsate)
- Matrix spike recoveries
- Performance evaluation (PE) samples (when specified)
- Analytical method precision
- Total measurement error determination

Zone J storm water effluent samples for the reference, Noisette, and Shipyard Creek locations were collected from January 2002 to March 2002 and analyzed by Severn Trent Laboratories/Savannah, Georgia facility, a SCDHEC certified laboratory. In accordance with the approved work plan, sample analyses followed the guidance in the *USEPA Test Methods for Evaluating Solid Waste*, SW-846 (USEPA, 1992) and Title 40 CFR Part 264. Table 4.1 summarizes the analytical methods and DQO laboratory deliverables.

Table 4.1
Charleston Naval Complex Analytical Program

Full Scan/Appendix IX Analytical Methods	Data Quality Level	Method Reference
SVOCs	III	SW-846 8270C
PCBs	III	SW-846 8081A/8082
Target Analyte List Metals	III	SW-846 6010B/7470A/7471A
Cyanide	III	USEPA 9012B
Salinity*	III	Standard Method 2520B

Notes:
* Salinity method was not originally listed as a parameter to be analyzed in the Point of Entry Effluent Evaluation Work Plan. Salinity was later added to distinguish storm water effluent runoff from tidal influence. TAL Metals include tin.

The methods listed in Table 4.1 are from:

- USEPA OSWER, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846), Third Edition, Update III, November 1997.

- American Public Health Association, *Standard Methods for the Examination of Water and Wastewater*, 19th edition.

Third-party independent data validation of all analytical work by Heartland Environmental Services, Inc. based on the QC criteria developed for USEPA Contract Laboratory Program (CLP). The third–party validator's function was to assess the quality and reliability of the data to determine its usability, documenting any mitigating factors such as noncompliance with methods, possible matrix interferences, and laboratory blank contamination.

4.3 Organic Evaluation Criteria

Section 4.2.1 of the *Zone A RFI Report* discusses the organic evaluation criteria as they apply to the Zone J storm water effluent investigation. These include holding times, instrument performance standards, surrogate spike recoveries, instrument calibration, matrix spikes/duplicates, laboratory control samples and laboratory duplicates, blank analysis, field–derived blank analyses, and internal performance standards.

4.4 Diluted Samples

There were no samples diluted due to high concentrations of contamination during the Zone J RFI.

4.5 Inorganic Evaluation Criteria

Section 4.2.2 of the *Zone A RFI Report* discusses the inorganic evaluation criteria as they apply to the Zone J investigation. These include holding times; instrument calibration; blank analysis; inductively coupled argon plasma (ICAP) interference check samples; laboratory control samples (LCS); spike sample analyses; laboratory duplicates; ICAP serial dilutions; and atomic absorption (AA) analysis, duplicate injections, and postdigestion spikes.

4.6 Zone J Data Validation Reports

A complete copy of the Zone J data validation reports for the evaluations described above is included in Appendix A for review. During the data validation review of Zone J storm water analyses, site–specific deficiencies and/or problems were noted in the semivolatile and metals methods. The following sections present analytes detected in blank samples analyzed during the storm water investigation.

4.7 Blank Data

Noisette Creek

SDG NBCJ03 — metals method

1. Arsenic, calcium, lead, mercury, sodium, and zinc, in the laboratory blank

SDG NBCJ03— semi-volatiles method

1. Di-n-butylphthalate in the method blank

SDG NBCJ04 — metals method

1. Calcium, manganese, and nickel in the method blank

SDG NBCJ05 — metals method

1. Aluminum, barium, cadmium, calcium, copper, magnesium, and zinc in the method blank

SDG NBCJ06 — metals method

1. Aluminum, beryllium, and zinc in the laboratory blank

Shipyard Creek

SDG NBCJ04 — metals method

1. Calcium, manganese, and nickel in the method blank

SDG NBCJ06 — metals method

1. Aluminum, beryllium, and zinc in the laboratory blank

Reference Location Samples

SDG NBCJ01 — metals method

1. Beryllium, calcium, copper, and zinc in the laboratory blank

SDG NBCJ02 — metals method

1. Aluminum, calcium, copper, manganese, sodium, and zinc in the equipment blank
2. Aluminum, arsenic, barium, beryllium, calcium, copper, lead, potassium, selenium, tin and zinc in the laboratory blank

SDG NBCJ03 — metals method

1. Arsenic, calcium, lead, mercury, sodium, and zinc, in the laboratory blank

SDG NBCJ03— semi-volatiles method

1. Di-n-butylphthalate in the method blank

SDG NBCJ04 — metals method

1. Calcium, manganese, and nickel in the method blank

SDG NBCJ05 — metals method

1. Aluminum, barium, cadmium, calcium, copper, magnesium, and zinc in the method blank

SDG NBCJ06 — metals method

1. Aluminum, beryllium, and zinc in the laboratory blank

SDG NBCJ07 — metals method

1. Aluminum, calcium, iron, potassium, selenium, vanadium, and zinc in the laboratory blank

SDG NBCJ08 — metals method

1. Aluminum, arsenic, calcium, copper, iron, manganese, potassium, sodium, thallium, vanadium, and zinc in the laboratory blank

4.8 Method Detection Limit (MDL)

The MDL is the minimum concentration above zero that an analyte can be detected with 99% confidence. Tables 4.2 through 4.5 show the MDL study from Severn Trent Laboratories/Savannah.

Table 4.2
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for SVOCs

Compound	CAS Number	PQLs Water (µg/L)	PQLs Soil (µg/kg)	MDLs Water (µg/L)	MDLs Soil (µg/kg)
Semivolatile					
Test Code:	**MS500**				
Method:	**SW846 8270, 823rd Edition, Nov. 1986, PQL Table II, Rev.0, Sept. 1986**				
Matrix:	**Water–Soil**				
Extract Volume:	**1000 mL – 30g**				
Initial Calibration:	**20–50–100–120–160 ng, %RSD for CCC compounds=30%, SPCC=97RF > 0.05**				
Continuing Calibration:	**50 ng, %D = 25% for CCC Compounds, SPCC = RF > 0.05100**				
Phenol	108–95–2	10	330	0.28	42.0
bis(2–chloroethyl)ether	111–44–4	10	330	0.44	26.0
2–Chlorophenol	95–57–8	10	330	0.24	32.0
1,3–Dichlorobenzene	541–73–1	10	330	0.32	31.0
1,4–Dichlorobenzene	106–46–7	10	330	0.29	27.0
1,2–Dichlorobenzene	95–50–1	10	330	0.31	24.0
2–Methylphenol	95–48–7	10	330	0.29	32.0
bis(2–chloroisopropyl)ether	108–60–1	10	330	0.23	33.0
4–Methylphenol	106–44–5	10	330	0.71	42.0
N–Nitroso–di–n–propylamine	621–64–7	10	330	0.29	32.0
Hexachloroethane	67–72–1	10	330	0.32	24.0
Isophorone	78–59–1	10	330	0.37	26.0
Nitrobenzene	98–95–3	10	330	0.31	27.0
2–Nitrophenol	88–75–5	10	330	0.36	19.0
2,4–Dimethylphenol	105–67–9	10	330	0.39	28.0
bis(2–chloroethoxy)methane	111–91–1	10	330	0.26	29.0
2,4–Dichlorophenol	120–83–2	10	330	0.66	31.0
1,2,4–Trichlorobenzene	120–82–1	10	330	0.36	22.0
Naphthalene	91–20–3	10	330	0.36	25.0
4–Chloroaniline	106–47–8	10	330	0.98	37.0
Hexachlorobutadiene	87–68–3	10	330	0.35	23.0
4–Chloro–3–methylphenol	59–50–7	10	330	0.33	49.0
2–Methylnaphthalene	91–57–6	10	330	0.33	32.0

Table 4.2
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for SVOCs

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (µg/kg)**	**Water (µg/L)**	**Soil (µg/kg)**
Hexachlorocyclopentadiene	77–47–4	10	330	2.4	51.0
2,4,6–Trichlorophenol	88–06–2	10	330	0.35	20.0
2,4,5–Trichlorophenol	95–95–4	25	830	0.74	29.0
2–Chloronaphthalene	91–58–7	10	330	0.39	24.0
2–Nitroaniline	88–74–4	25	830	5.3	42.0
Dimethylphthalate	131–11–3	10	330	0.39	25.0
Acenaphthylene	208–96–8	10	330	0.33	21.0
2,6–Dinitroltoluene	606–20–2	10	330	0.34	29.0
3–Nitroaniline	99–09–2	25	830	5.0	32.0
Acenaphthene	83–32–9	10	330	0.25	29.0
2,4–Dinitrophenol	51–28–5	25	830	0.80	150.0
4–Nitrophenol	100–02–7	25	830	4.9	160.0
Dibenzofuran	132–64–9	10	330	0.29	30.0
2,4–Dinitrotoluene	121–14–2	10	330	0.41	40.0
Diethylphthalate	84–66–2	10	330	0.47	32.0
Fluorene	86–73–7	10	330	0.38	31.0
4–Chlorophenyl–phenylther	7005–72–3	10	330	0.66	28.0
4–Nitroaniline	100–01–6	25	830	7.7	42.0
4,6–Dinitro–2–methylphenol	534–52–1	25	830	5.0	200.0
N–nitrosodiphenylamine	86–30–6	10	330	5.4	25.0
4–Bromophenyl–phenylether	101–55–3	10	330	0.35	24.0
Hexachlorobenzene	118–74–1	10	330	0.19	45.0
Pentachlorophenol	87–86–5	25	830	4.0	180.0
Phenanthrene	85–01–8	10	330	0.33	17.0
Anthracene	120–12–7	10	330	0.33	21.0
Di–n–butylphthalate	84–74–2	10	330	0.26	28.0
Fluoranthene	206–44–0	10	330	0.33	31.0

Table 4.2
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for SVOCs

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (µg/kg)**	**Water (µg/L)**	**Soil (µg/kg)**
Pyrene	129–00–0	10	330	0.53	63.0
Buytylbenzylphthalate	85–68–7	10	330	0.41	42.0
Benzo(a)anthracene	56–55–3	10	330	0.30	20.0
3,3'–Dichlorobenzidine	91–94–1	10	330	4.4	150.0
Chrysene	218–1–9	10	330	0.44	21.0
bis(2–ethylhexyl)phthalate	117–81–7	10	330	0.48	45.0
Di–n–octylphthalate	117–84–0	10	330	0.35	54.0
Benzo(b)fluoranthene	205–99–2	10	330	0.28	23.0
Benzo(k)fluoranthene	207–08–9	10	330	0.72	26.0
Benzo(a)pyrene	50–32–8	10	330	0.41	29.0
Indeno(1,2,3–cd)pyrene	193–39–5	10	330	0.56	67.0
Dibenz(a,h)anthracene	53–70–3	10	330	0.80	52.0
Benzo(g,h,i)perylene	191–24–2	10	330	0.68	26.0

Notes:
CAS = Chemical Abstracts Service
CCC = Calibration Check Compounds
g = grams
MDL = Method Detection Limit
mL = milliliters
NA = Not applicable
ng = nanograms
PQL = Practical Quantitation Limit
RRF = Relative Response Factor
SPCC = Spill Prevention, Control, and Countermeasures
SVOC = Semi-volatile Organic Compound
%D = Percent difference
%RSD = Percent Relative Standard Deviation
µg/L = micrograms per liter
µg/kg = micrograms per kilogram

Table 4.3
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Pesticides/PCB

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (µg/kg)**	**Water (µg/L)**	**Soil (µg/kg)**
Pesticide/PCB					
Test Code:	**GC800**				
Method:	**SW846 8080A, 3rd Edition, Nov. 1986**				
Matrix:	**Water–Soil**				
Extract Volume:	**1000 mL – 30g**				
Initial Calibration:	**5 point calibration, %RSD=20%**				
Continuing Calibration:	**Single point calibration, %D = 15%**				
alpha–BHC	319–84–6	0.04	1.3	0.0079	0.13
beta–BHC	319–85–7	0.04	1.3	0.0074	0.62
delta–BHC	319–86–8	0.04	1.3	0.012	0.083
gamma–BHC(Lindane)	58–89–9	0.04	1.3	0.0074	0.57
Heptachlor	76–44–8	0.04	1.3	0.0062	0.20
Aldrin	309–00–2	0.04	1.3	0.0099	0.15
Heptachlor epoxide	1024–57–3	0.04	1.3	0.0069	0.12
Endosulfan I	959–98–8	0.04	1.3	0.0094	0.14
Dieldrin	60–57–1	0.08	2.5	0.012	0.24
4,4–DDE	72–55–9	0.08	2.5	0.014	0.24
Endrin	72–20–8	0.08	2.5	0.014	0.42
Endosulfan II	33213–65–9	0.08	2.5	0.018	0.43
4'4'–DDD	72–54–8	0.08	2.5	0.018	0.35
Endosulfan sulfate	1031–07–8	0.08	2.5	0.020	0.44
4'4–DDT	50–29–3	0.08	2.5	0.017	0.35
Methoxychlor	72–43–5	0.38	12.5	0.038	0.51
Endrin ketone	53494–70–5	0.08	2.5	0.020	0.65
Endrin aldehyde	7421–36–3	0.08	2.5	0.021	0.24
alpha–Chlordane	5193–71–9	0.04	1.3	0.0076	0.23
gamma–Chlordane	5103–74–2	0.04	1.3	0.0074	0.20
Toxaphene	8001–35–2	2.5	83	1.0	33
Aroclor–1016	12674–11–2	1	33	0.21	5.7
Aroclor–1221	11104–28–2	1	33	0.36	7.6

Table 4.3
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Pesticides/PCB

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (µg/kg)**	**Water (µg/L)**	**Soil (µg/kg)**
Aroclor–1232	11141–16–5	1	33	0.095	3.5
Aroclor–1242	53469–21–9	1	33	0.20	6.5
Aroclor–1248	12672–29–6	1	33	0.13	5.9
Aroclor–1254	11097–69–1	1	33	0.22	8.2
Aroclor–1260	11096–82–5	1	33	0.11	8.0

Notes:
CAS = Chemical Abstracts Service
mL = milliliters
MDL = Method Detection Limit
PCB = Polychlorinated biphenyl
PQL = Practical Quantitation Limit
%D = Percent difference
%RSD = Percent Relative Standard Deviation
µg/L = micrograms per liter
µg/kg = micrograms per kilogram

Table 4.4
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Metals by Low-Level ICP Method

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (mg/kg)**	**Water (µg/L)**	**Soil (mg/kg)**
Metals reporting limits by Low Level ICP **Method:** **SW846 Third Edition, Nov. 1986, Method 6010A** **Matrix:** **Water–Soil** **Extract Volume: 100mL – 1g** **Initial Calibration:** **0-500µg/L – varies** **Continuing Calibration: ½ high standard**					
Aluminum	7429–90–5	200.0	10	9.6	37.9
Antimony	7440–36–0	20.0	1.5	3.0	5.0
Arsenic	7440–38–2	10.0	1.0	3.5	2.8
Barium	7440–39–3	10.0	1.0	0.30	0.8
Beryllium	7440–41–7	4.0	0.3	0.1	0.9
Cadmium	7440–43–9	5.0	0.3	0.5	0.8
Calcium	7440–70–2	500.0	50.0	4.6	55.4
Chromium	7440–47–3	10.0	0.5	0.9	1.2

Table 4.4
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Metals by Low-Level ICP Method

		PQLs		MDLs	
Compound	**CAS Number**	**Water (μg/L)**	**Soil (mg/kg)**	**Water (μg/L)**	**Soil (mg/kg)**
Cobalt	7440-48-4	10.0	1.0	1.0	1.6
Copper	7440-50-8	20.0	0.7	1.0	2.2
Iron	7439-89-6	50.0	10.0	16.5	24.4
Lead	7439-92-1	5.0	0.3	1.6	2.6
Magnesium	7439-95-4	500.0	50.0	6.8	45.5
Manganese	7439-96-5	10.0	0.4	0.20	0.6
Nickel	7440-02-0	40	1.0	1.3	2.3
Potassium	7440-09-7	1000.0	100.0	20.0	148.0
Selenium	7782-49-2	10.0	0.5	3.5	3.3
Silver	7440-22-4	10.0	1.0	0.70	1.4
Sodium	7440-23-5	500.0	100.0	173.9	165.0
Thallium	7440-28-0	10.0	1.0	4.5	5.0
Tin	7440-31-5	50.0	5.0	4.2	16.2
Vanadium	7440-62-2	10.0	0.6	0.9	1.1
Zinc	744-66-6	20.0	2.0	1.0	4.2

Notes:
CAS = Chemical Abstracts Service
g = gram
ICP = Inductively Coupled Plasma
MDL = Method Detection Limit
mg/kg = milligrams per kilogram
mL = milliliters
NR = Not reported
PQL = Practical Quantitation Limit
μg/L = micrograms per liter

Table 4.5
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Mercury by Cold Vapors

		PQLs		MDLs	
Compound	**CAS Number**	**Water (µg/L)**	**Soil (mg/kg)**	**Water (µg/L)**	**Soil (mg/kg)**
Mercury by Cold Vapors					
Test Code:	**MT310**				
Method:	**SW846 Third Edition, Nov. 1986**				
Matrix:	**Water–Soil**				
Extract Volume:	**100mL – 0.6g**				
Initial Calibration:	**0 – 10.0 µg/L**				
Continuing Calibration:	**½ high standard**				
Mercury	7439–97–6	0.20	0.033	0.10	0.008

Notes:
CAS = Chemical Abstracts Service
g = grams
MDL = Method Detection Limit
mg/kg = milligrams per kilogram
mL = milliliters
PQL = Practical Quantitation Limit
µg/L = micrograms per liter

Table 4.6
Zone J Storm Water Effluent Evaluation
Severn Trent Laboratories/Savannah Method Detection Limit Study for Miscellaneous Inorganics

		PQLs		MDLs	
Compound	**Method**	**Water (µg/L)**	**Soil (mg/kg)**	**Water (µg/L)**	**Soil (mg/kg)**
Miscellaneous Inorganic Analyses					
Test Code:	**Methods various**				
Method:					
Matrix:	**Water–Soil**				
Extract Volume:					
Initial Calibration:					
Continuing Calibration:					
Cyanide (Total)	SW846–9010	5.0	2.13	0.010	0.07

Notes:
MDL = Method Detection Limit
mg/kg = milligrams per kilogram
PQL = Practical Quantitation Limit
µg/L = micrograms per liter

5.0 EVALUATION OF REFERENCE VALUES OF OFF-SITE LOCATIONS

As central components of the local watershed, the Zone J water bodies receive storm water runoff and other inputs from the majority of surrounding upland areas, including the CNC, via numerous point and non-point source discharges. Point source discharge means a discharge which is released to the waters by a discernible, confined and discrete conveyance, including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which waste is or may be discharged and regulated under the NPDES program. Runoff pollution (technically known as non-point source pollution) occurs when rain or irrigation water flowing over hard surfaces, or loose soil, picks up pollutants and deposits them into the nearest lake, creek, estuary or groundwater supply.

According to the USEPA (Guidance Manual for Preparations of NPDES Permit, 1991), it is recognized that storm water runoff carries pollutants draining off streets and parking lots, construction and industrial sites, and mining, logging, and agricultural areas. Through natural or manmade conveyances, the runoff is channeled into and transported by gravity flow through a wide variety of drainage facilities. Runoff may purge accumulated pollutants out of gutters, catch basins, storm sewers, and drainage channels. Runoff eventually ends up in surface waters such as creeks, rivers, estuaries, bays and oceans. Runoff from urban and industrial areas has been considered as a non-point source of pollution.

In the Zone J Point of Entry Effluent Sampling Work Plan, it was determined that data from 18 non-point source storm water samples from watersheds not influenced by the CNC would be evaluated and used to calculate reference (background) concentration values as part of the storm water effluent migration pathway scenario. The non-point source storm water samples results are of naturally occurring conditions and/or associated with anthropogenic activities, and will be used to establish a baseline data set for comparison to the CNC storm water effluent samples to delineate contaminants that are attributable to the CNC contamination of the water bodies. The goal was to collect storm water for analysis from reference locations within these areas displaying similar watershed characteristics, i.e., types, sizes, sources, land uses and discharges,

to those observed on the CNC property. The data collected from the reference locations are to be used as screening criteria/action levels during Step 3 of the Baseline Ecological Risk Assessment (ERA).

Tidal Excursion Zone/Map

Due to the dynamic estuarine system around Charleston Harbor, tide currents around the CNC were studied to determine the tidal excursion zones and areas for possible reference point locations. A tidal excursion is the net horizontal distance traversed by a particle during a tide cycle of one flood and one ebb. Through hydrodynamic modeling, an excursion zone was established for the Charleston Harbor. During a tidal cycle, a particle released at the CNC into the Cooper River at peak low tide can travel upstream for six hours. Similarly, a particle released at peak high tide can travel downstream for six hours. The estimated upstream tidal excursion into the Cooper River is about 4.5 miles and the downstream excursion will reach the entrance of the harbor, meaning that some particles released at the CNC can be flushed out of the harbor during one tidal cycle. The upstream limit of tidal excursion on the Cooper River is located between the U.S. Naval Weapons Station and the discharge point of Goose Creek into the Cooper River. In addition to the Cooper River tidal excursion, a particle released at the CNC can be transported into the Wando and Ashley Rivers by the tides with the limits of the upstream transport into the rivers of about five miles from their entrances. The zone extends up the Wando River towards the north side of Daniel Island and upstream on the Ashley River just north of the James Island connector and Highway 17. Conversely, the water bodies associated with Zone J can also be receptors of particles from Ashley and Wando Rivers and Charleston Harbor.

Reference Location Selection

Public Works officials identified 58 storm water discharge displaying similar watershed characteristics to those observed on the CNC property. Maps obtained from these municipalities indicated that the following water bodies are potentially influenced by storm water runoff: Goose Creek, Filbin Creek, Noisette Creek, Shipyard Creek, Cooper River, Ashley River, Hobcaw Creek, Wando River, and Shem Creek. An offsite reconnaissance/field survey was conducted to evaluate the 58 potential reference-sampling locations identified during the interviews with

Public Works officials. A site visit was made to each location in order to collect information concerning physical characteristics impacting sampling potential. A ranking system was implemented and characteristics evaluated included: structure type, structure size, location, surrounding land use, tidal influence, presence of an alternate structure, time of day sample may be collected, traffic influence, accessibility, and presence of retention structure.

The following sites, shown in Table 5.1, were chosen as reference locations for the effluent storm water. These locations were evaluated to determine acreage size, discharge to specific water body, land use classification, and types of businesses in operation relative to the CNC past operations.

Table 5.1
Reference Locations

Municipality	Reference Location	Water Body Receiving Discharge	Acres	Landuse	Sample ID	Date of Rain Event
City of Hanahan	Dominion Drive	Goose Creek/Cooper River	20.67	Residential	REF001	1-6-02
	Bankton Drive	Goose Creek/Cooper River	41.46	Commercial/Industrial	REF002	1-14-02
	Remount Road/ Commerce Circle	Cooper River	63.75	Commercial/Industrial	REF003	1-25-02
	North Rhett (East)	Filbin Creek/Cooper River	18.66	Residential/Commercial	REF004	1-25-02
City of North Charleston	Rivers Avenue at Lillie's Game Room	Noisette Creek/Cooper River	344.72	Residential/Commercial	REF005	1-14-02
	Charleston Heights/ Food Bank	Cooper River	71.86	Residential/Commercial	REF009	1-6-02
	Charleston Heights/ Success Street	Cooper River	11.53	Residential/Commercial	REF010	1-25-02
	Bainbridge Avenue/ Spruill Avenue	Shipyard Creek/Cooper River	88.17	Residential/ Commercial/Industrial	REF011	2-7-02
City of Charleston	Ashley Marina	Ashley River	58.13	Commercial	REF012	2-7-02
	City Marina	Ashley River	53.65	Commercial	REF013	1-14-02
	King Street/ Meeting Street	Charleston Harbor	132.08	Residential/Commercial	REF014	1-14-02
	Market Street	Charleston Harbor	69.55	Residential/Commercial	REF015	1-14-02
Town of Mount Pleasant	Coleman Boulevard	Shem Creek/Charleston Harbor	62.44	Residential/Commercial	REF016	1-14-02
	Blockbuster Video/ Hwy. 17	Shem Creek/Charleston Harbor	97.81	Commercial	REF017	1-6-02
	Hidden Cove	Hobcaw Creek/ Wando River	54.28	Residential/Industrial	REF018	1-6-02
Charleston Naval Complex	Drainage Basin 6	Cooper River	3.94	Industrial	REF006	1-6-02
	Drainage Basin 9	Noisette Creek/Cooper River	3.07	Industrial	REF007	3-2-02
	Drainage Basin 28 – North Charleston Discharge	Cooper River	20.63	Industrial	REF008	1-6-02

Analytical Results

A third party validator has validated the data for the 18 reference samples. Appendix B summarizes the results of the analytical data for the reference locations. Results for organic constituents were of low frequency and detection levels; therefore, background values for organic constituents were not calculated. Data for the inorganic constituents shows that six different reference locations had the maximum concentrations reported, with REF014 reporting the most values: 16 out of 23 detected constituents. Of the 23 constituents detected, seven (copper, cyanide, lead, mercury, nickel, silver and zinc) have saltwater surface water screening values. Maximum concentrations for copper, lead, mercury, and nickel were reported at REF014, and maximum concentrations for cyanide, silver and zinc were reported at REF013, REF015, and REF008, respectively, with detections exceeding corresponding regulatory values. Frequencies of detections for mercury, silver, and nickel were low; mercury and silver each had one detection and nickel had two.

Of particular note is the inorganic data from the King/Meeting Street location (REF014) that has the most COPCs identified. The City of Charleston Public Works Department was unclear whether storm water lines between established drainage basins for King and Meeting Streets connected with each other. Therefore, a composite of the two outfalls was collected. On January 14, 2002, during a low tide rainfall event, field personnel observed a low tide water line several feet below the outfall discharge from the seawall, and a steady outbound flow of storm water effluent was discharging from the outfall pipes. Personnel also noted that the storm water effluent discharging from the King Street outfall was clear in color with some suspended sediment; however, the discharge at the Meeting Street outfall was black in color with suspended sediment resembling dissolved marsh clay. During the preliminary site evaluations prior to the January 2002 rainfall, it was also noted that dark water was discharging from the Meeting Street outfall and clear water from the King Street outfall.

Statistical Approach

Background concentrations for surface water samples collected for Zone J at the CNC were calculated using the "2 times the mean concentration method" ("2 X mean") outlined in Region

IV's *Supplemental Guidance to Risk Assessment Guidance for Superfund* (RAGS) (USEPA, November 1995) and the upper tolerance limit (UTL) method presented in *Statistical Guidance for Groundwater Monitoring Data at RCRA Facilities* (USEPA, 1989; 1992). The text below describes each method.

Data Evaluation

Prior to calculation of the "2 X mean" and UTLs, summary statistics were calculated on the 18 storm water effluent reference samples. Table 5.2 summarizes the following statistics for this data group: minimum/maximum concentrations, average detected concentrations, average concentrations calculated using detected concentrations and one-half the quantitation limit, detection frequency, and percentage of nondetects. These statistics were used to determine the best data distribution.

Handling of Nondetect Data

The percentage of nondetect values (data with "U" or "UJ" qualifiers) was calculated for each inorganic in the data set to determine the statistical method to be used to obtain the UTL. The procedures for handling nondetects are as follows:

- If less than 50% of all values in a data set are nondetect, then each nondetect is replaced by half its reported detection limit (i.e., half of the U-qualified value). The statistical distribution of the data was then examined for normality. If the original or log-transformed data values were normally distributed, a parametric UTL was calculated; if not, a nonparametric UTL was determined.

- If nondetects exceeded 50%, a nonparametric UTL (i.e., a tolerance limit not based on a normal distribution) was used. To obtain the desired levels of coverage and confidence, the highest observed value in the data set was used as the nonparametric UTL (USEPA, 1992).

For background concentrations calculated using Region IV guidance ("2 times the mean concentration method"), one-half the quantitation limit was used for all nondetect values before

the mean was calculated. Table 5.3 shows the "2 times the mean concentration method".

Tests for Normality

As explained above, if less than 50% of all reported values of an inorganic analyte in a data set are nondetect, calculation of a parametric UTL may be possible. After replacing each nondetect value by half its reported quantitation limit, the most representative distribution of the data was determined (nontransformed or log-transformed). These tools are used to determine normality, but results are questionable with small sample sizes, i.e., less than 20 to 30 observations (USEPA, 1992). As a result, professional judgment was the final arbiter of whether a data set was determined to be normally or lognormally distributed. Each statistical tool used is defined below.

Shapiro-Wilk Test

The Shapiro-Wilk test indicates whether a data set has a normal distribution by comparing a calculated *W*-statistic with an appropriate tabulated value of *W*. The null hypothesis is that the data set is normally distributed, while the alternate hypothesis is that the population is non-normal. Details concerning the calculation of the *W*-statistic are presented in Gilbert, 1987 and WDOE, 1992. The Washington Department of Ecology (WDOE) program MTCA*Stat* Version 3.0 was used to determine whether data sets were normally or lognormally distributed. The program can be obtained at http://www.ecy.wa.gov/programs/tcp/tools/toolmain.html.

Table 5.2
Chemicals Detected in Storm Water Reference Samples
Charleston Naval Complex, South Carolina

Chemical	Detected Concentration Range	Detection Frequency	Average Detected Concentration	Average Concentration (½ SQLs)[1]	Data Distribution[2]	Percent Nondetect
Aluminum	79 – 11000	18 / 18	1639	1639	lognormal	0
Antimony	3.3 – 5.1	3 / 18	4.2	3.0	undetermined	83
Arsenic	5.6 – 13	4 / 18	7.9	3.4	undetermined	78
Barium	3.4 – 170	18 / 18	30.2	30.2	lognormal	0
Beryllium	0.1 – 0.48	2 / 18	0.290	0.207	undetermined	89
Cadmium	0.89 – 2.2	2 / 18	1.5	0.6	undetermined	89
Calcium	3400 – 130000	18 / 18	26728	26728	lognormal	0
Chromium	0.98 – 21	18 / 18	6.5	6.5	lognormal	0
Cobalt	1 – 3.200	3 / 18	2.1	1	undetermined	83
Copper	4.5 – 70	10 / 18	34.7	21	lognormal	44
Iron	290 – 9700	18 / 18	2067	2067	lognormal	0
Lead	1.8 – 100	16 / 18	18.6	16.8	lognormal	11
Magnesium	310 – 290000	18 / 18	24628	24628	lognormal	0
Manganese	4.4 – 100	18 / 18	37.3	37.3	lognormal	0
Nickel	1.7 – 9.1	11 / 18	3.8	2.6	undetermined	39
Potassium	310 – 120000	18 / 18	11839	11839	lognormal	0
Silver	4.4 – 4.4	1 / 18	4.4	1.2	undetermined	94
Sodium	1900 – 2300000	18 / 18	197667	197667	lognormal	0
Thallium	4.6 – 4.6	1 / 18	4.6	2.9	undetermined	94
Vanadium	1.5 – 32	18 / 18	7.8	7.8	lognormal	0
Zinc	13 – 1300	18 / 18	154	154	lognormal	0
Mercury	0.18 – 0.18	1 / 18	0.180	0.057	undetermined	94
Cyanide, Total	5.6 – 49	5 / 18	16.4	8	undetermined	72

Notes:
All units are micrograms per liter (μg/L).

[1] Average concentration calculated using the detected concentration and ½ the sample quantitation limit (SQL).
[2] Data distribution determined using probability plots and/or the Shapiro-Wilk test (Gilbert, 1987).
Data distribution definitions:
Lognormal indicates the logtransformed data are normally distributed.
Undetermined indicates that nonparametric UTL considered because nondetects exceed 50%.

Table 5.3
Summary of the "2 Times the Mean Concentration Method" for Storm Water Reference Samples
Charleston Naval Complex, South Carolina

Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Nickel
REF001	380	1.5	1.75	9	0.05	0.25	14000	1.6	0.5	1.3	290	1.9	1600	11	0.65
REF002	2500	1.5	1.75	14	0.05	0.25	18000	5.3	0.5	1.2	2300	4.4	560	21	3.6
REF003	1600	1.9	1.35	46	0.15	0.25	51000	3.7	0.4	8.3	1600	3.55	2500	76	3.2
REF004	3100	4.3	2.45	170	0.15	0.89	27000	14	0.4	44	4900	47	1500	62	8.3
REF005	1300	1.5	6.1	44	0.05	0.25	24000	9.9	0.5	12	2200	22	3300	51	2.3
REF006	310	1.5	1.75	3.4	0.05	0.25	7400	1.2	0.5	1.7	440	2.8	13000	7.8	0.65
REF007	760	1.9	1.35	5.7	0.15	0.25	9600	1.1	0.4	4.500	660	1.1	1000	4.4	0.85
REF008	970	1.5	1.75	16	0.05	2.2	4900	4.3	0.5	12	1400	21	530	28	2.6
REF009	79	1.5	1.75	29	0.05	0.25	37000	0.98	0.5	2.2	1300	1.8	2000	35	0.65
REF010	1100	1.9	1.35	21	0.15	0.25	18000	2.9	0.4	40	4000	15	14000	80	1.7
REF011	1250	10	5	28.5	0.1	2.5	44500	20.5	5	9.850	1650	12	27000	36.5	2.55
REF012	750	10	5	30	2	2.5	33000	6.4	1	27	1300	7.9	46000	36	2.4
REF013	660	1.5	6.7	12	0.05	0.25	5500	6.3	0.5	66	730	8.2	2600	19	2.5
REF014	11000	3.3	13	55	0.48	0.25	130000	21	3.2	70	9700	100	290000	100	9.1
REF015	1300	5.1	5.6	26	0.05	0.25	34000	6.9	2.2	65	1700	44	36000	36	3.3
REF016	550	1.5	1.75	14	0.05	0.25	6800	5.9	0.5	8.5	810	3.1	610	16	0.65
REF017	290	1.5	1.75	6.2	0.05	0.25	3400	1.6	0.5	2.1	330	4.9	310	12	0.65
REF018	1600	1.5	1.75	13	0.05	0.25	13000	3.4	0.5	2.2	1900	2	790	39	0.65
Frequency of Hits	18/18	3/18	4/18	18/18	2/18	2/18	18/18	18/18	3/18	10/18	18/18	16/18	18/18	18/18	11/18
Mean	1639	2.97	3.44	30.2	0.21	0.64	26728	6.5	1	21	2067	16.8	24628	37.3	2.57
2× Mean	3278	5.93	6.88	60.3	0.41	1.29	53456	13	2	42	4134	33.6	49256	74.5	5.14

Notes:
All units are micrograms per liter (μg/L).

Table 5.3
Summary of the "2 Times the Mean Concentration Method" for Storm Water Reference Samples
Charleston Naval Complex, South Carolina

Sample ID	Potassium	Silver	Sodium	Thallium	Vanadium	Zinc	Mercury	Cyanide
REF001	2500	0.35	11000	4.6	2.2	13	0.05	5
REF002	910	0.35	2000	2.25	9.1	63	0.05	5
REF003	1900	0.7	6500	3.15	6.2	86	0.05	5
REF004	3400	0.7	8900	3.15	14	240	0.05	5
REF005	2500	0.35	20000	2.25	6.2	140	0.05	6.8
REF006	6300	0.35	120000	2.25	4.2	69	0.05	5
REF007	1400	0.7	1900	3.15	2.6	19	0.05	5
REF008	740	0.35	3600	2.25	11	1300	0.05	5
REF009	2100	0.35	9900	2.25	1.5	35	0.05	5
REF010	6200	0.7	100000	3.15	6.2	120	0.05	5
REF011	17000	5	250000	5	5.85	85.5	0.05	5.6
REF012	22000	5	400000	5	5.8	91	0.05	8.6
REF013	2100	0.35	23000	2.25	9.5	94	0.05	49
REF014	120000	0.35	2300000	2.25	32	99	0.18	5
REF015	22000	4.4	290000	2.25	8.4	150	0.05	5
REF016	770	0.35	6200	2.25	4.2	59	0.05	12
REF017	310	0.35	2000	2.25	2.7	57	0.05	5
REF018	980	0.35	3000	2.25	8.7	50	0.05	5
Frequency of Hits	18/18	1/18	18/18	1/18	18/18	18/18	1/18	5/18
Mean	11839	1.17	197667	2.89	7.8	154	0.06	8.17
2× Mean	23679	2.34	395333	5.77	15.6	308	0.11	16.3

Notes:
All units are micrograms per liter (μg/L).

The MTCA*Stat* program performs the W test on both the untransformed and log-transformed values if the sample size does not exceed 50.

Probability Plot Method

The probability plot of a normally or lognormally distributed data set should follow a straight line, i.e., correlation coefficient (r^2) should be greater than 0.90. If the line is curved, the data set is non-normal. The MTCA*Stat* program evaluates data for lognormality and normality using the normal probability plot method. As a measure of how well the log-transformed and untransformed data fit a straight line, the r^2 values are calculated and displayed. A good fit (defined as $r^2 \geq 0.900$) for the logtransformed data is consistent with the default assumption of a lognormal distribution. If this criterion is not met, the r^2 for the untransformed data is used to test for a normal distribution. An r^2 is not calculated and displayed if the regression analysis of variance F-value is non-significant at the $p = 0.05$ level or cannot be calculated.

Output from the MTCA*Stat* program can be provided upon request for all sample data. Each metal has the normality output as a table and two figures that graph the probability plots for the normal and lognormal cases.

Calculation of UTL

After the transformation of the data has been established and the data set is determined to be normally distributed, a parametric UTL is calculated for each analyte. The UTL represents the upper limit of a tolerance interval for a given data set. The tolerance limits calculated in this background study represent one-sided UTLs with 95% coverage and 95% confidence. A one-sided UTL with 95% coverage and 95% confidence allows the user to assume that there is a 95% certainty that a given value is higher than 95% of the possible sample values from the population.

A one-sided UTL is calculated as shown in Equation 1, where x is the mean of the data, s is the standard deviation, and K is the one-sided normal tolerance factor based on the frequency of the data set. K is found in several statistical handbooks, including Gilbert (1987, Table A3); α is 0.05, p is 0.95. K is 2.54 for 18 samples. Equation 1: $UTL_{1-\alpha}(x) = \bar{x} + sK_{1-\alpha,p}$.

The calculated UTLs for Zone J are shown in Table 5.4. REF014 was initially evaluated for exclusion from the reference value data set; however, the results showed that except for calcium, magnesium, manganese, and sodium, the removal of the sample data did not cause an order of magnitude change in "the 2 times the mean" or UTL calculations.

Table 5.4
Summary of the UTLs for Storm Water Reference Samples
Charleston Naval Complex, South Carolina

Chemical	n	Mean (X) (µg/L)	Data Transformation	Type of UTL Calculated[a]	Standard Deviation (s) (unitless)	Tolerance Factor (k) (unitless)	UTL (µg/L)
Aluminum	18	1,639	lognormal	parametric	2,461	2.543	7,896
Antimony	18	2.97	undetermined	nonparametric	NA	NA	5.1
Arsenic	18	3.44	undetermined	nonparametric	NA	NA	13
Barium	18	30.2	lognormal	parametric	37.9	2.543	127
Beryllium	18	0.21	undetermined	nonparametric	NA	NA	0.48
Cadmium	18	0.64	undetermined	nonparametric	NA	NA	2.2
Calcium	18	26,728	lognormal	parametric	29,519	2.543	101,795
Chromium	18	6.50	lognormal	parametric	6.17	2.543	22.2
Cobalt	18	1	undetermined	nonparametric	NA	NA	3.2
Copper	18	21.0	lognormal	parametric	24.7	2.543	83.8
Iron	18	2,067	lognormal	parametric	2,255	2.543	7,802
Lead	18	16.8	lognormal	parametric	24.9	2.543	80.2
Magnesium	18	24,628	lognormal	parametric	67,617	2.543	196,577
Manganese	18	37.3	lognormal	parametric	27.1	2.543	106
Nickel	18	2.57	undetermined	nonparametric	NA	NA	9.1
Potassium	18	11,839	lognormal	parametric	27,922	2.543	82,844
Silver	18	1.17	undetermined	nonparametric	NA	NA	4.4
Sodium	18	197,667	lognormal	parametric	537,918	2.543	1,565,591
Thallium	18	2.89	undetermined	nonparametric	NA	NA	4.6
Vanadium	18	7.80	lognormal	parametric	6.88	2.543	25.3
Zinc	18	154	lognormal	parametric	291	2.543	894
Mercury	18	0.06	undetermined	nonparametric	NA	NA	0.18
Cyanide	18	8.2	undetermined	nonparametric	NA	NA	49

Notes:

a = The parametric UTL for lognormally distributed data calculated using equation: UTL = X + k(s). where X is the mean concentration, k is the tolerance factor (a = 0.05, p = 0.95), and s is the standard deviation. Nonparametric UTLs were set equal to the maximum detected concentration.

n = number of samples

Conclusions

Conceptual Approach

- The overall determination of reference values for Zone J had to take a unique approach from conventional methods. Because a goal of the RFI is to determine the CNC's contribution to contamination of the surrounding water bodies through storm water runoff, it was necessary to identify other possible routes of storm water contaminant migration, to quantify storm water runoff from these routes, and to eventually compare results to runoff from the CNC migration routes.

Tidal Excursion

- Providing one set of reference values is more defensible because of the tidal excursion zones of the surrounding water bodies. Though distribution of the data shows a majority of the maximum concentrations and the number of Saltwater-Surface Water Screening Values are located in the City of Charleston, the water bodies surrounding the CNC can be receptors of particles from the rivers surrounding the City of Charleston.

Statistical Approach

- Review of the background concentrations in Table 5.5 generally shows the "2 X mean" values are more conservative for the two methods. Values for antimony, thallium, and cyanide are higher using the "2 X mean" method, but the rate of frequency of these constituents for storm water effluent samples collected to date (36 samples, detections only), as shown in Table 6, is low. Antimony, which does not have a Saltwater-Surface Water Screening Value, was detected in two samples and exceeded background in one sample (EFF005); and cyanide, which has a screening value of 1 μg/L, was detected in one sample and did not exceed background. The screening value for thallium is 21.3 μg/L, and none of the results exceeded the screening value.

Table 5.5
Comparison of Calculated Background Concentrations
Charleston Naval Complex, South Carolina

Chemical	2× Mean	UTLs
Aluminum	3277.67	7896.48
Antimony	5.93	5.10
Arsenic	6.88	13.00
Barium	60.31	126.50
Beryllium	0.41	0.48
Cadmium	1.29	2.20
Calcium	53455.56	101795.06
Chromium	13.00	22.19
Cobalt	2.00	3.20
Copper	41.98	83.83
Iron	4134.44	7801.59
Lead	33.63	80.21
Magnesium	49255.56	196576.60
Manganese	74.52	106.18
Nickel	5.14	9.10
Potassium	23678.89	82844.16
Silver	2.34	4.40
Sodium	395333.33	1565591.49
Thallium	5.77	4.60
Vanadium	15.59	25.30
Zinc	307.83	893.78
Cyanide, Total	16.33	0.18

Notes: All units are microgram per liter (μg/L).

6.0 DRAINAGE BASIN EVALUATIONS

Section 6 summarizes the CNC drainage basins that discharge into Noisette Creek and Shipyard Creek. Twenty-one drainage basins discharge to the water bodies; however, only drainage basins containing upland SWMUs/AOCs and storm water drainage features were evaluated for storm water effluent contamination. Storm water effluent samples were collected from a variety of storm water drainage features: manholes, catch basin and drainage ditches.

Based on risk management decisions, storm water effluent samples were compared to the Zone J screening criteria. Screening level criteria for surface soil and shallow groundwater samples were used to identify possible upland sources to establish a linkage with the effluent samples. The following table describes the order and type of screening criteria for each sample media for the pathway evaluations:

Table 6.0
Zone J Screening Criteria for Sample Media

Sediment/Surface Soil	*Shallow Groundwater*	*Effluent Samples*
1. Zone-specific Background (inorganics and selected poly aromatic hydrocarbons (PAHs) only)	1. Zone-specific Background (inorganics and selected PAHs only)	1. Reference Concentrations (inorganics)
2. Sediment Screening Values (SSV, USEPA Region IV)	2. Chronic Saltwater Water Quality Screening Values (USEPA Region IV)	2. Chronic Saltwater Water Quality Screening Values (USEPA Region IV)
	3. Acute Saltwater Water Quality Screening Values (USEPA Region IV)	3. Acute Saltwater Water Quality Screening Values (USEPA Region IV)
	4. Maximum Contaminant Levels (MCLs) for Groundwater	4. Maximum Contaminant Levels (MCLs) for Groundwater

6.1 Drainage Basin Evaluations for Noisette Creek

There are 14 drainage basins that discharge into Noisette Creek. Seven of those fourteen have upland SWMU/AOCs associated with them. Storm water effluent samples were collected from the seven drainage basins to evaluate potential contaminants that may be discharging into Noisette Creek. A total of nine storm water effluent samples were collected to characterize those drainage basins. Table 6.1 summarizes the drainage basins associated with Noisette Creek, and

Figure 6-1 illustrates Noisette Creek drainage basins and outfalls. Table 6.2 summarizes the precipitation and storm interval information during sampling activities.

Table 6.1
Noisette Creek Drainage Basins
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Zone	SWMU/AOC	Storm Water Effluent Sample ID	Storm Water Location (Catch basin/Manhole)
1A	A	39	EFF002	1A-A
1B	A	42	EFF003	1B-A
1C	A	42	EFF004	Ditch-1C
		505		
9	A	NL	NR	NA
10	A	42	EFF007	10/1-A
		43		
10A	C	44	EFF008	Ditch-10A S (South)
		512	EFF009	Ditch-10A N (North)
			EFF010	Ditch-10A C (Central)
10B	C	44	EFF011	10B/4
		700		
10C	C	47	EFF012	10C-A
10D	B	NL	NR	NA
10E	B	NL	NR	NA
11	B	NL	NR	NA
12	B	NL	NR	NA
13	B	NL	NR	NA
14	B	NL	NR	NA

Notes:
NA = Not Applicable
NL = No Listed SWMU/AOC
NR = Not Required according to the Zone J Point of Entry Work Plan

Table 6.2
Noisette Creek
Rainfall/ Sample/Tide Event Data

Sample ID	Date Collected	Time Collected	Start/End of Rainfall	Total Rainfall During Hour of Collection	Rainfall Amount	Low Tide Time	Duration
EFF009	25-Jan-02	2:25 PM	7:00 AM/ 12:00 PM	0.00	0.09	11:30 AM	5 hours
EFF010	25-Jan-02	2:25 PM	7:00 AM/ 12:00 PM	0.00	0.09	11:30 AM	5 hours
EFF002	7-Feb-02	3:30 PM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours
EFF004	7-Feb-02	9:15 AM	1:00 AM/ 4:00 PM	0.04	0.94	10:48 AM	15 hours
EFF008	7-Feb-02	8:55 AM	1:00 AM/ 4:00 PM	0.06	0.94	10:48 AM	15 hours
EFF011	7-Feb-02	11:00 AM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours

Table 6.2
Noisette Creek
Rainfall/ Sample/Tide Event Data

Sample ID	Date Collected	Time Collected	Start/End of Rainfall	Total Rainfall During Hour of Collection	Rainfall Amount	Low Tide Time	Duration
EFF003	2-Mar-02	4:45 PM	7:00 AM/ 8:00 PM	0.09	1.88	4:50 PM	13 hours
EFF007	2-Mar-02	4:55 PM	7:00 AM/ 8:00 PM	0.09	1.88	4:50 PM	13 hours
EFF012	2-Mar-02	5:00 PM	7:00 AM/ 8:00 PM	0.09	1.88	4:50 PM	13 hours

6.2 Drainage Basin 1-A

Drainage Basin 1-A encompasses approximately 7.5 acres within Zone A in the northern section of the CNC. Land cover within the drainage basin consists of approximately 50% unpaved surfaces (i.e., mostly grass), 45% paved surfaces, and 5% building foundations. Most storm water runoff within the drainage basin is directed to a storm sewer pipeline with five catch basins and two ditches that are directed to Outfall 1A which discharges to Noisette Creek.

Figure 6-2 illustrates the area encompassing Drainage Basin 1-A and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.2.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that no SWMU/AOC is partly or completely within the boundary of Drainage Basin 1-A. However, sample locations associated with SWMUs 39 and 42 fall within the boundaries of Drainage Basin 1-A. Potential source areas for Drainage Basin 1-A {SWMU 39 (Petroleum, Oil and Lubricant (POL) Drum Storage) and SWMU 42 (former asphalt plant and tanks)} are listed in Table 6.2.1 along with current status. SWMU 42 and AOC 505 (creosote cross tie/ballast storage area) are overlapping areas of investigation and will be discussed together. Due to close proximity, SWMU 42 and AOC 505 were investigated as a combined site. However, sample locations associated with AOC 505 do not fall within the basin boundaries and are not considered potential contributors to Drainage Basin 1-A.

Table 6.2.1
Drainage Basin 1-A SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 39	POL Drum Storage	RFI Complete, CMS field work ongoing
SWMU 42	Former Asphalt Plant and Tanks	RFI complete; Draft CMS report submitted; Interim Measure (IM) complete
AOC 505	Creosote Cross Tile/Ballast Storage Area	RFI complete; Draft CMS report submitted; IM complete

6.2.1.1 SWMU 39

Site Description and History

SWMU 39 refers to a former petroleum, oil, and lubricant (POL) drum storage area situated north of Building 1604, near the northern boundary of the CNC. That portion of the site adjoining the south, east, and west sides of Building 1604 is paved, while the portion that continues north to the property boundary is gravel–covered. The potential for petroleum releases from offsite sources to impact the CNC property was included in the scope of the site investigation due to the close proximity of the Hess Oil, Inc. tank farm to the property boundary.

Previous Investigations

A summary of investigative activities performed at SWMU 39 is presented in Table 6.2.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone A RFI Report* (EnSafe, 1998).

Table 6.2.2
Summary of SWMU 39 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1997	Site soil and groundwater investigation.	
		Round 1 **Soil:** 15 surface borings (0 to 1 foot) 15 subsurface borings (3 to 5 feet) (039SB001 – 039SB015): VOCs, SVOCs, metals, pesticides/PCBs, and Total Petroleum Hydrocarbons (TPH)	***Round 1*** **Groundwater:** 5 shallow wells (039001 - 039005): VOCs, SVOCs, metals, pesticides/PCBs, TPH (1duplicate collected for same

Table 6.2.2
Summary of SWMU 39 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
		(2 duplicates collected for same parameters plus herbicides, cyanide, hexachrome, organophosphorous (OP) pesticides, and dioxins)	parameters plus herbicides, cyanide, OP pesticides, chloride, sulfate, dioxins, hexachrome, and total dissolved solids (TDS))
RFI (EnSafe)	1995-1997	***Round 2*** **Soil:** 25 surface borings (0 to 1 foot) 25 subsurface borings (3 to 5 feet) (039SB016 – 039SB018, 039SB020, and 039SB025): TPH and pesticides/PCBs (039SB022 – 039SB024, and 039SB038): TPH and SVOCs (039SB019, 039SB021, 039SB026 – 039SB037, and 039SB039 – 039SB040): TPH (1 duplicate collected for same parameters plus herbicides, cyanide, hexachrome, OP pesticides, and dioxins)	***Round 2*** **Groundwater:** 5 shallow wells (039001 - 039005): VOCs
RFI (EnSafe)	1995-1997	***Round 3*** **Soil:** 3 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (039SB041 – 039SB043): VOCs	***Round 3*** **Groundwater:** 5 shallow wells (039001 - 039005): VOCs, SVOCs, metals, and hexachrome (1 duplicate collected for same parameters plus cyanide and dioxins)
RFI (EnSafe)	1995-1997	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 5 shallow wells (039001 - 039003,): VOCs, SVOCs, metals, chloride, sulfate, hexachrome, and TDS (039004 and 039005): VOCs, SVOCs, metals, chloride, sulfate, hexachrome, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 5*** **Soil:** No Soil Samples Collected.	***Round 5*** **Groundwater:** 10 additional wells installed and sampled (1996) of which there were 7 shallow wells (039006 - 039012): VOCs
RFI (EnSafe)	1995-1997	***Round 6*** **Soil:** 1 biased sample (039SB10I02): VOCS and SVOCs	***Round 6*** **Groundwater:** No Groundwater Samples Collected.

Table 6.2.2
Summary of SWMU 39 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1997	***Round 7*** **Soil:** No Soil Samples Collected.	***Round 7*** **Groundwater:** 12 shallow wells (039001, 039002): VOCs, SVOCs, metals, chloride, sulfate, hexachrome, dioxins, and TDS (039003): VOCs, SVOCs, metals, chloride, sulfate and TDS (039004): VOCs, SVOCs, metals, chloride, sulfate dioxins, and TDS (039005): VOCs, SVOCs, metals, chloride, sulfate, pesticides/PCBs, cyanide, dioxins, and TPH (039006 - 039012): VOCs, SVOCs, metals, chloride, sulfate, dioxins, and TDS (2 duplicates collected for VOCs, SVOCs, chloride, sulfate, metals, dioxins, and TDS)
RFI (EnSafe)	1995-1997	***Round 8*** **Soil:** No Soil Samples Collected.	***Round 8*** **Groundwater:** No Groundwater Samples Collected.
RFI (EnSafe)	1995-1997	***Round 9*** **Soil:** No Soil Samples Collected.	***Round 9*** **Groundwater:** 3 shallow wells (039013 - 039015): VOCs, SVOCs, metals, pesticides/PCBs, and cyanide
RFI (EnSafe)	1995-1997	***Round 10*** **Soil:** No Soil Samples Collected.	***Round 10*** **Groundwater:** 7 shallow wells (039008 - 039010, 039012, and 039013): VOCs, SVOCs, metals, chloride, sulfate, dioxins, TDS, and TPH (039014 and 039015): VOCs, SVOCs, alkalinity, ammonia, chloride, cyanide, ferrous iron, nitrate, phosphorous, sulfate, sulfide, biochemical oxygen demand (BOD), metals, and pesticides/PCBs (1 duplicate collected for VOCs, SVOCs, chloride, sulfate, dioxins, metals, TDS, and TPH)
RFI (EnSafe)	1995-1997	***Round 11*** **Soil:** No Soil Samples Collected.	***Round 11*** **Groundwater:** 10 shallow wells

Table 6.2.2
Summary of SWMU 39 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
			(039006 - 039015): VOCs and SVOCs (2 duplicates collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 12*** **Soil:** No Soil Samples Collected.	***Round 12*** **Groundwater:** 10 shallow wells (039006 - 039015): VOCs, SVOCs, and metals (1 duplicate for same parameters)
MNA (EnSafe)	1998-1999	***Round 1*** **Soil:** No Soil Samples Collected.	***Round 1*** **Groundwater:** 15 shallow wells (039001 - 039015): VOCs, total organic carbon (TOC), and sulfate
MNA (EnSafe)	1998-1999	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 14 shallow wells (039001 - 039014): VOCs, total kjeldahl nitrogen (TKN), TOC, nitrate, phosphorous, sulfate, and sulfide 12 additional wells installed and sampled (1998) of which there were 4 shallow wells (039016 - 039019): VOCs, TKN, TOC, nitrate, phosphorous, sulfate, and sulfide **(MNA Round 2 Confirmatory Sampling):** 5 shallow wells (039009, 039016 - 039019): VOCs 6 additional wells installed and sampled (1999) of which there were 2 shallow wells (039020 and 039021): VOCs
MNA (EnSafe)	1998-1999	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** ***Groundwater:*** 19 shallow wells (039001 - 039014, 039016, 039018 - 039021): VOCs, TOC, alkalinity, iron, sulfate, nitrate, and sulfide
CMS (EnSafe)	1998-1999	***Round 1*** **Soil:** 15 surface borings (0 to 1 foot) (039SB047 – 039SB061): VOCs,	***Round1*** **Groundwater:** 19 shallow wells (039001 - 039019): Chloride,

Table 6.2.2
Summary of SWMU 39 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
		SVOCs, and metals (1 duplicate collected for same parameters)	metals, and TDS (2 duplicates collected for same parameters)
CMS (EnSafe)	1998-1999	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 1 multi-level well installed and sampled (1999) (039024 M): VOCs
CH2M-Jones	2001	***Round 1*** **Soil** One surface boring (0 to 1 foot) (GDLSB02201): SVOCs, metals	***Round 1*** **Groundwater** No Groundwater Sample Collected.
CH2M-Jones	2002	***Round 1*** **Soil** No soil samples collected	***Round 1*** **Groundwater** 1 shallow well (039023): VOCs, methane (CH4), carbon dioxide (CO2).

Notes:
MNA = Monitored Natural Attenuation

Nature and Extent of Contaminants

Approximately 80 sample locations associated with SWMU 39 were evaluated for the presence of contaminants between 1995 and 2002. Of these 80, approximately 21 sample locations are within the boundaries of Drainage Basin 1-A. Surface, subsurface and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were detections of Benzo(a)pyrene Equivalent Quotients (BEQs), beryllium and Arochlor 1260 in soil; and VOCs and inorganics in groundwater.

6.2.1.2 SWMU 42/AOC 505

Site Description and History

These sites were combined into one investigation due to their close proximity and their potential for similar COPCs. These overlapping sites are located in the southwest portion of Zone A and are bounded by a wetland and railroad spur to the west, Noisette Creek to the south, and the railroad storage yard surrounding Building 1614 to the north. The east side of SWMU 42/AOC 505 roughly follows a rail spur that divides an open area to the Noisette Creek bridge on Avenue

D. SWMU 42 consists of a former asphalt plant site and associated tanks. The facility operated from 1947 until 1962 and has since been demolished. The site currently contains a concrete rack once used to support asphalt-related aboveground storage tanks (ASTs). The unpaved surrounding area contains rock and asphalt debris. AOC 505 consists of Building 1803, the former golf course maintenance shop where pesticides for the golf course were handled, and nearby surrounding area, which was used to store creosote cross-ties and excavated railroad ballast during the 1960s and 1970s. Currently, the site is a graveled area containing asphalt rubble, traces of tar, and other debris. Little information is available regarding site design features, specific dates of operation, or operating practices since operations were discontinued at SWMU 42 and AOC 505 in the 1960s and 1970s.

Several chemicals of concern (COCs) requiring further evaluation through the CMS process were identified for surface soil based on RFI analytical results. An Interim Stabilization Measure (IMS), completed at SWMU 42 by the Navy Environmental Detachment (DET) in March 1999, was performed to remove and dispose of lead contaminated soil. A total of 5.4 cubic yards of soils was excavated from two 6-foot by 6-foot by 2-foot pits at boring locations 505SB005 and 042SB009. The excavated soil was removed from the site, characterized and then disposed at an offsite landfill. Confirmation sample results from the excavation pits indicated that soil with a lead concentration greater than 400 mg/kg had been removed.

Previous Investigations

A summary of investigative activities performed at SMWU 42/AOC 505 is presented in Table 6.2.3, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone A RFI* (EnSafe, 1998).

Table 6.2.3
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1995 – 1996	Site investigation of soil and groundwater.	
	1995	***Round 1*** **Soil:** 21 surface borings (0 to 1 foot) 17 subsurface borings (3 to 5 feet) (042SB001 – 042SB0010; 505SB001 – 505SB011): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (2 duplicates collected for SVOCs, pesticides/PCBs, herbicides, VOCs, cyanide, dioxin, hexachrome, OP pesticides, and metals)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): Cyanide, herbicides, metals, pesticides, PCBs, SVOCs, and VOCs
RFI (EnSafe)	1996	The interim round was performed to confirm the presence of chlorinated solvent detections. ***Interim Round*** **Soil:** No soil samples were collected as part of the interim round.	***Interim Round*** **Groundwater:** 4 shallow wells (042001 – 042G03 and 505G01): VOCs
RFI (EnSafe)	1996	***Round 2*** **Soil:** 17 surface borings (0 to 1 foot) 16 subsurface borings (3 to 5 feet) (042SB011 – 042SB021): Metals and SVOCs (505SB012 – 505SB017): SVOCs and pesticide/PCBs (2 duplicates collected for SVOCs and metals and 1 duplicate samples collected for SVOCs and pesticides/PCBs)	***Round 2*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 3*** **Soil:** 8 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (042SB022 – 042SB025 and 505SB018 – 505SB021): SVOCs (2 duplicates collected for same parameters)	***Round 3*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals

Table 6.2.3
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
CMS (EnSafe)	1998 – 1999	Site investigation of soil and groundwater.	
	1998	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB026, 042SB033, 042SB037, 042SB040): Arsenic, beryllium, SVOCs, SPLP metal, TCLP metal (042SB027 – 042SB032, 042SB034 – 042SB036, 042SB038 – 042SB039, 042SB041 – 042SB043): Arsenic, beryllium, and SVOCs (one duplicate collected for arsenic and beryllium)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003): Metals, chloride, and TDS (505001): Metals, chloride, pesticides/PCBs, and TDS
CMS (EnSafe)	1999	***Round 2*** **Soil:** 10 surface borings (0 to 1 foot) (042SB044 – 042SB049): Arsenic (042SBC01 and 042SBC02): Total Lead, SPLP-Metal, TCLP-Metal (042SBC03 and 042SBC04): Total Lead	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001-2002	Site investigation of soil and groundwater.	
	2001	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB050-042SB053): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (042SB054-042SB061): Arsenic (042SB063-042SB067): SVOCs	***Round 1*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2002	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 2 shallow well (042002): VOCs (505001): Acetone

Notes:
SPLP = Synthetic Precipitation Leaching Procedure
TCLP = Toxicity Characteristic Leachate Procedure

Nature and Extent of Contaminants

Approximately 95 sample locations associated with SWMU 42/AOC 505 were evaluated for the presence of contaminants between 1995 and 2002. Soil sample location 042SB050 is the only location within the boundaries of Drainage Basin 1-A. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were the detections of non-chlorinated SVOCs (BEQs), arsenic, and beryllium in soil and chlorinated solvents (PCE, 1,1,2,2-TCA, and 1,1-DCE), aluminum, arsenic, chromium, silver, vanadium, and manganese in groundwater. Based on analytical results, a CMS was recommended for surface soils only.

6.2.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at manhole 1A-A on February 7, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 1-A into Noisette Creek and subsequently to the Cooper River. Analytical detections for sample EFF002 are presented in Table 6.2.4.

Table 6.2.4
Storm Water Effluent Sampling Results
Drainage Basin 1-A

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
1-A	1A-A	EFF002	Aluminum	1,700	3,277.67	NL	No
			Barium	23	60.31	NL	No
			Calcium*	20,000	53,455.56	NL	No
			Chromium	5.90	13.00	50	No
			Iron	1,300	4,134.44	NL	No
			Lead	18	33.63	8.50	No
			Magnesium*	840	49,255.56	NL	No
			Manganese	16	74.52	NL	No
			Potassium*	900	23,678.89	NL	No
			Sodium*	1,600	395,333.33	NL	No
			Vanadium	5.90	15.59	NL	No
			Zinc	140	307.83	86	No
			bis(2-Ethylhexyl)phthalate	**2.60**	**NL**	**NL**	**Yes**

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.2.3 Pathway Evaluation

Data collected during the investigative activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 and determine the applicability of each scenario to Drainage Basin 1-A. The Zone J data evaluation resulted in three possible outcomes based on the available data present for Drainage Basin 1-A. Table 6.2.5 summarizes the migration pathway scenarios.

Table 6.2.5
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 1-A

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.2.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travels through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 1-A were discovered during review of environmental incident reports that were maintained by the former Charleston Naval Shipyard (CNSY) environmental office (Code 106) between the time period from 1982 until base closure in 1996, and EBS reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.2.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release into Zone J water bodies from drainage basin outfalls. The pathway evaluation shows that 1 of 5 catch basins (1A-D), and one ditch are near surface soil sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near these drainage features to Zone A background concentrations and the ecological risk based screening criteria did not identify existing areas which have the potential to provide an upland source of bis(2-Ethylhexyl)phthalate in the storm sewer system.

6.2.3.3 Scenario 1c

Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc. All rounds of groundwater data collected within Drainage Basin 1-A were reviewed. The preliminary evaluation did not identify any groundwater contaminated with bis(2-Ethylhexyl)phthalate intercepting the storm water drainage pipeline within Drainage Basin 1-A.

6.2.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information

obtained from the Davis and Floyd Study and the *Zone L RFI Report* (EnSafe, December 1998) indicates that there are no cross-connects present in Drainage Basin 1-A.

6.2.4 Summary of Potential COPCs

There are no potential COPCs for Drainage Basin 1-A due to a lack of an upland terrestrial source identification.

6.3 Drainage Basin 1-B

Drainage Basin 1-B encompasses approximately 4 acres within Zone A, located on the northeast section of the CNC. Land cover within the drainage basin consists of approximately 80% unpaved surfaces (i.e., mostly grass) and 20% paved surfaces. Storm water runoff within the basin is directed to three catch basins discharging to Noisette Creek via Outfall 1B.

Figure 6-3 illustrates the area encompassing Drainage Basin 1-B and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.3.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 1-B. The sites are listed in Table 6.3.1, along with their current status. SWMU 42 (former asphalt plant and tanks) and AOC 505 (creosote cross tie/ballast storage area) are overlapping and will be discussed together. SWMU 42 and AOC 505 are not entirely located with in Drainage Basin 1-B. The boundary of SWMU 42 transcends the boundary of Drainage Basin 1-B along the south side where it extends into Drainage Basin 1-C. The boundary of AOC 505 transcends the boundary on the south and west sides where it also extends into Drainage Basin 1-C. Due to close proximity, SWMU 42 and AOC 505 were investigated as a combined site; however, sample locations associated with AOC 505 do not fall within the basin boundaries and are not considered potential contributors to Drainage Basin 1-B.

Table 6.3.1
Drainage Basin 1-B SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 42	Former Asphalt Plant and Tanks	RFI complete; Draft CMS report submitted; IM complete
AOC 505	Creosote Cross Tile/Ballast Storage Area	RFI complete; Draft CMS report submitted; IM complete

6.3.1.1 SWMU 42/AOC 505
Site Description and History

These sites were combined into one investigation due to their close proximity and their potential for similar COPCs. These overlapping sites are located in the southwest portion of Zone A and are bounded by a wetland and railroad spur to the west, Noisette Creek to the south, and the railroad storage yard surrounding Building 1614 to the north. The east side of SWMU 42/AOC 505 roughly follows a rail spur and divides an open area to the Noisette Creek bridge on Avenue D. SWMU 42 consists of a former asphalt plant site and its associated tanks. The facility operated from 1947 until 1962, and has since been demolished. The site currently contains a concrete rack once used to support asphalt-related ASTs. The unpaved surrounding area contains rock and asphalt debris. AOC 505 consists of Building 1803, the former golf course maintenance shop, and a nearby area, which was used to store creosote cross-ties and removed railroad ballast during the 1960s and 1970s. Pesticides used at the golf course were handled in Building 1803. Currently, the site is a graveled area containing asphalt rubble, traces of tar, and other debris. Since operations were discontinued at SWMU 42 and AOC 505 in the 1960s and 1970s, little information is available regarding the site design features, specific dates of operation, or operating practices.

Based on RFI analytical results, several COCs requiring further evaluation through the CMS process were identified for surface soil. An IMS, completed at SWMU 42 by the DET in March 1999, was performed to remove and dispose of lead contaminated soil. A total of 5.4 cubic yards of soils was excavated from two 6-foot by 6-foot by 2-foot pits at boring locations 505SB005 and 042SB009. The excavated soil was removed from the site, characterized and then disposed at an offsite landfill. Confirmation sample results from the excavation pits indicated that soil with a lead concentration greater than 400 milligrams per kilogram (mg/kg) had been removed.

Previous Investigations

A summary of investigative activities performed at SMWU 42/AOC 505 is presented in Table 6.3.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the

investigation. Detailed discussions and results are presented in the *Final Zone A RFI* (EnSafe, 1998).

Table 6.3.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1995 – 1996	Site investigation of soil and groundwater.	
	1995	***Round 1*** **Soil:** 21 surface borings (0 to 1 foot) 17 subsurface borings (3 to 5 feet) (042SB001 – 042SB0010; 505SB001 – 505SB011): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (2 duplicates collected for SVOCs, pesticides/PCBs, herbicides, VOCs, cyanide, dioxin, hexachrome, OP pesticides, and metals)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): Cyanide, herbicides, metals, pesticides, PCBs, SVOCs, and VOCs
RFI (EnSafe)	1996	The interim round was performed to confirm the presence of chlorinated solvent detections. ***Interim Round*** **Soil:** No soil samples were collected as part of the interim round.	***Interim Round*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs
RFI (EnSafe)	1996	***Round 2*** **Soil:** 17 surface borings (0 to 1 foot) 16 subsurface borings (3 to 5 feet) (042SB011 – 042SB021): Metals and SVOCs (505SB012 – 505SB017): SVOCs and pesticide/PCBs (2 duplicates collected for SVOCs and metals and 1 duplicate collected for SVOCs and pesticides/PCBs)	***Round 2*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 3*** **Soil:** 8 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (042SB022 – 042SB025 and 505SB018 – 505SB021): SVOCs (2 duplicates collected for same parameters)	***Round 3*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals

Table 6.3.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
CMS (EnSafe)	1998 – 1999	Site investigation of soil and groundwater.	
	1998	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB026, 042SB033, 042SB037, 042SB040): Arsenic, beryllium, SVOCs, SPLP metal, TCLP metal (042SB027 – 042SB032, 042SB034 – 042SB036, 042SB038 – 042SB039, 042SB041 – 042SB043): Arsenic, beryllium, and SVOCs (one duplicate collected for arsenic and beryllium)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003): Metals, chloride, and TDS (505001): Metals, chloride, pesticides/PCBs, and TDS
CMS (EnSafe)	1999	***Round 2*** **Soil:** 10 surface borings (0 to 1 foot) (042SB044 – 042SB049): Arsenic (042SBC01 and 042SBC02): Total Lead, SPLP-Metal, TCLP-Metal (042SBC03 and 042SBC04): Total Lead	***Round 2*** **Groundwater:** No Groundwater Samples Collected
CH2M-Jones	2001-2002	Site investigation of soil and groundwater.	
	2001	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB050-042SB053): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (042SB054-042SB061): Arsenic (042SB063-042SB067): SVOCs	***Round 1*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2002	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 2 shallow well (042002): VOCs (505001): Acetone

Nature and Extent of Contaminants

Approximately 95 sample locations associated with SWMU 42/AOC 505 were evaluated for the presence of contaminants between 1995 and 2002. Of these 95, approximately 25 sample locations (SWMU 42 only) are within the boundaries of Drainage Basin 1-B. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were the detections of nonchlorinated SVOCs (BEQs), arsenic, and beryllium in soil and chlorinated solvents (PCE, 1,1,2,2-TCA, and 1,1-DCE), aluminum, arsenic, chromium, silver, vanadium, and manganese in groundwater. Based on analytical results, a CMS was recommended for surface soils only.

6.3.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at catch basin 1B-A on March 2, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 1-B into Noisette Creek. Analytical detections for sample EFF003 are presented in Table 6.3.3.

Table 6.3.3
Storm Water Effluent Sampling Results
Drainage Basin 1-B

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
1-B	1B-A	EFF003	Aluminum	120	3,277.67	NL	No
			Barium	12	60.31	NL	No
			Calcium*	16,000	53,455.56	NL	No
			Copper	9.50	41.98	2.90	No
			Iron	190	4,134.44	NL	No
			Magnesium*	1,300	49,255.56	NL	No
			Manganese	6.50	74.52	NL	No
			Potassium*	2,400	23,678.89	NL	No
			Sodium*	4,700	395,333.33	NL	No
			Vanadium	1.40	15.59	NL	No

Table 6.3.3
Storm Water Effluent Sampling Results
Drainage Basin 1-B

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
			Zinc	66	307.83	86	No

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.3.3 Pathway Evaluation

There were no potential storm water effluent COPCs identified for Drainage Basin 1-B that require further characterization; therefore, contaminant migration pathway scenarios (1a through 1d) do not require further evaluation.

6.4 Drainage Basin 1-C

Drainage Basin 1-C encompasses approximately 4 acres within Zone A in the northeast section of the CNC. Land cover within the drainage basin consists of 95% unpaved surfaces (i.e., mostly grass) and 5% paved surfaces. Most storm water runoff within the drainage basin is directed to a ditch that discharges to Noisette Creek via Outfall 1C.

Figure 6-4 illustrates the area encompassing Drainage Basin 1-C and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.4.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 1-C. The sites are listed in Table 6.4.1, along with their current status. SMWU 42 (former asphalt plant and tanks) and AOC 505 (creosote cross-tie/railroad storage area) are overlapping and will be discussed together. SWMU 42 and AOC 505 are not entirely located within Drainage Basin 1-C. The boundary of SWMU 42 transcends the boundary of Drainage Basin 1-C along the north side where it extends into Drainage Basin 1-B, to the south into an unbounded area and Drainage Basin 10. The boundary of AOC 505 transcends the boundary of Drainage Basin 1-C along the north side where it extends into Drainage Basin 1-B.

Table 6.4.1
Drainage Basin 1-C SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 42	Former Asphalt Plant and Tanks	RFI complete; Draft CMS report submitted; IM complete
AOC 505	Creosote Cross Tile/Ballast Storage Area	RFI complete; Draft CMS report submitted; IM complete

6.4.1.1 SWMU 42/AOC 505
Site Description and History

These sites were combined into one investigation due to their close proximity and their potential for similar COPCs. These overlapping sites are located in the southwest portion of Zone A and are bounded by a wetland and railroad spur to the west, Noisette Creek to the south, and the

railroad storage yard surrounding Building 1614 to the north. The east side of SWMU 42/AOC 505 roughly follows a rail spur and divides an open area to the Noisette Creek bridge on Avenue D. SWMU 42 consists of a former asphalt plant site and its associated tanks. The facility operated from 1947 until 1962, and has since been demolished. The site currently contains a concrete rack once used to support asphalt-related ASTs. The unpaved surrounding area contains rock and asphalt debris. AOC 505 consists of Building 1803, the former golf course maintenance shop, and a nearby area, which was used to store creosote cross-ties and removed railroad ballast during the 1960s and 1970s. Pesticides used at the golf course were handled in Building 1803. Currently, the site is a graveled area containing asphalt rubble, traces of tar, and other debris. Since operations were discontinued at SWMU 42 and AOC 505 in the 1960s and 1970s, little information is available regarding the site design features, specific dates of operation, or operating practices.

Based on RFI analytical results, several COCs requiring further evaluation through the CMS process were identified for surface soil. An IMS, completed at SWMU 42 by the DET in March 1999, was performed to remove and dispose of lead contaminated soil. A total of 5.4 cubic yards of soils was excavated from two 6-foot by 6-foot by 2-foot pits at boring locations 505SB005 and 042SB009. The excavated soil was removed from the site, characterized and then disposed at an offsite landfill. Confirmation sample results from the excavation pits indicated that soil with a lead concentration greater than 400 mg/kg had been removed.

Previous Investigations

A summary of investigative activities performed at SMWU 42/AOC 505 is presented in Table 6.4.2, which contains the date of the activities, soil and shallow groundwater collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone A RFI* (EnSafe, 1998).

Table 6.4.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1995 – 1996	Site investigation of soil and groundwater.	
	1995	***Round 1*** **Soil:** 21 surface borings (0 to 1 foot) 17 subsurface borings (3 to 5 feet) (042SB001 – 042SB0010; 505SB001 – 505SB011): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (2 duplicates collected for SVOCs, pesticides/PCBs, herbicides, VOCs, cyanide, dioxin, hexachrome, OP pesticides, and metals)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): Cyanide, herbicides, metals, pesticides, PCBs, SVOCs, and VOCs
RFI (EnSafe)	1996	The interim round was performed to confirm the presence of chlorinated solvent detections. ***Interim Round*** **Soil:** No soil samples were collected as part of the interim round.	***Interim Round*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs
RFI (EnSafe)	1996	***Round 2*** **Soil:** 17 surface borings (0 to 1 foot) 16 subsurface borings (3 to 5 feet) (042SB011 – 042SB021): Metals and SVOCs (505SB012 – 505SB017): SVOCs and pesticide/PCBs (2 duplicates collected for SVOCs and metals and 1 duplicate collected for SVOCs and pesticides/PCBs)	***Round 2*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 3*** **Soil:** 8 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (042SB022 – 042SB025 and 505SB018 – 505SB021): SVOCs (2 duplicates collected for same parameters)	***Round 3*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals

Table 6.4.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
CMS (EnSafe)	1998 – 1999	Site investigation of soil and groundwater.	
	1998	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB026, 042SB033, 042SB037, 042SB040): Arsenic, beryllium, SVOCs, SPLP metal, TCLP metal (042SB027 – 042SB032, 042SB034 – 042SB036, 042SB038 – 042SB039, 042SB041 – 042SB043): Arsenic, beryllium, and SVOCs (1 duplicate collected for arsenic and beryllium)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003): Metals, chloride, and TDS (505001): Metals, chloride, pesticides/PCBs, and TDS
CMS (EnSafe)	1999	***Round 2*** **Soil:** 10 surface borings (0 to 1 foot) (042SB044 – 042SB049): Arsenic (042SBC01 and 042SBC02): Total Lead, SPLP-Metal, TCLP-Metal (042SBC03 and 042SBC04): Total Lead	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001-2002	Site investigation of soil and groundwater.	
	2001	***Round 1*** **Soil:** 17 surface borings (0 to 1 foot) (042SB050-042SB053): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (042SB054-042SB061): Arsenic (042SB063-042SB067): SVOCs	***Round 1*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2002	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 2 shallow well (042002): VOCs (505001): Acetone

Nature and Extent of Contamination

Approximately 95 sample locations associated with SWMU 42/AOC 505 were evaluated for the presence of contaminants between 1995 and 2002. Of these 95, approximately 89 sample locations are within the boundaries of Drainage Basin 1-C. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and

extent of potential contamination at the site. Of particular interest were detections of nonchlorinated SVOCs (BEQs), arsenic, and beryllium in soil and chlorinated solvents (PCE, 1,1,2,2-TCA, and 1,1-DCE), aluminum, arsenic, chromium, silver, vanadium, and manganese in groundwater. Based on analytical results, a CMS was recommended for surface soils only.

6.4.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at Ditch 1-C on February 7, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 1-C into Noisette Creek. Analytical detections for sample EFF004 are presented in Table 6.4.3

Table 6.4.3
Storm Water Effluent Sampling Results
Drainage Basin 1-C

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (μg/L)	Screening Value (μg/L) Reference Concentration	Screening Value (μg/L) Chronic Saltwater Screening Value	Potential COPC
1-C	Ditch-1C	EFF004	**Aluminum**	**4,500**	**3,277.67**	**NL**	**Yes**
			Barium	25	60.31	NL	No
			Beryllium	0.16	0.41	NL	No
			Calcium*	29,000	53,455.56	NL	No
			Chromium	5.60	13.00	50	No
			Copper	13	41.98	2.90	No
			Iron	1,600	4,134.44	NL	No
			Lead	5.50	33.63	8.50	No
			Magnesium*	1,600	49,255.56	NL	No
			Manganese	9.90	74.52	NL	No
			Nickel	1.70	5.14	8.30	No
			Potassium*	3,100	23,678.89	NL	No
			Sodium*	2,300	395,333.33	NL	No
			Vanadium	8.10	15.59	NL	No
			Zinc	19	307.83	86	No

Notes:
μg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.4.3 Pathway Evaluation

The data collected during the investigation activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 1-C. Based on the available data present for Drainage Basin 1-C, the Zone J data evaluation resulted in three possible outcomes. Table 6.4.4 summarizes the migration pathway scenarios.

Table 6.4.4
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 1-C

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.4.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travels through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 1-C were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and EBS reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.4.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release in to Zone J water bodies from drainage basin outfalls. Open culverts discharging to a drainage ditch leading to the outfall were also considered under this scenario evaluation. The pathway evaluation

shows that within the drainage basin, an open culvert/drainage ditch is either within or near sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near these drainage features to Zone A background concentrations and the ecological risk based screening criteria did not identify existing areas which have the potential to provide an upland source of aluminum in the storm sewer system.

6.4.3.3 Scenario 1c

Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc. All rounds of groundwater data collected within Drainage Basin 1-C were reviewed. The preliminary evaluation did not identify any groundwater contaminated with aluminum intercepting the storm water drainage pipeline within Drainage Basin 1-C.

6.4.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the *Zone L RFI Report* indicates that there are no cross-connects present in Drainage Basin 1-C.

6.4.4 Summary of Potential COPCs

There are no potential COPCs for Drainage Basin 1-C due to a lack of an upland terrestrial source identification.

6.5 Drainage Basin 10

Drainage Basin 10 encompasses approximately 8 acres within Zone A in the northern section of the CNC. Land cover within the drainage basin consists of approximately 55% unpaved surfaces (i.e., mostly grass), 10% paved surfaces and 35% buildings. Storm water runoff within the drainage basin is directed to a storm sewer pipeline with fourteen catch basins that discharge to Noisette Creek via Outfall 10.

Figure 6-5 illustrates the area encompassing Drainage Basin 10 and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.5.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 10. These sites are listed in Table 6.5.1, along with their current status. One site (SWMU 43) was designated a no further action site and was not included in the Zone J data evaluation. The remaining potential source area is SWMU 42 (Former Asphalt Plant and Tanks). Due to their close proximity, SWMU 42 and AOC 505 were investigated as a combined site; however, sample locations associated with AOC 505 do not fall within the basin boundaries and are not considered potential contributors to Drainage Basin 10.

Table 6.5.1
Drainage Basin 10 SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 42	Former Asphalt Plant & Tanks	RFI Complete, Draft CMS Submitted, IM Complete
SWMU 43	Publications & Printing Plant	RFI Complete, No Further Action (NFA)

6.5.1.1 SWMU 42/AOC 505
Site Description and History

These sites were combined into one investigation due to their close proximity and their potential for similar COPCs. These overlapping sites are located in the southwest portion of Zone A and are bounded by a wetland and railroad spur to the west, Noisette Creek to the south, and the

railroad storage yard surrounding Building 1614 to the north. The east side of SWMU 42/AOC 505 roughly follows a rail spur and divides an open area to the Noisette Creek bridge on Avenue D. SWMU 42 consists of a former asphalt plant site and its associated tanks. The facility operated from 1947 until 1962, and has since been demolished. The site currently contains a concrete rack once used to support asphalt-related ASTs. The unpaved surrounding area contains rock and asphalt debris. AOC 505 consists of Building 1803, the former golf course maintenance shop, and a nearby area that was used to store creosote cross-ties and removed railroad ballast during the 1960s and 1970s. Pesticides used at the golf course were handled in Building 1803. Currently, the site is a graveled area containing asphalt rubble, traces of tar, and other debris. Since operations were discontinued at SWMU 42 and AOC 505 in the 1960s and 1970s, little information is available regarding the site design features, specific dates of operation, or operating practices.

Based on RFI analytical results, several COCs requiring further evaluation through the CMS process were identified for surface soil. An IMS, completed at SWMU 42 by the DET in March 1999, was performed to remove and dispose of lead contaminated soil. A total of 5.4 cubic yards of soils was excavated from two 6-foot by 6-foot by 2-foot pits at boring locations 505SB005 and 0422SB009. The excavated soil was removed from the site, characterized and then disposed at an offsite landfill. Confirmation sample results from the excavation pits indicated that soil with a lead concentration greater than 400 mg/kg had been removed.

Previous Investigations

A summary of investigative activities performed at SMWU 42/AOC 505 is presented in Table 6.5.2, which contains the date of the activities, number of samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone A RFI* (EnSafe, 1998).

Table 6.5.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1995 – 1996	Site investigation of soil and groundwater.	
	1995	***Round 1*** **Soil:** 21 surface borings (0 to 1 foot) 17 subsurface borings (3 to 5 feet) (042SB001 – 042SB010; 505SB001 – 505SB011): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (2 duplicates collected for SVOCs, pesticides/PCBs, herbicides, VOCs, cyanide, dioxin, hexachrome, OP pesticides, and metals)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): Cyanide, herbicides, metals, pesticides, PCBs, SVOCs, and VOCs
RFI (EnSafe)	1996	The interim round was performed to confirm the presence of chlorinated solvent detections. ***Interim Round*** **Soil:** No soil samples were collected as part of the interim round.	***Interim Round*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs
RFI (EnSafe)	1996	***Round 2*** **Soil:** 17 surface borings (0 to 1 foot) 16 subsurface borings (3 to 5 feet) (042SB011 – 042SB021): Metals and SVOCs (505SB012 – 505SB017): SVOCs and pesticide/PCBs (2 duplicates collected for SVOCs and metals and 1 duplicate collected for SVOCs and pesticides/PCBs)	***Round 2*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 3*** **Soil:** 8 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (042SB022 – 042SB025 and 505SB018 – 505SB021): SVOCs (2 duplicates collected for same parameters)	***Round 3*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals
RFI (EnSafe)	1996	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 4 shallow wells (042001 – 042003 and 505001): VOCs and metals

Table 6.5.2
Summary of SWMU 42/AOC 505 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
CMS (EnSafe)	1998 – 1999	Site investigation of soil and groundwater.	
		Round 1	
	1998	**Soil:** 17 surface borings (0 to 1 foot) (042SB026, 042SB033, 042SB037, 042SB040): Arsenic, beryllium, SVOCs, SPLP metal, TCLP metal (042SB027 – 042SB032, 042SB034 – 042SB036, 042SB038 – 042SB039, 042SB041 – 042SB043): Arsenic, beryllium, and SVOCs (1 duplicate collected for arsenic and beryllium)	***Round 1*** **Groundwater:** 4 shallow wells (042001 – 042003): Metals, chloride, and TDS (505001): Metals, chloride, pesticides/PCBs, and TDS
CMS (EnSafe)	1999	***Round 2*** **Soil:** 10 surface borings (0 to 1 foot) (042SB044 – 042SB049): Arsenic (042SBC01 and 042SBC02): Total Lead, SPLP-Metal, TCLP-Metal (042SBC03 and 042SBC04): Total Lead	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001-2002	Site investigation of soil and groundwater.	
	2001	***Round 1*** **Soil:** No Soil Samples Collected.	***Round 1*** **Groundwater:** 3 shallow wells (U41001, U41005, U41007): VOCs, metals, general chemistry, and CH4/CO2
CH2M-Jones	2001	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** (U41001 and U41007): VOCs
CH2M-Jones	2002	***Round 3*** **Soil:** 17 surface borings (0 to 1 foot) (042SB050-042SB053): Cyanide, herbicides, metals, pesticides/PCBs, SVOCs, VOCs (042SB054-042SB061): Arsenic (042SB063-042SB067): SVOCs	***Round 3*** **Groundwater:** (U41001 and U41007): VOCs
CH2M-Jones	2002	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 2 shallow well (042002): VOCs (505001): Acetone

Nature and Extent of Contamination

Approximately 102 sample locations associated with SWMU 42/AOC 505 were evaluated for the presence of contaminants between 1995 and 2002. Of these 102, approximately 35 sample locations are within the boundaries of Drainage Basin 10. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were detections of nonchlorinated SVOCs (BEQs), arsenic, and beryllium in soil and chlorinated solvents (PCE, 1,1,2,2-TCA, and 1,1-DCE), aluminum, arsenic, chromium, silver, vanadium, and manganese in groundwater. Based on analytical results, a CMS was recommended for surface soils only.

6.5.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at catch basin 10/1-A on March 2, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 10 into Noisette Creek. Analytical detections for sample EFF007 are presented in Table 6.5.3.

Table 6.5.3
Storm Water Effluent Sampling Results
Drainage Basin 10

					Screening Value (µg/L)		
Drainage Basin	**Catch Basin/ Manhole ID**	**Sample ID**	**Parameter**	**Concentration (µg/L)**	**Reference Concentration**	**Chronic Saltwater Screening Value**	**Potential COPC**
10	10/1-A	EFF007	Aluminum	200	3,277.67	NL	No
			Barium	8.50	60.31	NL	No
			Calcium*	20,000	53,455.56	NL	No
			Copper	4.80	41.98	2.90	No
			Iron	300	4,134.44	NL	No
			Magnesium*	2,100	49,255.56	NL	No
			Manganese	6.30	74.52	NL	No
			Potassium*	2,400	23,678.89	NL	No
			Sodium*	6,000	395,333.33	NL	No
			Vanadium	1.70	15.59	NL	No

Table 6.5.3
Storm Water Effluent Sampling Results
Drainage Basin 10

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
			Zinc	99	307.83	86	No

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.5.3 Pathway Evaluation

There were no potential storm water effluent COPCs identified for Drainage Basin 10 that require further characterization; therefore, contaminant migration pathway scenarios (1a through 1d) do not require further evaluation.

6.6 Drainage Basin 10-A

Drainage Basin 10-A encompasses approximately 29 acres within Zone C in the northern section of the CNC. Land cover within the drainage basin consists of approximately 40% unpaved surfaces (i.e., mostly grass), 45% paved surfaces, and 15% buildings. Most storm water runoff within the drainage basin is directed to a storm sewer pipeline with 45 catch basins and a large drainage ditch that discharges to Noisette Creek via Outfall 10A.

Figure 6-6 illustrates the area encompassing Drainage Basin 10-A and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.6.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 10-A. The sites are listed in Table 6.6.1, along with their current status. One site (AOC 512) was designated as a no further action site and was not included in the Zone J data evaluation. The remaining potential source area is SWMU 44 (Coal Storage Yard). For this basin assessment, note that the western boundary of SWMU 44 transcends the northeastern boundary of Drainage Basin 10-A; however, the majority of SWMU 44 resides in an unbounded area located between Drainage Basin 10-A and Drainage Basin 10-B.

Table 6.6.1
Drainage Basin 10-A SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 44	Coal Storage Area	RFI Complete, CMS Pending, IM Complete
AOC 512	Former Incinerator	RFI Complete, NFA

6.6.1.1 SWMU 44
Site Description and History

SWMU 44 was a coal storage yard used for unloading railcars and the intermediate storage of coal, prior to use at the steam-generation plant (Building 32). Operations began in the 1940s but were scaled down in late 1995. Coal was unloaded through the bottom of railcars onto concrete

pads and transferred for staging by crane. Two coal piles were onsite during the field investigation, the largest of which was estimated to be 80' X 400' in size. Containment, such as berms, was never utilized in the area to control storm water runoff from storage piles.

In September 1996, the Detachment completed an IM at the site involving the excavation of soil/coal debris at 2 to 5 foot depth intervals over 4.14 acres, resulting in the removal of approximately 13,246 tons of coal and a coal/dirt mixture. The IM objective to remove bulk coal as a source of contamination at the site was achieved based on visual confirmation. Confirmation sampling was conducted during the RFI.

Previous Investigations

A summary of investigative activities performed at SWMU 44 is presented in Table 6.6.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone C RFI Report* (EnSafe, 1997).

Table 6.6.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
Historic Sampling Events	1981-1985	Investigations focused on surface water runoff and surface water quality. Analytical results indicated the presence of metals and total suspended solids. Data was not available for review.	
RFI (EnSafe)	1995-1997	Site soil and groundwater investigation	
		Round 1 **Soil:** 8 surface borings (0 to 1 foot) 1 subsurface borings (3 to 5 feet) (044SB001 – 044SB008): Metals and cyanide (1 duplicate collected for same parameters plus herbicides, hexachrome, OP pesticides, and dioxins)	***Round 1*** **Groundwater:** 8 shallow wells (044001 and 044008): Metals and cyanide (1 duplicate collected for same parameters plus herbicides, hexachrome, OP pesticides, and dioxins) (1 duplicate collected for VOCs, SVOCs, pesticides/PCBs, sulfate, and TDS)

Table 6.6.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1997	***Round 2*** **Soil:** 2 surface borings (0 to 1 foot) (044SB023 – 044SB024): Metals	***Round 2*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 3*** **Soil:** 2 surface borings (0 to 1 foot) (044SB025 and 044SB026): Metals	***Round 3*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 4*** **Soil:** 9 surface borings (0 to 1 foot) (044SS001 – 044SS009): SVOCs and metals	***Round 4*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 5*** **Soil:** 2 surface borings (0 to 1 foot) 5 subsurface soil (various intervals) (044SB027 and 044SB028): Metals	***Round 5*** **Groundwater:** 8 shallow wells (044001): SVOCs (044002 – 044007): SVOCs and metals (044008): VOCs, SVOCs, metals and pesticides/PCBs

Table 6.6.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
IM (DET)	1996-1997	Action taken to remove bulk coal as a source of contamination at the site. Objective was achieved based on visual confirmation. Confirmation sampling was deferred to the RFI.	
CMS (EnSafe)	1999	***Round 1*** **Soil:** 50 surface borings (0 to 1 foot) 46 subsurface (3 to 5 feet) (044SBC01 – 044SBC50): SVOCs and metals (5 duplicates collected for same parameters)	***Round 1*** **Groundwater:** 7 shallow wells (044001 – 044004, 044006 – 044008): Metals
CH2M-Jones	2000-2002	Site investigation of soil and groundwater.	
	2000	***Round 1*** **Soil:** No Soil Samples Collected.	***Round 1*** **Groundwater:** 4 shallow wells (U31002-U31005): VOCs, metals, general chemistry, CH4/CO2
CH2M-Jones	2000	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 7 shallow wells (NH4604, NH4606 – NH4608, NH4610 – NH4611, NH4613): VOCs, metals, general chemistry, CH4/CO2
CH2M-Jones	2001	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 2 shallow wells (U31002 – U31003): VOCs, general chemistry
CH2M-Jones	2001	***Round 4*** **Soil:** 1 surface boring (0 to 1 foot) (044SS001): VOCs, SVOCs, metals	***Round 4*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001	***Round 5*** **Soil:** 4 surface borings (0 to 1 foot) (044SB029 – 044SB032): Arsenic	***Round 5*** **Groundwater:** 4 shallow wells (U30W01, U30W04, U30W10): VOCs, general chemistry (U30W05): VOCs

Table 6.6.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
CH2M-Jones	2001	***Round 6*** **Soil:** 19 surface borings (0 to 1 foot) (044SB036 –044SB043, 044SB047 – 044SB052, 044SB062 – 044SB066): Arsenic 19 subsurface borings (3 to 5 foot) 044SB033-044SB035, 044SB044-044SB046, 044SB053-044SB058, 044SB067-044SB070): Arsenic	***Round 6*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001	***Round 7*** **Soil:** 2 surface borings (0 to 1 foot) (044SB071 – 044SB072): Arsenic	***Round 7*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001	***Round 8*** **Soil:** 4 surface borings (0 to 1 foot) (044SB073 – 044SB076): Arsenic	***Round 8*** **Groundwater:** 5 shallow wells (NC29W01 – NC29W04, NC29W07): VOCs, metals, general chemistry, CH4/CO2
CH2M-Jones	2002	***Round 9*** **Soil:** No Soil Samples Collected.	***Round 9*** **Groundwater:** 2 shallow wells (U30015 – U30016): VOCs, SVOCs

Nature and Extent of Contaminants

Approximately 135 sample locations associated with SWMU 44 were evaluated for the presence of contaminants between 1995 and 2002. Of these 135, approximately 93 locations are within the boundaries of Drainage Basin 10-A. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination attributable to historic coal pile storage at the site. Of particular interest were detections of aluminum, arsenic, BEQs, beryllium, and thallium in soil; and arsenic, beryllium, and manganese in groundwater. During the CMS, remedial goal objectives were developed based on the analytical results and the human health risk assessment for the site. Final decisions concerning remedial actions are still pending.

6.6.2 Storm Water Effluent Evaluation

Storm water effluent samples were collected at ditch 10A S (south) on February 7, 2002 and ditches 10A N (north) and 10A C (central) on January 25, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 10-A into the Noisette Creek. Analytical detections for samples EFF008, EFF009, and EFF010 are presented in Table 6.6.3.

Table 6.6.3
Storm Water Effluent Sampling Results
Drainage Basin 10-A

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPCs
10-A	Ditch 10A S	EFF008	Aluminum	140	3,277.67	NL	No
			Barium	3.60	60.31	NL	No
			Calcium*	3,200	53,455.56	NL	No
			Copper	30	41.98	2.90	No
			Iron	92	4,134.44	NL	No
			Lead	7.80	33.63	8.50	No
			Magnesium*	370	49,255.56	NL	No
			Manganese	5.00	74.52	NL	No
			Potassium*	1,000	23,678.89	NL	No
			Sodium*	2,400	395,333.33	NL	No
			Thallium	4.60	5.77	21.30	No
			Vanadium	4.00	15.59	NL	No
			Zinc	47	307.83	86	No
			Benzo(b)fluoranthene	**0.39**	**NL**	**NL**	**Yes**
			Indeno(1,2,3-cd) pyrene	**0.59**	**NL**	**NL**	**Yes**
	Ditch 10A N	EFF009	Aluminum	170	3,277.67	NL	No
			Barium	8.20	60.31	NL	No
			Calcium*	34,000	53,455.56	NL	No
			Copper	4.50	41.98	2.90	No
			Iron	280	4,134.44	NL	No

Table 6.6.3
Storm Water Effluent Sampling Results
Drainage Basin 10-A

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPCs
			Magnesium*	16,000	49,255.56	NL	No
			Manganese	32	74.52	NL	No
			Nickel	1.80	5.14	8.30	No
			Potassium*	10,000	23,678.89	NL	No
			Sodium*	130,000	395,333.33	NL	No
			Tin	**5.00**	**NL**	**NL**	**Yes**
			Vanadium	2.30	15.59	NL	No
			Zinc	130	307.83	86	No
			bis(2-Ethylhexyl)phthalate	**0.63**	**NL**	**NL**	**Yes**
	Ditch 10A C	EFF010	Aluminum	1,200	3,277.67	NL	No
			Barium	22	60.31	NL	No
			Calcium*	47,000	53,455.56	NL	No
			Chromium	2.90	13.00	50	No
			Copper	6.90	41.98	2.90	No
			Iron	910	4,134.44	NL	No
			Magnesium*	4,200	49,255.56	NL	No
			Manganese	25	74.52	NL	No
			Nickel	2.30	5.14	8.30	No
			Potassium*	7,700	23,678.89	NL	No
			Sodium*	30,000	395,333.33	NL	No
			Tin	**4.70**	**NL**	**NL**	**Yes**
			Vanadium	6.10	15.59	NL	No
			Zinc	100	307.83	86	No

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.6.3 Pathway Evaluation

The data collected during the investigative activities summarized about were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 10-A. Based on the available data present for Drainage Basin 10-A, the Zone J data evaluation resulted in three possible outcomes. Table 6.6.4 summarizes the migration pathway scenarios.

Table 6.6.4
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 10-A

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.6.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travels through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 10-A were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and environmental baseline survey (EBS) reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.6.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release in to Zone J water bodies from drainage basin outfalls. The pathway evaluation shows that within the

drainage basin at least 1 of 45 catch basins and drainage ditches are near sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near these drainage features to Zone C background concentrations and the ecological risk based screening criteria did not identify existing areas which have the potential to provide an upland source of COPCs identified in Table 6.6.3 in the storm sewer system.

6.6.3.3 Scenario 1c

Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc. All rounds of groundwater data collected within Drainage Basin 10-A were reviewed. The preliminary evaluation did not identify any groundwater contaminated with COPCs identified in Table 6.6.3 intercepting the storm water drainage pipeline within Drainage Basin 10-A.

6.6.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the *Zone L RFI Report* indicates that there are no cross-connects present in Drainage Basin 10-A.

6.6.4 Summary of Potential COPCs

There are no potential COPCs for Drainage Basin 10-A due to a lack of an upland terrestrial source identification.

6.7 Drainage Basin 10-B

Drainage Basin 10-B encompasses approximately 3 acres within Zone C in the northern section of the CNC along Noisette Creek. Land cover within the drainage basin consists of approximately 75% unpaved surfaces (i.e., mostly grass), 10% paved surfaces, 10% water and 5% buildings. Most storm water runoff within the drainage basin is directed to a storm sewer pipeline with one catch basin that discharges to the Noisette Creek via Outfall 10-B. Some sheet flow from the northern portion of the drainage basin flows directly into Noisette Creek.

Figure 6-7 illustrates the area encompassing Drainage Basin 10-B and associated RCRA sites and catch basins.

6.7.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 10-B. The sites are listed in Table 6.7.1, along with current status. These potential source areas include SWMU 44 (Coal Storage Yard) and AOC 700 (Golf Maintenance Building). The eastern boundary of SWMU 44 transcends the western boundary of Drainage Basin 10-B; however, the majority of SWMU 44 resides in an unbounded area located between Drainage Basin 10-A and Drainage Basin 10-B.

Table 6.7.1
Drainage Basin 10-B SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 44	Coal Storage Area	RFI Complete, IM Complete, CMS Pending,
AOC 700	Golf Maintenance Building	RFI Complete, CMS Pending

6.7.1.1 SWMU 44

Site Description and History

SWMU 44 was a coal storage yard used for unloading railcars and the intermediate storage of coal, prior to use at the steam-generation plant (Building 32). Operations began in the 1940s, but were scaled down in late 1995. Coal was unloaded through the bottom of railcars onto concrete pads and transferred for staging by crane. Two coal piles were onsite during the field investigation, the largest of which was estimated to be 80' X 400' in size. Containment, such as berms, was never utilized in the area to control storm water runoff from storage piles.

In September 1996, the Detachment completed an interim measure (IM) at the site involving the excavation of soil/coal debris at 2 to 5 foot depth intervals over 4.14 acres, resulting in the removal of approximately 13,246 tons of coal and a coal/dirt mixture. The IM objective to remove bulk coal as a source of contamination at the site was achieved based on visual confirmation. Confirmation sampling was conducted during the RFI.

Previous Investigations

A summary of investigative activities performed at SWMU 44 is presented in Table 6.7.2, which contains the date of the activities, number of samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone C RFI Report* (EnSafe, 1997).

Table 6.7.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations
Historic Sampling Events	1981-1985	Investigations focused on surface water runoff and surface water quality. Analytical results indicated the presence of metals and total suspended solids. Data was not available for review.

Table 6.7.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1997	Site soil and groundwater investigation	
		Round 1 **Soil:** 8 surface borings (0 to 1 foot) 1 subsurface borings (3 to 5 feet) (044SB001 – 044SB008): Metals and cyanide (1 duplicate collected for same parameters plus herbicides, hexachrome, OP pesticides, and dioxins)	***Round 1*** **Groundwater:** 8 shallow wells (044001 and 044008): Metals and cyanide (1 duplicate collected for same parameters plus herbicides, hexachrome, OP pesticides, and dioxins) (1 duplicate collected for VOCs, SVOCs, pesticides/PCBs, sulfate, and TDS)
RFI (EnSafe)	1995-1997	***Round 2*** **Soil:** 2 surface borings (0 to 1 foot) (044SB023 – 044SB024): Metals	***Round 2*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1007	***Round 3*** **Soil:** 2 surface borings (0 to 1 foot) (044SB025 and 044SB026): Metals	***Round 3*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)

Table 6.7.2
Summary of SWMU 44 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1997	***Round 4*** **Soil:** 9 surface borings (0 to 1 foot) (044SS001 – 044SS009): SVOCs and metals	***Round 4*** **Groundwater:** 8 shallow wells (044001 – 044003, 044006 - 044008): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, and TDS (044004 and 044005): SVOCs, metals, pesticides/PCBs, cyanide, chloride, sulfate, dioxins, and TDS (1duplicate collected for same parameters)
RFI (EnSafe)	1995-1997	***Round 5*** **Soil:** 2 surface borings (0 to 1 foot) 5 subsurface soil (various intervals) (044SB027 and 044SB028): Metals	***Round 5*** **Groundwater:** 8 shallow wells (044001): SVOCs (044002 – 044007): SVOCs and metals (044008): VOCs, SVOCs, metals and pesticides/PCBs
IM (DET)	1996-1997	Action taken to remove bulk coal as a source of contamination at the site. Objective was achieved based on visual confirmation. Confirmation sampling was deferred to the RFI.	
CMS (EnSafe)	1999	***Round 1*** **Soil:** 50 surface borings (0 to 1 foot) 46 subsurface (3 to 5 feet) (044SBC01 – 044SBC50): SVOCs and metals (5 duplicates collected for same parameters)	***Round 1*** **Groundwater:** 7 shallow wells (044001 – 044004, 044006 – 044008): Metals
CH2M-Jones	2001	***Round 1*** **Soil:** 29 surface soil borings (0 to 1 foot): Arsenic 1 surface soil boring (0 to 1 foot): metals and SVOCs 19 subsurface soil borings (3 to 5 feet): Arsenic	***Round 1*** **Groundwater:** No groundwater samples collected

Nature and Extent of Contaminants

Approximately 110 sample locations associated with SWMU 44 were evaluated for the presence of contaminants between 1995 and 1999. An additional 50 sample locations were collected in 2001. Of these 150 samples, approximately 15 locations are within the boundaries of Drainage

Basin 10-B. Surface, subsurface, sediment, surface water and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination attributable to historic coal pile storage at the site. Of particular interest were detections of aluminum, arsenic, BEQs, beryllium, and thallium in soil; and arsenic, beryllium, and manganese in groundwater. During the CMS, remedial goal objectives were developed based on the analytical results and the human health risk assessment for the site. Final decisions concerning remedial actions are still pending.

6.7.1.2 AOC 700

Site Description and History

AOC 700 refers to the golf course maintenance building, Building 1646, located west of Avenue D and north of Hunt Street. General maintenance supplies were stored in this building from the 1960s or 1970s to base closure in 1996. Reportedly, small amounts of pesticides were stored in Building 1646.

Previous Investigations

A summary of investigative activities performed at AOC 700 is presented in Table 6.7.3, which contains the date of the activities, number of samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone C RFI Report* (EnSafe, 1997).

Table 6.7.3
Summary of AOC 700 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1996	Site soil and groundwater investigation.	
		Round 1 **Soil:** 5 surfaces borings (0 to 1 foot) 5 subsurface borings (3 to 5 feet) (700SB001 – 700SB005): VOCs, SVOCs, pesticides/PCBs, metals, and cyanide (1 duplicate collected for same parameters plus herbicides, hexachrome, OP pesticides, and dioxins)	***Round 1*** **Groundwater:** 1 shallow well (close proximity) (044008): SVOCs, metals, and pesticides/PCBs

Table 6.7.3
Summary of AOC 700 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
CMS (EnSafe)	1999	***Round 1***	***Round 1***
		Soil:	**Groundwater:**
		No Soil Samples Collected.	1 shallow well installed (1999) (700C01): Pesticides/PCBs and metals

Nature and Extent of Contaminants

Approximately 7 sample locations associated with AOC 700 were evaluated for the presence of contaminants between 1996 and 1999. All sample locations are within the boundaries of Drainage Basin 10-B. Surface, subsurface and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were detections of arsenic and BEQs in soil. During the CMS, remedial goal objectives were developed based on the analytical results and the human health risk assessment for the site. Final decisions concerning remedial actions are still pending.

6.7.2 Stormwater Effluent Evaluation

One stormwater effluent sample was collected to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 10-B into Noisette Creek. A sample was collected at manhole 10B/4 on February 7, 2002. Analytical results for sample EFF011 are presented in Table 6.7.4. It should be noted that storm water collected from location 10B/5-A was very turbid. The storm water line did not flow freely a any time during the investigation and appeared to be blocked to some degree since the water level did not apreciably decline in response to tidal activity as in other storm water lines at CNC.

Table 6.7.4
Storm water Effluent Sampling Results
Drainage Basin 10-B

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/l)	Screening Value: Reference *Concentration*	Screening Value: Chronic Saltwater Screening Value	*Potential* COPC
10-B	10B/4	EFF011	Aluminum	13,000	3,277.67	-	Yes
			Arsenic	190	6.88	36	Yes
			Barium	120	60.31	-	Yes
			Beryllium	4.50	0.41	-	Yes
			Cadmium	3.30	1.29	9.30	No
			Calcium	260,000	53,455.56	-	Yes
			Chromium	31	13.00	50	No
			Cobalt	2.80	2.00	-	Yes
			Copper	130	41.98	2.90	Yes
			Iron	180,000	4,134.44	-	Yes
			Lead	4.90	33.63	8.50	No
			Magnesium	34,000	49,255.56	-	No
			Manganese	900	74.52	-	Yes
			Nickel	18	5.14	8.30	Yes
			Potassium	14,000	23,678.89	-	No
			Sodium	220,000	395,333.33	-	No
			Vanadium	5.00	15.59	-	No
			Zinc	530	307.83	86	Yes

Notes:
µg/L = Micrograms per Liter

6.7.3 Pathway Evaluation

The data collected during the investigative activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 10-B. The Zone J data evaluation resulted in three possible outcomes based on the available data present for Drainage Basin 10-B. In some instances enough data may currently be available to determine a contaminant migration pathway is incomplete, in other cases the data may indicate the migration pathway is complete, but in the majority of instances data gaps remain which prevent a conclusive determination from being made at this time. Table 6.7.5 summarizes the migration pathway scenarios.

Table 6.2.4
Storm water Contaminant Migration Pathway Scenario Summary
Drainage Basin 10-B

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	Yes
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	Yes
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.7.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travel through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 10-B were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and Environmental Baseline Survey (EBS) reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.7.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release in to Zone J water bodies from drainage basin outfalls. Pathway evaluation shows that the only catchbasin (10B/5-A) is near surface soil sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near this drainage feature to Zone A background concentrations and the ecological risk based screening criteria identified three sample location areas (Figure 6-7A) which have the potential to act as a source for contaminants entering the storm sewer system. A summary of this evaluation is provided in Table 6.7.6.

Table 6.7.6
Drainage Basin 10-B
Scenario 1b Catch Basin Evaluation
Charleston Naval Complex, South Carolina

Catch Basin	*Sample ID*	Surface Soil COPCs	Concentration (mg/kg)	Screening Level (mg/kg)	Distance to Catch Basin#
10B/5-A	044SS0080	Arsenic	15.7	7.24/SSV	106
	1	Cobalt	2.4	2.6/BKG	
		Copper	24.4	36/BKG	
		Iron	8570	NL	
	700SB0001	Calcium	80200	NL	45
		Cobalt	2.4	2.6/BKG	
	700SB0050	Arsenic	14.3	7.24/SSV	54
	1	Beryllium	0.27	0.26/BKG	
		Cobalt	2.5	2.6/BKG	
		Copper	31.1	36/BKG	
		Zinc	309	150/BKG	

Notes:
BKG =Background Concentration
SSV =Region IV Sediment Screening Value
EPA Soil =Region IV Soil Screening Vales
PRG =Screening Value
mg/kg =Milligrams per kilogram
=COPCs not detected within 50 foot radius of catch basin will be further characterized to reduce uncertainty

Evaluation of surface soil data for consistency with EFF011 COPCs revealed that arsenic, beryllium, calcium, cobalt, copper, iron, and zinc were detected in surface soil above screening criteria at locations within 106 feet of Catch basin 10/5-A. Therefore, the pathway is complete for the above 7 COPCs. Additional charcterization will be required to reduce the uncertainty of these locations as potential sources due to the distances involved with the surface soil locations presented in the above table.

6.7.3.3 Scenario 1c

Scenario 1c evaluates contaminated groundwater (infiltration) storm water drainage lines which discharges to Zone J water bodies. COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm sewer line. All rounds of groundwater data were evaluated and no COPCs were identified if the last three rounds of data had no Zone J screening criteria exceedances. When COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment which includes reviewing groundwater flow patterns to see if localized groundwater

depressions are present which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc.

Wells 700C01 and 044008 are upradient of the storm water drainage pipeline leading to Oufall 10B. There were no detections in groundwater from well 700C01 consistent with EFF011 COPCs. However, there were detections concsistent with EFF011 COPCs in groundwater from well 044008. Well 044007 is downgradient of well 044008 based on Zone C groundwater elevation contours and EFF011 COPCs were detected in 044007 groundwater samples. The storm water drain line leading to Oufall 10B passes through the groundwater flow path between wells 044008 and 044007 (Figure 6-7B).

Table 6.7.7
Drainage Basin 10-B
Scenario 1c Evaluation
Charleston Naval Complex, South Carolina

Drainage Basin	*Well ID*	COPCs Consistent w/EFF011	Concentration (µg/L)	Screening Level (µg/L)	Distance to EFF011
10-B	044008	Aluminum	7780	578	150 ft.
		Arsenic	15.3	8.0	Upgradient
		Barium	43	22	
		Calcium	218000	164900	
		Copper	12.6	2.9	
		Iron	9290	3438	
		Manganese	955	692	
		Nickel	7.4	6.0	
		Zinc	166	20	
	044007	Arsenic	173	8	396 ft.
		Barium	98.1	22	Downgradient
		Iron	8710	3438	

Notes:
µg/L = Micrograms per Liter

Evaluation of groundwater data for consistency with EFF011 COPCs revealed that only arsenic, barium, and iron were detected in groundwater above screening criteria upgradient and downgradient of the stormwater line. Therefore, the pathway is complete for the above three COPCs.

6.7.3.4 Scenario 1d

Scenario 1d evaluates if a cross connect exists from the sanitary sewer system to the storm sewer system therefore identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the Zone L RFI Report indicates that there are no cross-connects present in Drainage Basin 10-B.

6.7.4 Summary of COPCs

Table 6.7.8 summarizes the potential COPCs that have been included for further characterization of Drainage Basin 10-B.

Table 6.7.8
Summary of Potential Drainage Basin 10-B COPCs

Potential COPC	Pathway of Concern
Aluminum	Storm water effluent/discharge to water body
Arsenic	Storm water effluent/discharge to water body
	Scenario 1b
	Scenario 1c
Barium	Storm water effluent/discharge to water body
	Scenario 1c
Beryllium	Storm water effluent/discharge to water body
	Scenario 1b
Calcium	Storm water effluent/discharge to water body
	Scenario 1b
Cobalt	Storm water effluent/discharge to water body
	Scenario 1b
Copper	Storm water effluent/discharge to water body
	Scenario 1b
Iron	Storm water effluent/discharge to water body
	Scenario 1b
	Scenario 1c
Manganese	Storm water effluent/discharge to water body
Nickel	Storm water effluent/discharge to water body
Zinc	Storm water effluent/discharge to water body
	Scenarion 1b

6.8 Drainage Basin 10-C

Drainage Basin 10-C encompasses approximately 13.4 acres within Zones B and C located in the northern section of the CNC in the vicinity of Noisette Creek. Land cover within the drainage basin consists of approximately 80% unpaved surfaces (i.e., mostly grass), 15% paved surfaces and 5% buildings. Storm water runoff within the drainage basin is directed to a storm sewer pipeline with six catch basins that discharge to Noisette Creek via Outfall 10C.

Figure 6-8 illustrates the area encompassing Drainage Basin 10-C, and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.8.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there is no SWMU/AOC that is partly or completely within the boundary of Drainage Basin 10-C. However, sample locations associated with one SWMU/AOC fall within the boundaries of Drainage Basin 10-C. The site is listed in Table 6.8.1, along with its current status. This potential source area is SWMU 47 (Burning Dump). SWMU 47 and AOC 516 were investigated as a combined site due to close proximity. However, sample locations associated with AOC 516 do not fall within the basin boundaries and are not considered potential contributors to Drainage Basin 10-C.

Table 6.8.1
Drainage Basin 10-C SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 47	Burning Dump	RFI Complete, CMS Pending

6.8.1.1 SWMU 47 and AOC 516
Site Description and History

SWMU 47 was a burning dump in the late 1920s where various types of wastes (including medical waste) were reportedly burned. Petroleum releases have also been reported onsite. SWMU 47 includes Buildings NSC-64, NSC-66, and NSC-67 and the surrounding asphalt and grassed areas as well as the property north of Turnbull Avenue where former Building NH-1137

was located (prior to demolition) and associated parking lot and grassed areas. The RFI focused on site environmental media potentially impacted by products of incomplete combustion and residual petroleum hydrocarbons.

AOC 516 is just west of SWMU 47 and includes Building 233. This area was used for spray washing vehicles and equipment from 1972 until the 1980s. Prior to the base closure in the spring of 1996, AOC 516 was used for recharging lead-acid batteries. Chemicals of potential concern included lead and other inorganics, solvents, acids, and petroleum hydrocarbons.

Previous Investigations

A summary of investigative activities performed at SWMU 47/AOC 516 is presented in Table 6.8.2, which contains the date of the activities, number of soil and groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Zone C RFI Report* (EnSafe, 1997) and *Draft Zone C Combined Minor Site Corrective Measures Study Report* (EnSafe, 1999).

Table 6.8.2
Summary of SWMU 47/AOC 516 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1995-1996	Site soil and groundwater investigation	
		Round 1 **Soil:** 16 surface borings (0 to 1 foot) 13 subsurface borings (3 to 5 feet) (047SB001 – 013, and 015; 516SB001 – 002): VOCs, SVOCs, Metals, Pesticides/PCBs, TPH, Cyanide (2 duplicates collected for same parameters plus Herbicides, Hexachrome, OP Pesticides, and Dioxins)	***Round 1*** **Groundwater:** 14 shallow wells (047001 – 013, and 015): VOCs, SVOCs, Metals, Pesticides/PCBs, TPH (Gasoline Range Organics (GRO) and Diesel Range Organics (DRO)), and Cyanide (2 duplicates collected for same parameters plus herbicides, OP pesticides, dioxins and hexachrome)
RFI (EnSafe)	1995-1996	***Round 2*** **Soil:**	***Round 2*** **Groundwater:**

Table 6.8.2
Summary of SWMU 47/AOC 516 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
		8 surface borings (0 to 1 foot) (047SB016 – 023): SVOCs (2 duplicates collected for same parameter)	14 shallow wells (047001 – 013, and 015): VOCs, SVOCs, Metals, Pesticides/PCBs, TPH (GRO and DRO), and Cyanide (1 duplicate collected for same parameters)
RFI (EnSafe)	1995-1996	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 14 shallow wells (047001 – 013, and 015): VOCs, SVOCs, Metals, Pesticides/PCBs, TPH (GRO and DRO), and Cyanide (1 duplicate collected for same parameters)
RFI (EnSafe)	1995-1996	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 14 shallow wells (047001 – 013, and 015): VOCs, SVOCs, Metals, Pesticides/PCBs, TPH (GRO and DRO), and Cyanide (1 duplicate collected for same parameters)
CMS (EnSafe)	1999	***Round 1*** **Soil:** 9 surface borings (0 to 1 foot) 9 subsurface borings (3 to 5 feet) (516SBC01 – 516SBC04): Lead and Arsenic) (516SBC05 – 516SBC09): Dioxins	***Round 1*** **Groundwater:** 2 shallow wells (047001 and 047011): TSS and Metals (filtered and unfiltered)
CMS (EnSafe)	1999	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 1 shallow well (047011): Metals (filtered and unfiltered)

Nature and Extent of Contaminants

Approximately 47 sample locations associated with SWMU 47/AOC 516 were evaluated for the presence of contaminants between 1995 and 1999. Only one (047SB018) of the 47 locations is within the boundaries of Drainage Basin 10-C and contained detectable concentrations of BEQs in the surface sample. Subsequent evaluations as part of the CMS determined that the BEQs

were not indicative of a native source but were related to asphalt applications, vehicular traffic, and naturally occurring levels of BEQs throughout the former naval base.

6.8.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at catch basin 10C-A on March 2, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 10-C into Noisette Creek. Analytical detections for sample EFF012 are presented in Table 6.8.3. Salinity results for EFF012 were 2.7 ppt may have influenced the calcium, magnesium, potassium, and sodium results.

Table 6.8.3
Storm Water Effluent Sampling Results
Drainage Basin 10-C

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (μg/L)	Screening Value (μg/L) Reference Concentration	Screening Value (μg/L) Chronic Saltwater Screening Value	Potential COPC
10-C	10C-A	EFF012	Aluminum	230	3,277.67	NL	No
			Antimony	4.40	5.93	NL	No
			Arsenic	5.20	6.88	36	No
			Barium	41	60.31	NL	No
			Cadmium	**2.70**	**1.29**	**9.30**	**Yes**
			Calcium*	**160,000**	**53,455.56**	**NL**	**Yes**
			Chromium	1.50	13.00	50	No
			Copper	37	41.98	2.90	No
			Iron	270	4,134.44	NL	No
			Lead	15	33.63	8.50	No
			Magnesium*	**100,000**	**49,255.56**	**NL**	**Yes**
			Manganese	**85**	**74.52**	**NL**	**Yes**
			Nickel	**8.50**	**5.14**	**8.30**	**Yes**
			Potassium*	**38,000**	**23,678.89**	**NL**	**Yes**
			Sodium*	**770,000**	**395,333.33**	**NL**	**Yes**
			Vanadium	1.70	15.59	NL	No
			Zinc	**460**	**307.83**	**86.00**	**Yes**
			Heptachlor	**0.014**	**NL**	**0.0036**	**Yes**

Notes:
μg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.8.3 Pathway Evaluation

The data collected during the investigative activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 10-C. Based on the available data present for Drainage Basin 10-C, the Zone J data evaluation resulted in three possible outcomes. Table 6.8.4 summarizes the migration pathway scenarios.

Table 6.8.4
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 10-C

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.8.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travel through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 10-C were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and EBS reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.8.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release into Zone J

water bodies from drainage basin outfalls. The pathway evaluation shows that the closest catch basin within drainage basin 10-C is located 740 feet away from sample location 047SB018.

Comparison of the analytical results from surface soil samples near this catch basin to Zone C background concentrations and the ecological risk based screening criteria did not identify areas which have the potential to provide an upland source of COPCs identified in Table 6.8.3 in the storm sewer system.

6.8.3.3 Scenario 1c

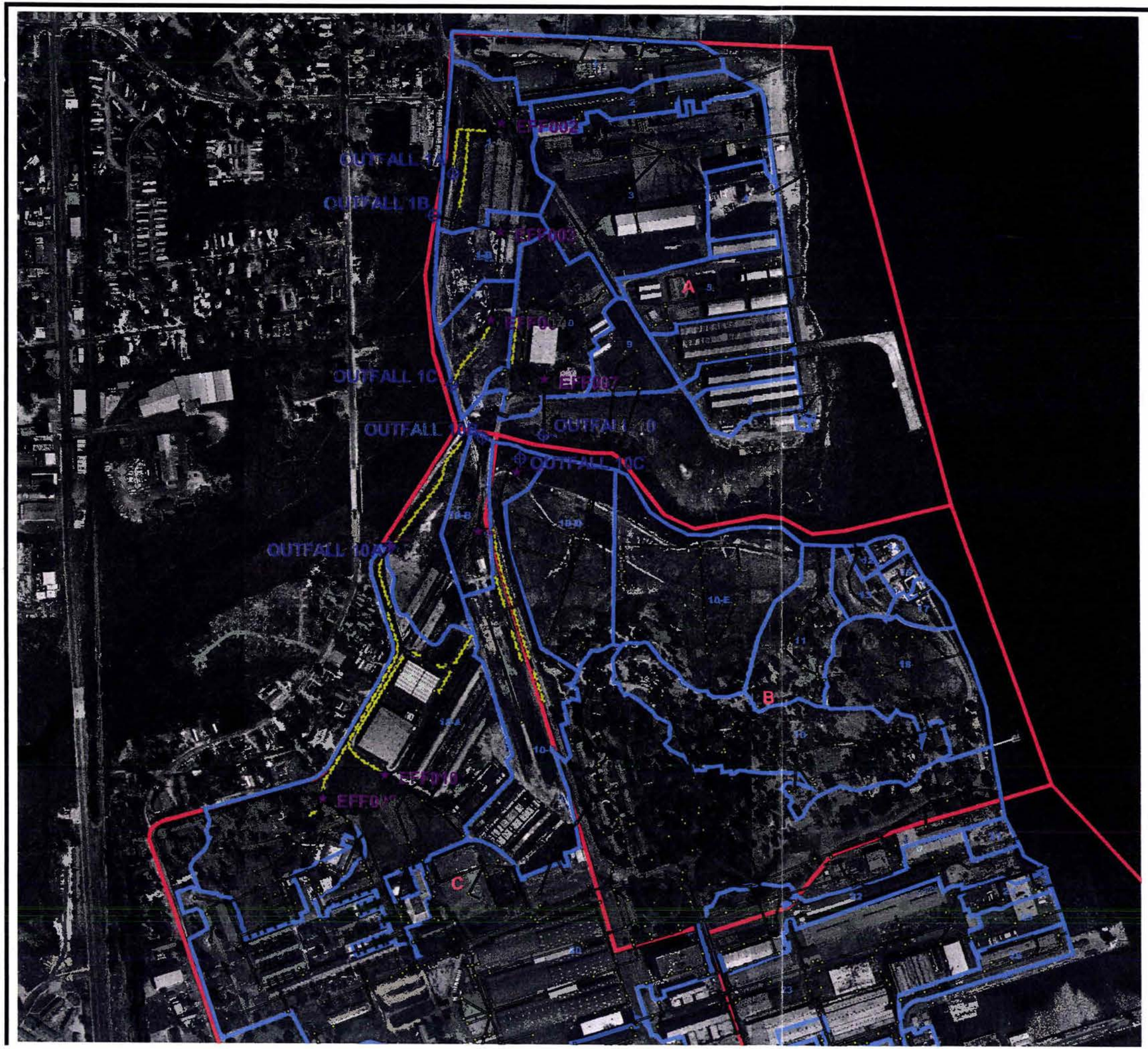
Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc. All rounds of groundwater data collected within Drainage Basin 10-C were reviewed. The preliminary evaluation did not identify any groundwater contaminated with the identified COPCs from Table 6.8.3 intercepting the storm water drainage pipeline within Drainage Basin 10-C.

6.8.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the *Zone L RFI Report* indicates that there are no cross-connects present in Drainage Basin 10-C.

6.8.4 Summary of Potential COPCs

There are no potential COPCs for Drainage Basin 10-C due to a lack of an upland terrestrial source identification.



N

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall
- Zone Boundary

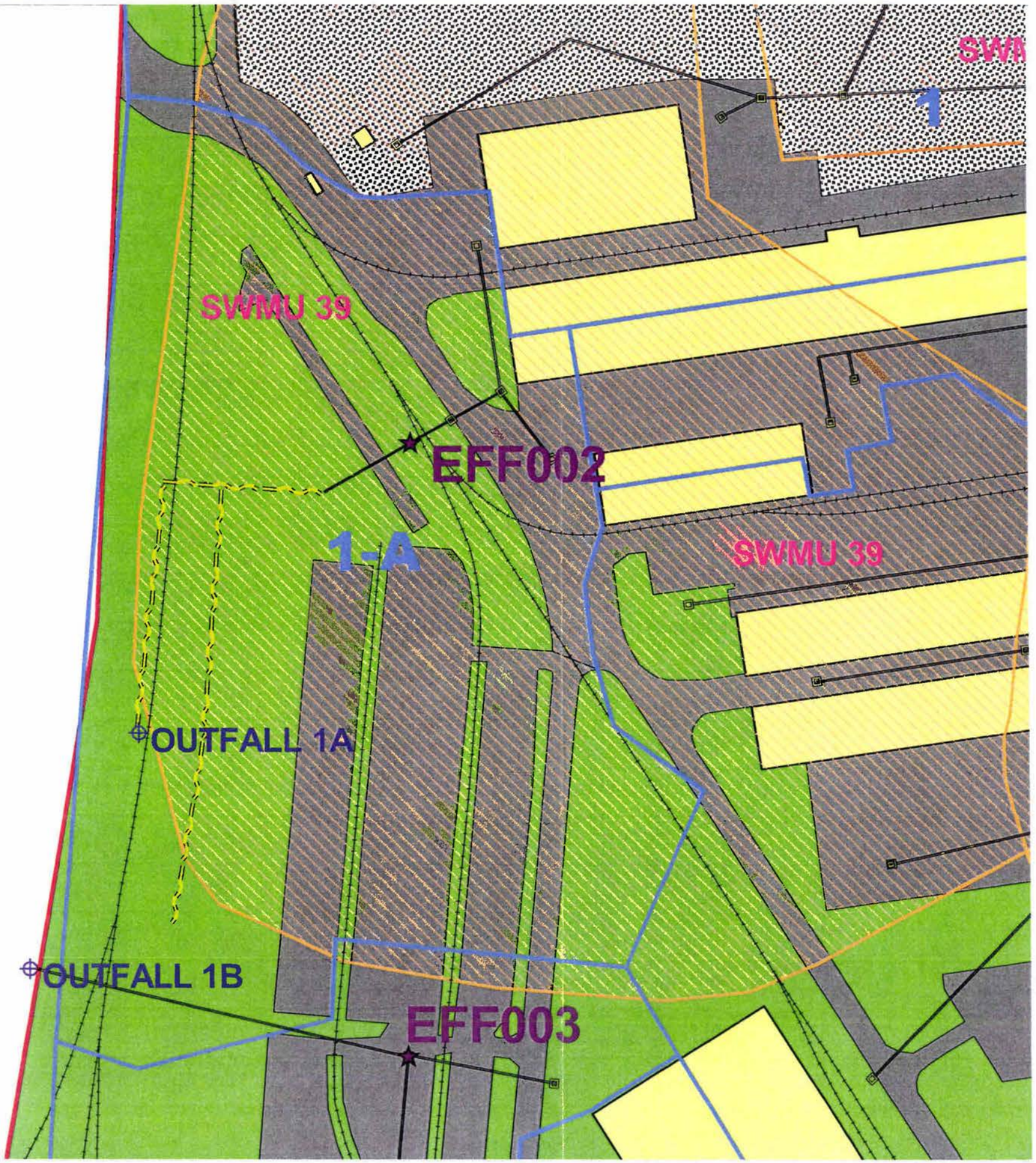
Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-1
Noisette Creek Drainage Basin Area

October 2002	RFI CNC Drainage Basins.apr



N

100 0 100 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-2
Drainage Basin 1-A

October 2002 | RFI N_SYC Drainage Basins.apr

N

100 0 100 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

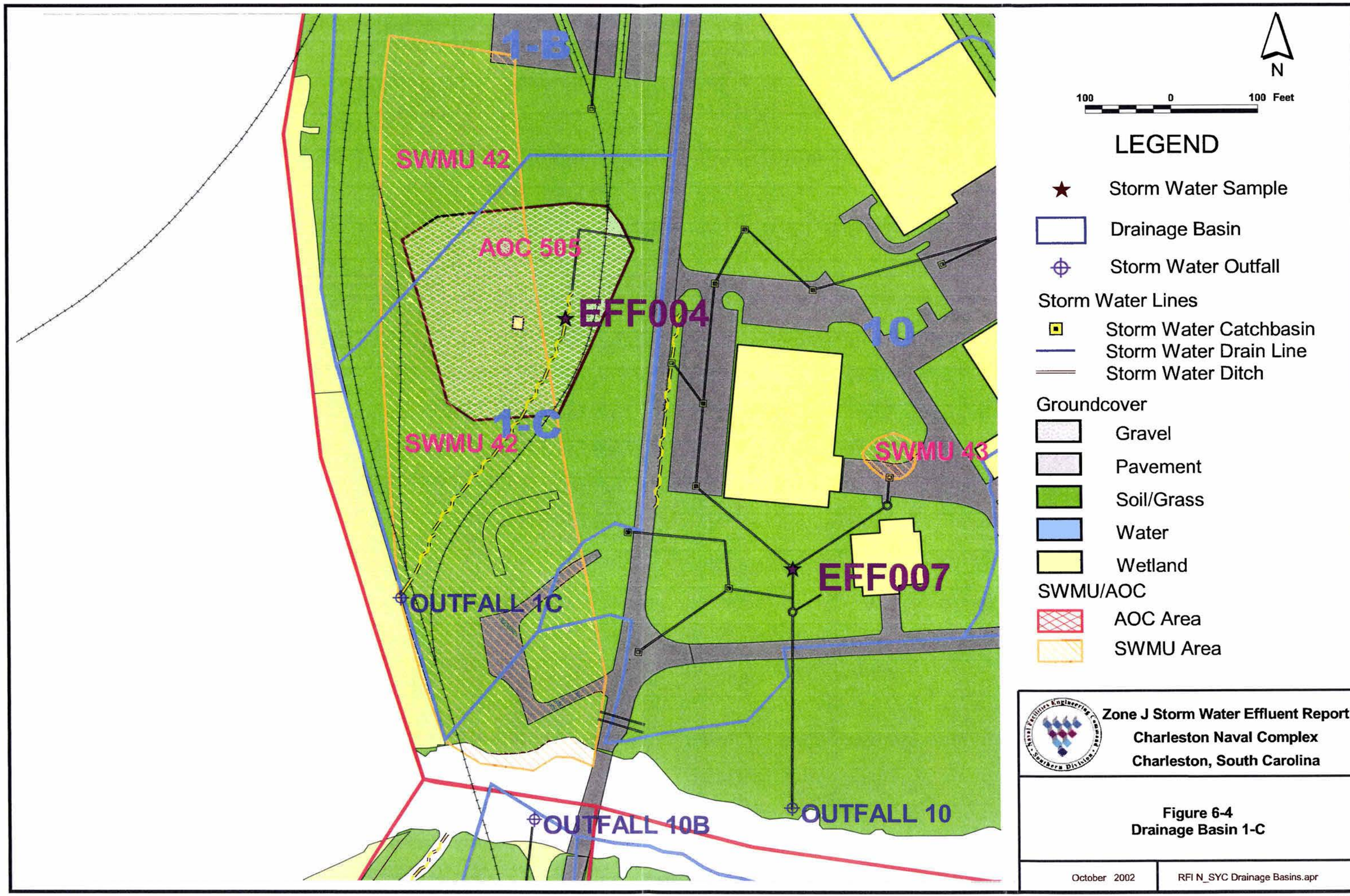
SWMU/AOC

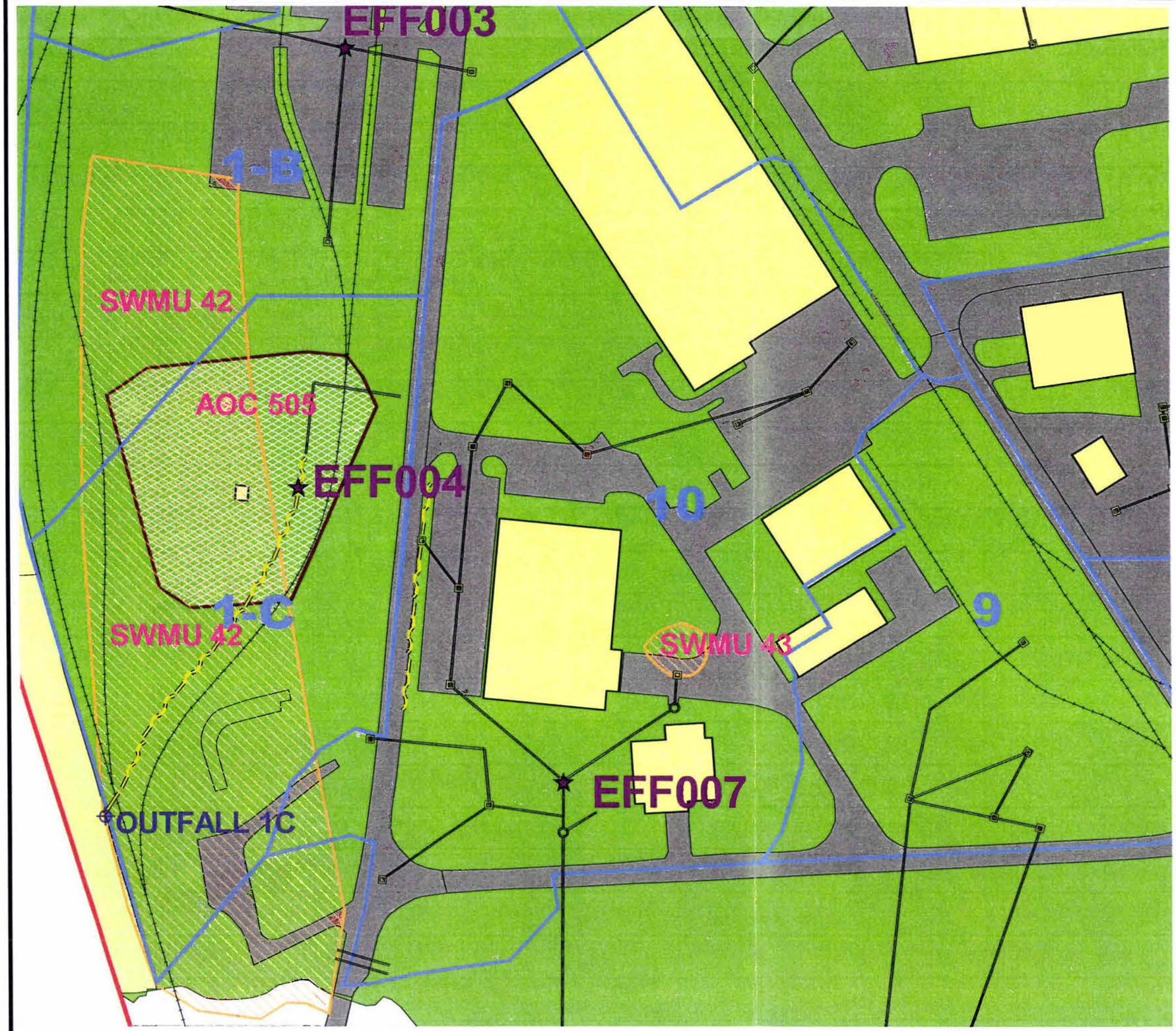
- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-3
Drainage Basin 1-B

October 2002 | RFI N_SYC Drainage Basins.apr


1-B
SWMU 42
AOC 505
EFF004
1-C
SWMU 42
10
SWMU 43
EFF007
OUTFALL 1C
OUTFALL 10B
OUTFALL 10
N
100 0 100 Feet
LEGEND
Storm Water Sample
Drainage Basin
Storm Water Outfall
Storm Water Lines
Storm Water Catchbasin
Storm Water Drain Line
Storm Water Ditch
Groundcover
Gravel
Pavement
Soil/Grass
Water
Wetland
SWMU/AOC
AOC Area
SWMU Area
Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina
Figure 6-4
Drainage Basin 1-C
October 2002
RFI N_SYC Drainage Basins.apr



N

100 0 100 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-5
Drainage Basin 10

October 2002 | RFI N_SYC Drainage Basins.apr

N

300 0 300 Feet

LEGEND

- ★ Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

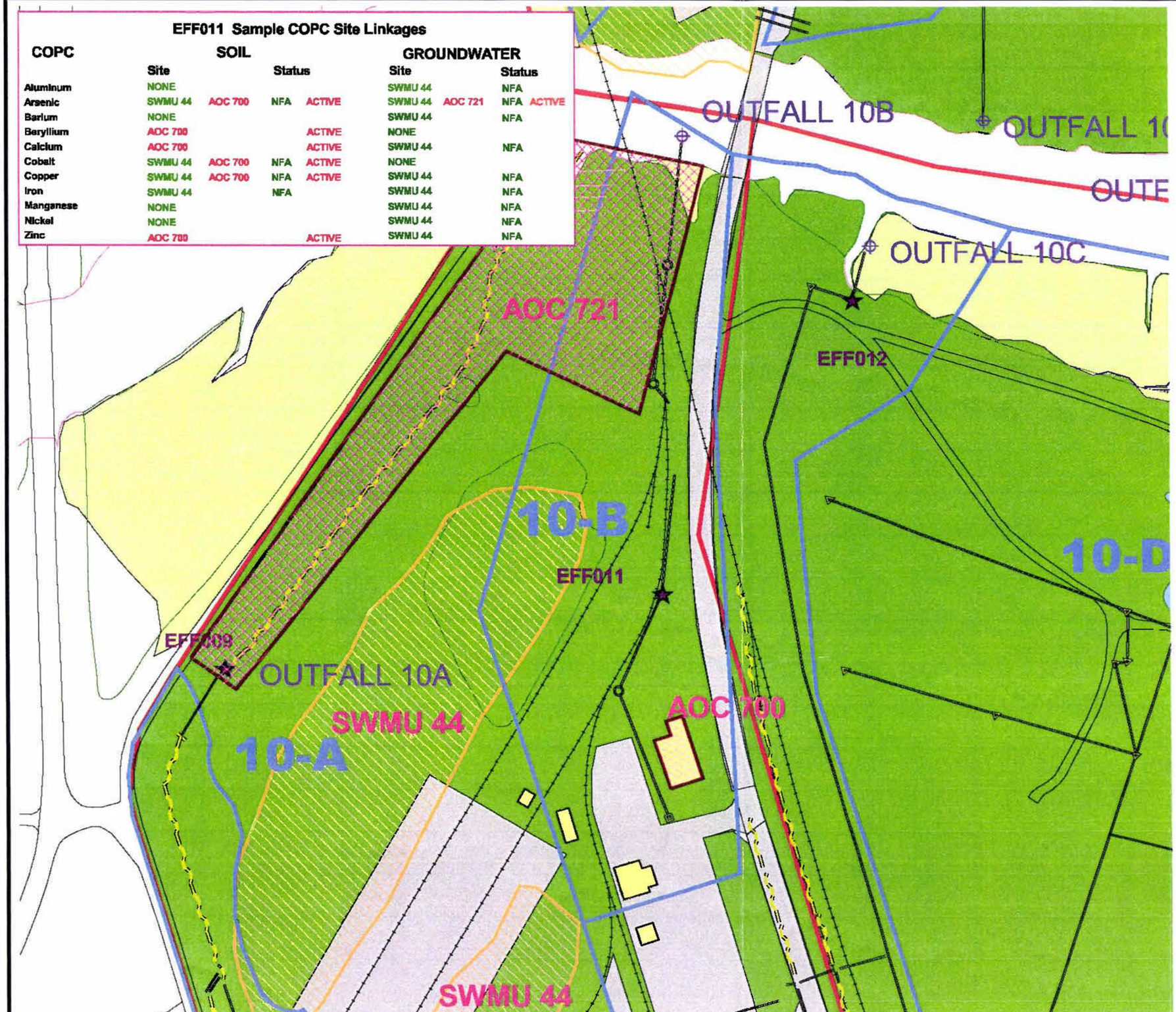
Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-6
Drainage Basin 10-A

October 2002 | RFI N_SYC Drainage Basins.apr

EFF011 Sample COPC Site Linkages

COPC	SOIL Site		SOIL Status		GROUNDWATER Site		GROUNDWATER Status	
Aluminum	NONE				SWMU 44		NFA	
Arsenic	SWMU 44	AOC 700	NFA	ACTIVE	SWMU 44	AOC 721	NFA	ACTIVE
Barium	NONE				SWMU 44		NFA	
Beryllium	AOC 700			ACTIVE	NONE			
Calcium	AOC 700			ACTIVE	SWMU 44		NFA	
Cobalt	SWMU 44	AOC 700	NFA	ACTIVE	NONE			
Copper	SWMU 44	AOC 700	NFA	ACTIVE	SWMU 44		NFA	
Iron	SWMU 44		NFA		SWMU 44		NFA	
Manganese	NONE				SWMU 44		NFA	
Nickel	NONE				SWMU 44		NFA	
Zinc	AOC 700			ACTIVE	SWMU 44		NFA	



N

100 0 100 Feet

LEGEND

- Storm Water Effluent Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Wetland

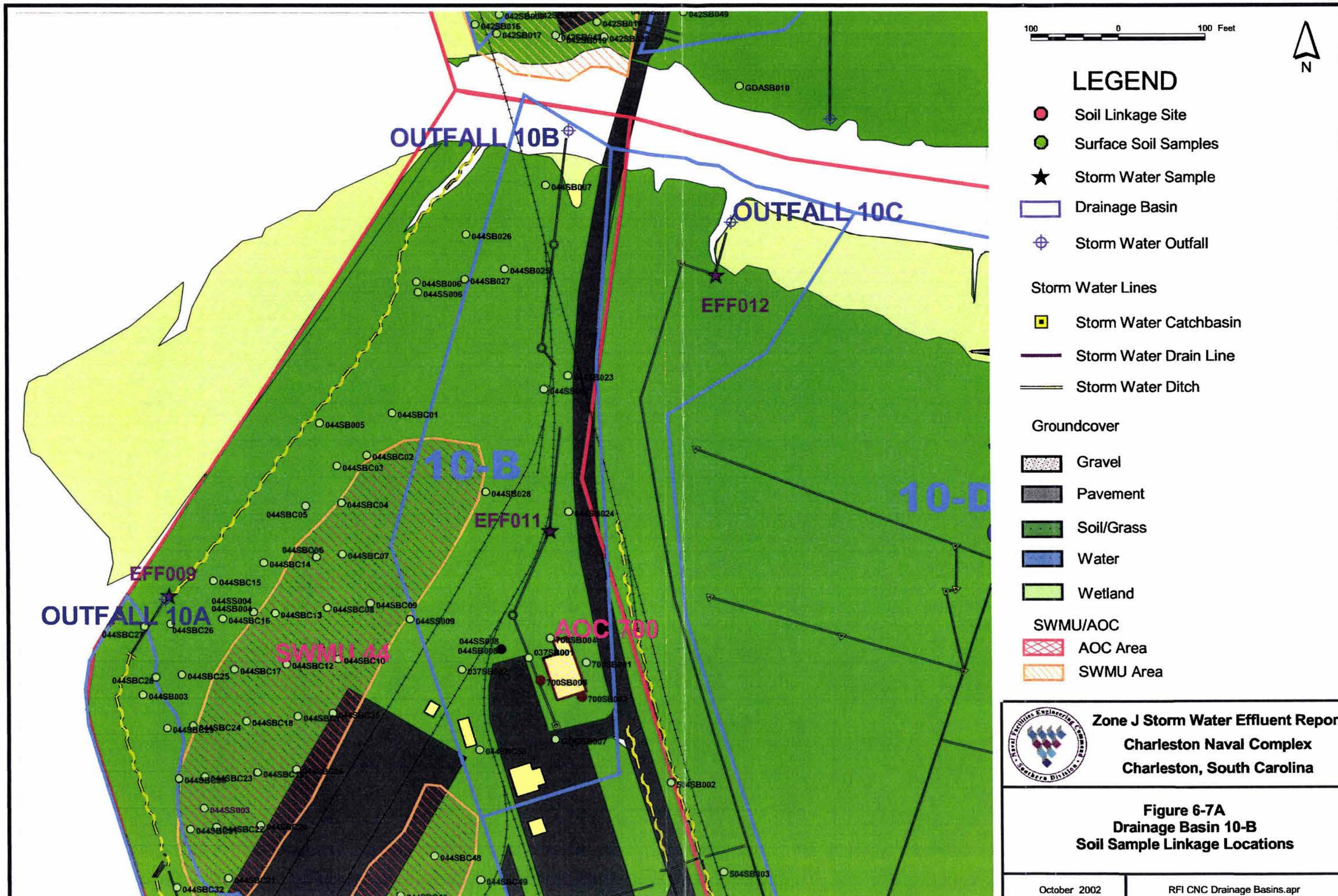
SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-7
Drainage Basin 10B

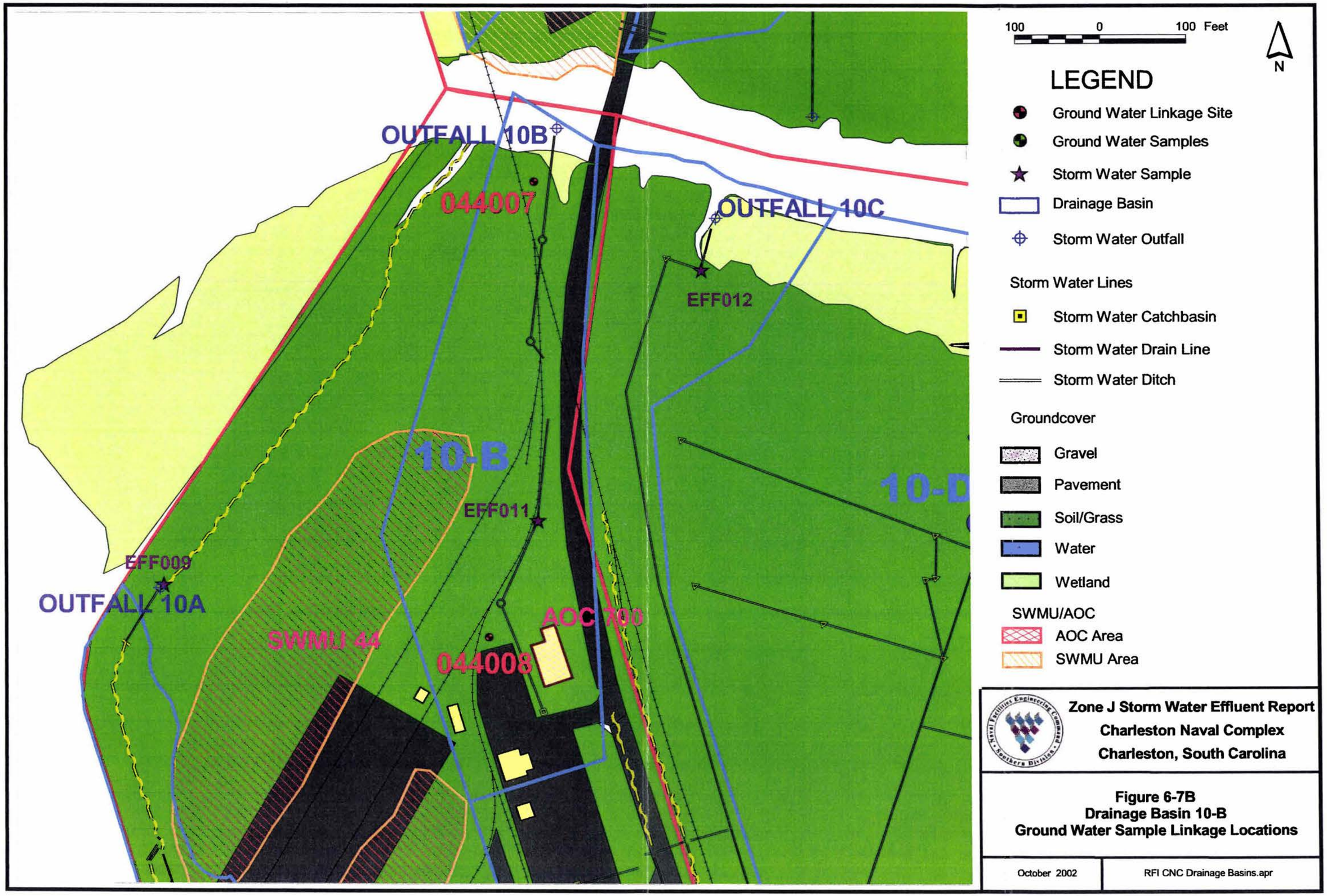
July 2003	Zone J Main Project.apr

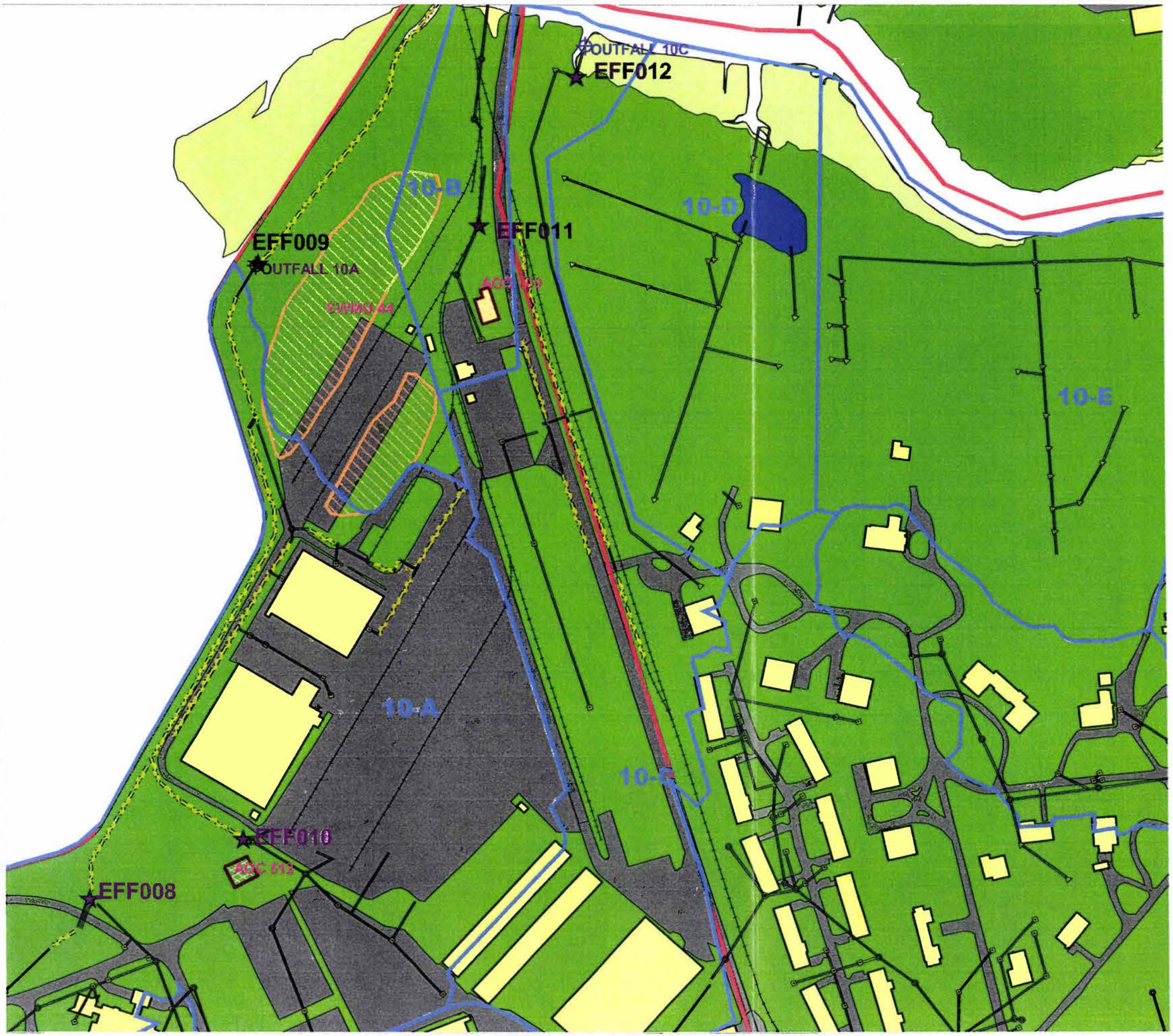


Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-7A
Drainage Basin 10-B
Soil Sample Linkage Locations

October 2002 | RFI CNC Drainage Basins.apr


OUTFALL 10B
044007
OUTFALL 10C
EFF012
10-B
10-D
EFF011
EFF009
OUTFALL 10A
SWMU 44
AOC 700
044008
100 0 100 Feet
N
LEGEND
Ground Water Linkage Site
Ground Water Samples
Storm Water Sample
Drainage Basin
Storm Water Outfall
Storm Water Lines
Storm Water Catchbasin
Storm Water Drain Line
Storm Water Ditch
Groundcover
Gravel
Pavement
Soil/Grass
Water
Wetland
SWMU/AOC
AOC Area
SWMU Area
Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina
Figure 6-7B
Drainage Basin 10-B
Ground Water Sample Linkage Locations
October 2002
RFI CNC Drainage Basins.apr



N

200 0 200 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-8
Drainage Basin 10-C

October 2002 | RFI N_SYC Drainage Basins.apr

6.9 Drainage Basin Evaluations for Shipyard Creek

There are seven drainage basins that discharge into Shipyard Creek. Six of those seven have upland SWMUs/AOCs associated with them. Storm water effluent samples were collected from three of the seven drainage basins to evaluate potential contaminants that may be discharging into Shipyard Creek. Drainage basins 54A, 55 and 56 were not included in the evaluation. Drainage basin 54A contains storm water drainage features; however, the discharge point for this basin is located in Drainage basin 56. Drainage basins 55 and 56 do not contain any storm water drainage feature. Storm water from Drainage basins 55 and 56 sheet flows to the water body. A total of seven storm water effluent samples were collected to characterize the remaining drainage basins. Table 6.9 summarizes the drainage basins associated with Shipyard Creek. Table 6.10 summarizes the precipitation and storm interval information during sampling activities.

Table 6.9
Shipyard Creek Drainage Basins
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Zone	SWMU/AOC	Storm Water Effluent Sample ID	Storm Water Location (Ditch/Manhole)
51H	H	670	EFF063	51H
52	G	8, 633, 634, 636, 637, 706 FDS	EFF064 EFF065 EFF066 EFF067 EFF068	52/1 Ditch-52 North Ditch-52 West Ditch-52 East Ditch-52 South
52A	G	11, 24, FDS	EFF069	Ditch-52A
54	G	NL	NR	NA
54A	H and I	159, 654, 690	NR	NA
55	H and I	19, 20, 121, 649, 650, 690	NR	NA
56	I	690	NR	NA

Notes:
NA = Not Applicable
NL = No Listed SWMU/AOC
NR = Not Required according to the Zone J Point of Entry Work Plan

6.10 Drainage Basin 51-H

Drainage Basin 51-H encompasses approximately 8 acres within Zone H in the south section of the CNC. Land cover within the drainage basin consists of approximately 40% unpaved surfaces (i.e., mostly grass), 45% paved surfaces and 15% buildings. Storm water runoff within the drainage basin is directed to a storm sewer pipeline with twenty-two catch basins that discharge to Shipyard Creek via a concrete culvert.

Figure 6-10 illustrates the area encompassing Drainage Basin 51-H and associated RCRA sites, storm water effluent locations and storm water drainage features.

Table 6.10
Shipyard Creek
Rainfall/and Sample/Tide Event Data

Sample ID EFF	Date Collected	Time Collected	Start/End of Rainfall	Total Rainfall During Time of Collection	Rainfall Amount	Low Tide Time	Duration
EFF063	7-Feb-02	10:45 AM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours
EFF065	7-Feb-02	10:00 AM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours
EFF067	7-Feb-02	10:15 AM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours
EFF068	7-Feb-02	10:30 AM	1:00 AM/ 4:00 PM	0.02	0.94	10:48 AM	15 hours
EFF064	2-Mar-02	5:25 PM	7:00 AM/ 8:00 PM	0.03	1.88	4:50 PM	13 hours
EFF066	2-Mar-02	6:05 PM	7:00 AM/ 8:00 PM	0.03	1.88	4:50 PM	13 hours
EFF069	2-Mar-02	6:20 PM	7:00 AM/ 8:00 PM	0.03	1.88	4:50 PM	13 hours

6.10.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there is no SWMU/AOC that is partly or completely within the boundary of Drainage Basin 51-H. However, sample locations associated with one SWMU/AOC fall within the boundaries of Drainage Basin 51-H. The site is listed in Table 6.10.1, along with its current status. This potential source area is AOC 670 (Former Skeet Range). Note that due to close proximity, AOC 684, SWMU 14 and SWMU 15 were investigated in conjunction with AOC 670 during the *Final Zone H RFI Report* (EnSafe, 1996); however, only two sample locations associated with AOC

670 are located within Drainage Basin 51-H. Sample location associated with AOC 684, SWMU 14 and SWMU 15 do not fall within the basin boundaries and are not considered potential contributors to Drainage Basin 51-H.

Table 6.10.1
Drainage Basin 51-H SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
AOC 670	Former Skeet Range	RFI Complete, IM Complete

6.10.1.1 Combined SWMU 14 (Includes SWMU 15, AOC 670 and AOC 684) Site Description and History

SWMU 14 is an abandoned chemical disposal area where miscellaneous chemicals, warfare decontaminating agents, and possibly industrial wastes were reportedly buried from approximately the mid 1940s to 1977. The last reported disposal occurred in 1977, when ten 5-gallon containers of Warfare Decontaminating Agents (DANC) M4 and DS-2 were buried at the site. Currently, the site is an unused field with several closed buildings. The SWMU 14 area actually encompasses the other three sites referenced in this section.

SWMU 15 refers to the former site of a propane-fired incinerator reportedly used to destroy classified documents. Only the concrete pad and concrete propane tank saddles remain at the site.

AOC 670 refers to the former site of the outdoor trap and skeet range operated from 1960 to the late 1970s. Lead shot and clay targets were not recovered from the range during the time of operation.

AOC 684 is the former site of an outdoor pistol range in operation from the early 1960s to 1981. Firearms were discharged into a soil berm, from which the spent ammunition was not recovered.

In 1997, the DET performed an IM at the SWMU 14 site. The primary objective was to investigate and remove anomalies (specifically DANC containers) and lead contamination

identified in the RFI report dated July 5, 1996. Soils were to be excavated until contaminant concentrations fell below the 1996 USEPA Region III industrial risk-based concentrations (RBCs). The removal action resulted in the demolition of Building 1897, the excavation of construction debris and DANC containers, and the generation/shipment of 225 tons of hazardous soil and 430 tons of non-hazardous soil. Upon completion, excavated areas were backfilled, cleaned and groomed. Although, according to the DET, the overall objective of the IM was achieved, subsequent review of the IM report by EnSafe indicated ambiguities pertaining to objective goals. Given that a CMS was planned for the site to further address issues identified in the IM objectives, these ambiguities were determined irrelevant.

Previous Investigations

A summary of investigative activities performed at AOC 670 is presented in Table 6.10.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Final Zone H RFI Report* (EnSafe, 1996).

Table 6.10.2
Summary of AOC 670 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1994-1996	Site soil and groundwater investigation	
		Round 1 **Soil:** 27 surface borings (0 to 1 foot) 27 subsurface borings (3 to 5 feet) (670SB001 – 670SB027): VOCs, SVOCs, pesticides/PCBs, metals, cyanide, herbicides, OP pesticides, hexachrome, and dioxins (2 duplicates collected for same parameters)	***Round 1*** **Groundwater:** No Groundwater Samples Collected.

Table 6.10.2
Summary of AOC 670 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1994-1996	***Round 2*** **Soil:** 5 surface borings (0 to 1 foot) 3 subsurface borings(3 to 5 feet) (670SB028 – 670SB031): SVOCs (670SB032): VOCs, SVOCs, metals, pesticides/PCBs, cyanide, herbicides, OP pesticides, hexachrome, dioxins, and TPH (1 duplicate collected for same parameters)	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
RFI (EnSafe)	1994-1996	***Round 3*** **Soil:** 3 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (670SB033 – 670SB035): SVOCs (1 duplicate collected for same parameters)	***Round 3*** **Groundwater:** No Groundwater Samples Collected.
RFI (EnSafe)	1994-1996	***Round 4*** **Soil:** 1 surface boring (0 to 1 foot) 1 subsurface boring (3 to 5 feet) (670SB08A): General chemistry, pH, moisture	***Round 4*** **Groundwater:** No Groundwater Samples Collected.
IM (DET)	1997-1998	Performed to investigate and remove anomalies (primarily DANC containers) and lead contamination identified during the geophysical survey and RFI	A total of 40 samples were collected during the removal action: 5 investigatory 30 confirmatory 5 waste characterization Data not available for review.
CH2M-Jones	2001	Site investigation of soil.	
	2001	***Round 1*** **Soil:** 34 surface soil samples (0 to 1 foot) (670SB036 - 670SB039): Lead (670SB040 – 670SB055, 670SB060 – 670SB063): SVOCs (670SB056 – 670SB059, 670SB068 – 670SB071): Antimony, Arsenic, and Lead (670SB064, 670SB066): Antimony	***Round 1*** **Groundwater:** No Groundwater Samples Collected.

Table 6.10.2
Summary of AOC 670 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
CH2M-Jones	2001	***Round 2*** **Soil:** 6 surface soil samples (0 to 1 foot) (670SB072 – 670SB076): SVOCs (670SB077): Arsenic and Lead	***Round 2*** **Groundwater:** No Groundwater Samples Collected.

Nature and Extent of Contamination

Approximately 115 sample locations associated with AOC 670 were evaluated for the presence of contaminants between 1995 and 2001. Of these 115, approximately 2 sample locations associated with AOC 670 are within the boundaries of Drainage Basin 51-H. Surface, and subsurface samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were detections of Arochlor-1254, Arochlor-1260, aluminum, antimony, arsenic, BEQs, beryllium, thallium, and TPH in soil. Based on analytical results, a CMS was recommended for surface soil at AOC 670.

6.10.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at manhole 51H on March 2, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 51-H to Shipyard Creek. Analytical detections for sample EFF063 are presented in Table 6.10.3.

Table 6.10.3
Storm Water Effluent Sampling Results
Drainage Basin 51-H

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L): Reference Concentration	Screening Value (µg/L): Chronic Saltwater Screening Value	Potential COPCs
51-H	51-H	EFF063	Aluminum	140	3,277.67	NL	No
			Barium	7.60	60.31	NL	No
			Calcium*	42,000	53,455.56	NL	No
			Copper	3.80	41.98	2.90	No
			Iron	670	4,134.44	NL	No

Table 6.10.3
Storm Water Effluent Sampling Results
Drainage Basin 51-H

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPCs
			Magnesium*	28,000	49,255.56	NL	No
			Manganese	**140**	**74.52**	**NL**	**Yes**
			Potassium*	13,000	23,678.89	NL	No
			Sodium*	170,000	395,333.33	NL	No
			Vanadium	2.20	15.59	NL	No
			Zinc	38	307.83	86	No

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.10.3 Pathway Evaluation

The data collected during the investigative activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 51-H. Based on the available data present for Drainage Basin 51-H, the Zone J data evaluation resulted in three possible outcomes. Table 6.10.4 summarizes the migration pathway scenarios.

Table 6.10.4
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 51-H

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.10.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travel through the storm water drainage pipeline into Zone J water bodies. No releases impacting the storm water sewer system within the boundaries of Drainage Basin 51-H were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and EBS reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.10.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release in to Zone J water bodies from drainage basin outfalls. The pathway evaluation shows that within the drainage basin at least 1 of 22 catch basins are near sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near these drainage features to Zone H background concentrations and the ecological risk based screening criteria did not identify existing areas which have the potential to provide an upland source of manganese in the storm sewer system.

6.10.3.3 Scenario 1c

Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the downgradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets,

data from surrounding well points, etc. There was no groundwater data collected within Drainage Basin 51-H or associated with AOC 670 to review; therefore, this pathway is considered incomplete.

6.10.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the *Zone L RFI Report* indicates that there are no cross-connects present in Drainage Basin 51-H.

6.10.4 Summary of Potential COPCs

There are no potential COPCs for Drainage Basin 51-H due to a lack of an upland terrestrial source identification.

6.11 Drainage Basin 52

Drainage Basin 52 encompasses approximately 46 acres within Zone G, located on the southeast section of the CNC. Land cover within the drainage basin consists of approximately 73% unpaved surfaces (i.e., mostly grass), 15% paved surfaces, and 12% buildings. Storm water runoff within the basin is directed to a series of open drainage ditches eventually discharging to Shipyard Creek.

Figure 6-11 illustrates the area encompassing Drainage Basin 52 and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.11.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are six SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 52. These potential source areas include SWMU 8 (former Oil Sludge Pits), AOC 633 (Electrical Substation, Building 451C), AOC 634 (former Flammable Materials Storage Area), AOC 636 (Torpedo Magazine), AOC 637 (Dump Area), and AOC 706 (Area Behind Building 246). AOCs 634, 637 and 706 are located completely within Drainage Basin 52; however, SWMU 8, AOC 633 and AOC 636 transcend the boundary of Drainage Basin 52 along the north side where it extends into Drainage Basins 43 (AOC 633), 44 and 45 (SWMU 8 and AOC 636). Table 6.11.1 outlines the status of each site.

Table 6.11.1
Drainage Basin 52 SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 8	Oil Sludge Pit	RFI Complete, IM complete
AOC 633	Substation	RFI Complete, IM Pending, Proposed NFA
AOC 634	Flammable Material Storage	RFI Complete, Proposed NFA
AOC 636	Torpedo Magazine	RFI Complete, IM Complete
AOC 637	Dump Area	RFI Complete
AOC 706	Area Behind Building 246	RFI Complete, Proposed NFA

6.11.1.1 SWMU 8/AOC 636
Site Description and History

These sites were combined into one investigation due to their close proximity and their potential for similar COPCs. SWMU 8 and AOC 636 are located in an area bound by Hobson Avenue to the north, Dyess Avenue to the south, Brumby Street to the west, and the Building X-10 compound (AOC 642) to the east. The SWMU 8 area contained three unlined pits, which were used to dispose of oil sludge from 1944 to 1977. The pits have since been filled. The area is currently gravel paved parking area. AOC 636 is the former torpedo magazine where subsurface disposal of unused torpedoes and munitions allegedly occurred prior to 1944. The AOC 636 area was primarily marshlands at the time. This area has since been filled with dredged materials. Currently, the AOC 636 area contains Building 161 and asphalt paved parking lot.

An IM, completed at SWMU 8/AOC 636 by the DET in September 1999, was performed to delineate soil contamination boundaries, remove the source of contamination from the area, and ascertain the potential for unexploded ordnance remaining in the area. The removal action resulted in the excavation of 26,533 tons of waste oil contaminated soil, the recovery of 50,000 gallons of free product, and the determination that unexploded ordnance was not a threat in the area.

Previous Investigations

A summary of investigative activities performed at SWMU 8/AOC 636 is presented in Table 6.11.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RFI Report* (EnSafe, 1998) and *Draft Zone G RFI Addendum Report* (EnSafe, 1999).

Table 6.11.2
Summary of SWMU 8/AOC 636 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
SWMU 8 Confirmation Study	1982	Completed to assess potential site hazards. Data not available for evaluation.	
Pre-RFI Sampling Event	1993	Site investigation of soil and groundwater.	
		Soil: 31 surface borings (0 to 1 foot) 16 subsurface borings (3 to 5 feet) (S08B01 - S08B31): VOCs, SVOCs, metals, and pesticides/PCBs (5 duplicates collected for same parameters)	**Groundwater:** 6 shallow wells (008001 - 008006): VOCs, SVOCs, metals, and pesticides/PCBs (1 duplicate collected for same parameters)
RFI (EnSafe)	1996–2000	Site investigation of soil and groundwater	
		Round 1 Soil: 12 surface borings (0 to 1 foot) 5 subsurface borings (3 to 5 feet) (008SB01 - 008SB03): VOCs, SVOCs, metals, pesticides/PCBs, propellants/explosives, and cyanide (636SB001 - 636SB009): VOCs, SVOCs, metals, pesticides/PCBs, and propellants/explosives (1 duplicate collected for VOCs, SVOCs, metals, pesticides/PCBs, herbicides, dioxins, OP pesticides, cyanide, and hexachrome)	***Round 1*** **Groundwater:** 6 shallow wells (008001 – 008006): VOCs, SVOCs, metals, and pesticides/PCBs 1 additional shallow well installed (1996) (636001): VOCs, SVOCs, metals, hydrazine, explosives, and pesticides/PCBs
RFI (EnSafe)	1996–2000	***Round 2*** **Soil:** 5 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (636SB010 - 636SB014): SVOCs, metals, and pesticides/PCBs	***Round 2*** **Groundwater:** 7 shallow wells (008001 - 008006 and 636001): VOCs, SVOCs, metals, hydrazine, explosives, and pesticides/PCBs
RFI (EnSafe)	1996-2000	***Round 3*** **Soil:** 3 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (636SB015 - 636SB017): SVOCs, metals, hydrazine, TOC, and SPLP metals	***Round 3*** **Groundwater:** 7 shallow wells (008001 – 008006 and 636001): VOCs, SVOCs, metals, hydrazine, explosives, and pesticides/PCBs

Table 6.11.2
Summary of SWMU 8/AOC 636 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996-2000	***Round 4*** **Soil:** 3 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (636SB018 - 636SB020): metals	***Round 4*** **Groundwater:** 7 shallow wells (008001 – 008006 and N636001): VOCs, SVOCs, metals, hydrazine, explosives, and pesticides/PCBs
SWMU 8 & AOC 636 Interim Measures (Navy)	1996-1999	Removal of visible oil sludge, heavily contaminated soil, pipelines, and free product (SWMU 8) and investigate AOC 636 for buried explosives and propellants. The objective of removing the source of contamination from the SWMU was accomplished. However, it was not determined if residual contamination remains in the subsurface.	No subsurface samples were collected to determine if contaminants associated with oil wastes were present.
CH2M-Jones	2001-2002	Site investigation of soil and groundwater.	
	2001	***Round 1*** **Soil:** 5 subsurface borings (3 to 5 feet) (636SB024 – 636SB027): Metals (636SB028): Metals and 1,1,2,2-PCA	***Round 1*** **Groundwater:** 2 shallow wells (FDS02A, FDS05B): VOCs, SVOCs, general chemistry
CH2M-Jones	2002	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 7 shallow wells (008001 – 008006): Metals, general chemistry (636001): General chemistry
CH2M-Jones	2002	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 4 shallow wells (008001, 008004 – 008005, 636001): General chemistry

Nature and Extent of Contaminants

Approximately 68 sample locations associated with SWMU 8/AOC 636 were evaluated for the presence of contaminants between 1993 and 2002. Of these 68, approximately 13 locations are within the boundaries of Drainage Basin 52. Surface, subsurface and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of

potential contamination at the site. Of particular interest were detections of arsenic, BEQs, chromium and thallium in soil; and antimony, barium, bis(2-ethylhexyl)phthalate, and thallium in groundwater. Based on the analytical results and the human health risk assessment for the combined site, a CMS was recommended for both soil and shallow groundwater at SWMU 8/AOC 636. Based on the analytes detected and the overall groundwater flow in the area, it was also recommended that the groundwater CMS investigation include AOC 637 and SWMU 9.

6.11.1.2 AOC 633

Site Description and History

AOC 633 is located near Building 451C, an electrical substation built in 1943. The building is a block structure with a concrete roof and floor, several steel enclosures on concrete slabs, and foundations from earlier buildings. Several high voltage switches, breakers, and transformers are located in the two-room block structure. Several large PCB releases have been documented from this site.

Previous Investigations

A summary of investigative activities performed at AOC 633 is presented in Table 6.11.3, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RFI Report* (EnSafe, 1998) and *Draft Zone G RFI Addendum Report* (EnSafe, 1999).

Table 6.11.3
Summary of AOC 633 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996 - 1999	Site investigation of soil.	
		Round 1 **Soil:** 7 surface borings (0 to 1 foot) 5 subsurface soil (3 to 5 feet) (633SB001 - 633SB007): Pesticides/PCBs	***Round 1*** **Groundwater:** No Groundwater Samples Collected.

Table 6.11.3
Summary of AOC 633 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996 - 1999	***Round 2*** Soil: 3 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (633SB008 - 633SB010): Pesticides/PCBs	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
RFI (EnSafe)	1996 - 1999	***Round 3*** **Soil:** 10 surface borings (0 to 1 foot) 10 subsurface borings (3 to 5 feet) (633SB011): Pesticides/PCBs (633SB012): SPLP metals, TOC, and metals (633SB013 - 633SB020): Metals and pesticides/PCBs (633SB021): PCBs	***Round 3*** **Groundwater:** No Groundwater Samples Collected.

Nature and Extent of Contaminants

Approximately 20 sample locations associated with AOC 633 were evaluated for the presence of contaminants between 1996 and 1999. Of these 20, approximately 16 locations are within the boundaries of Drainage Basin 52. Surface, and subsurface samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Due to the presence of high voltage equipment in the two room block structure and documented releases at the site, Arochlor-1260 was of particular concern; however, based on the analytical results and the human health risk assessment for the site, no further action was recommended for AOC 633.

6.11.1.3 AOC 634

Site Description and History

AOC 634 is located at Building 1814, a former flammable materials storage facility. Built in 1977, Building 1814 was used until 1992 to store small (less than one gallon) containers of flammable material. The building is no longer used, and the 1995 RCRA Facility Assessment (RFA) cited that the roof of the building and the building's surrounding chain link fence have been removed. Paint and flammable materials were stored at this facility.

Previous Investigations

A summary of investigative activities performed at AOC 634 is presented in Table 6.11.4, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RFI Report* (EnSafe, 1998) and *Draft Zone G RFI Addendum Report* (EnSafe, 1999).

Table 6.11.4
Summary of AOC 634 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996 - 1999	Site soil investigation. ***Round 1*** **Soil:** 3 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (634SB001 – 634SB003): VOCs, metals	***Round 1*** **Groundwater:** No Groundwater Samples Collected.
RFI (EnSafe)	1996 - 1999	***Round 2*** **Soil:** 3 surface borings (0 to 1 foot) 2 subsurface borings (3 to 5 feet) (634SB004 - 634SB006): metals, TOC, and SPLP metals	***Round 2*** **Groundwater:** No Groundwater Samples Collected.

Nature and Extent of Contaminants

Approximately 6 sample locations associated with AOC 634 were evaluated for the presence of contaminants between 1996 and 1999. All sample locations are within the boundaries of Drainage Basin 52. Surface and subsurface samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of primary interest were detections of arsenic and beryllium exceeding their respective RBCs in surface soil. Although levels were in excess of RBC values, the concentrations present were below established background levels for these compounds. Consequently, arsenic and beryllium were eliminated as potential contaminants of concern and no further action recommended for AOC 634.

6.11.1.4 AOC 637
Site Description and History

AOC 637 is a former burning dump located between Dyess Avenue and Bainbridge Avenue directly south of SWMU 8 and AOC 636. The area was used from the late 1940s to the early 1950s. Although no spills or releases were documented at this site, the burning and burial of wastes supports the possibility that contamination exists at the site. No visible evidence of the past disposal remains, as the area has since been filled with dredged spoil, and the area is gravel covered parking area.

Previous Investigations

A summary of investigative activities performed at AOC 637 is presented in Table 6.11.5, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RFI Report* (EnSafe, 1998) and *Draft Zone G RFI Addendum Report* (EnSafe, 1999).

Table 6.11.5
Summary of AOC 637 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
RFI (EnSafe)	1996 - 1998	Site soil and groundwater investigation. ***Round 1*** **Soil:** 5 surface borings (0 to 1 foot) 1 subsurface borings (3 to 5 feet) (637SB001 – 637SB005): VOCs, SVOCs, metals, pesticides/PCBs, cyanide, explosives/propellants, and hydrazine (1 duplicate collected for same parameters plus dioxins, herbicides, hexachrome, OP pesticides)	***Round 1*** **Groundwater:** 1 shallow well (637001): VOCs, SVOCs, metals, pesticides/PCBs
RFI (EnSafe)	1996 - 1998	***Round 2*** **Soil:** 2 surface borings (0 to 1 foot) 1 subsurface borings (3 to 5 feet) (637SB006 – 637SB007): SVOCs, metals, pesticides/PCBs	***Round 2*** **Groundwater:** 1 shallow well (637001): VOCs, SVOCs, metals, pesticides/PCBs, and explosives/propellant

Table 6.11.5
Summary of AOC 637 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
		(1duplicate collected for same parameters plus VOCs, dioxins, herbicides, hexachrome, OP pesticides)	2 additional shallow wells installed (1997) (637002 - 637003): VOCs, SVOCs, metals, pesticides/PCBs, and explosives/propellant (1duplicate collected for same parameters plus dioxins, cyanide, herbicides, hexachrome, and OP pesticides
RFI (EnSafe)	1996 - 1998	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 3 shallow wells (637001 - 637003): VOCs, SVOCs, metals, pesticides/PCBs, and explosives/propellant
RFI (EnSafe)	1996 – 1998	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 3 shallow wells (637001 - 637003): VOCs, SVOCs, metals, pesticides/PCBs, and explosives/propellant
RFI (EnSafe)	1996 - 1998	***Round 5*** **Soil:** No Soil Samples Collected.	***Round 5*** **Groundwater:** 3 shallow wells (637001 - 637003): VOCs, SVOCs, metals, pesticides/PCBs, and explosives/propellant
CH2M-Jones	2002	***Round 1*** **Soil:** No Soil Samples Collected.	***Round 1*** **Groundwater:** 3 shallow wells (637001, 637003): Metals and general chemistry (637002): General chemistry

Nature and Extent of Contaminants

Approximately 10 sample locations associated with AOC 637 were evaluated for the presence of contaminants between 1996 and 2002. All sample locations are within the boundaries of Drainage Basin 52. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest were detections of arsenic, BEQs hydrazine, and thallium in soil; and barium, benzene, hydrazine and thallium in groundwater. Based on the analytical results and

the human health risk assessment for the site, a CMS was recommended for both soil and shallow groundwater at AOC 637.

6.11.1.5 AOC 706

Site Description and History

AOC 706 is located behind Building 246, the former Hazardous Waste Storage and Transit Facility. Building 246 and its surrounding paved area were constructed in 1986. Prior to this, the land parcel appears to have been an open lot surrounded by trees, accessed from Bainbridge Avenue.

Previous Investigations

A summary of investigative activities performed at AOC 706 is presented in Table 6.11.6, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RFI Report* (EnSafe, 1998) and *Draft Zone G RFI Addendum Report* (EnSafe, 1999).

Table 6.11.6
Summary of AOC 706 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
Interim RFA (Ebasco)	1987	Performed to determine the need for a RFI. Data not available for review.	
Closure Activities Report (RUST)	1996	Site soil investigation to delineate contamination boundaries. Data not available for review.	
RFI (EnSafe)	1996 - 2000	Site soil and groundwater investigation. ***Round 1*** **Soil:** 10 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (706SB001 - 706SB002): VOCs, SVOCs, metals, pesticides/PCBs, cyanide (706SB003 - 706SB010): VOCs, SVOCs, metals, pesticides/PCBs (1 duplicate collected for same parameters plus herbicides, OP pesticides, dioxins, and	***Round 1*** **Groundwater:** 1 shallow well (706001): metals and SVOCs

Table 6.11.6
Summary of AOC 706 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/Samples/Locations	
		hexachrome)	
RFI (EnSafe)	1996 – 2000	***Round 2*** **Soil:** 11 surface borings (0 to 1 foot) 10 subsurface borings (3 to 5 feet) (706SB011 - 706SB012): metals and pesticides (706SB013): metals, pesticides, SPLP metals, and TOC (706SB014): metals, dioxins, SPLP metals, and TOC (706SB015 - 706SB017, 706SB019 - 706SB020): metals, TOC, SPLP metals (706SB018): metals, dioxins, SPLP metals, TOC, and hexachrome (706SB021 - 706SB022): metals	***Round 2*** **Groundwater:** 1 shallow well (706001): metals and SVOCs
RFI (EnSafe)	1996 – 2000	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 1 shallow well (706001): metals and SVOCs
RFI (EnSafe)	1996 – 2000	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 1 shallow well (706001): metals and SVOCs
RFI (EnSafe)	1996 - 2000	***Round 5*** **Soil:** No Soil Samples Collected.	***Round 5*** **Groundwater:** 1 shallow well (706001): metals and SVOCs
CH2M-Jones	2002	***Round 1*** **Soil:** No Soil Samples Collected.	***Round 1*** **Groundwater:** (706001): General chemistry
CH2M-Jones	2002	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** (706001): General chemistry

Nature and Extent of Contaminants

Approximately 22 sample locations associated with AOC 706 were evaluated for the presence of contaminants between 1996 and 2002. All sample locations are within the boundaries of Drainage Basin 52. Surface, subsurface and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Of particular concern were detections of barium and thallium in shallow groundwater.

Based on the analytical results and the human health risk assessment for the site, a CMS was recommended for shallow groundwater at AOC 706.

6.11.2 Storm Water Effluent Evaluation

Five storm water effluent samples were collected to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 52 into Shipyard Creek. Along with storm water pipelines, a series of drainage ditches is associated with Drainage Basin 52. In order to characterize runoff from upland SWMUs/AOCs into the drainage ditches, multiple storm water effluent samples were collected, as well as a sample from a manhole that discharges to the ditches (Figure 6-11). Samples were collected at Ditch-52-North, Ditch-52-East, and Ditch-52-South on February 7, 2002; and at manhole 52/1, and Ditch-52-West on March 2, 2002. Analytical detections for samples EFF064 through EFF069 are presented in Table 6.11.7.

Table 6.11.7
Storm Water Effluent Sampling Results
Drainage Basin 52

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
52	52/1	EFF064	Aluminum	220	3,277.67	NL	No
			Barium	20	60.31	NL	No
			Calcium*	20,000	53,455.56	NL	No
			Chromium	2.00	13.00	50	No
			Copper	5.80	41.98	2.90	No
			Iron	580	4,134.44	NL	No
			Lead	3.10	33.63	8.50	No
			Magnesium*	3,800	49,255.56	NL	No
			Manganese	32	74.52	NL	No
			Potassium*	2,300	23,678.89	NL	No
			Selenium	5.60	NL	71	No
			Sodium*	33,000	395,333.33	NL	No
			Vanadium	2.40	15.59	NL	No

Table 6.11.7
Storm Water Effluent Sampling Results
Drainage Basin 52

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
			Zinc	33	307.83	86	No
	Ditch-52-North	EFF065	Aluminum	900	3,277.67	NL	No
			Barium	26	60.31	NL	No
			Calcium*	40,000	53,455.56	NL	No
			Chromium	3.00	13.00	50	No
			Copper	12	41.98	2.90	No
			Iron	790	4,134.44	NL	No
			Lead	5.40	33.63	8.50	No
			Magnesium*	4,700	49,255.56	NL	No
			Manganese	16	74.52	NL	No
			Nickel	1.30	5.14	8.30	No
			Potassium*	2,500	23,678.89	NL	No
			Sodium*	74,000	395,333.33	NL	No
			Vanadium	5.40	15.59	NL	No
			Zinc	110	307.83	86	No
	Ditch-52-West	EFF066	Aluminum	810	3,277.67	NL	No
			Barium	26	60.31	NL	No
			Calcium*	24,000	53,455.56	NL	No
			Chromium	2.60	13.00	50	No
			Copper	10	41.98	2.90	No
			Iron	780	4,134.44	NL	No
			Lead	4.90	33.63	8.50	No
			Magnesium*	6,900	49,255.56	NL	No
			Manganese	27	74.52	NL	No
			Potassium*	5,800	23,678.89	NL	No
			Sodium*	75,000	395,333.33	NL	No

Table 6.11.7
Storm Water Effluent Sampling Results
Drainage Basin 52

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
			Vanadium	3.40	15.59	NL	No
			Zinc	55	307.83	86	No
	Ditch-52-East	EFF067	Aluminum	520	3,277.67	NL	No
			Barium	**100**	**60.31**	**NL**	**Yes**
			Cadmium	0.61	1.29	9.30	No
			Calcium*	70,000	53,455.56	NL	No
			Chromium	1.50	13.00	50	No
			Copper	10	41.98	2.90	No
			Iron	510	4,134.44	NL	No
			Magnesium*	18,000	49,255.56	NL	No
			Manganese	**98**	**74.52**	**NL**	**Yes**
			Potassium*	11,000	23,678.89	NL	No
			Sodium*	260,000	395,333.33	NL	No
			Vanadium	4.10	15.59	NL	No
			Zinc	91	307.83	86	No
			Pentachlorophenol	**14**	**NL**	**7.90**	**Yes**
	Ditch-52-South	EFF068	Aluminum	930	3,277.67	NL	No
			Barium	44	60.31	NL	No
			Calcium*	44,000	53,455.56	NL	No
			Chromium	3.30	13.00	50	No
			Copper	25	41.98	2.90	No
			Iron	1,000	4,134.44	NL	No
			Lead	7.50	33.63	8.50	No
			Magnesium*	18,000	49,255.56	NL	No
			Nickel	2.60	5.14	8.30	No
			Potassium*	13,000	23,678.89	NL	No

Table 6.11.7
Storm Water Effluent Sampling Results
Drainage Basin 52

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (µg/L)	Screening Value (µg/L) Reference Concentration	Screening Value (µg/L) Chronic Saltwater Screening Value	Potential COPC
			Sodium*	190,000	395,333.33	NL	No
			Vanadium	4.70	15.59	NL	No
			Zinc	50	307.83	86	No

Notes:
µg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.11.3 Pathway Evaluation

The data collected during the investigative activities summarized above were used to evaluate the contaminant migration pathway scenarios described in Section 2.1.2 to determine the applicability of each scenario to Drainage Basin 52. Based on the available data present for Drainage Basin 52, the Zone J data evaluation resulted in three possible outcomes. Table 6.11.8 summarizes the migration pathway scenarios.

Table 6.11.8
Storm Water Contaminant Migration Pathway Scenario Summary
Drainage Basin 52

Scenario	Pathway Description	Is Pathway Complete?
1a	waste→catch basin→storm water drainage pipeline→Zone J	No
1b	waste in sheet flow→catch basin→storm water drainage pipeline→Zone J	No
1c	storm water drainage pipeline intercepting contaminated groundwater (infiltration)→Zone J	No
1d	cross connect exists from the sanitary sewer system to the storm sewer system →Zone J	No

6.11.3.1 Scenario 1a

Scenario 1a evaluates the direct release of waste into a catch basin which subsequently travel through the storm water drainage pipeline into Zone J water bodies. No releases impacting the

storm water sewer system within the boundaries of Drainage Basin 52 were discovered during review of environmental incident reports that were maintained by the former CNSY environmental office (Code 106) between the time period from 1982 until base closure in 1996, and EBS reports prepared for property transfer. Therefore, this pathway is considered incomplete.

6.11.3.2 Scenario 1b

Scenario 1b evaluates movement of contaminants via sheet flow to catch basins, transport of those chemicals from catch basins to storm water drainage pipelines and release in to Zone J water bodies from drainage basin outfalls. Open culverts discharging to a drainage ditch leading to the outfall were also considered under this scenario evaluation. The pathway evaluation shows that within the drainage basin, an open culvert/drainage ditch is near sample locations associated with existing SWMUs or AOCs.

Comparison of the analytical results from surface soil samples near these drainage features to Zone G background concentrations and the ecological risk based screening criteria did identify three sample locations which have the potential to provide an upland source for contaminants consistent with EFF064 through EFF069 for entry into the storm sewer system. Sample location 706SB015 with an exceedance of manganese (832 mg/kg) is bound by non-detects; therefore, it will not be considered a potential storm water effluent source for contamination. A summary of the remaining evaluation is provided in Table 6.11.9.

Table 6.11.9
Drainage Basin 52
Scenario 1b Catch Basin Evaluation
Charleston Naval Complex, South Carolina

Catch Basin	Sample ID	Surface Soil COPCs	Concentration (mg/kg)	Screening Value (mg/kg)	Distance to Ditch#
Open Ditch	706SB011	Barium	208	102 (BKG)	2 feet
		Manganese	575	326 (BKG)	
Open Ditch	706SB018	Barium	119	102 (BKG)	3 feet
		Manganese	431	326 (BKG)	

Notes:
BKG = Background Concentration
mg/kg = Milligrams per kilogram
= COPCs not detected within 50-foot radius of catch basin will be further characterized to reduce uncertainty

Evaluation of surface soil data to determine possible upland terrestrial source identification with EFF064 COPCs revealed that barium, and manganese were detected in surface soil above screening criteria at locations within 3 feet of the drainage ditches associated with Drainage Basin 52. However, storm water effluent sample EFF066 (Ditch-52-South) was collected down gradient of the other storm water effluent sample locations and at the point all the drainage ditches converge to discharge to Shipyard Creek. Storm water effluent sample EFF066 did not have any screening value exceedances; therefore, an upland soil linkage is not established for Drainage Basin 52.

6.11.3.3 Scenario 1c

Scenario 1c evaluates storm water drainage pipeline intercepting contaminated groundwater (infiltration) which discharges to Zone J water bodies. Potential COPCs were identified if constituent concentrations exceeded Zone J screening criteria in the down gradient well(s) and were identified on both sides of a storm water sewer line. When potential COPCs were identified the maximum values were presented for the evaluation process. This is a conservative approach that will identify potentially problematic areas for a more detailed assessment, which includes reviewing groundwater flow patterns to see if localized groundwater depressions are present, which could indicate an area where infiltration is occurring, long term trends in the data sets, data from surrounding well points, etc. All rounds of groundwater data collected within Drainage Basin 52 were reviewed. The preliminary evaluation did not identify any groundwater contaminated with identified COPCs from Table 6.11.7 intercepting the storm water drainage pipeline within Drainage Basin 52.

6.11.3.4 Scenario 1d

Scenario 1d evaluates if cross connects exists between the sanitary and storm sewer systems, thereby identifying a possible pathway for waste to enter Zone J water bodies. Information obtained from the Davis and Floyd Study and the *Zone L RFI Report* indicates that there are no cross-connects present in Drainage Basin 52.

6.11.4 Summary of Potential COPCs

There were no potential storm water effluent COPCs identified for Drainage Basin 52 that require further characterization. Storm water effluent sample EFF066 (Ditch-52-South) is the most down gradient storm water effluent sample collected from the drainage ditches associated with Drainage Basin 52 and is located at the convergence of all the ditches prior to discharging to Shipyard Creek. There were no potential storm water effluent COPCs identified for storm water effluent sample EFF066.

6.12 Drainage Basin 52-A

Drainage Basin 52-A encompasses approximately 33 acres within Zone G in the southwest section of the CNC. Land cover within the drainage basin consists of approximately 65% unpaved surfaces (i.e., mostly grass), 15% wetlands, 15% paved surfaces, and 5% buildings. Most storm water runoff within the drainage basin is directed to a storm sewer pipeline with six catch basins and a series of drainage ditches that discharge to Shipyard Creek via a concrete culvert.

Figure 6-12 illustrates the area encompassing Drainage Basin 52-A and associated RCRA sites, storm water effluent locations and storm water drainage features.

6.12.1 Potential Source Areas

A review of the listing of sites in Appendix A of the Part B permit indicates that there are two SWMUs/AOCs that are partly or completely within the boundary of Drainage Basin 52-A. The sites are listed in Table 6.12.1, along with their current status. SWMU 3 is located completely within SWMU 24 and Drainage Basin 37-B; however, one sample is located with Drainage Basin 52-A and was included in this evaluation. The boundary of SWMU 11 transcends the boundary of Drainage Basin 52-A along the north side where it extends into Drainage Basin 37-B, to the west side where it extends into Drainage Basin 53, and to the east where it extends into Drainage Basin 35. SWMU 11 is located completely within Drainage Basin 52-A.

Table 6.12.1
Drainage Basin 52-A SWMUs/AOCs
Charleston Naval Complex, Charleston, South Carolina

SWMU/AOC	Site Name	RCRA Permit Status
SWMU 3	Pesticide Mixing Area	Draft RFI; Draft RFI Addendum; IM complete
SWMU 11	Caustic Pond	Draft RFI; Draft RFI Addendum; IM complete
SWMU 24	Waste Oil Reclamation Facility	Draft RFI; Draft RFI Addendum

6.12.1.1 SWMU 3

Site Description and History

SWMU 3 is an approximately 50 by 30 foot area where the former Building 42-A was located. The building was a shed where pesticides were mixed prior to 1971. Equipment for spraying and mixing pesticides was reportedly rinsed on the ground outside, with the rinsate allowed to infiltrate the soil. During the 1982 Confirmation Study (Geraghty and Miller, 1982), a portion of the area surrounding the slab for Building 42-A was also noted to be devoid of vegetation. This once bare area is now covered with grass. The northwest wall of Building 249 was constructed later over a portion of the area concern. SWMU 3 is located adjacent to SWMU 24 in the western portion of Zone G.

An IMS, completed at SWMU 3 by the Navy DET in 1998, was performed to remove approximately 22 cubic yards of pesticide-contaminated soil and properly abandon well 003GW003. Confirmation samples were collected from eight locations.

Previous Investigations

A summary of investigative activities performed at SWMU 3 is presented in Table 6.12.2, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RCRA Facility Investigation Report* (EnSafe, 1998) and *Draft Zone G RCRA Facility Investigation Addendum Report* (EnSafe, 1999).

Table 6.12.2
Summary of SWMU 3 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1996 -1999	Site investigation of soil and groundwater.	
		Round 1 **Soil:** 10 surface borings (0 to 1 foot) 9 subsurface borings (3 to 5 feet) (003SB001): cyanide, metals, pesticide/PCBs, SVOCs, and OP pesticides (003SB002 and 003SB003): cyanide, metals, pesticides/PCBs, and OP pesticides (003SB004 – 003SB010): metals, pesticides/PCBs, and OP pesticides (1 duplicate collected for herbicides, pesticides/PCBs, SVOCs, VOCs, cyanide, hexachrome, dioxins, metals, and OP pesticides)	***Round 1*** **Groundwater:** 3 shallow wells (003001 – 003003): herbicides, metals, OP pesticides, and pesticides/PCBs (1 duplicate collected for herbicides, pesticides/PCBs, SVOCs, VOCs, cyanide, hexachrome, dioxins, metals, and OP pesticides)
RFI (EnSafe)	1996 - 1999	***Round 2*** **Soil:** 9 surface borings (0 to 1 foot) 10 subsurface borings (3 to 5 feet) (003SB011 – 003SB013): pesticides/PCBs (003SB0014): SPLP pesticide/PCBs and TOC (003SB0015 – 003SB020): pesticides	***Round 2*** **Groundwater:** 3 shallow wells (003001 – 003003): metals and pesticides (1 duplicate collected for same parameters)
RFI (EnSafe)	1996 - 1999	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 3 shallow wells (003001 – 003003): metals and pesticides (1 duplicate collected for same parameters)
RFI (EnSafe)	1996 - 1999	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 3 shallow wells (003001 – 003003): metals and pesticides (1 duplicate collected for the same parameters)
RFI (EnSafe)	1996 - 1999	***Round 5*** **Soil:** No Soil Samples Collected.	***Round 5*** **Groundwater:** 3 shallow wells (003001 – 003003): metals, SVOCs, and VOCs (1 duplicate collected for the same parameters)

Table 6.12.2
Summary of SWMU 3 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
CH2M-Jones	2001-2002	***Round 1*** **Soil:** 16 surface soil borings (0 to 1 foot) (003SB021: VOCs, Pesticides, and PCBs (033SB022 – 003SB036): VOCs, and Pesticides 16 subsurface soil borings (3 to 5 feet) (003SB021: VOCs, Pesticides, and PCBs (033SB022 – 003SB036): VOCs, and Pesticides	***Round 1*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001-2002	***Round 2*** **Soil:** 14 surface soil borings (0 to 1 foot) (003SB068 – 003SB081): Pesticides 17 subsurface soil borings (3 to 5 feet) (003SB068 – 003SB084): Pesticides	***Round 2*** **Groundwater:** No Groundwater Samples Collected.
CH2M-Jones	2001-2002	***Round 3*** **Soil:** 6 surface soil borings (0 to 1 foot) (003SB085 – 003SB086, 003SB088 – 003SB091): Pesticides 6 subsurface soil borings (3 to 5 feet) (003SB087 – 003SB092): Pesticides	***Round 3*** **Groundwater:** No Groundwater Samples Collected.

Nature and Extent of Contamination

Approximately 60 sample locations associated with SWMU 3 were evaluated for the presence of contaminants between 1996 and 2002. Of these 60, 47 sample locations are within the boundaries of Drainage Basin 52-A. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contaminants at SWMU 3. Of particular interest were detections of Aroclor-1248, alpha-chlordane and gamma-chlordane in surface soil and beryllium, thallium, aluminum, vanadium, and chromium in shallow groundwater. Based on the analytical results and the human health risk assessment for the site, a CMS was recommended for both soil and shallow groundwater at SWMU 3.

6.12.1.2 SWMU 11
Site Description and History

SWMU 11 is located near the interchange formed by the junction of Bainbridge Avenue and Viaduct Road. It is currently an open space, landscaped with grass. From the early 1940s to the early 1970s, the site contained Building 131, acetylene plant, and settling ponds used for the disposal of calcium hydroxide generated as a byproduct of the production of acetylene gas. The settling ponds covered an area of approximately 2.75 acres. Unknown quantities of water saturated with calcium hydroxide were discharged into the pond, which discharged supernatant into Shipyard Creek. A Confirmation Study (Geraghty and Miller) of groundwater was performed in 1982; however, data were unavailable for review.

An IMS, completed at SWMU 11 by the DET in 1997, was performed to excavate and dispose of soil in the area of a ditch and drainage culvert where calcium hydroxide was visible due to erosion. Visible calcium hydroxide was removed from an area approximately 30-feet by 20-feet by 5-feet for a total of approximately 260 cubic yards. No confirmation sampling was completed and excavation was based on visual observations of impacted soil.

Previous Investigations

A summary of investigative activities performed at SWMU 11 is presented in Table 6.12.3, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RCRA Facility Investigation Report* (EnSafe, 1998) and *Draft Zone G RCRA Facility Investigation Addendum Report* (EnSafe, 1999).

Table 6.12.3
Summary of SWMU 11 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI (EnSafe)	1996 – 1999	Site investigation of soil and groundwater.	
		Round 1 **Soil:** 5 surface borings (0 to 1 foot) 3 subsurface borings (3 to 5 feet) (011SB001 – 011SB003): Cyanide and metals (011SB004 and 011SB005): Metals (011SB002 and 011SB004 were collected for surface only) (1 duplicate collected from the surface for herbicides, pesticides/PCBs, SVOCs, VOCs, cyanide, hexachrome, dioxins, metals, and OP pesticides)	***Round 1*** **Groundwater:** 3 shallow wells (011001 – 011003): metals
RFI (EnSafe)	1996 - 1999	***Round 2*** **Soil:** 6 surface borings (0 to 1 foot) 5 subsurface borings (3 to 5 feet) (011SB006 and 011SB007): metals (011SB008 – 011SB011): TOC and metals (011SB010 was collected for surface only)	***Round 2*** **Groundwater:** 3 shallow wells (011001 – 011003): metals
RFI (EnSafe)	1996 - 1999	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 3 shallow wells (011001 – 011003): metals
RFI (EnSafe)	1996 - 1999	***Round 4*** **Soil:** No Soil Samples Collected.	***Round 4*** **Groundwater:** 3 shallow wells (011001 – 011003): metals
CH2M-Jones	2001	***Round 1*** **Soil:** 4 surface soil borings (0 to 1 foot) (011SB012 – 011SB015): Lead	***Round 1*** **Groundwater:** 4 shallow wells (F0808A – F0808D): VOCs, and SVOCs
CH2M-Jones	2001	***Round 2*** **Soil:** No Soil Samples Collected.	***Round 2*** **Groundwater:** 4 shallow wells (F0808A – F0808D): VOCs, and SVOCs

Nature and Extent of Contamination

Approximately 22 sample locations associated with SWMU 11 were evaluated for the presence of contaminants between 1996 and 2001. Of these 22, 21 locations are within Drainage Basin 52-A. Surface, subsurface, and groundwater samples were collected and analyzed for various

constituents in order to delineate the nature and extent of potential contamination at the site. Of particular interest was the detection of lead in a single surface soil sample. A CMS was recommended for lead in surface soil based on the single lead detection in soil.

6.12.1.3 SWMU 24

Site Description and History

SWMU 24, the waste oil reclamation facility for the CNC, consists of tanks 39-A and 39-D. This area is located south of Hobson Avenue and east of Wood Street. SWMU 24 was originally investigated under the petroleum program as part of the Fuel Distribution System (FDS) but was returned to the RCRA program to assess inorganics detected in the area groundwater. Tanks 39-A and 39-D operated as waste oil settling tanks. Waste oil containing water and presumably other impurities was delivered to these tanks via the pipeline system. The tanks were used both to separate and store the water and oil phases. The wastewater was subsequently discharged to the sanitary sewer system.

Previous Investigation

A summary of investigative activities performed at SWMU 24 is presented in Table 6.12.4, which contains the date of the activities, number of soil and shallow groundwater samples collected, sample locations, and analytical methods performed during each phase of the investigation. Detailed discussions and results are presented in the *Draft Zone G RCRA Facility Investigation Report* (EnSafe, 1998) and *Draft Zone G RCRA Facility Investigation Addendum Report* (EnSafe, 1999).

Table 6.12.4
Summary of SWMU 24 Investigations
Charleston Naval Complex, Charleston, South Carolina

Activity	Date	Description/ Samples/Locations	
RFI Addendum (EnSafe)	1996 - 1998	Site investigation of soil and groundwater.	
		Round 1 **Soil:** 4 surface borings (0 to 1 foot) (FDSSH024 and FDSSH026): Metals, pesticides/PCBs, SVOCs, VOCs, cyanide, TPH-DRO, and TPH-GRO (FDSSH025 and FDSSH027): TPH-DRO and TPH-GRO (1 duplicate collected for metals, pesticides/PCBs, SVOCs, VOCs, cyanide, TPH-DRO, and TPH-GRO)	***Round 1*** **Groundwater:** 4 shallow wells (024001 – 024004): Metals, SVOCs, and VOCs (1 duplicate collected for same parameters)
RFI Addendum (EnSafe)	1996 – 1998	***Round 2*** **Soil:** No Soil Samples Collected	***Round 2*** **Groundwater:** 4 shallow wells (024001 – 024004): Metals, SVOCs, and VOCs
RFI Addendum (EnSafe)	1996 – 1998	***Round 3*** **Soil:** No Soil Samples Collected.	***Round 3*** **Groundwater:** 4 shallow wells (024001 – 024004): Metals, SVOCs, and VOCs
RFI Addendum (EnSafe)	1996 – 1998	***Round 4*** **Soil:** No Soil Samples Collected	***Round 4*** **Groundwater:** 4 shallow wells (024001 – 024004): Metals, SVOCs, and VOCs
RFI Work Plan	1999 - 2000	Site investigation to delineate BEQs in soil.	
		Soil: 9 surface borings (0 to 1 foot) and 9 subsurface borings (3 to 5 feet) (024SB001 – 024SB004, 024SB009, and 024SB010): SVOCs (024SB005 – 024SB007): Metals and SVOCs (2 duplicates collected for metals and SVOCs)	**Groundwater:** No Groundwater Samples Collected.

Nature and Extent of Contamination

Approximately 17 sample locations associated with SWMU 24 were evaluated for the presence of contaminants between 1996 and 2000. Of these 17, four locations are within the boundaries of Drainage Basin 52-A. Surface, subsurface, and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential

contamination at the site. According to *Section 10.15.11 Corrective Measures Considerations* in the *Draft Zone G RCRA Facility Investigation Addendum Report*, BEQs were considered a COC for soil and arsenic a COC for groundwater. However, results and conclusions were not available for this drainage basin evaluation.

6.12.2 Storm Water Effluent Evaluation

A storm water effluent sample was collected at ditch 52-A on March 2, 2002 to determine if constituents are migrating from the SWMUs/AOCs associated with Drainage Basin 52-A into the Shipyard Creek. Analytical detections for sample EFF069 are presented in Table 6.12.5.

Table 6.12.5
Storm Water Effluent Sampling Results
Drainage Basin 52-A

Drainage Basin	Catch Basin/ Manhole ID	Sample ID	Parameter	Concentration (μg/L)	Screening Value (μg/L): Reference Concentration	Screening Value (μg/L): Chronic Saltwater Screening Value	Potential COPC
52-A	Ditch 52-A	EFF069	Aluminum	570	3,277.67	NL	No
			Barium	13	60.31	NL	No
			Calcium*	23,000	53,455.56	NL	No
			Chromium	1.70	13.00	50	No
			Copper	5.20	41.98	2.90	No
			Iron	520	4,134.44	NL	No
			Lead	2.50	33.63	8.50	No
			Magnesium*	2,500	49,255.56	NL	No
			Manganese	17	74.52	NL	No
			Potassium*	3,500	23,678.89	NL	No
			Sodium*	14,000	395,333.33	NL	No
			Vanadium	2.30	15.59	NL	No
			Zinc	18	307.83	86	No

Notes:
μg/L = Micrograms per Liter
NL = Not Listed
* = Parameter is considered an essential nutrient; therefore, it will not be evaluated as a potential COPC.

6.12.3 Pathway Evaluation

There were no potential storm water effluent COPCs identified for Drainage Basin 52-A that require further characterization; therefore, contaminant migration pathway scenarios (1a through 1d) do not require further evaluation.

900 0 900 Feet

N

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall
- Zone Boundary

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Zone J Storm Water Effluent Report
Charleston Naval Complex
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Figure 6-9
Shipyard Creek Drainage Basin Area

October 2002 | RFI CNC Drainage Basins.apr

N

100 0 100 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-10
Drainage Basin 51H

October 2002 | RFI N_SYC Drainage Basins.apr

N

300 0 300 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

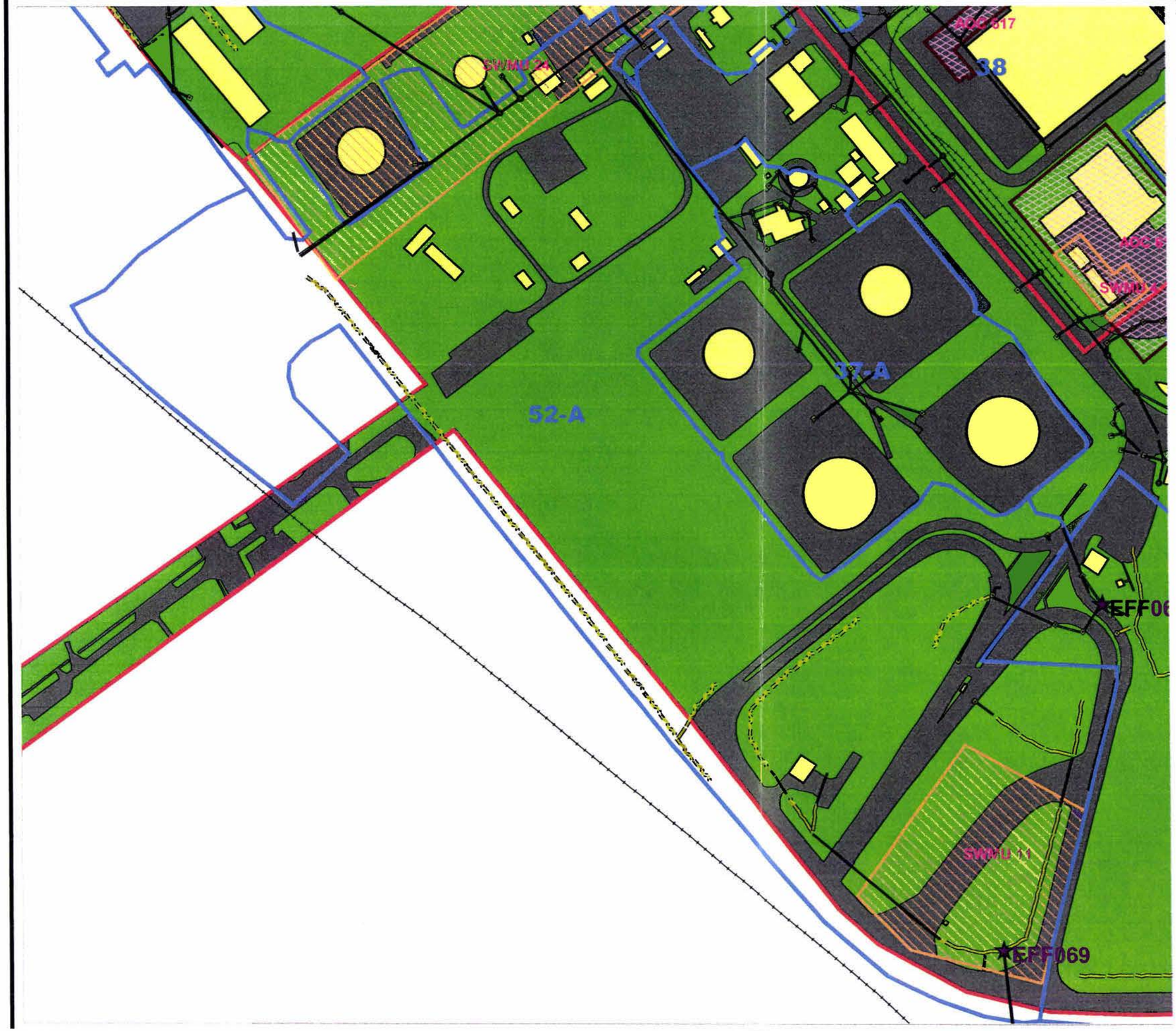
SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-11
Drainage Basin 52

October 2002 | RFI N_SYC Drainage Basins.apr



N

200 0 200 Feet

LEGEND

- Storm Water Sample
- Drainage Basin
- Storm Water Outfall

Storm Water Lines

- Storm Water Catchbasin
- Storm Water Drain Line
- Storm Water Ditch

Groundcover

- Gravel
- Pavement
- Soil/Grass
- Water
- Wetland

SWMU/AOC

- AOC Area
- SWMU Area

Zone J Storm Water Effluent Report
Charleston Naval Complex
Charleston, South Carolina

Figure 6-12
Drainage Basin 52A

October 2002 | RFI N_SYC Drainage Basins.apr

7.0 HYDRODYNAMICS OF THE CHARLESTON HARBOR

7.1 Introduction

The *Zone J RFI Storm Water Effluent Evaluation Report* presents a comprehensive evaluation of the dynamic nature of the Charleston Harbor Estuary and how it relates to the fate and transport mechanisms of CNC-related constituents at Noisette Creek, Shipyard Creek and the Cooper River. This report focuses on the hydrodynamics of Noisette and Shipyard Creeks. The hydrodynamics of Cooper River will be presented in the Addendum report. Section 7 will provide an overview of the tidal hydrodynamics based on published literature and ongoing studies and detailed information regarding tidal current distribution in Zone J.

7.2 Tidal Excursion Analysis

When a potential contaminant is released from the CNC into the water column of the Cooper River, it will be transported in the Cooper River in the upstream as well as downstream directions by the flood and ebb tide current flows. There is a net downstream transport of the contaminant toward the ocean. However, the pollutants can also be carried into the Ashley River and the Wando River during a flood tide. While the pollutants originating from the CNC are being transported into the Ashley and Wando Rivers, their concentration will be significantly reduced because of the longer travel time, thus becoming more diluted by the ambient water. Contaminants from other source locations within the tidal excursion zone in the Ashley, Cooper, and Wando Rivers have the potential to be transported to the CNC as well.

To determine the upstream limit of the pollutant transport in the Cooper River, Ashley River, and Wando River, a tidal excursion analysis was conducted. As defined in *Engineering Societies Monographs: Estuary and Coastline Hydrodynamics,* (Eagleson, 1996) the tidal excursion is the average distance traveled by a particle of water on the flood tide. The tidal excursion analysis was based on a simple linear particle tracking method in a Lagrangian sense. The spatially and temporally varying current field in the estuary was established by the tidal current predictions published by the NOAA. An average tidal condition was used for the analysis.

Particle tracking was started at the low slackwater or the beginning of a flood tide. The current

velocity field of a semidiurnal tide in the estuary can be represented by the general formula in Eulerian specification:

$$u_{(x,t)} = u_{\max}(x)\sin\left(\frac{2\pi}{T}[t-\delta(x)]\right)$$

where:	t	=	time.
	x	=	linear coordinate.
	$u_{(x,t)}$	=	instantaneous current velocity, which is a function of space and time.
	$u_{max}(x)$	=	peak current velocity at location x.
	$\delta(x)$	=	tidal phase lag at location x.
	T	=	tidal period = 12.42 hours for M2 tide.

The distance of travel or particulate track can be determined by simple numerical integration by time in a Lagrangian sense. The particle path can be defined by the following Lagrangian specification:

$$X(t) = \int_o^t u(x,t')dt'$$

where: X(t) = particle position at time t.
Initial condition: X(0) = 0.

The Lagrangian integration is analogous to a baton being carried by members of a relay team. Each of the relay team members carries the baton a very short distance, and each team member runs with a unique top speed and a unique acceleration/deceleration pattern, depending on the time of day.

For example, the spatially varying peak current and phase lag at nine locations in the Cooper River can be defined by Table 7-1 based on the NOAA tidal current prediction. The peak tidal current speed and phase lag between two tidal stations can be computed by linear interpolation.

The results of upstream particle tracking in the Cooper River is presented in Figure 7-1, which indicates that the tidal excursion distance is approximately 4.3 miles from the northern boundary

of the CNC during an average flood tide. Similarly, the upstream excursion limit during an average tide is approximately 3.5 miles from the mouth of the Ashley River and is 5.6 miles upstream of the Wando River mouth.

This analysis was based on simple numerical integration and linear interpolation between NOAA tidal prediction stations, assuming a half sinusoidal function. In reality, the tidal velocity may vary significantly according to channel depth, width, and geometry. Therefore, this approach should be considered an approximation. To accurately quantify the tidal excursion distance, a two- or three-dimensional hydrodynamic model should be used.

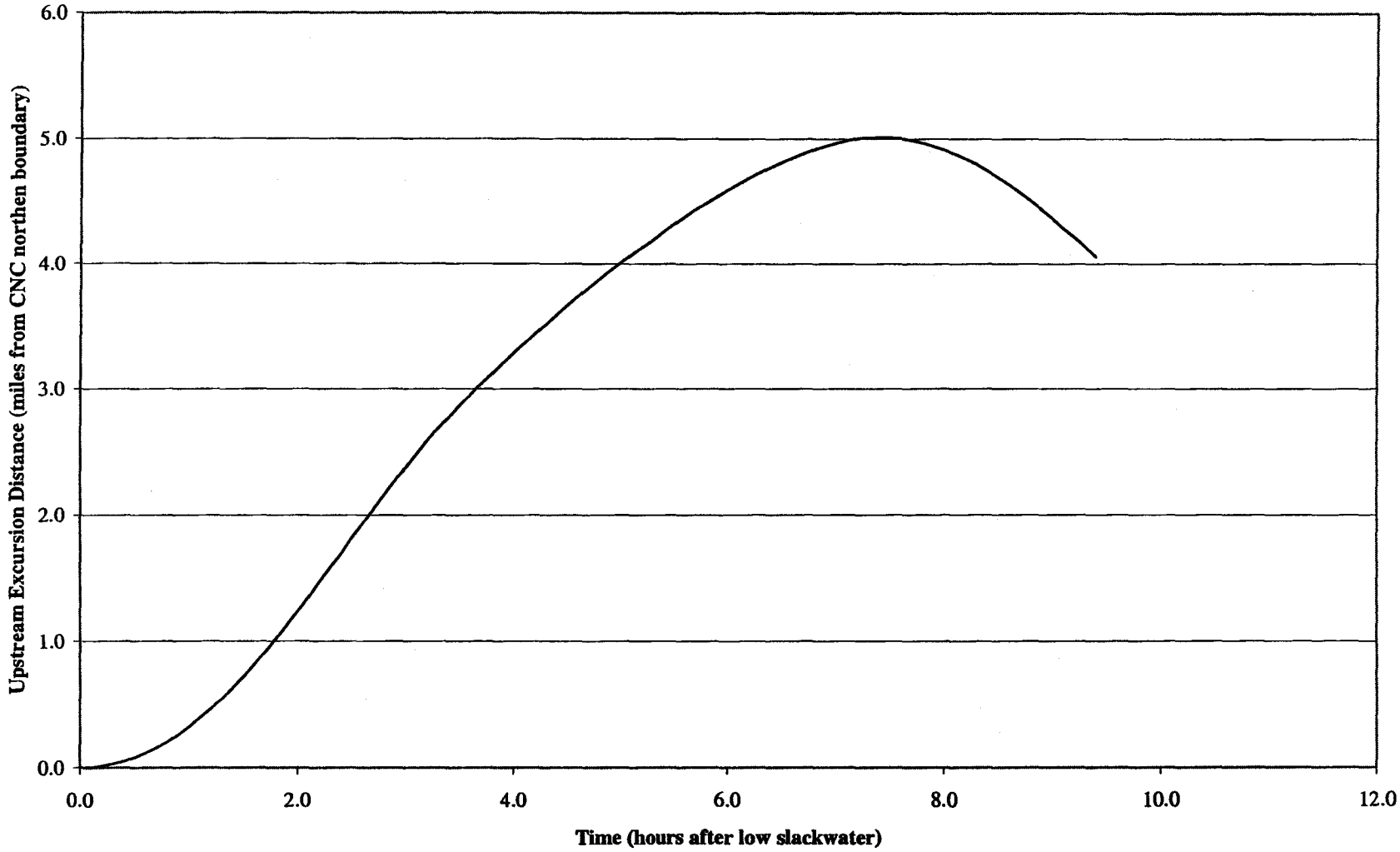
Table 7.1. Tidal Current Velocities and Phases in Cooper River

Station	Distance from CNC Northern Boundary (miles)	Average Peak Flood Velocity (kts)	Phase Lag (hrs)
Cooper River at North Charleston	-1.12	1.10	-0.05
Cooper River at Northern Boundary of CNC	0.00	1.16	0.00
Cooper River at Filbin Creek Reach	0.70	1.20	0.03
Cooper River at Filbin Creek Reach Buoy 58	1.28	1.10	-0.18
Cooper River at Ordnance Reach	2.12	1.00	0.10
Cooper River at Yellow House Creek	3.09	0.70	0.62
Cooper River at 1 mile NW of Yellow House Landing	4.00	0.70	0.62
Copper River at Woods Point	4.94	0.90	1.20
Cooper River at 0.5 mile North of Snow Point	6.62	1.10	0.77

Note: Velocity and phase at CNC boundary was computed by linear interpolation.

Source: ECT, 2002.

Upstream Tidal Excursion in Cooper River from CNC Northern Boundary



7.3 Noisette Creek

Noisette Creek is a small tidal tributary of the Cooper River. It flows eastward through the CNC's abandoned golf course between Zones A and B to the Cooper River. Anthropogenic features along the 0.5-mile tidal creek reach within the CNC property include 15 storm water outfalls along the bank and the reinforced portion of the southern shoreline near the creek's mouth, which has been protected from erosion by riprap, concrete debris, and a seawall. Two bridges are upstream at the western property line: one for railcars, another for motor vehicles. There is a smaller footbridge near the center of the creek's run.

Noisette Creek is heavily influenced by the tides, with several undercut areas along the bank where tidal flow has caused shore erosion. The banks are on average 3 to 6 ft above the water. High tides occasionally cause the tidal creek to spill over banks and flood portions of the surrounding areas. The brackish water in the creek is often turbid, and the creek bottom is visible only at its confluence with the Cooper River, and then only at low tide. Visible substrate within the creek consists of marl, gravel, and muck, with some detritus and debris.

According to the NOAA tidal table, the average tide range in the Cooper River near the south entrance of Clouter Creek (about 2 miles south of the Noisette Creek entrance) is 5.4 ft, and the average tide range in the Cooper River near the north entrance of Clouter Creek (about 3.4 miles north of the Noisette Creek entrance) is 5.48 ft. By linear interpolation, the average tide range at the Noisette Creek entrance is estimated to be 5.43 ft.

EnSafe and Environmental Consulting & Technology, Inc. (ECT) conducted a hydrographical study in Noisette Creek on December 6 and 7, 2000, during a neap tide when the tide range was close to its minimum within a lunar cycle. Specific conductivity, salinity, dissolved oxygen (DO), pH, water temperature, and current data were collected at five locations in Noisette Creek.

The sampling locations were:

- Station 1—Mouth of Noisette Creek.
- Station 2—Hobson Avenue.
- Station 3—O'Hear Road.
- Station 4—Spruill Avenue.
- Station 5—South Rhett Avenue.

Data were also collected in the Cooper River at Marker R54 near Noisette Creek as a reference. Sampling station locations are shown in Figure 7-1. A YSI multi-parameter water quality sampling unit and a Marsh McBirney current meter were used to collect water quality and current velocity data. Sediments were collected by a petite ponar for visual examination.

7.3.1 Bathymetry

The widths and depths of the Noisette Creek measured at low tide at various locations are shown as follows:

Station	Width (ft)	Depth at Low Tide (ft)
1	—	4
2	108	5
3	112	2.5
4	92	<1
5	51	<1

The width of the Cooper River near Noisette Creek entrance is about 2,300 ft and the depth of the navigational channel is 40 ft at mean low water (MLW).

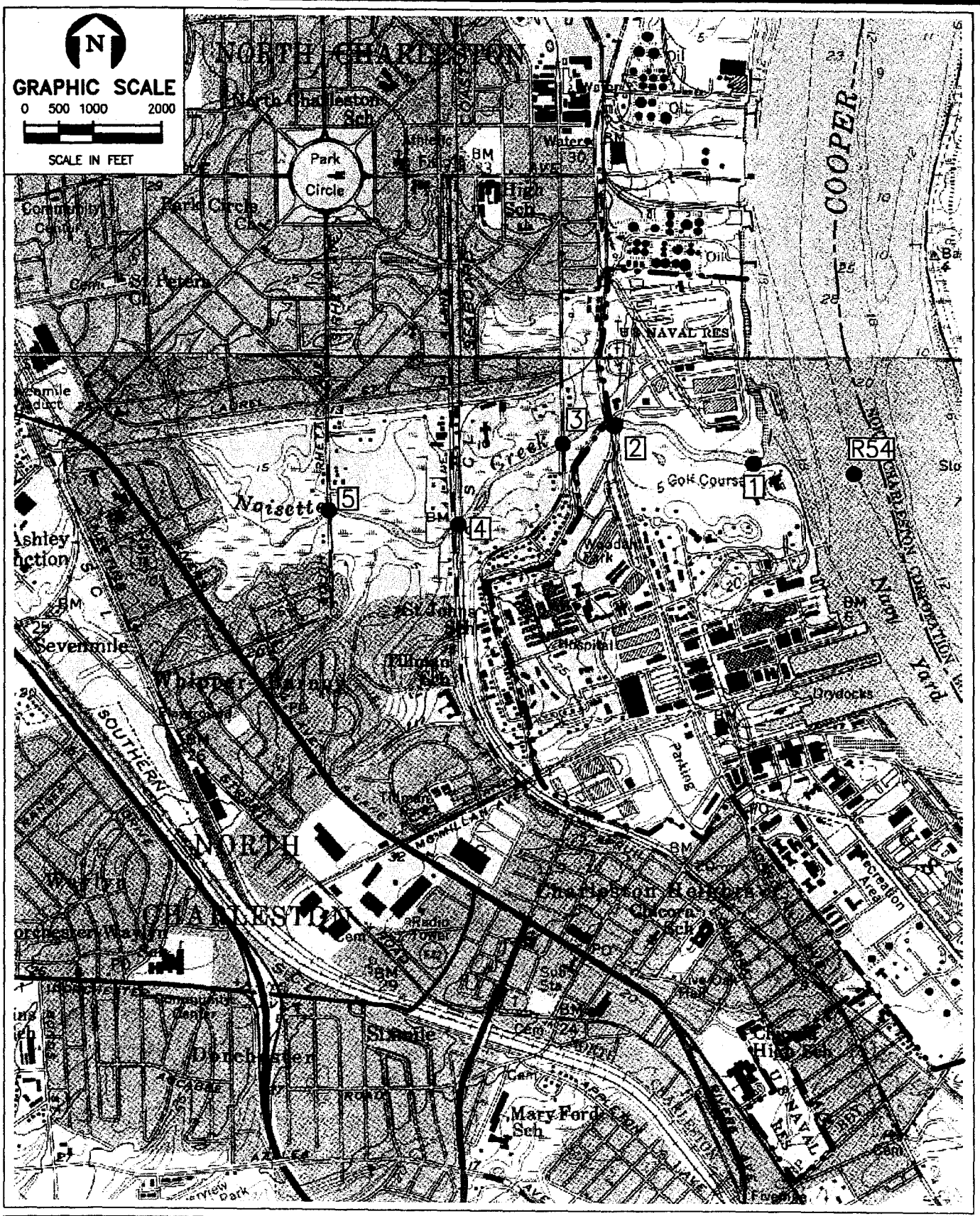


Figure 7-1

WATER QUALITY SAMPLING STATIONS

Source: USGS Quad: Charleston & North Charleston, SC, 1979; 1979; ECT, 2001.

ECT

Environmental Consulting & Technology, Inc.

7.3.2 Water Quality Data

Water quality data were collected during morning low tide and afternoon high tide on December 6, 2000, and during morning low tide on December 7, 2000. No evidence of vertical stratification in Noisette Creek was found. The difference in surface and bottom salinity was mostly less than 0.5 parts per thousand (ppt) except at Station 1, where a salinity difference of 1.7 ppt was observed. The average values of temperature, conductivity, salinity, DO, and pH at each station at low tide and at high tide are summarized in Table 7.2.

At low tide, the average salinity ranged from 9.8 ppt at Station 5 to 14.3 ppt at Station 1. At high tide, the average salinity ranged from 13.5 ppt at Station 4 and to 15.9 ppt at Station 1. DO concentrations were generally lower at low tide as compared to high tide values. This is possibly caused by sediment oxygen demand consuming a portion of the DO during low tide when water stayed in the creek for about half of a tidal cycle. In contrast, high DO water at Cooper River flows into Noisette Creek during flood tide, replenishing DO in the creek. The lowest observed DO was 4.93 milligrams per liter (mg/L) at Station 5 during morning low tide on December 7, 2000, with a 43.8 percent DO saturation level. Higher DO concentrations, ranging from 8.84 to 9.34 mg/L (89.7 to 93.4 percent saturation) were observed throughout the creek during afternoon high tide. The afternoon DO in the creek was higher than DO in the Cooper River, probably due to the effects of photosynthesis in the marsh.

Low pH values were observed during morning low tide at upstream stations. The lowest value of 5.39 was measured at Station 5 in the morning on December 6, 2000. There were not sufficient data to determine whether the cause of low pH values was from upland sources or the bio-activity in the marsh.

The SCDHEC maintains a water quality sampling station in Cooper River at I-526 (Station MD-248) which is about 1.4 miles north of the Noisette Creek entrance. Table 7.3 summarizes the water quality at MD-248 for data collected in 1999 and 2000.

Table 7.2. Noisette Creek Water Quality Data Summary (December 6 to 7, 2000)

Station	Temperature (°C)	Conductivity	Salinity (ppt)	D.O. (mg/L)	D.O. Saturation (%)	pH
Low Tide Average						
1	11.06	23,578	14.29	8.66	86.42	7.33
2	8.66	21,224	12.69	6.27	58.24	6.49
3	8.04	20,023	11.88	5.97	56.90	6.19
4	8.09	18,810	11.11	5.70	51.50	5.94
5	7.44	16,715	9.77	5.60	43.80	5.58
R54	11.92	28,795	17.71	8.62	89.25	7.79
High Tide Average						
1	11.94	25,960	15.86	8.86	90.73	7.92
2	11.94	24,987	15.23	8.95	91.30	7.89
3	12.06	22,845	13.81	9.16	92.95	7.86
4	11.77	22,335	13.48	9.28	93.55	7.78
5	11.54	22,520	13.59	8.98	89.85	7.81
R54	11.86	35,612	22.44	8.05	85.32	7.90

Source: ECT, 2001.

Table 7.3. Water Quality Data at Cooper River at I-526 (MD-248), 1999-2000

Parameter	Unit	Mean	Minimum	Maximum	Stdev	Number of Samples
Alkalinity, Carbonate as $CaCO_3$	mg/L	60.37	41	73	8.74	19
Biochemical oxygen demand (BOD)	mg/L	0.49	0	1.1	0.42	19
Cadmium	µg/L	ND	ND	ND		7
Chromium	µg/L	ND	ND	ND		7
Copper	µg/L	ND	ND	ND		7
Dissolved oxygen (DO)	mg/L	6.53	4.50	9.39	1.52	22
Iron	µg/L	262.9	0	430	141.6	7
Lead	µg/L	ND	ND	ND		7
Manganese	µg/L	14.29	0	30	8.89	7
Mercury	µg/L	ND	ND	ND		7
Nickel	µg/L	ND	ND	ND		7
Nitrogen, ammonia (NH3)	mg/L	0.15	0	0.27	0.08	19
Nitrogen, Kjeldahl	mg/L	0.32	0	0.5	0.12	22
Nitrogen, Nitrite (NO2) + Nitrate (NO3)	mg/L	0.082	0.04	0.17	0.031	22
pH	s.d	7.66	7.17	8.40	0.28	21
Phosphorus as P	mg/L	0.050	0	0.14	0.0322	21
Salinity	ppt	12.6	5	21	4.2	23
Specific conductance	umho/cm	18,869	9,000	31,000	6,019	23
Temperature, water	deg C	21.4	11.5	31	6.2	23
Total Fecal Coliform	#/100 mL	33.3	7	140	30.7	19
Total Organic Carbon (TOC)	mg/L	3.77	1.7	10	2.13	7
Turbidity	NTU	5.09	1.7	10	2.24	19
Zinc	µg/L	15.71	0	50	17.18	7

Source: ECT, 2002.

7.3.3 Currents

Tidal current velocities were measured on December 6 between 12:00 to 1:30 p.m. at five monitoring stations in Noisette Creek during peak flood current. The current velocities were also measured during peak ebb current in the afternoon on December 6, 2000, and during peak flood current in the afternoon on December 7, 2000. The following table shows the peak profile-averaged current speeds at each station during flood tide and ebb tide.

	Peak Current Speed	
Station	Flood (fps)	Ebb (fps)
1	0.83	0.82
2	0.49	0.98
3	0.48	0.65
4	0.72	1.12
5	0.59	0.30

The maximum profile-averaged ebb current of 1.12 feet per second (fps) was recorded at Station 4, and the maximum profile-averaged flood current of 0.83 fps was recorded at Station 1. The maximum surface current speed of 0.95 fps during flood tide was recorded at Station 1, and the maximum surface current speed of 1.1 fps was recorded at Station 4 during ebb tide.

As previously described, the current data were measured close to the neap tide. The tide ranges varied from 4.1 to 4.7 ft during the hydrographical study; therefore, the long-term average peak current in the creek could be 15 to 32 percent higher than the values measured during the study. This calculation was based on the ratio of the neap and average tide ranges.

According to the NOAA's tidal current table, the average peak flood current in the Cooper River at North Charleston (about 0.7 mile south of Noisette Creek) is 1.8 fps and the average peak ebb current speed is 2.8 fps.

7.3.4 Sediments

A petite ponar was used to collect bottom sediment samples in Noisette Creek for visual examination. The soil classifications of the sediment samples are presented as follows:

- Station 1—Very dark gray clayey sand, saturated. Approximately 30 to 40 percent clay, fine to very fine-grained sand; approximately 10 percent decaying organic matter (leaves, etc); decaying vegetation odor.

- Station 2—Dark gray clayey sand, saturated. Approximately 20 percent clay, fine to very fine-grained sand; approximately 10 to 20 percent decaying organic matter (leaves, etc) and shells up to approximately ½-inch diameter; decaying vegetation odor.

- Station 3—Decaying organic matter (leaves, twigs, etc) and shells (up to ¾-inch diameter) in dark olive gray clayey matrix. Mostly organic matter and shells; decaying vegetation odor.

- Station 4—Very dark clayey sand. Approximately 30 to 40 percent clay, approximately 10 to 20 percent decaying organic matter, minor shells, fine to very fine sand, and saturated; strong decaying vegetation odor.

- Station 5—Very dark gray clayey sand, saturated, very fine-grained sand. Approximately 45 percent clay, very minor organic debris (<5 percent), very strong sulfur, decaying vegetation odor.

The sediment matrix is mostly fine to very fine sand throughout the Noisette Creek bottom except for Station 3, where abundant inactive oyster shells were found. These shell materials might be the remnants of the deployed oysters and clams for a previous bioaccumulation study. The finest grain-sized materials were observed in Station 5, the upstream location. There was increasing decaying organic material from Station 1 (the creek mouth) to Station 5. The spatial

trend of organic material distribution supports the hypothesis that low DO concentrations in upstream reach of the creek during low tides might be caused by high sediment oxygen demand in the marsh area.

The highest clay contents were found at both Station 1 and Station 5, which suggests that there are dual sources of the clay materials. One source is the upland runoff, mostly from the urban area outside of the CNC, another source is the Cooper River, which brings suspended fine materials, or clays, into Noisette Creek during flood tides. The tidal velocity in Noisette Creek is much smaller than that in the Cooper River; therefore suspended materials may settle in the creek when entering the creek.

7.3.5 Drainage

The total drainage area of the Noisette Creek basin is approximately 1,747 acres, including the open water and tidal marsh areas. The tidal marsh area is approximately 134 acres and the open water in the creek at low tide is about 14 acres. Therefore, the total upland drainage area of the Noisette Creek basin is approximately 1,599 acres. About 118 acres of the drainage area is within the CNC property, or about 7.4 percent of the total upland drainage area. The remaining area is located in the urban area of the city of North Charleston. The drainage basin delineation is based on the CNC drainage evaluation (Davis and Floyd, 1998), North Charleston drainage inventory (Davis and Floyd, 1980), and U.S. Geological Survey (USGS) quadrangles.

There are 15 storm water outfalls in the Noisette Creek basin within the CNC boundary. The inventory of these outfalls is shown in Table 7.4.

A major factor in the determination of the diluting and flushing capacity of a tidal creek is the quantity (volume and rate) of storm water runoff which enters the creek as compared to the magnitude of the tidal water exchange in the creek. Estimates of storm water runoff were calculated for comparison with tidal flows in the creek. Estimates of runoff volume and peak flow rates were prepared for annual average, storm-event average, and larger, more infrequent storm events.

Runoff estimates require an evaluation of the area's topography and drainage infrastructure for the determination of drainage basins, rainfall statistics, and land cover including estimates of impervious surface. These evaluations were carried out for the Noisette Creek basins. Details and results of the evaluation are presented in the following sections.

Table 7.4. Noisette Creek Storm Water Outfalls Inventory

Outfall ID	Diameter (inches)	Drainage Basin Area (acres)	Sample ID	Comments
1A	15	7.51	EFF002	
1B	24	3.80	EFF003	
1C	8	3.73	EFF004	
10	18	7.85	EFF007	
9A	—		none	included in DB9
9	24	3.07	none	
10A	ditch	29.27	EFF008, EFF009, EFF010	
10B	6	3.28	EFF011	
10C	16	13.44	EFF012	
10D	2 @ 15"	9.92	none	
10E	18	14.24	none	
11	8	5.64	none	
12	6	0.38	none	
13	12	1.58	none	
14	—	0.47	none	

Source: ECT, 2002.

Land Cover

Using the available GIS coverage for the CNC, the area of impervious cover and open space was computed. Land cover outside of the CNC was determined using aerial photographs and USGS quadrangles. The following table provides a break down of land cover in the Noisette Drainage basin.

Commercial	788 acres
Industrial	597 acres
Open space	170 acres
Marsh	134 acres
Impervious	44 acres
Open water	14 acres

Rainfall

Charleston County receives on average of approximately 51 inches of rainfall per year. This is based on the SCDNR Office of Climatology. The SCDNR has compiled a rainfall data records from 1930 to 2000. The U.S. Environmental Protection Agency (EPA) has compiled data for selected regions of the country and determined mean event statistics for these regions as part of the NPDES storm water sampling protocol development. The mean storm event for the southeast region of the country including Charleston was determined to be 0.75 inches of rainfall (Urban Targeting and BMP Selection, EPA Region 5, November 1990). Using the most current National Weather Service (NWS) data, the Natural Resources Conservation Service (NRCS) has compiled infrequent-event rainfall amounts. The following table provides event rainfall amounts for the 2- through 100-year, 24-hour events for the Charleston South Carolina area.

Return Period (years)	Rainfall Depth (inches)
2	4.6
5	5.9
10	6.8
25	7.8
50	8.8
100	10

Runoff Estimates

Peak runoff rates were determined using NRCS Technical Release No. 55 (TR55). Runoff volumes were computed using Soil Conservation Service (SCS) methodology for all storm events except the mean rainfall event. Runoff volumes for the mean rainfall event were computed using the rational method. The runoff summary for Noisette Creek is presented in Table 7.5.

On an annual average basis, the Noisette Creek average flow is estimated to be 8.2 cfs, of which approximately 0.5 cfs is from the CNC property.

7.3.6 Tidal Flushing and Dilution Analysis

The volume of the Cooper River water flowing into and out of Noisette Creek due to tidal action was estimated and used to evaluate the flushing capabilities of the Noisette Creek and to evaluate the ambient dilution of storm water discharges. The tidal flow volume, also known as the tidal prism, is defined to be the volume of water in the creek between high tide and low tide. Based on an average tide range of 5.43 ft and the open water and marsh areas presented in the previous section, the estimated tidal prism is 344 acre-ft. This calculation is based on the assumption that the tidal marsh is about 2 ft below mean high water. The average tidal flow is computed to be 670 cfs and the maximum tidal flow during an average tide will be 1,053 cfs. The tidal prism is about 3.7 times of the total runoff volume from an average storm event in the Noisette Creek basin, and is about 55 times the runoff volume from the CNC during an average storm event. The tidal prism, which enters the Noisette Creek twice a day, is about 66 percent of the runoff volume from a 2-year, 24-hour storm event in Noisette Creek basin.

The volume of water in Noisette Creek at MLW is estimated to be 46 acre-ft and the volume of water at mean high water (MHW) is 340 acre-ft. Compared to the tidal prism volume, approximately 88 percent of the water in the creek can be flushed out of the system within one tidal cycle (12.4 hours).

Table 7.5. Noisette Creek Runoff Summary Table

	Mean Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak Runoff (cfs)	—	2,380	3,179	3,720	4,333	4,936	5,659
Runoff Volume (acre-ft)	92.8	523.2	707.3	835.7	979.1	1,123.0	1,296.0
Runoff from CNC (acre-ft)	6.3	35.3	47.7	56.4	66.1	75.8	87.5

Source: ECT, 2002.

The hydrologic and hydrodynamic analysis of the Noisette Creek can be summarized as follows:

- The dilution ratio between the total Noisette Creek runoff and the CNC runoff to Noisette Creek is about 14.7 to 1.

- The dilution ratio between tidal flow and the CNC runoff to Noisette Creek during an average storm event is about 55 to 1.

- The dilution ratio between tidal flow and total Noisette Creek runoff during an average storm event is about 3.7 to 1.

- The Noisette Creek hydraulics is dominated by storm water runoff during severe storm events (e.g., a 2-year, 24-hour storm).

- The Noisette Creek has efficient flushing capabilities. More than 90 percent of the storm water runoff to Noisette Creek can be flushed into the Cooper River by tidal flow within 1 day.

Noisette Creek hydraulics may be dominated by large storm events, especially during low tide when the depth is shallow. There can be significant velocity in the creek channel to carry suspended sediments (fine or coarse) into the Cooper River. The coarse material may be deposited in the Cooper River in the vicinity of the Noisette Creek mouth, and fine material may be transported in great distances and be deposited when it reaches a low energy zone. The low energy zones may include Shipyard Creek, dry docks area in Zone E, nearshore shallow area at Zone I (especially during ebb tide), Middle Ground at SE of the Shutes Folly Island (during ebb tide), shallow areas near Crab Bank (south of Hog Island, especially during ebb tide).

The sediments from the CNC, when entering the Noisette, may be deposited in the Creek locally if the particle size is large (coarse sand or silt). Most of the fine materials probably will be carried by storm water or tidal current to the Cooper River.

7.4 Shipyard Creek Hydrology and Hydrodynamics

Shipyard Creek is a 2-mile-long tidal tributary of the lower Cooper River. It borders the southwestern property boundary of the CNC. The lower 1-mile segment of the Shipyard Creek consists of dredged navigation channels and two turning basins. Estuarine intertidal and subtidal marsh habitat is present along the eastern shoreline of the creek and around the upstream portion of the creek.

There are several large industrial facilities and recreational docks in the Shipyard Creek basin. The Cooper River Marina is located at the southern tip of the CNC where Shipyard Creek and the Cooper River converge. Along the western shoreline of Shipyard Creek, Macalloy and Foster Wheeler are among the major industrial facilities. Other industrial sites include Chevron Products, Kinder Morgan Bulk Terminal, and Salmon Dredging Corporation.

7.4.1 Bathymetry

The water depth of the approach channel, the entrance channel, and the outer turning basin of the Shipyard Creek is about 50 ft at MLW. The depth of the interior channel and the second turning basin is about 44 ft at MLW. The total dredged area in the Shipyard Creek measured from the creek entrance is about 46 acres, and the total open water in the Shipyard Creek is about 91 acres. The tidal marsh area in the Shipyard Creek is about 105 acres. The mouth of the Shipyard Creek is about 600 ft wide, with an average depth of 41.7 ft at MLW. The depth of the Daniel Island Reach in the Cooper River near Shipyard Creek is about 43 ft at MLW.

7.4.2 Tides and Currents

According to NOAA's tide table, the average tide range in Shipyard Creek is about 5.3 ft and the spring tide range is 6.1 ft. There was no published tidal current information available in the Shipyard Creek. The computed average peak current speed at the Shipyard Creek entrance channel is about 0.05 fps based on an estimate tidal prism of 692 acre-ft and a cross-section area of 26,600 square feet at mean sea level (MSL). It is evident that the Shipyard Creek is an environment of low tidal energy because of a relatively small tidal prism as compared with its large cross-sectional area.

In contrast to the low current velocity in the Shipyard Creek, the tidal currents in the Cooper River are much stronger. According to the NOAA's tidal current table, the average peak ebb current in the Cooper River in the immediate vicinity of the Shipyard Creek entrance is about 2.5 fps and the average peak flood current is 0.8 fps. The average peak ebb current in the Daniel Island Reach of the Cooper River is about 3.8 fps and the average peak flood current is 2.2 fps.

7.4.3 Water Quality

The SCDHEC maintains a water quality station in Shipyard Creek at Marker No. 6 (MD-243). Water quality samples were also collected in the Cooper River above Shipyard Creek (MD-045). Tables 7.6 and 7.7 present the water quality data summaries at MD-243 and -045 for 1999 through 2000.

7.4.4 Drainage

The total drainage area of the Shipyard Creek basin is approximately 1,157 acres, including the open water and tidal marsh areas. The tidal marsh area is approximately 105 acres and the open water in the creek at low tide is about 91 acres. Therefore, the total upland drainage area of the Shipyard Creek basin is approximately 961 acres. About 279 acres of the drainage area is within the CNC property, or about 29 percent of the total upland drainage area. The remaining area is located in the urban area west of the CNC property. The drainage basin delineation is based on the CNC drainage evaluation (Davis and Floyd, 1998) and USGS quadrangles.

There are only five storm water outfalls in the Shipyard Creek basin within the CNC boundary. Most of the surface drainage to the Shipyard Creek from the CNC is in the form of overland sheet flow. The inventory of the storm water outfalls is shown in Table 7-8.

Table 7.6. Water Quality Data at Shipyard Creek at Marker No. 6 (MD-243), 1999-2000

Parameter	Unit	Mean	Minimum	Maximum	Stdev	Number of Samples
Alkalinity, Carbonate as $CaCO_3$	mg/L	75.68	60	90	8.30	19
BOD	mg/L	0.52	ND	1.4	0.47	19
Cadmium	µg/L	ND	ND	ND	ND	7
Chromium	µg/L	1.43	ND	10	3.78	7
Copper	µg/L	ND	ND	ND	ND	7
DO	mg/L	6.58	4.8	9.5	1.48	21
Iron	µg/L	195.7	90	400	111.5	7
Lead	µg/L	ND	ND	ND	ND	7
Manganese	µg/L	10	ND	30	11.55	7
Mercury	µg/L	ND	ND	ND	ND	7
Nickel	µg/L	ND	ND	ND	ND	7
Nitrogen, ammonia (NH_3)	mg/L	0.16	ND	0.34	0.11	16
Nitrogen, Kjeldahl	mg/L	0.30	ND	0.6	0.15	22
Nitrogen, Nitrite (NO_2) + Nitrate (NO_3)	mg/L	0.072	0.02	0.15	0.033	22
pH	s.d.	7.78	7.41	9.48	0.42	21
Phosphorus as P	mg/L	0.054	ND	0.12	0.032	21
Salinity	ppt	18.1	7	28	4.9	22
Specific conductance	umho/cm	26,717	15,000	37,000	6,027	22
Temperature, water	deg C	21.51	11.02	31	6.36	22
Total Fecal Coliform	#/100mL	108.6	4	900	212.5	18
Total Organic Carbon (TOC)	mg/L	3.46	ND	5.4	1.19	19
Turbidity	NTU	4.23	1.6	8.4	1.67	19
Zinc	µg/L	5.71	ND	20	7.87	7
1,2,4-Trichlorobenzene	µg/L	ND	ND	ND	ND	1
1-Amino-3-nitrobenzene	µg/L	ND	ND	ND	ND	1
2,2'-Dichlorodiethylether	µg/L	ND	ND	ND	ND	1
2,2'-Dichlorodiisopropyl ether	µg/L	ND	ND	ND	ND	1
2,4,5-Trichlorophenol	µg/L	ND	ND	ND	ND	1
2,4,6-Trichlorophenol (TCPh)	µg/L	ND	ND	ND	ND	1
2,4-Dichlorophenol	µg/L	ND	ND	ND	ND	1
2,4-Dimethylphenol	µg/L	ND	ND	ND	ND	1
2,4-Dinitrotoluene	µg/L	ND	ND	ND	ND	1
2,6-Dinitrotoluene	µg/L	ND	ND	ND	ND	1
2-Chloronaphthalene	µg/L	ND	ND	ND	ND	1
2-Chlorophenol	µg/L	ND	ND	ND	ND	1
2-Methylnaphthalene	µg/L	ND	ND	ND	ND	1
2-Nitrophenol	µg/L	ND	ND	ND	ND	1
3,3'-Dichlorobenzidine	µg/L	ND	ND	ND	ND	1
4-Bromophenyl phenyl ether	µg/L	ND	ND	ND	ND	1

Table 7.6. Water Quality Data at Shipyard Creek at Marker No. 6 (MD-243), 1999-2000

Parameter	Unit	Mean	Minimum	Maximum	Stdev	Number of Samples
4-Chloro-3-methylphenol	µg/L	ND	ND	ND	ND	1
4-Nitrophenol	µg/L	ND	ND	ND	ND	1
Acenaphthene	µg/L	ND	ND	ND	ND	1
Acenaphthylene	µg/L	ND	ND	ND	ND	1
Aldrin	µg/L	ND	ND	ND	ND	1
alpha-BHC	µg/L	ND	ND	ND	ND	1
alpha-Endosulfan	µg/L	ND	ND	ND	ND	1
Aniline	µg/L	ND	ND	ND	ND	1
Anthracene	µg/L	ND	ND	ND	ND	1
Benzo(a)pyrene	µg/L	ND	ND	ND	ND	1
Benzo[a]anthracene	µg/L	ND	ND	ND	ND	1
Benzo[b]fluoranthene	µg/L	ND	ND	ND	ND	1
Benzo[g,h,i]perylene	µg/L	ND	ND	ND	ND	1
Benzo[k]fluoranthene	µg/L	ND	ND	ND	ND	1
Benzoic acid	µg/L	ND	ND	ND	ND	1
Benzyl alcohol	µg/L	ND	ND	ND	ND	1
beta-BHC	µg/L	ND	ND	ND	ND	1
beta-Endosulfan	µg/L	ND	ND	ND	ND	1
bis(2-Chloroethoxy)methane	µg/L	ND	ND	ND	ND	1
bis(n-octyl) Phthalate	µg/L	ND	ND	ND	ND	1
Butyl benzyl phthalate	µg/L	ND	ND	ND	ND	1
Chlordane	µg/L	ND	ND	ND	ND	1
Chlorophenyl-4 phenyl ether	µg/L	ND	ND	ND	ND	1
Chrysene	µg/L	ND	ND	ND	ND	1
DDD	µg/L	ND	ND	ND	ND	1
DDE	µg/L	ND	ND	ND	ND	1
DDT	µg/L	ND	ND	ND	ND	1
delta-BHC	µg/L	ND	ND	ND	ND	1
Dibenz[a,h]anthracene	µg/L	ND	ND	ND	ND	1
Dibenzofuran	µg/L	ND	ND	ND	ND	1
Dibutyl phthalate	µg/L	ND	ND	ND	ND	1
Dieldrin	µg/L	ND	ND	ND	ND	1
Diethyl phthalate	µg/L	ND	ND	ND	ND	1
Dimethyl phthalate	µg/L	ND	ND	ND	ND	1
Dinitro-o-cresol	µg/L	ND	ND	ND	ND	1
di-sec-octyl phthalate (DEHP)	µg/L	ND	ND	ND	ND	1
Endosulfan Sulfate	µg/L	ND	ND	ND	ND	1
Endrin	µg/L	ND	ND	ND	ND	1
Endrin Aldehyde	µg/L	ND	ND	ND	ND	1
Fluoranthene	µg/L	ND	ND	ND	ND	1

Table 7.6. Water Quality Data at Shipyard Creek at Marker No. 6 (MD-243), 1999-2000

Parameter	Unit	Mean	Minimum	Maximum	Stdev	Number of Samples
Fluorene	µg/L	ND	ND	ND	ND	1
gamma-BHC (Lindane)	µg/L	ND	ND	ND	ND	1
Heptachlor	µg/L	ND	ND	ND	ND	1
Heptachlor epoxide	µg/L	ND	ND	ND	ND	1
Hexachlorobenzene	µg/L	ND	ND	ND	ND	1
Hexachlorobutadiene	µg/L	ND	ND	ND	ND	1
Hexachlorocyclopentadiene	µg/L	ND	ND	ND	ND	1
Hexachloroethane	µg/L	ND	ND	ND	ND	1
Indeno[1,2,3-cd]pyrene	µg/L	ND	ND	ND	ND	1
Isophorone	µg/L	ND	ND	ND	ND	1
m-Dichlorobenzene	µg/L	ND	ND	ND	ND	1
Naphthalene	µg/L	ND	ND	ND	ND	1
nitro-Benzene	µg/L	ND	ND	ND	ND	1
n-Nitrosodimethylamine	µg/L	ND	ND	ND	ND	1
n-Nitrosodiphenylamine	µg/L	ND	ND	ND	ND	1
n-Nitrosodipropylamine	µg/L	ND	ND	ND	ND	1
o-Dichlorobenzene	µg/L	ND	ND	ND	ND	1
para-Dichlorobenzene	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1016	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1221	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1232	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1242	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1248	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1254	µg/L	ND	ND	ND	ND	1
Pcb-aroclor 1260	µg/L	ND	ND	ND	ND	1
Pentachloro-phenol (PCP)	µg/L	ND	ND	ND	ND	1
Phenanthrene	µg/L	ND	ND	ND	ND	1
Phenol	µg/L	ND	ND	ND	ND	1
Pyrene	µg/L	ND	ND	ND	ND	1
Toxaphene	µg/L	ND	ND	ND	ND	1

Table 7.7. Water Quality Data at Cooper River above Shipyard Creek (MD-045), 1999-2000

Parameter	Unit	Mean	Minimum	Maximum	Stdev	Number of Samples
Alkalinity, Carbonate as $CaCO_3$	mg/L	73.06	56	100	11.55	18
BOD	mg/L	0.54	ND	1.6	0.50	18
Cadmium	µg/L	ND	ND	ND		7
Chromium	µg/L	ND	ND	ND		7
Copper	µg/L	ND	ND	ND		7
DO	mg/L	6.48	4.71	9.44	1.46	20
Iron	µg/L	305.7	ND	770	189.5	7
Lead	µg/L	ND	ND	ND		7
Manganese	µg/L	10	ND	20	6.71	7
Mercury	µg/L	ND	ND	ND		7
Nickel	µg/L	ND	ND	ND		7
Nitrogen, ammonia (NH_3)	mg/L	0.15	ND	0.38	0.12	17
Nitrogen, Kjeldahl	mg/L	0.29	ND	0.51	0.12	22
Nitrogen, Nitrite (NO_2) + Nitrate (NO_3)	mg/L	0.084	0.04	0.25	0.049	22
pH	s.d	7.68	7.38	8.18	0.20	20
Phosphorus as P	mg/L	0.049	ND	0.11	0.0295	21
Salinity	ppt	17.6	8	28	5.3	21
Specific conductance	umho/cm	25,567	14,000	40,000	7,279	21
Temperature, water	deg C	21.8	12	31	6.3	21
Total Fecal Coliform	#/100mL	40.6	2	130	41.7	17
Total Organic Carbon (TOC)	mg/L	3.34	2.5	5.1	0.96	7
Turbidity	NTU	9.91	1.7	55	13.61	18
Zinc	µg/L	5.71	ND	20	7.87	7

Table 7.8. Shipyard Creek Storm Water Outfalls Inventory

Outfall ID	Diameter (inches)	Contributing Drainage Basin Area (acres)	Sample ID
51H	6 x 4 box	7.822	EFF063
54	36	5.829	none
54A	15	23.815	none
55	ditch	81.08	EFF064, EFF065, EFF066, EFF067, EFF068
52A	ditch	33.417	EFF069

Source: ECT, 2002.

A major factor in the determination of the diluting and flushing capacity of a tidal creek is the quantity (volume and rate) of storm water runoff which enters the creek as compared to the magnitude of the tidal water exchange in the creek. Estimates of storm water runoff were calculated for comparison with tidal flows in the creek. Estimates of runoff volume and peak flow rates were prepared for annual average, storm-event average, and larger, more infrequent storm events.

Runoff estimates require an evaluation of the area's topography and drainage infrastructure for the determination of drainage basins, rainfall statistics, and land cover including estimates of impervious surface. These evaluations were carried out for the Shipyard Creek basin. Details and results of the evaluation are presented in the following sections.

Land Cover

Using the available GIS coverage for the CNC, the area of impervious cover and open space was computed. Land cover outside of the CNC was determined using aerial photographs and USGS quadrangles. The following table provides a break down of land cover in the Shipyard drainage basin.

High-Density Residential	123 acres
Industrial	460 acres
Open space	283 acres
Marsh and Wetland	183 acres
Impervious	14 acres
Gravel Lot	6 acres
Open water	91 acres

Rainfall

Charleston County receives on average of approximately 51 inches of rainfall per year. This is based on the SCDNR Office of Climatology. The SCDNR has compiled a rainfall data records from 1930 to 2000. The EPA has compiled data for selected regions of the country and determined mean event statistics for these regions as part of the NPDES storm water sampling protocol development. The mean storm event for the southeast region of the country including Charleston was determined to be 0.75 inches of rainfall (Urban Targeting and BMP Selection,

EPA Region 5, November 1990). Using the most current NWS data, the NRCS has compiled infrequent-event rainfall amounts. The following table provides event rainfall amounts for the 2- through 100-year, 24-hour events for the Charleston South Carolina area.

Return Period (years)	Rainfall Depth (inches)
2	4.6
5	5.9
10	6.8
25	7.8
50	8.8
100	10

Runoff Estimates

Peak runoff rates were determined using NRCS Technical Release No. 55 (TR55). Runoff volumes were computed using SCS methodology for all storm events except the mean rainfall event. Runoff volumes for the mean rainfall event were computed using the rational method. The runoff summary for Shipyard Creek is presented in Table 2-4.

On an annual average basis, the Shipyard Creek average flow is estimated to be 4.6 cfs, of which approximately 0.5 cfs is from the CNC property.

7.4.5 Tidal Flushing and Dilution Analysis

The volume of the Cooper River water flowing into and out of Shipyard Creek due to tidal action was estimated and used to evaluate the flushing capabilities of the Shipyard Creek and to evaluate the ambient dilution of storm water discharges. The tidal flow volume, also known as the tidal prism, is defined to be the volume of water in the creek between high tide and low tide. Based on an average tide range of 5.3 ft and the open water and marsh areas presented in the previous section, the estimated tidal prism is 692 acre-ft. This calculation is based on the assumption that the tidal marsh is about 2 ft below MHW. The average tidal flow is computed to be 1,348 cfs and the maximum tidal flow during an average tide will be 2,118 cfs. The tidal prism is about 14 times the total runoff volume from an average storm event in the Shipyard Creek basin, and is about 117 times the runoff volume from the CNC during an average storm

event. The tidal prism, which enters the Shipyard Creek twice a day, is about 2.4 times the runoff volume from a 2-year, 24-hour storm event in Shipyard Creek basin and is about the same volume as a 50-year, 24-hour storm runoff.

The volume of water in Shipyard Creek at MLW is estimated to be 2,620 acre-ft and the volume of water at MHW is 3,312 acre-ft. Compared to the tidal prism volume, only about 21 percent of the water in the creek can be flushed out of the system within one tidal cycle (12.4 hours). The flushing time required to reduce the concentration in the creek to 10 percent of its initial value will be about 10 tidal cycles, or 5.2 days.

The hydrologic and hydrodynamic analysis of the Shipyard Creek can be summarized as follows:

- The dilution ratio between the total Shipyard Creek runoff and the CNC runoff to Shipyard Creek is about 8.4 to 1.

- The dilution ratio between tidal flow and the CNC runoff to Shipyard Creek during an average storm event is about 117 to 1.

- The dilution ratio between tidal flow and total Shipyard Creek runoff during an average storm event is about 14 to 1.

- The Shipyard Creek hydraulics is dominated by the tidal flow over the effects of storm water runoff, except when the storm event is more severe than a 50-year, 24-hour event.

- The Shipyard Creek does not have efficient flushing capabilities. It will take more than 5 days to flush out 90 percent of a pollutant spill in the creek.

- The Shipyard Creek is in a low tidal energy environment. The pollutant transport in the creek is quite slow, and suspended solids tend to be deposited in the Shipyard

Creek due to small current velocity and long hydraulic retention time. The suspended material being carried into the Shipyard Creek from the Cooper River during a flood tide may also be deposited in the lower reach of the Shipyard Creek.

Table 7.9. Shipyard Creek Runoff Summary Table

	Mean Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak Runoff (cfs)	—	1,427	1,959	2,328	2,736	3,142	3,627
Runoff Volume (acre-ft)	49.3	308.9	427.8	511.3	605.0	699.3	813.0
Runoff from CNC (acre-ft)	5.9	66.5	95.7	116.6	140.2	164.1	193.0

Source: ECT, 2002.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The investigative objectives for the *Zone J Storm Water Effluent Evaluation Report* were designed to collect sufficient storm water runoff data to accomplish the following:

- Characterize the storm water runoff from listed RCRA sites throughout the CNC
- Define contaminant migration pathways and potential receptors (on and offsite, where applicable)
- Define the nature and extent of contamination, if any
- Characterize reference values
- Identify storm water COPCs

Identified potential storm water effluent COPCs for each water body will be further evaluated in a COPC refinement report. The COPC refinement reports will also include potential surface water and groundwater COPCs. COPCs identified in the COPC refinement reports will be further evaluated in the SLERA. A summary of potential storm water COPCs for Noisette Creek are presented in Table 8.1, and Table 8.2 summarizes potential storm water COPCs for Shipyard Creek. Additional characterization of storm water effluent, soil and groundwater COPCs is recommended for Drainage Basin 10-B. COPCs of particular interest include: arsenic, barium, beryllium, chromium, cobalt, copper, iron, and zinc.

Table 8.1
Potential Storm Water COPCs for Noisette Creek
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
1-A	bis(2-Ethylhexyl)phthalate	No	No
1-C	Aluminum	No	No
10-A	bis(2-Ethylhexyl)phthalate	No	No
	Benzo(b)fluoranthene	No	No
	Indeno(1,2,3-cd)pyrene	No	No
	Tin	No	No

Table 8.1
Potential Storm Water COPCs for Noisette Creek
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
10-B	Aluminum	No	No
	Arsenic	Yes-Soil and Groundwater	Yes
	Barium	Yes-Groundwater	Yes
	Beryllium	Yes-Soil	Yes
	Chromium	Yes-Soil	Yes
	Cobalt	Yes-Soil	Yes
	Copper	Yes-Soil	Yes
	Iron	Yes-Soil and Groundwater	Yes
	Manganese	No	No
	Nickel	No	No
	Zinc	Yes-Soil	Yes
10-C	Cadmium	No	No
	Manganese	No	No
	Nickel	No	No
	Zinc	No	No
	Heptachlor	No	No

Table 8.2
Potential Storm Water COPCs for Shipyard Creek
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
51-H	Manganese	No	No
52	Barium	No	No
	Manganese	No	No
	Pentachlorophenol	No	No

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Washington Department of Ecology. (1998). *Supplement to Statistical Guidance for Ecology Site Managers.* Toxics Cleanup Program. Olympia, WA.

10.0 SIGNATORY REQUIREMENT

Condition I.E. of the Hazardous and Solid Waste Amendments (HSWA) portion of RCRA Part B Permit (EPA SCO 170 022 560) states: *All applications, reports, or information submitted to the Regional Administrator shall be signed and certified in accordance with 40 CFR §270.11.* The certification reads as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Robert A. Harrell, Jr., P.E.
Engineer-In-Charge

15 Oct 02
Date

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT

REVISION: 1

VOLUME II OF II – APPENDIX A

SOUTHDIV Contract Number:
N62467-89-D-0318

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

ENSAFE INC.
313 WINGO WAY
MOUNT PLEASANT, SOUTH CAROLINA 29464
(843) 884-0029

July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

Appendix A

Chains of Custody, Analytical Data, Data Validation Reports

EnSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: Ø154-9. Ø8-41Ø-ØØ
COC NO:
PO NO: 477Ø
REL NO:
LAB NAME: STL- Savannah

CLIENT: Navy- SouthDiV
LOCATION: Charleston, SC
SAMPLERS: (SIGNATURE) James Watson / Charlie Vernoy
PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO. 843-884-0029

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	Salinity	Cyanide	TAL Metals	SVOCs	Pesticides/PCBs					REMARKS
REFØ12 *	1-7-Ø2	1Ø:Ø5	W	1Liter amber glass	4°C	NaOH	7	1	1	1	2	2					CN- preserved
REFØ18 *	1-7-Ø2	1Ø:55	W	for organics	4°C	Nitric	7	1	1	1	2	2					w/ NaOH
REFØ17 *	1-7-Ø2	11:2Ø	W	plastic for	4°C	Acid	7	1	1	1	2	2					TAL Metals -
REFØØ8 *	1-7-Ø2	13:15	W	non-organics	4°C		7	1	1	1	2	2					preserved w/
REFØØ9 *	1-7-Ø2	13:3Ø	W		4°C		7	1	1	1	2	2					nitric Acid
REFØØ1 *	1-7-Ø2	1Ø:24	W		4°C		7	1	1	1	2	2					
REFØØ6 *	1-7-Ø2	11:Ø5	W		4°C		7	1	1	1	2	2					

1/7/02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Charlie Vernoy	1-7-02						
PRINTED: Charles A. Vernoy	TIME 15:3Ø	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: Fed Ex
SHIPMENT NO. 3441835941; 3461557897; 3441835944
SEND RESULTS TO: Charlie Vernoy

COMMENTS: * Analyze Salinity first. Post results on Data view. wait for instructions from EnSafe project manager before analyzing for remaining parameters

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCDC2
REV. 05/98

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON,SC; CINCINNATI,OH; DALLAS,TX; JACKSON,TN; KNOXVILLE,TN; LANCASTER,PA; NASHVILLE,TN; NORFOLK,VA; PADUCAH,KY; PENSACOLA,FL; RALEIGH,NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

Revised COC 1/15/02

PAGE 1 OF 1

PROJECT/JOB NO: 0154-06 ~~0000-00~~
COC NO:
PO NO: ~~4707~~ 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy / Zone J
LOCATION: Charleston, SC
SAMPLERS: (SIGNATURE) Julie Shaffer

PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO. 843-884-0029 / 843-856-0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	PEST/PCB	TAL metals	salinity **	cyanide						REMARKS
REF007	01/14/02	1045	W	* SVOC/PEST/PCB = 2 amber TAL mts = 500ml poly CN = 250ml poly Salinity = 125ml poly	4°C	* mt = HNO3 * CN = NaOH	7	2	2	1	1	1						
REF014		1515					7	2	2	1	1	1						
REF013		1630					7	2	2	1	1	1						
REF015		1540					7	2	2	1	1	1						
REF016		1705					7	2	2	1	1	1						
REF005		1630					7	2	2	1	1	1						

1-14-02

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Julie Shaffer	01/14/02						
PRINTED: Julie Shaffer	TIME 1800	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX PRIORITY OVNT
SHIPMENT NO.
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ** Run Salinity / Results First = Contact EnSafe prior to running other analysis.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

Revised Chain 1 102

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-C . 000-00
COC NO:
PO NO: ~~4770~~ 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO: 843-884-0029 | 843-856-0107
SAMPLERS: (SIGNATURE)

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCB	TAL Metals	Cyanide	Salinity **						REMARKS
EQP001	1/15/02	1130	W	*SVOC/Pest/PCB = 2L amber MT = 500ml poly CN = 125ml poly Salinity = 125ml poly	4°C	* MT = HNO3 CN = NaOH	6	X2	X2	X1	1 X							
CAP001	↓	1015	↓	↓	↓	↓	7	2	2	1	1	1						
REF002 **	↓	1050	↓	↓	↓	↓	7	2	2	1	1	1						

15 Jan 02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED:	1/15/02	PRINTED:		PRINTED:		PRINTED:	
COMPANY: ENSAFE	TIME 1400	COMPANY:	TIME	COMPANY:	TIME	COMPANY:	TIME

METHOD OF SHIPMENT: FED-EX PRIORITY OVNT
SHIPMENT NO. 3466998026
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: ** Please post salinity Results ~~prior~~ on Dataview prior to running other analysis.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

EnSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-0 09-000-00
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843-884-0029/843-856-0107
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	TAL Metals	Cyanide	Salinity						REMARKS
REF 004	1-25-02	0940	W	*	4°C	MT=HNO3 CN=NaOH	7	2	2	1	1	1						
REF 003	1-25-02	1005	↓	↓	↓	↓	7	2	2	1	1	1						
EFF 010	1-25-02	1405	↓	↓	↓	↓	7	2	2	1	1	1						
REF 010	1-25-02	1355	↓	↓	↓	↓	7	2	2	1	1	1						
EFF 058	1-25-02	1335	↓	↓	↓	↓	7	2	2	1	1	1						
EFF 009	1-25-02	1425	↓	↓	↓	↓	7	2	2	1	1	1						

1-25-02

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Julie Shaffer	1-25-02						
PRINTED: Julie Shaffer	TIME 1500	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FEDEX Priority OVNT
SHIPMENT NO. 346258870 1/244786 7026/346258858 6
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ~~**: Please Fax Salinity Results on DAY VIEW PRIOR to running other analyses~~
*: SVOC & Pest/PCB 1L Amber, Metals 500 ml poly (HNO3), CN 125 ml poly (NaOH) & SALINITY 125 ml poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF ___
PROJECT/JOB NO: 0154-00, 9-000-00
COC NO:
PO NO: ~~[illegible]~~ 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843-884-0029 / 843-856-0107
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	TAL Metals	Cyanide	Salinity						REMARKS
EFF008	2/7/02	0855	W	SVOC = 1L amber PT/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF004	↓	0915	↓	MT = 500ml poly CN = 500ml poly Salinity = 250ml poly	↓	↓	7	2	2	1	1	1						
EFF006**	↓	0930	↓	↓	↓	↓	7	2	2	1	1	1						**
EFF005**	↓	0945	↓	↓	↓	↓	7	2	2	1	1	1						**
REF012**	↓	1030	↓	↓	↓	↓	7	2	2	1	1	1						**
REF011A**		0930					7	2	2	1	1	1						**
REF011D**		0930					7	2	2	1	1	1						**
EFF065		1000					7	2	2	1	1	1						
EFF067		1015					7	2	2	1	1	1						
EFF068		1030					7	2	2	1	1	1						

RELINQUISHER: Julie Shaffer	DATE 2/7/02	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Julie Shaffer	TIME	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO.
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: ** Analyze Salinity FIRST - Post Results on DataView - EnSafe will contact with instructions to proceed with other analyses.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2

E NSAFE

800-888-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-00, 2-000-00
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843-884-0029 / 843 856 0107
SAMPLERS: (SIGNATURE) Julie Shaff

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCB	TAL Metals	cyanide	salinity **						REMARKS
EFF014 **	2/7/02	1625	W	SVOC = 1L amber PTAL = 1L amber MT = 500ml poly CN = 500ml poly Salinity = 250ml	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF013 **		1635					7	2	2	1	1	1						
EFF012 **		1555					7	2	2	1	1	1						
EFF011 **		1610					7	2	2	1	1	1						
EFF003 **		1540					7	2	2	1	1	1						
EFF002 **		1530					7	2	2	1	1	1						
EFF001 **		1505					7	2	2	1	1	1						

2/8/02

RELINQUISHER: Julie Shaff	DATE 2/8/02	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Julie Shaffer	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 3443576297; 3463298081; 3468292721
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: ** Run Salinity FIRST - Post Results on DataView - EnSafe will contact lab with instructions to proceed with other analyses.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: Ø154-9 Ø9-ØØØ-ØØ
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL- Savannah

CLIENT: US Navy - Zone J
LOCATION: Charleston, SC
SAMPLERS: (SIGNATURE) Julie Shaff
PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO. 843-884-0029 / 843-856-0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCB	TAL Metals	Cyanide	Salinity **						REMARKS
EFFØ43 **	2/8/02	13:2Ø	W	SVOC: 1Lamber PT/PCB: 1Lamber	4°C	MT = HNO3 CN: NaOH	7	2	2	1	1	1						
EFFØ41 **		13:3Ø		MT = 500ml poly CN = 250ml poly			7	2	2	1	1	1						
EFFØ63 **		13:45		Salinity = 125ml poly			7	2	2	1	1	1						
EFFØ42 **		14:ØØ					7	2	2	1	1	1						
EFFØ4Ø **		14:15					7	2	2	1	1	1						
EFFØ44 **		1435					7	2	2	1	1	1						
EFFØ47 **		1445					7	2	2	1	1	1						
EFFØ45 **		1500					7	2	2	1	1	1						

Julie Shaff 2/8/02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Julie Shaffer	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 3468330722; 3468330573; 3443614684
SEND RESULTS TO: Charlie Vernoy 3463336642

COMMENTS: ** Run Salinity first - post results on Data View - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

800-388-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; LANCASTER, PA; NAS... TN; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

Amended LJC 3/11/02

COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL-Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO.: 843-884-0029 / 884-856-0107
SAMPLERS: (SIGNATURE) Charlie Vernoy / Pete Bayley
Charles A. Vernoy

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCBs	TAL Metals	Cyanide	Salinity **						REMARKS
EFF019**	3/2/02	16:30	W	SVOC: 1 Amber Pest/PCB: 1 Amber	4°C	MT=HNO3 CN=NaOH	7	2	2	1	1	1						
EFF003**		16:45		MT: 500ml poly CN: 250ml poly			7	2	2	1	1	1						
REF007**		16:50		Salinity: 125ml poly			7	2	2	1	1	1						
EFF007**		16:55					7	2	2	1	1	1						
EFF012**		17:00					7	2	2	1	1	1						
EFF013**		17:10					7	2	2	1	1	1						
EFF64** EFF064		17:25					7	2	2	1	1	1						EFF064
~~EFF66~~ EFF066 CW 3/5/02		18:05					7	2	2	1	1	1						
EFF069**		18:20					7	2	2	1	1	1						EFF069

Charles A. Vernoy 3/4/02

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Charles Vernoy	3/4/02						
PRINTED: Charles Vernoy	TIME 17:00	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 3444704602/3444704672/3444704742
SEND RESULTS TO: Charlie Vernoy 3464426831

COMMENTS: ** Run Salinity first - Post Results on DarwinCW - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PROJECT/JOB NO: Ø154-4 89-ØØØ-ØØ
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL-Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO.: 843-884-0029/843-856-0107
SAMPLERS: (SIGNATURE) Charlie Vernoy / Pete Bayley / Julie Shaffer / James Watson

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticids/PCBs	TAL metals	Cyanide	Salinity						REMARKS
EFF Ø31 **	3/2/02	18:00	W	SVOC = 1L amber Pest/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF Ø34 **		17:25		MT = 500ml poly CN = 250ml poly			7	2	2	1	1	1						
EFF Ø35 **		17:30		salinity = 125ml poly			7	2	2	1	1	1						
EFF Ø36 **		17:38					7	2	2	1	1	1						
EFF Ø44 **		17:00					7	2	2	1	1	1						
EFF Ø48 **		16:56					7	2	2	1	1	1						
EFF Ø57 **		17:05					7	2	2	1	1	1						
EFF Ø63 **		17:12					7	2	2	1	1	1						

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Charlie Vernoy	3/4/02						
PRINTED: Charles Vernoy	TIME 17:00	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FedEx
SHIPMENT NO. 3464426472 / 3444704541 / 3469420701
SEND RESULTS TO: Charlie Vernoy 3469420753

COMMENTS: ** Run Salinity first - post Results on Data View - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF002	2/7/02	3:30:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7429-90-5	Aluminum	1700		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-39-3	Barium	23		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-70-2	Calcium	20000		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-47-3	Chromium	5.9	J	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-50-8	Copper	11	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7439-89-6	Iron	1300		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7439-92-1	Lead	18		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7439-95-4	Magnesium	840		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7439-96-5	Manganese	16		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-09-7	Potassium	900	J	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-23-5	Sodium	1600		µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-62-2	Vanadium	5.9	J	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7440-66-6	Zinc	140	J	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF002	2/7/02	3:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF002	2/7/02	3:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	2.6	J	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF002	2/7/02	3:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF002	2/7/02	3:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF003	2/7/02	3:40:00 PM	E-10242	Salinity	12		mg/l	NBCJ05
EFF003	3/2/02	4:45:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7429-90-5	Aluminum	120	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-39-3	Barium	12		µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-41-7	Beryllium	0.49	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-70-2	Calcium	16000		µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-50-8	Copper	9.5	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7439-89-6	Iron	190		µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7439-95-4	Magnesium	1300		µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7439-96-5	Manganese	6.5	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-09-7	Potassium	2400		µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-23-5	Sodium	4700	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-62-2	Vanadium	1.4	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7440-66-6	Zinc	66	J	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF003	3/2/02	4:45:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF003	3/2/02	4:45:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF003	3/2/02	4:45:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF003	3/2/02	4:45:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF004	2/7/02	9:15:00 AM	E-10242	Salinity	2	U	mg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7429-90-5	Aluminum	4500		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-39-3	Barium	25		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-41-7	Beryllium	0.16	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-70-2	Calcium	29000		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-47-3	Chromium	5.6	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-50-8	Copper	13	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7439-89-6	Iron	1600		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7439-92-1	Lead	5.5		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7439-95-4	Magnesium	1600		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7439-96-5	Manganese	9.9	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-02-0	Nickel	1.7	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-09-7	Potassium	3100		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-23-5	Sodium	2300		µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-62-2	Vanadium	8.1	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7440-66-6	Zinc	19	J	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF004	2/7/02	9:15:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF004	2/7/02	9:15:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04

Storm Water Effluent Anal, ..al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF004	2/7/02	9:15:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
EFF004	2/7/02	9:15:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF007	3/2/02	4:55:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7429-90-5	Aluminum	200	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-39-3	Barium	8.5	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-41-7	Beryllium	0.52	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-70-2	Calcium	20000		µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-50-8	Copper	4.8	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7439-89-6	Iron	300		µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7439-95-4	Magnesium	2100		µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7439-96-5	Manganese	6.3	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-09-7	Potassium	2400		µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06

Storm Water Effluent Anal, ..:al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF007	3/2/02	4:55:00 PM	7440-23-5	Sodium	6000	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-62-2	Vanadium	1.7	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7440-66-6	Zinc	99	J	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF007	3/2/02	4:55:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF007	3/2/02	4:55:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF007	3/2/02	4:55:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF008	2/7/02	8:55:00 AM	E-10242	Salinity	2	U	mg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7429-90-5	Aluminum	140	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-39-3	Barium	3.6	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-70-2	Calcium	3200		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-47-3	Chromium	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-50-8	Copper	30		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7439-89-6	Iron	92		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7439-92-1	Lead	7.8		µg/l	NBCJ04

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF008	2/7/02	8:55:00 AM	7439-95-4	Magnesium	370	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7439-96-5	Manganese	5	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-02-0	Nickel	40	UJ	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-09-7	Potassium	1000		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-23-5	Sodium	2400		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-28-0	Thallium	4.6	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-62-2	Vanadium	4	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7440-66-6	Zinc	47		µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ04

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF008	2/7/02	8:55:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	205-99-2	Benzo(b)fluoranthene	0.39	J	µg/l	NBCJ04

Storm Water Effluent Analy...al Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF008	2/7/02	8:55:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	0.59	J	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
EFF008	2/7/02	8:55:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF009	1/25/02	2:25:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7429-90-5	Aluminum	170	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-38-2	Arsenic	3.6	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-39-3	Barium	8.2	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF009	1/25/02	2:25:00 PM	7440-70-2	Calcium	34000		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-50-8	Copper	4.5	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7439-89-6	Iron	280		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7439-92-1	Lead	2.4	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7439-95-4	Magnesium	16000		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7439-96-5	Manganese	32		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-02-0	Nickel	1.8	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-09-7	Potassium	10000		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-23-5	Sodium	130000		µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-31-5	Tin	5	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-62-2	Vanadium	2.3	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7440-66-6	Zinc	130	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF009	1/25/02	2:25:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF009	1/25/02	2:25:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	0.63	J	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ03
EFF009	1/25/02	2:25:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF010	1/25/02	2:05:00 PM	7429-90-5	Aluminum	1200		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-38-2	Arsenic	4.5	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-39-3	Barium	22		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-70-2	Calcium	47000		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-47-3	Chromium	2.9	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-50-8	Copper	6.9	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7439-89-6	Iron	910		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7439-92-1	Lead	3.6	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7439-95-4	Magnesium	4200		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7439-96-5	Manganese	25		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-02-0	Nickel	2.3	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-09-7	Potassium	7700		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-23-5	Sodium	30000		µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-31-5	Tin	4.7	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-62-2	Vanadium	6.1	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7440-66-6	Zinc	100	J	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF010	1/25/02	2:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF010	1/25/02	2:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF010	1/25/02	2:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ03
EFF010	1/25/02	2:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
EFF011	2/7/02	4:10:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7429-90-5	Aluminum	13000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-38-2	Arsenic	190		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-39-3	Barium	120		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-41-7	Beryllium	4.5		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-43-9	Cadmium	3.3	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-70-2	Calcium	260000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-47-3	Chromium	31		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-48-4	Cobalt	2.8	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-50-8	Copper	130		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7439-89-6	Iron	180000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7439-92-1	Lead	4.9	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7439-95-4	Magnesium	34000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7439-96-5	Manganese	900		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-02-0	Nickel	18	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-09-7	Potassium	14000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-23-5	Sodium	220000		µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-62-2	Vanadium	5	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7440-66-6	Zinc	530	J	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF011	2/7/02	4:10:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF011	2/7/02	4:10:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF011	2/7/02	4:10:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF011	2/7/02	4:10:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF012	2/7/02	3:55:00 PM	E-10242	Salinity	5.1		mg/l	NBCJ05
EFF012	3/2/02	5:00:00 PM	E-10242	Salinity	2.7		mg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7429-90-5	Aluminum	230	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-36-0	Antimony	4.4	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-38-2	Arsenic	5.2	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-39-3	Barium	41		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-41-7	Beryllium	0.62	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-43-9	Cadmium	2.7	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-70-2	Calcium	160000		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-47-3	Chromium	1.5	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-50-8	Copper	37		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7439-89-6	Iron	270		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7439-92-1	Lead	15		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7439-95-4	Magnesium	100000		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7439-96-5	Manganese	85		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-02-0	Nickel	8.5	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-09-7	Potassium	38000		µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-23-5	Sodium	770000	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-62-2	Vanadium	1.7	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7440-66-6	Zinc	460	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF012	3/2/02	5:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	76-44-8	Heptachlor	0.014	J	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF012	3/2/02	5:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Noisette Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF012	3/2/02	5:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF012	3/2/02	5:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF063	2/8/02	1:45:00 PM	E-10242	Salinity	7.8		mg/l	NBCJ05
EFF063	3/2/02	5:12:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7429-90-5	Aluminum	140	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-39-3	Barium	7.6	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-70-2	Calcium	42000		µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-50-8	Copper	3.8	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7439-89-6	Iron	670		µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7439-95-4	Magnesium	28000		µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7439-96-5	Manganese	140		µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-09-7	Potassium	13000		µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-23-5	Sodium	170000	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-62-2	Vanadium	2.2	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7440-66-6	Zinc	38	J	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF063	3/2/02	5:12:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF063	3/2/02	5:12:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF063	3/2/02	5:12:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF063	3/2/02	5:12:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7429-90-5	Aluminum	220	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-39-3	Barium	20		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-41-7	Beryllium	0.44	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-70-2	Calcium	20000		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-47-3	Chromium	2	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-50-8	Copper	5.8	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7439-89-6	Iron	580		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7439-92-1	Lead	3.1	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7439-95-4	Magnesium	3800		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7439-96-5	Manganese	32		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-09-7	Potassium	2300		µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7782-49-2	Selenium	5.6	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-23-5	Sodium	33000	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7440-62-2	Vanadium	2.4	J	µg/l	NBCJ06

Storm Water Effluent Anal..cal Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF064	3/2/02	5:25:00 PM	7440-66-6	Zinc	33	J	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane)	10	U	µg/l	NBCJ06

Storm Water Effluent Anai, .cal Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
				[bis(2-Chloroisopropyl)ether]				
EFF064	3/2/02	5:25:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06

Storm Water Effluent Anal..cal Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF064	3/2/02	5:25:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF064	3/2/02	5:25:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF065	2/7/02	10:00:00 AM	E-10242	Salinity	2	U	mg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7429-90-5	Aluminum	900		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-39-3	Barium	26		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-70-2	Calcium	40000		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-47-3	Chromium	3	J	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-50-8	Copper	12	J	µg/l	NBCJ04

Storm Water Effluent Anal, ..al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF065	2/7/02	10:00:00 AM	7439-89-6	Iron	790		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7439-92-1	Lead	5.4		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7439-95-4	Magnesium	4700		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7439-96-5	Manganese	16		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-02-0	Nickel	1.3	J	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-09-7	Potassium	2500		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-23-5	Sodium	74000		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-62-2	Vanadium	5.4	J	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7440-66-6	Zinc	110		µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF065	2/7/02	10:00:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF065	2/7/02	10:00:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF065	2/7/02	10:00:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF065	2/7/02	10:00:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF066	3/2/02	6:05:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7429-90-5	Aluminum	810		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-39-3	Barium	26		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-41-7	Beryllium	0.43	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-70-2	Calcium	24000		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-47-3	Chromium	2.6	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-50-8	Copper	10	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7439-89-6	Iron	780		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7439-92-1	Lead	4.9	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7439-95-4	Magnesium	6900		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7439-96-5	Manganese	27		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-09-7	Potassium	5800		µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-23-5	Sodium	75000	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-62-2	Vanadium	3.4	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7440-66-6	Zinc	55	J	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF066	3/2/02	6:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06

Storm Water Effluent Anal_ _al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF066	3/2/02	6:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06

Storm Water Effluent Anal_ _al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF066	3/2/02	6:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF066	3/2/02	6:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF067	2/7/02	10:15:00 AM	E-10242	Salinity	2	U	mg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7429-90-5	Aluminum	520		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-39-3	Barium	100		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-43-9	Cadmium	0.61	J	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-70-2	Calcium	70000		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-47-3	Chromium	1.5	J	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-50-8	Copper	10	J	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7439-89-6	Iron	510		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7439-92-1	Lead	5	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7439-95-4	Magnesium	18000		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7439-96-5	Manganese	98		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-02-0	Nickel	40	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-09-7	Potassium	11000		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-23-5	Sodium	260000		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7440-62-2	Vanadium	4.1	J	µg/l	NBCJ04

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF067	2/7/02	10:15:00 AM	7440-66-6	Zinc	91		µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane)	10	U	µg/l	NBCJ04

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
				[bis(2-Chloroisopropyl)ether]				
EFF067	2/7/02	10:15:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04

Storm Water Effluent Anal, .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF067	2/7/02	10:15:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	87-86-5	Pentachlorophenol	14	J	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
EFF067	2/7/02	10:15:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	E-10242	Salinity	2	U	mg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7429-90-5	Aluminum	930		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-39-3	Barium	44		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-70-2	Calcium	44000		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-47-3	Chromium	3.3	J	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-50-8	Copper	25		µg/l	NBCJ04

Storm Water Effluent Analy .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF068	2/7/02	10:30:00 AM	7439-89-6	Iron	1000		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7439-92-1	Lead	7.5		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7439-95-4	Magnesium	18000		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7439-96-5	Manganese	37		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-02-0	Nickel	2.6	J	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-09-7	Potassium	13000		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-23-5	Sodium	190000		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-62-2	Vanadium	4.7	J	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7440-66-6	Zinc	50		µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04

Storm Water Effluent Analy. .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF068	2/7/02	10:30:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04

Storm Water Effluent Anal, al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF068	2/7/02	10:30:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF068	2/7/02	10:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04

Storm Water Effluent Analy...al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF068	2/7/02	10:30:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF069	3/2/02	6:20:00 PM	E-10242	Salinity	2	U	mg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7429-90-5	Aluminum	570		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-39-3	Barium	13		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-41-7	Beryllium	0.4	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-70-2	Calcium	23000		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-47-3	Chromium	1.7	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-50-8	Copper	5.2	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7439-89-6	Iron	520		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7439-92-1	Lead	2.5	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7439-95-4	Magnesium	2500		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7439-96-5	Manganese	17		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-09-7	Potassium	3500		µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-23-5	Sodium	14000	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-62-2	Vanadium	2.3	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7440-66-6	Zinc	18	J	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06

Storm Water Effluent Analy...al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF069	3/2/02	6:20:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06

Storm Water Effluent Analy. .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF069	3/2/02	6:20:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06

Storm Water Effluent Analy. .al Data for Shipyard Creek

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF069	3/2/02	6:20:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF069	3/2/02	6:20:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF001	1/7/02	10:24:00 AM	E-10242	Salinity	2	U	ppt	NBCJ01
REF001	1/7/02	10:24:00 AM	7429-90-5	Aluminum	380	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-39-3	Barium	9	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-70-2	Calcium	14000		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-47-3	Chromium	1.6	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-50-8	Copper	2.6	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7439-89-6	Iron	290		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7439-92-1	Lead	1.9	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7439-95-4	Magnesium	1600		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7439-96-5	Manganese	11		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-09-7	Potassium	2500		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-23-5	Sodium	11000		µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-28-0	Thallium	4.6	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-62-2	Vanadium	2.2	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7440-66-6	Zinc	13	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ01

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF001	1/7/02	10:24:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	95-48-7	2-Methylphenol (o-Cresol)	0.92	J	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF001	1/7/02	10:24:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF001	1/7/02	10:24:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ01
REF001	1/7/02	10:24:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01
REF002	1/15/02	10:50:00 AM	E-10242	Salinity	2	U	ppt	NBCJ02
REF002	1/15/02	10:50:00 AM	7429-90-5	Aluminum	2500		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-39-3	Barium	14		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-70-2	Calcium	18000		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-47-3	Chromium	5.3	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-50-8	Copper	2.4	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7439-89-6	Iron	2300		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7439-92-1	Lead	4.4	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7439-95-4	Magnesium	560		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7439-96-5	Manganese	21		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-02-0	Nickel	3.6	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-09-7	Potassium	910	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-23-5	Sodium	2000		µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-62-2	Vanadium	9.1	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7440-66-6	Zinc	63	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ02

Storm Water Effluent Analytical . a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF002	1/15/02	10:50:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02

Storm Water Effluent Analytical . a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF002	1/15/02	10:50:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	2.4	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	117-84-0	Di-n-octylphthalate	1.7	J	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF002	1/15/02	10:50:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
REF002	1/15/02	10:50:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ02
REF003	1/25/02	10:05:00 AM	E-10242	Salinity	2	U	ppt	NBCJ03
REF003	1/25/02	10:05:00 AM	7429-90-5	Aluminum	1600		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-39-3	Barium	46		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-70-2	Calcium	51000		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-47-3	Chromium	3.7	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-50-8	Copper	8.3	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7439-89-6	Iron	1600		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7439-92-1	Lead	7.1	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7439-95-4	Magnesium	2500		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7439-96-5	Manganese	76		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-02-0	Nickel	3.2	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-09-7	Potassium	1900		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-23-5	Sodium	6500		µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-31-5	Tin	4.1	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-62-2	Vanadium	6.2	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7440-66-6	Zinc	86	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF003	1/25/02	10:05:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical . a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF003	1/25/02	10:05:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	0.57	J	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF003	1/25/02	10:05:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ03
REF003	1/25/02	10:05:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	E-10242	Salinity	2	U	ppt	NBCJ03
REF004	1/25/02	9:40:00 AM	7429-90-5	Aluminum	3100		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-36-0	Antimony	4.3	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-38-2	Arsenic	4.9	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-39-3	Barium	170		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-43-9	Cadmium	0.89	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-70-2	Calcium	27000		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-47-3	Chromium	14		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-50-8	Copper	44		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7439-89-6	Iron	4900		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7439-92-1	Lead	47		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7439-95-4	Magnesium	1500		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7439-96-5	Manganese	62		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-02-0	Nickel	8.3	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-09-7	Potassium	3400		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-23-5	Sodium	8900		µg/l	NBCJ03

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF004	1/25/02	9:40:00 AM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-31-5	Tin	4.1	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-62-2	Vanadium	14		µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7440-66-6	Zinc	240	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical . a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF004	1/25/02	9:40:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	3.3	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF004	1/25/02	9:40:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	131-11-3	Dimethylphthalate	0.51	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	117-84-0	Di-n-octylphthalate	1.4	J	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ03
REF004	1/25/02	9:40:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
REF005	1/14/02	4:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ02
REF005	1/14/02	4:30:00 PM	7429-90-5	Aluminum	1300		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-36-0	Antimony	3	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-38-2	Arsenic	6.1	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-39-3	Barium	44		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-70-2	Calcium	24000		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-47-3	Chromium	9.9	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-48-4	Cobalt	1	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-50-8	Copper	24	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7439-89-6	Iron	2200		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7439-92-1	Lead	22		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7439-95-4	Magnesium	3300		µg/l	NBCJ02

Storm Water Effluent Analytical . a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF005	1/14/02	4:30:00 PM	7439-96-5	Manganese	51		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-02-0	Nickel	2.3	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-09-7	Potassium	2500	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-23-5	Sodium	20000		µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-62-2	Vanadium	6.2	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7440-66-6	Zinc	140	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	319-85-7	beta-BHC	0.023	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF005	1/14/02	4:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF005	1/14/02	4:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	2.7	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	84-74-2	Di-n-butylphthalate	0.94	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	117-84-0	Di-n-octylphthalate	1.8	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	206-44-0	Fluoranthene	0.86	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	85-01-8	Phenanthrene	0.58	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	129-00-0	Pyrene	0.76	J	µg/l	NBCJ02
REF005	1/14/02	4:30:00 PM	57-12-5	Cyanide, Total	6.8	J	µg/l	NBCJ02
REF006	1/7/02	11:05:00 AM	E-10242	Salinity	2	U	ppt	NBCJ01
REF006	1/7/02	11:05:00 AM	7429-90-5	Aluminum	310	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-39-3	Barium	3.4	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-70-2	Calcium	7400		µg/l	NBCJ01

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF006	1/7/02	11:05:00 AM	7440-47-3	Chromium	1.2	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-50-8	Copper	3.4	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7439-89-6	Iron	440		µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7439-92-1	Lead	2.8	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7439-95-4	Magnesium	13000		µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7439-96-5	Manganese	7.8	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-09-7	Potassium	6300		µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-23-5	Sodium	120000		µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-62-2	Vanadium	4.2	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7440-66-6	Zinc	69		µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF006	1/7/02	11:05:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF006	1/7/02	11:05:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	1.6	J	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ01
REF006	1/7/02	11:05:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01
REF007	3/2/02	4:50:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
REF007	3/2/02	4:50:00 PM	7429-90-5	Aluminum	760	J	µg/l	NBCJ07

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF007	3/2/02	4:50:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-39-3	Barium	5.7	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-70-2	Calcium	9600		µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-47-3	Chromium	1.1	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-50-8	Copper	4.5	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7439-89-6	Iron	660		µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7439-95-4	Magnesium	1000		µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7439-96-5	Manganese	4.4	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-09-7	Potassium	1400		µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7782-49-2	Selenium	4.9	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-23-5	Sodium	1900		µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-62-2	Vanadium	2.6	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7440-66-6	Zinc	19	J	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ07

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF007	3/2/02	4:50:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ07

Storm Water Effluent Analytical . .a for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF007	3/2/02	4:50:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ07

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF007	3/2/02	4:50:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ07
REF007	3/2/02	4:50:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ07
REF008	1/7/02	1:15:00 PM	E-10242	Salinity	2	U	ppt	NBCJ01
REF008	1/7/02	1:15:00 PM	7429-90-5	Aluminum	970	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-39-3	Barium	16		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-43-9	Cadmium	2.2	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-70-2	Calcium	4900		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-47-3	Chromium	4.3	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-50-8	Copper	12	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7439-89-6	Iron	1400		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7439-92-1	Lead	21		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7439-95-4	Magnesium	530		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7439-96-5	Manganese	28		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-02-0	Nickel	2.6	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-09-7	Potassium	740	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-23-5	Sodium	3600		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-62-2	Vanadium	11		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7440-66-6	Zinc	1300		µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF008	1/7/02	1:15:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	95-48-7	2-Methylphenol (o-Cresol)	0.81	J	µg/l	NBCJ01

Storm Water Effluent Analytica. .ta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF008	1/7/02	1:15:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	1.8	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	1.2	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	84-74-2	Di-n-butylphthalate	0.35	J	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF008	1/7/02	1:15:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ01
REF008	1/7/02	1:15:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ01
REF009	1/7/02	1:30:00 PM	7429-90-5	Aluminum	79	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-39-3	Barium	29		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-70-2	Calcium	37000		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-47-3	Chromium	0.98	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-50-8	Copper	4.4	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7439-89-6	Iron	1300		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7439-92-1	Lead	1.8	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7439-95-4	Magnesium	2000		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7439-96-5	Manganese	35		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-09-7	Potassium	2100		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-23-5	Sodium	9900		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-62-2	Vanadium	1.5	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7440-66-6	Zinc	35		µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ01

Storm Water Effluent Analytica. ıta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF009	1/7/02	1:30:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF009	1/7/02	1:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	1.6	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	84-74-2	Di-n-butylphthalate	0.55	J	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ01

Storm Water Effluent Analytical _ _ta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF009	1/7/02	1:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ01
REF009	1/7/02	1:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01
REF010	1/25/02	1:55:00 PM	E-10242	Salinity	2	U	ppt	NBCJ03
REF010	1/25/02	1:55:00 PM	7429-90-5	Aluminum	1100		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-39-3	Barium	21		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-70-2	Calcium	18000		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-47-3	Chromium	2.9	J	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-50-8	Copper	40		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7439-89-6	Iron	4000		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7439-92-1	Lead	15		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7439-95-4	Magnesium	14000		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7439-96-5	Manganese	80		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-02-0	Nickel	1.7	J	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-09-7	Potassium	6200		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-23-5	Sodium	100000		µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF010	1/25/02	1:55:00 PM	7440-62-2	Vanadium	6.2	J	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7440-66-6	Zinc	120	J	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF010	1/25/02	1:55:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	85-68-7	Butylbenzylphthalate	0.54	J	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF010	1/25/02	1:55:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ03
REF010	1/25/02	1:55:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
REF011	2/7/02	9:30:00 AM	E-10242	Salinity	2	U	ppt	NBCJ04
REF011	2/7/02	9:30:00 AM	7429-90-5	Aluminum	1300		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-39-3	Barium	28		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-70-2	Calcium	44000		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-47-3	Chromium	21		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-50-8	Copper	10	J	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7439-89-6	Iron	1700		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7439-92-1	Lead	13		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7439-95-4	Magnesium	27000		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7439-96-5	Manganese	36		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-02-0	Nickel	2.3	J	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011	2/7/02	9:30:00 AM	7440-09-7	Potassium	17000		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-23-5	Sodium	250000		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-62-2	Vanadium	5.9	J	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7440-66-6	Zinc	85		µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011	2/7/02	9:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011	2/7/02	9:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	0.63	J	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
REF011	2/7/02	9:30:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	E-10242	Salinity	2	U	ppt	NBCJ04
REF011D	2/7/02	9:30:00 AM	7429-90-5	Aluminum	1200		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-39-3	Barium	29		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-41-7	Beryllium	0.1	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-70-2	Calcium	45000		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-47-3	Chromium	20		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011D	2/7/02	9:30:00 AM	7440-50-8	Copper	9.7	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7439-89-6	Iron	1600		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7439-92-1	Lead	11		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7439-95-4	Magnesium	27000		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7439-96-5	Manganese	37		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-02-0	Nickel	2.8	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-09-7	Potassium	17000		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-23-5	Sodium	250000		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-62-2	Vanadium	5.8	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7440-66-6	Zinc	86		µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.014	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011D	2/7/02	9:30:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF011D	2/7/02	9:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	0.52	J	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
REF011D	2/7/02	9:30:00 AM	57-12-5	Cyanide, Total	5.6	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	E-10242	Salinity	2	U	ppt	NBCJ04
REF012	2/7/02	10:30:00 AM	7429-90-5	Aluminum	750		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF012	2/7/02	10:30:00 AM	7440-39-3	Barium	30		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-43-9	Cadmium	5	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-70-2	Calcium	33000		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-47-3	Chromium	6.4	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-48-4	Cobalt	1	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-50-8	Copper	27		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7439-89-6	Iron	1300		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7439-92-1	Lead	7.9		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7439-95-4	Magnesium	46000		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7439-96-5	Manganese	36		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-02-0	Nickel	2.4	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-09-7	Potassium	22000		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-23-5	Sodium	400000		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-62-2	Vanadium	5.8	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7440-66-6	Zinc	91		µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF012	2/7/02	10:30:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF012	2/7/02	10:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	83-32-9	Acenaphthene	0.66	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	2.1	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	85-68-7	Butylbenzylphthalate	0.48	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	84-74-2	Di-n-butylphthalate	0.28	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	206-44-0	Fluoranthene	0.45	J	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF012	2/7/02	10:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
REF012	2/7/02	10:30:00 AM	57-12-5	Cyanide, Total	8.6	J	µg/l	NBCJ04
REF013	1/14/02	4:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ02
REF013	1/14/02	4:30:00 PM	7429-90-5	Aluminum	660		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-36-0	Antimony	3	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-38-2	Arsenic	6.7	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-39-3	Barium	12		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-70-2	Calcium	5500		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-47-3	Chromium	6.3	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-48-4	Cobalt	1	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-50-8	Copper	66	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7439-89-6	Iron	730		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7439-92-1	Lead	8.2		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7439-95-4	Magnesium	2600		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7439-96-5	Manganese	19		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-02-0	Nickel	2.5	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-09-7	Potassium	2100	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-23-5	Sodium	23000		µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-62-2	Vanadium	9.5	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7440-66-6	Zinc	94	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	319-85-7	beta-BHC	0.039	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF013	1/14/02	4:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF013	1/14/02	4:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	5.2	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	85-68-7	Butylbenzylphthalate	0.94	J	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF013	1/14/02	4:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
REF013	1/14/02	4:30:00 PM	57-12-5	Cyanide, Total	49		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	E-10242	Salinity	7		ppt	NBCJ02
REF014	1/14/02	3:15:00 PM	7429-90-5	Aluminum	11000		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-36-0	Antimony	3.3	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-38-2	Arsenic	13		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-39-3	Barium	55		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-41-7	Beryllium	0.48	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-70-2	Calcium	130000		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-47-3	Chromium	21		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-48-4	Cobalt	3.2	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-50-8	Copper	70	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7439-89-6	Iron	9700		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7439-92-1	Lead	100		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7439-95-4	Magnesium	290000		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7439-96-5	Manganese	100		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-02-0	Nickel	9.1	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-09-7	Potassium	120000	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-23-5	Sodium	2300000		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-62-2	Vanadium	32		µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7440-66-6	Zinc	99	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7439-97-6	Mercury	0.18	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF014	1/14/02	3:15:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF014	1/14/02	3:15:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	1.5	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	84-74-2	Di-n-butylphthalate	5.3	J	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF014	1/14/02	3:15:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
REF014	1/14/02	3:15:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	E-10242	Salinity	2	U	ppt	NBCJ02
REF015	1/14/02	3:40:00 PM	7429-90-5	Aluminum	1300		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-36-0	Antimony	5.1	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-38-2	Arsenic	5.6	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-39-3	Barium	26		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-70-2	Calcium	34000		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-47-3	Chromium	6.9	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-48-4	Cobalt	2.2	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-50-8	Copper	65	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7439-89-6	Iron	1700		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7439-92-1	Lead	44		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7439-95-4	Magnesium	36000		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7439-96-5	Manganese	36		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-02-0	Nickel	3.3	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-09-7	Potassium	22000	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-22-4	Silver	4.4	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-23-5	Sodium	290000		µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-62-2	Vanadium	8.4	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7440-66-6	Zinc	150	J	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF015	1/14/02	3:40:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	5103-71-9	alpha-Chlordane	0.012	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	319-86-8	delta-BHC	0.21	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	72-43-5	Methoxychlor	0.061	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02

Storm Water Effluent Analytica. ıta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF015	1/14/02	3:40:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	91-57-6	2-Methylnaphthalene	0.78	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	3.7	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	85-68-7	Butylbenzylphthalate	1.5	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	84-66-2	Diethylphthalate	1.2	J	µg/l	NBCJ02

Storm Water Effluent Analytica. ata for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF015	1/14/02	3:40:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	84-74-2	Di-n-butylphthalate	1.2	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	117-84-0	Di-n-octylphthalate	2	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	91-20-3	Naphthalene	0.96	J	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
REF015	1/14/02	3:40:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	E-10242	Salinity	2	U	ppt	NBCJ02
REF016	1/14/02	5:05:00 PM	7429-90-5	Aluminum	550		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-36-0	Antimony	3	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-39-3	Barium	14		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-70-2	Calcium	6800		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-47-3	Chromium	5.9	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-48-4	Cobalt	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-50-8	Copper	17	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7439-89-6	Iron	810		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7439-92-1	Lead	3.1	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7439-95-4	Magnesium	610		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7439-96-5	Manganese	16		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-09-7	Potassium	770	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02

Storm Water Effluent Analytica .ta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF016	1/14/02	5:05:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-23-5	Sodium	6200		µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-62-2	Vanadium	4.2	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7440-66-6	Zinc	59	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02

Storm Water Effluent Analytica. ıta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF016	1/14/02	5:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	2.8	J	µg/l	NBCJ02

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF016	1/14/02	5:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	206-44-0	Fluoranthene	0.48	J	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
REF016	1/14/02	5:05:00 PM	57-12-5	Cyanide, Total	12		µg/l	NBCJ02
REF017	1/7/02	11:20:00 AM	E-10242	Salinity	2	U	ppt	NBCJ01
REF017	1/7/02	11:20:00 AM	7429-90-5	Aluminum	290	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-39-3	Barium	6.2	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-70-2	Calcium	3400		µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-47-3	Chromium	1.6	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-50-8	Copper	4.2	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7439-89-6	Iron	330		µg/l	NBCJ01

Storm Water Effluent Analytica. ıta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF017	1/7/02	11:20:00 AM	7439-92-1	Lead	4.9	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7439-95-4	Magnesium	310	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7439-96-5	Manganese	12		µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-09-7	Potassium	310	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-23-5	Sodium	2000		µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-62-2	Vanadium	2.7	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7440-66-6	Zinc	57		µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ01

Storm Water Effluent Analytica. .ta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF017	1/7/02	11:20:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	56-55-3	Benzo(a)anthracene	0.99	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	50-32-8	Benzo(a)pyrene	1.6	J	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF017	1/7/02	11:20:00 AM	205-99-2	Benzo(b)fluoranthene	2.8	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	191-24-2	Benzo(g,h,i)perylene	1.8	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	207-08-9	Benzo(k)fluoranthene	2.3	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	1.6	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	86-74-8	Carbazole	0.62	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	218-01-9	Chrysene	3.3	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	117-84-0	Di-n-octylphthalate	2.5	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	206-44-0	Fluoranthene	5.7	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	1.9	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	85-01-8	Phenanthrene	1.9	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	129-00-0	Pyrene	3.4	J	µg/l	NBCJ01
REF017	1/7/02	11:20:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	E-10242	Salinity	2	U	ppt	NBCJ01
REF018	1/7/02	10:55:00 AM	7429-90-5	Aluminum	1600	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-38-2	Arsenic	3.5	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-39-3	Barium	13		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-41-7	Beryllium	0.1	UJ	µg/l	NBCJ01

Storm Water Effluent Analytical Data for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF018	1/7/02	10:55:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-70-2	Calcium	13000		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-47-3	Chromium	3.4	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-50-8	Copper	4.4	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7439-89-6	Iron	1900		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7439-92-1	Lead	2	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7439-95-4	Magnesium	790		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7439-96-5	Manganese	39		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-02-0	Nickel	1.3	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-09-7	Potassium	980	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-23-5	Sodium	3000		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-28-0	Thallium	4.5	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-62-2	Vanadium	8.7	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7440-66-6	Zinc	50		µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ01

Storm Water Effluent Analytica. ata for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF018	1/7/02	10:55:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ01

Storm Water Effluent Analytica. ıta for Reference Concentrations

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
REF018	1/7/02	10:55:00 AM	100-02-7	4-Nitrophenol	6.2	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	1.9	J	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ01
REF018	1/7/02	10:55:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ01

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ01
Date:	February 27, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	January 7, 2002
Number of Samples:	6 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sempson — 2-29-02.

for Paul B. Humburg, President — Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ01

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF018	WATER	X		X		X		X	
REF017	WATER	X		X		X		X	
REF008	WATER	X		X		X		X	
REF009	WATER	X		X		X		X	
REF001	WATER	X		X		X		X	
REF006	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		6	0	6	0	6	0	6	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ01

A validation was performed on the Semivolatile Data from SDG #NBCJ01. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
  Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Calibrations

The continuing calibration, EQ725, contained compounds with %Ds greater than 20% and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

REF018	bis (2-ethylhexyl)phthalate (22.8%)
REF008	
REF006	

The continuing calibration, EQ727, contained compounds with %Ds greater than 20% and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

REF017	indeno(1,2,3-cd)pyrene (29.6%)

Blank

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF018 REF008 REF006	bis (2-ethylhexyl)phthalate	+	J
REF017	indeno(1,2,3-cd)pyrene	+	J
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ01

A validation was performed on the Pesticides/PCB Data from SDG NBCJ01. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated. J/UJ.

Sample ID	Surrogate Compound	%R
REF018	TCX	28%
	DCB	15%/13%
REF008	DCB	28%/24%
REF001	DCB	22%/20%

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF018	All Compounds	+/-	J/UJ
REF008			
REF001			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ01

A validation was performed on the Metals and cyanide Data from SDG NBCJ01. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	9.64 ug/l	no impact
Copper	1.37 ug/l	all water samples below 6.85 ug/l
Zinc	1.05 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Beryllium	-0.12 ug/l	all water samples below 1.2 ug/l

Serial Dilution results

The serial dilution results for waters for Aluminum was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 6.85 ug/l	Cu.	+	U
all water samples below 1.2 ug/l	Be.	+/U	J/UJ
all water samples	Al.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ02
Date:	February 27, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	January 14 - 15, 2002
Number of Samples:	8 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seaffers
for Paul B. Humburg, President

2-27-02
Date

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(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ02

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF014	WATER	X		X		X		X	
REF013	WATER	X		X		X		X	
REF015	WATER	X		X		X		X	
REF016	WATER	X		X		X		X	
REF005	WATER	X		X		X		X	
CAP001	WATER	X		X		X		X	
REF002	WATER	X		X		X		X	
EQP001	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		8	0	8	0	8	0	8	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ02

A validation was performed on the Semivolatile Data from SDG #NBCJ02. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ02

A validation was performed on the Pesticides/PCB Data from SDG NBCJ02. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The calibration verification standard MJA23016 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

REF015 methoxychlor (26.8%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
REF013	DCB	18%/18%
REF015	DCB	14%/20%
REF005	DCB	20%/24%
REF002	DCB	24%/22%

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.

2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.

3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.

4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
REF005	beta-BHC	154.7	P	U	3

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF015	methoxychlor (26.8%)	+	J
REF013 REF015 REF005 REF002	All Compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries. matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ02

A validation was performed on the Metals and cyanide Data from SDG NBCJ02. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	31.2 ug/l	all water samples below 155 ug/l
Barium	0.96 ug/l	no impact
Calcium	12.8 ug/l	all water samples below 64.0 ug/l
Copper	8.72 ug/l	all water samples below 44.0 ug/l
Selenium	4.66 ug/l	no impact

Zinc	2.16 ug/l	all water samples below 11.0 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

Serial Dilution results

The serial dilution results for waters for Copper, Potassium and Zinc were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 155 ug/l	Al.	+	U
all water samples below 64.0 ug/l	Ca.		
all water samples below 44.0 ug/l	Cu.		
all water samples below 11.0 ug/l	Zn.		
all water samples	Cu, K and Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ03
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	January 25, 2002
Number of Samples:	6 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles. Pesticides/PCBs. Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc.. for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scorfan
for Paul B. Humburg, President

3-20-02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ03

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF004	WATER	X		X		X		X	
REF003	WATER	X		X		X		X	
EEF010	WATER	X		X		X		X	
REF010	WATER	X		X		X		X	
EEF058	WATER	X		X		X		X	
EFF009	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		6	0	6	0	6	0	6	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ03

A validation was performed on the Semivolatile Data from SDG #NBCJ03. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

The blank(s) associated with samples in this SDG exhibited contamination. Qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

Associated blank	Compound	Concentration	Action Level
0131C-GMB	di-n-butylphthalate	0.44J ug/L	4.4 ug/L

Samples	Compound	Qualification
REF003	di-n-butylphthalate	CRQL

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF003	di-n-butylphthalate	+	CRQL
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ03

A validation was performed on the Pesticides/PCB Data from SDG NBCJ03. The data was evaluated based on the following parameters:

*	•	Data Completeness
	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Holding Times

The following sample was re-extracted seven days outside the recommended extraction holding time of seven days for water samples. All reported positive and non-detect results in the sample are qualified as estimated, J/UJ.

REF004RE

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
REF003	DCB	13/14
EEF010	DCB	28/28
REF010	DCB	12/15
EFF058	DCB	14/16
EFF009	DCB	22/24
REF004RE	DCB	15/14

Compound Quantitation

The following sample exhibited surrogate recoveries less than 10%. The reported results are not used in favor of the results reported from the RE analysis of the sample.

REF004

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF004RE	All compounds	+/-	J/UJ
REF003 EEF010 REF010 EFF058 EFF009 REF004RE	All compounds	+/-	J/UJ
REF004	All compounds	+/-	Do Not Use

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ03

A validation was performed on the Metals and cyanide Data from SDG NBCJ03. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Arsenic	3.31 ug/l	all water samples below 16.5 ug/l
Calcium	10.8 ug/l	no impact
Lead	2.48 ug/l	all water samples below 12.5 ug/l
Zinc	1.79 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Sodium	-13.0 ug/l	no impact
Mercury	-0.10 ug/l	all water samples below 1.0 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 16.5 ug/l	As.	+	U
all water samples below 12.5 ug/l	Pb.		
all water samples below 1.0 ug/l	Hg.	+/U	J/UJ
all water samples	Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ04
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	February 7, 2002
Number of Samples:	10 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sewson
Paul R. Humburg, President

3-20-02.
Date

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SDG# NBCJ04

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF008	WATER	X		X		X		X	
EFF004	WATER	X		X		X		X	
EFF065	WATER	X		X		X		X	
EFF067	WATER	X		X		X		X	
EFF068	WATER	X		X		X		X	
EFF006	WATER	X		X		X		X	
EFF005	WATER	X		X		X		X	
REF012	WATER	X		X		X		X	
REF011	WATER	X		X		X		X	
REF011D	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		10	0	10	0	10	0	10	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times. blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ04

A validation was performed on the Semivolatile Data from SDG #NBCJ04. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
* Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data as presented requires no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ04

A validation was performed on the Pesticides/PCB Data from SDG NBCJ04. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF004	DCB	28/16
EFF065	DCB	24
EFF067	DCB	26/18
EFF068	DCB	28/18
EFF005	DCB	24
REF012	DCB	24/14
REF011	DCB	19/14
REF011D	DCB	24/17

Compound Quantitation

One sample exhibited a column quantitation %D greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.
3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.
4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
REF011D	lindane	48.6	P	J	2

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

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BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF004 EFF065 EFF067 EFF068 EFF005 REF012 REF011 REF011D	All compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

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DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ04

A validation was performed on the Metals and cyanide Data from SDG NBCJ04. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	38.6 ug/l	no impact
Magnesium	7.31 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Nickel	-1.72 ug/l	all water samples below 17.2 ug/l

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 17.2 ug/l	Ni.	+/U	J/UJ
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ05
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	February 8, 2002
Number of Samples:	10 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sanson
for Paul B. Humburg, President

3-20-02.
Date

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SDG# NBCJ05

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF014	WATER	X		X		X		X	
EFF011	WATER	X		X		X		X	
EFF002	WATER	X		X		X		X	
EFF001	WATER	X		X		X		X	
EFF043	WATER	X		X		X		X	
EFF041	WATER	X		X		X		X	
EFF042	WATER	X		X		X		X	
EFF040	WATER	X		X		X		X	
EFF047	WATER	X		X		X		X	
EFF045	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		10	0	10	0	10	0	10	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ05

A validation was performed on the Semivolatile Data from SDG #NBCJ05. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
* Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data as presented requires no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ05

A validation was performed on the Pesticides/PCB Data from SDG NBCJ05. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification standard MFB18005 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF047	methoxychlor (47.9%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF014	DCB	17/19
EFF011	DCB	18/20
EFF002	DCB	19/22
EFF001	DCB	20/24
EFF043	DCB	26/28
EFF041	DCB	24/28
EFF042	DCB	20/18
EFF040	DCB	22/24
EFF047	DCB	20/19
EFF045	DCB	15/17

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF047	methoxychlor (47.9%)	+	J
EFF014	All compounds	+/-	J/UJ
EFF011			
EFF002			
EFF001			
EFF043			
EFF041			
EFF042			
EFF040			
EFF047			
EFF045			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ05

A validation was performed on the Metals and cyanide Data from SDG NBCJ05. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Barium	0.37 ug/l	no impact
Calcium	21.0 ug/l	no impact
Copper	2.79 ug/l	all water samples below 14.0 ug/l
Magnesium	17.5 ug/l	no impact
Zinc	16.7 ug/l	all water samples below 83.5 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-30.6 ug/l	all water samples below 306 ug/l
Cadmium	-0.78 ug/l	all water samples below 7.8 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 14.0 ug/l	Cu.	+	U
all water samples below 83.5 ug/l	Zn.		
all water samples below 306 ug/l	Al.	+/U	J/UJ
all water samples below 7.8 ug/l	Cd.		
all water samples	Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ06
Date:	April 23, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	March 2, 2002
Number of Samples:	15 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Searson — 4.23.02

Paul B. Humburg, President — Date

4127 Plaza 94 South • St. Charles, MO 63304
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SDG# NBCJ06

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF019	WATER	X		X		X		X	
EFF003	WATER	X		X		X		X	
EFF007	WATER	X		X		X		X	
EFF012	WATER	X		X		X		X	
EFF013	WATER	X		X		X		X	
EFF64	WATER	X		X		X		X	
EFF066	WATER	X		X		X		X	
EFF069	WATER	X		X		X		X	
EFF031	WATER	X		X		X		X	
EFF034	WATER	X		X		X		X	
EFF035	WATER	X		X		X		X	
EFF044	WATER	X		X		X		X	
EFF048	WATER	X		X		X		X	
EFF057	WATER	X		X		X		X	
EFF063	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		15	0	15	0	15	0	15	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ06

A validation was performed on the Semivolatile Data from SDG NBCJ06. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0307B-KMB - 4.1J ug/L; 0313D-KMB - 4.3J ug/L)

Compound Quantitation

For the following sample, the reported results are not used, in favor of the results reported in the original analysis of the sample. Although the original sample exhibited two non-compliant surrogate recoveries, based on the validation guidance. qualification of the data was not required.

EFF003RE

For the following sample, the reported results are not used, in favor of the results reported in the original analysis of the sample. Although the RE sample was extracted slightly outside the holding time (2 days), it exhibited acceptable surrogate recoveries - and qualifications were not required based on the exceeded holding time as there were no positive results reported in the sample.

EFF034

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	All B flagged TICs within 10X contamination concentration	+B	R
EFF003RE	All compounds	+/-	Do Not Use
EFF034	All compounds	+/-	Do Not Use

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ06

A validation was performed on the Pesticides/PCB Data from SDG NBCJ06. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification standard MMR10047 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF012	heptachlor (34.5/27.4%)

Calibration (continued)

The calibration verification standard MMR10047 exhibited one compound with a %D greater than 50% but less than 90% for which qualifications were required. For the following sample and non-compliant compound, the reported positive and non-detect results are qualified as estimated, J/UJ.

EFF019	methoxychlor (54.6%)
EFF003	
EFF007	
EFF012	
EFF013	
EFF64	
EFF066	
EFF069	
EFF031	
EFF034	
EFF035	
EFF044	

The calibration verification standard MMR10078 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF044	4,4,'-DDD (18.7%)

The calibration verification standard MMR10088 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF044	4,4,'-DDD (17.7/21.2%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated. J/UJ.

Sample ID	Surrogate Compound	%R
EFF019	DCB	28
EFF003	DCB	26/24
EFF007	DCB	22/20
EFF012	DCB	15/13
EFF013	DCB	22/19
EFF64	DCB	19/17
EFF066	DCB	15/13
EFF069	DCB	15/13
EFF034	DCB	22/19
EFF035	DCB	28
EFF044	DCB	17/14
EFF048	DCB	24/22
EFF057	DCB	26/26
EFF063	DCB	21/20

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF012	heptachlor	+	J
EFF019	methoxychlor	+/-	J/UJ
EFF003			
EFF007			
EFF012			
EFF013			
EFF64			
EFF066			
EFF069			
EFF031			
EFF034			
EFF035			
EFF044			
EFF044	4,4,'-DDD	+	J
EFF044	4,4,'-DDD	+	J
EFF019	All Compounds	+/-	J/UJ
EFF003			
EFF007			
EFF012			
EFF013			
EFF64			
EFF066			
EFF069			
EFF034			
EFF035			
EFF044			
EFF048			
EFF057			
EFF063			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ06

A validation was performed on the Metals and cyanide Data from SDG NBCJ06. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Beryllium	0.58 ug/l	all water samples below 2.9 ug/l
Zinc	2.35 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-26.5 ug/l	all water samples below 265 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc and Sodium were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 2.9 ug/l	Be.	+	U
all water samples below 265 ug/l	Al.	+/U	J/UJ
all water samples	Zn and Na.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ07
Date:	March 27, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	March 2, 2002
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scanlon
Paul B. Humburg, President

3·27·02.
Date

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SDG# NBCJ07

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF007	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		16	10	9	7	6	4	3	1

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ07

A validation was performed on the Semivolatile Data from SDG #NBCJ07. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
* Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data as presented requires no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ07

A validation was performed on the Pesticides/PCB Data from SDG NBCJ07. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

DATA ASSESSMENT NARRATIVE
PESTICIDES/PCB

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
REF007	DCB	16/17

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF007	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ07

A validation was performed on the Metals and cyanide Data from SDG NBCJ07. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	8.82 ug/l	no impact
Calcium	14.9 ug/l	no impact
Iron	34.1 ug/l	no impact
Sodium	39.2 ug/l	no impact
Zinc	1.92 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-9.35 ug/l	no impact
Selenium	-6.13 ug/l	all water samples below 61.3 ug/l
Vanadium	-1.04 ug/l	all water samples below 10.4 ug/l

Serial Dilution results

The serial dilution results for waters for Aluminum was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 61.3 ug/l	Se.	+/U	J/UJ
all water samples below 10.4 ug/l	V.		
all water samples	Al.	+	J
all "B" results	all analytes	B	J

APPENDIX C

ZONE J STORM WATER EFFLUENT EVALUATION REPORT ADDENDUM

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT ADDENDUM

REVISION: 1

VOLUME I OF IV - SECTIONS 1 TO 4

SOUTHDIV Contract Number:
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Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

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July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

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Appendix A Chains of Custody, Analytical Data, Data Validation Reports
Appendix B Incident Reports and Website Instructions

EXECUTIVE SUMMARY

The environmental investigation and remediation activities at Charleston Naval Complex (CNC) are required by the Hazardous and Solid Waste Amendments portion of the Resource, Conservation and Recovery Act (RCRA), Part B permit. For management purposes, CNC has been geographically divided into 12 investigative "zones" identified as A through L. Zone J consists of portions of the Cooper River, Shipyard Creek, Noisette Creek, and associated marsh areas. Characterizations include evaluations of storm water discharge, sediments below the mean high water mark, and the water bodies surrounding CNC. The main objective of the Zone J RCRA Facility Investigation (RFI) is to assess impacts from CNC-related discharges to receptors within Zone J.

The Navy completed preliminary sampling of the water bodies in September 1997, using the protocols and methods outlined in the *Final Comprehensive Sampling and Analysis Plan* (EnSafe/Allen & Hoshall (E/A&H) July 1996) and the *Zone J RFI Work Plan* (E/A&H December 1996). In a December 1997 technical memorandum entitled *Preliminary Results of Zone J Sampling* (EnSafe), the Navy presented the investigative approach, deviations from the Zone J work plan, applied sampling protocols, and presented analytical results of the Zone J sampling. Numerous zone-specific investigations of upland areas of concern/solid waste management units (AOCs/SWMUs) were still ongoing when the 1997 Zone J sampling was completed. Therefore, correlations between the constituents detected in Zone J and potential CNC sources were not attempted. However, the 1997 technical memorandum did present a preliminary list of chemicals of potential concern (COPCs) in Zone J sediments and surface waters, and a map of contaminant distributions.

EnSafe submitted the *Zone J Draft RFI Report - Part One* on April 24, 2000 to the South Carolina Department of Health and Environmental Control (SCDHEC), the South Carolina Department of Natural Resources (SCDNR), the National Oceanic and Atmospheric Administration (NOAA), the United States Environmental Protection Agency (USEPA), and the United States Fish and Wildlife Service (USFWS) for their review and comment. The Part One report presented a screening-level ecological risk assessment (SLERA) using the preliminary results of Zone J sampling and the

protocols outlined in the USEPA1997 guidance document for Superfund, Process for Designing and Conducting Ecological Risk Assessments.

Comments from reviewing agencies on the Part One report addressed general approach, document preparation, approach in evaluating lines of evidence for eliminating COPCs from further investigation, more in-depth evaluation of linkages between CNC and Zone J and a clearer determination of reference concentrations.

EnSafe and the Navy presented the migration pathway evaluation process to the Base Closure Team (BCT) in September 2000, along with checklists desired to yield a more definitive assessment of potential contaminant migration pathways and the scope of work required to complete the next phase of the Zone J RFI. EnSafe and the Navy concluded that CNC storm water effluent data were required to produce a reasonably definitive evaluation of the migration pathway scenarios, particularly for contaminant transport via storm water drainage pipelines and effluent.

At the May 2001 BCT project team meeting, EnSafe presented the conceptual approach for collecting effluent samples from CNC and reference samples from non-point-source locations offsite. The approach was agreed upon by the project team, which decided that a scoping package would be presented to the BCT project team prior to submittal of the Point of Entry Effluent Sampling Work Plan to incorporate comments from the SCDHEC. The scoping package was presented at the August 2001 project team meeting where a consensus was reached that a number of reference locations should also come from areas on base that were not influenced by an AOC/SWMU, if possible.

Evaluation of CNC storm water effluent is an interim phase of the Zone J RFI. The investigation will continue until sufficient data is obtained to determine whether COPCs are present from the other migration pathways and if the COPCs can be attributed to a Navy source. Data will be used to characterize the associated impact to the receiving waters and potential receptors.

This report focuses on the CNC outfalls associated with the Cooper River. Storm water effluent sample detections were evaluated for COPCs and compared with CNC site data to evaluate upland

source linkages for Scenario 1 (Transport to Zone J via Storm Water Drainage Pipeline), which describes a release from a SWMU or AOC resulting in either:

1a) Waste being introduced directly into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1b) Storm water runoff transporting contaminated media into a storm sewer catch basin, and migrating via the storm sewer pipeline to Zone J;

1c) Contaminated groundwater being intercepted by and entering a low-integrity storm sewer pipeline and migrating via the storm sewer pipeline to Zone J; or

1d) Waste discharging directly to Zone J via sanitary/storm sewer cross connects.

Much of the CNC storm water system is influenced by tidal activity and is inundated by surface water to some degree during high tide. Storm water effluent was collected from outfalls that discharge into the Cooper River during periods of precipitation that occurred at low tide to prevent inclusion of surface water in the sample. The storm water drainage basins (DB) sampled for this report are:

DB1	DB32	DB47
DB2	DB33	DB47A
DB3	DB34	DB47B
DB18	DB35	DB48
DB20	DB36	DB48A/48G
DB22	DB37	DB48H
DB23	DB38	DB49
DB26	DB39	DB51
DB27	DB40	DB51C
DB28	DB41	DB53
DB30	DB42A	
DB30A	DB43B	
DB30C	DB44	
DB31	DB45	

Storm water effluent sample detections were compared against storm water effluent reference and screening criteria, upland surface soil detections, groundwater detections, and environmental incident and sewer cross-connect reports in determining COPCs for further evaluation and linkages to CNC sites. The following lists storm water drainage basins that warrant further investigation of the specified COPCs and linkages:

Drainage Basin	Potential Storm Water COPCs	Upland Linkage
DB 3	Lead	Soil
	Mercury	Soil and Groundwater
	Vanadium	Soil
DB 20	Aluminum	Groundwater
	Bis(2-Ethylhexyl)phthalate	Soil
	Iron	Soil and Groundwater
	Lead	Soil
	Zinc	Soil
DB 30	Copper	Soil and Groundwater
	Nickel	Soil and Groundwater
DB 37	Benzo(g,h,i)perylene	Soil
DB 41	Aluminum	Soil
	Iron	Soil
DB 45	Barium	Soil
	Beryllium	Soil
	Cobalt	Soil
	Lead	Soil
	Nickel	Soil
	Vanadium	Soil
DB 47	Bis(2-Ethylhexyl)phthalate	Soil
DB 51	Bis(2-Ethylhexyl)phthalate	Release and Soil
	Copper	Soil

Hydrodynamic evaluation of the Cooper River was performed as part of this study to determine transport of CNC and non-CNC contaminants in these water bodies. This evaluation has determined that pollutants released into the water bodies are transported both up and down stream with the flood and ebb tides, although there is a net downstream component towards the ocean. Hydrodynamics of the Charleston Harbor Estuary system are dominated by the tidal currents generated by tidal propagation. Tidal flow measurement studies were conducted in 1996 for the Charleston Harbor Estuary and tributaries. Tidal flow (averaged over the tidal cycle) in the Cooper River was estimated to be 18 times the freshwater flow. Water diversion projects and dredging operations performed in the estuary have affected hydrodynamics in the Cooper River and Charleston Harbor Estuary. Freshwater diversion projects have resulted in changes to density stratification in the estuary and sediment load, while dredging operations have affected river and harbor bathymetric contours which affect the complex tidal current patterns that are responsive to tide range, shoreline geometry, river cross-sectional area, bottom roughness, and freshwater discharges. Tidal currents in the Charleston Harbor Estuary were found to have significant spatial variability. Therefore, the pathway and fate of a pollutant spill in the estuary can be highly variable, depending on location of the spill, time history of the spill, and tidal currents after the spill. Sediment originating from the area adjacent to the Charleston Harbor Estuary can be transported over a large area in the form of either suspended load or bed load, and can be deposited or accumulated in various parts of the estuary because of the complex tidal current and circulation pattern in the Charleston Harbor Estuary

Runoff analysis performed on CNC determined that total runoff volume from CNC and adjacent offsite area for a 24-hour, 25-year storm is 497 acre-ft, which is approximately 0.5 percent of the total tidal flow volume in the Cooper River within one tidal cycle (12.4 hours). The total runoff volume for a 24-hour, 100-year storm is 658 acre-ft is about 0.6 percent of the Cooper River tidal flow volume within one tidal cycle.

1.0 INTRODUCTION

The purpose of the Zone J RFI is to assess Navy-related impacts to the water bodies adjacent to the CNC as part of the overall basewide assessment. Zone J, which consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek and their associated marsh areas, is one of CNC's 12 interdependent RFI zones. Zone J characterizations include evaluations of storm water discharge, sediments beyond the mean high water mark and the water bodies surrounding CNC. It is also the only zone that is entirely within an estuarine system and with only rivers, creeks, and marshes, the investigated components are more ecological than industrial. As such, standard industrial site investigative protocols (monitoring well and soil boring installation, etc.) are inappropriate, necessitating the use of a variety of preliminary investigative techniques.

To date, the Zone J RFI techniques have included unbiased offshore sampling to assess the nature and extent of sediment contamination, screening-level ecological risk assessments to determine potential adverse effects of detected contaminants to aquatic receptors, and conceptual site models to define potential routes of exposure. These approaches have not yielded a complete and comprehensive evaluation of CNC impacts to the Zone J water bodies since such a broad evaluation requires a thorough analysis of contaminant migration pathways between suspected CNC sources and Zone J. Site-specific analytical data collected from AOCs/SWMUs during RFI and Corrective Measures Study (CMS) activities are being evaluated and screened against ecological screening values to complete migration pathway evaluations and determine if a possible linkage exists to the contribution of contamination to Zone J water bodies. This addendum report evaluates the storm water migration pathways and identifies COPCs, hydrodynamics of the Cooper River as part of the Zone J estuary system, and data gaps that will be addressed in the future.

Section 2 describes transportation mechanisms of contaminants in the Cooper River. Preliminary hydrodynamic modeling will also aid in the predictions of contaminant fate and transport entering Zone J water bodies. Section 3 details the data quality objectives (DQOs) and the appropriate guidance for the RFI at CNC. Section 4 includes discussions on CNC drainage basin evaluations for Cooper River. Evaluations will include descriptions of drainage basins and associated

AOCs/SWMUs, previous site investigations, storm water effluent data evaluation, COPCs and upland terrestrial unit source identification, and possible data gaps. Section 5 describes historical releases of contaminants into the Cooper River. Section 6 summarizes the conclusion of each drainage basin summary relating to storm water evaluations, and Section 7 is a compilation of references.

Unique to this report is the creation of a website that will contain project documents and figures, milestones, schedules, and an interactive information system that includes historical analytical data and geological features of the CNC. The website was created to provide access to data and documents on a real-time basis with the ability to review from a remote access. Instructions on how to utilize the website information system are included in Appendix B. Initial login access will be established by contacting Charlie Vernoy, Task Order Manager, at 843-884-0029 or at cvernoy@ensafe.com. System Coordinator is Zac Odom and can be reached by email at zodom@ensafe.com.

Sections 2, 3, and 4 are not included herein but are available at the Redevelopment Authority Library, Charleston Naval Complex.

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT ADDENDUM

REVISION: 1

VOLUME II OF IV – SECTIONS 5 TO 8

SOUTHDIV Contract Number:
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DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

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July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

5.0 CONTAMINANT RELEASE HISTORY FOR CHARLESTON HARBOR

A summary of the spill history for Charleston Harbor was prepared from the United States Coast Guard National Response Center and US Navy records. The primary function of the National Response Center (NRC) is to serve as the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories. In addition to gathering and distributing spill data for Federal On-Scene Coordinators and serving as the communications and operations center for the National Response Team, the NRC maintains agreements with a variety of federal entities to make additional notifications regarding incidents meeting established trigger criteria. Details on the NRC organization and specific responsibilities can be found in the National Oil and Hazardous Substances Pollution Contingency Plan. Spills/releases from the CNC were recorded by the Environmental Office Code 106 office and copies of the reported spills are in Appendix B.

Each year numerous spills occur in and around the Charleston Harbor which are reported to the NRC. A total of 974 spill reports are contained in the NRC records for the years 1990 through 2002. These incidents range from small spills of unknown origin which cause oil sheens to large incidents like the spill of approximately 2500 gallons of fuel oil from a freighter which occurred in September 2002. The vast majority of spills are of petroleum products, many of them fuel spills from CNC operations. However, other types of chemicals were sometimes involved. Table 5.1 provides a summary of the non-petroleum spill records for Charleston and environs. Table 5.2 provides a summary of available incident reports related to CNC spills and releases to the Cooper River between 1982 and 1994.

Table 5.1 United States Coast Guard Recorded Spills/Releases into the Charleston Harbor

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
621751	9/1/2002	550 HARBOR COVE LANE	CHARLESTON	CHARLESTON	MEAD WEST VACO	FIXED	AIR	SULFUR
595604	3/4/2002	2700 BENNETT YARD RD	CHARLESTON	CHARLESTON	SAFETY CLEAN	RAILROAD NON-RELEASE	LAND	(null)

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
623774	9/24/2002	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS	PIPELINE	LAND	GASOLINE: AUTOMOTIVE (UNLEADED)
623775	9/24/2002	INSIDE CONTAINMENT BERM OF TANK 771500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINAL INC.	PIPELINE	LAND	GASOLINE: AUTOMOTIVE (UNLEADED)
606080	5/23/2002	SAVANAH HIGHWAY (ROUTE 17)& DAVIDSON ROAD	CHARLESTON	CHARLESTON	N/A	AIRCRAFT	LAND	JET FUEL
624676	10/2/2002	4242 PACESAIA TERMINAL	CHARLESTON	CHARLESTON	SAIA MOTOR FREIGHT	STORAGE TANK	LAND	NNDIMETHYLANILINE
616067	7/9/2002	TANK FARM1500 GREENLEAF ST	CHARLESTON	CHARLESTON	OLD WORLD CHEMICALS	STORAGE TANK	LAND	SODIUM HYDROXIDE (50% SOLUTION: PH OF 14)
605723	5/22/2002	ALLIED FUEL TERMINAL BARGE DOCK, ON THE COOPER RIVER	CHARLESTON	CHARLESTON	COLONIAL OIL INDUSTRIES	VESSEL	OTHER	OIL, FUEL: NO. 6
627626	10/29/2002	CSX RAIL YARD2700 BENNETT YARD RD	CHARLESTON	CHARLESTON	N/A	FIXED	SOIL	OIL, FUEL: NO. 2-D
595584	3/4/2002	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	WATER RECOVERY SYSTEM INC	STORAGE TANK	SOIL	OILY WASTE WATER
606345	5/25/2002	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	WALLENIUS	VESSEL	WATER	HYDRAULIC OIL
606348	5/25/2002	UNION PIER	CHARLESTON	CHARLESTON	WALLDNIUS WILLIAMSEN LINES AB	VESSEL	WATER	HYDRAULIC OIL
611594	6/17/2002	COOPER RIVER	CHARLESTON	CHARLESTON	CASE ATLANTIC	FIXED	WATER	HYDRAULIC OIL
619656	8/12/2002	PIER Z CHARLESTON INTERNATIONAL PORT1419 VIADUCT ROAD	CHARLESTON	CHARLESTON	UNITED STATES NAVY	VESSEL	WATER	HYDRAULIC OIL
615710	7/5/2002	ATLANTIC OCEAN	CHARLESTON	CHARLESTON	DEPT OF COMMERCE	VESSEL	WATER	OIL, FUEL: NO. 2-D
620796	8/23/2002	PIER D	CHARLESTON	CHARLESTON	POLISH	VESSEL	WATER	OIL, FUEL: NO. 2-D
596624	3/15/2002	PIER PP AT PORT AUTHORITY / OLD NAVY BASE	CHARLESTON	CHARLESTON	"GOOSE BAY"	VESSEL	WATER	OIL, FUEL: NO. 2-D

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
600357	4/22/2002	2030 HAYTER ST.	CHARLESTON	CHARLESTON	COOPER T SMITH STEVEDORE	VESSEL	WATER	OIL, FUEL: NO. 2-D
618860	8/4/2002	400 FEET SOUTHEAST OF DRUM ISLAND	CHARLESTON	CHARLESTON	PALMETTO BRIDGE CONSTRUCTORS	MOBILE	WATER	OIL: MISC: LUBRICATING
593117	2/5/2002	NAVAL WEAPONS STATION	BERKELEY	CHARLESTON	SANI TECH	MOBILE	WATER	OIL: MISC: LUBRICATING
618487	7/31/2002	62 SPORING STREET	CHARLESTON	CHARLESTON	SC E & G	FIXED	WATER	OIL: MISC: TRANSFORMER
618490	7/31/2002	62 SPRINGS ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS CO.	FIXED	WATER	OIL: MISC: TRANSFORMER
621188	8/27/2002	910 MORRISON DR	CHARLESTON	CHARLESTON	CASE ATLANTIC	FIXED	WATER	OIL: DIESEL
622190	9/6/2002	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED MARINE TERMINAL	FIXED	WATER	OIL: DIESEL
615436	7/2/2002	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	COLONIAL FUEL BARGE	VESSEL	WATER	OIL: DIESEL
615989	7/8/2002	SHIP YARD CREEKKINDER MORGAN DOCK	CHARLESTON	CHARLESTON	MORAN TOWING	VESSEL	WATER	OIL: DIESEL
600561	4/24/2002	FOLLY RIVER / MARINER KAY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
604038	5/14/2002	UNKNOWN SHEEN INCIDENT, NEAR CRAB BANK CENTRAL CHARLESTON HARBORCHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
604981	5/18/2002	ASHLEY RIVER < ATLANTIC OCEANCHARLESTON HARBOR	CHARLESTON	CHARLESTON	SEA ISLAND BOAT SALES	VESSEL	WATER	OIL: DIESEL
593321	2/7/2002	NAVAL WEAPONS STATION / WHARF A	CHARLESTON	CHARLESTON	MAERSKE LINE LTD	VESSEL	WATER	OILY WATER SLOP MIXTURE
610886	6/13/2002	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	EAST COAST PAINTING	FIXED	WATER	PAINT
618487	7/31/2002	62 SPORING STREET	CHARLESTON	CHARLESTON	SC E & G	FIXED	WATER	POLYCHLORINATED BIPHENYLS

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
618490	7/31/2002	62 SPRINGS ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS CO.	FIXED	WATER	POLYCHLORINATED BIPHENYLS
623942	9/25/2002	222 HUGER ST.	CHARLESTON	CHARLESTON	PALMETTO BRIDGE CONSTRUCTORS	VESSEL	WATER	RESIDUE
593118	2/5/2002	PIER A AT THE NAVAL WEAPONS STATION	CHARLESTON	CHARLESTON	SANI-TECH ENVIRONMENT	VESSEL	WATER	SLOP OIL
596706	3/16/2002	1801 MILFORD STDOCK 2	CHARLESTON	CHARLESTON	KINDER MORGAN BULK TERMINALS	FIXED	WATER	THERMINOL HEATING OIL
612861	6/24/2002	ISLE OF PALMS BEACH904 OCEAN BLVD	CHARLESTON	CHARLESTON	N/A	STORAGE TANK	WATER	UNKNOWN MATERIAL
596827	3/17/2002	HESS OIL COMPANY	CHARLESTON	CHARLESTON	HESS OIL COMPANY	FIXED	WATER	UNKNOWN MATERIAL
624323	9/30/2002	COOPER RIVER MARINA / SOUTH END OF OLD NAVY BASE1010 JUNEAU	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
624325	9/30/2002	UNKNOWN SHEEN INCIDENT COOPER RIVERPIER X-RAY	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
624331	9/30/2002	UNKNOWN SHEEN INCIDENTPIER ZULUCHARLESTON INTERNATIONL PORTS	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
624500	10/1/2002	UNKNOWN SHEEN INCIDENTPIER COLD NAVY BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
624744	10/2/2002	1201 FINLEY RD	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
613184	6/25/2002	UNKNOWN SHEEN INCIDENT / 20 FEET FROM PIER DELTA AT NAVAL BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
618858	8/4/2002	OFF OF SHUTTES FOLLY	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
591692	1/20/2002	UNKNOWN SHEEN INCIDENT17 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
594758	2/22/2002	AGAINST SHORE LINE1801 MILFORD ST	CHARLESTON	CHARLESTON	CHEVRON TEXACO	UNKNOWN SHEEN	WATER	UNKNOWN OIL
594763	2/22/2002	UNKNOWN SHEEN INCIDENTCOLUMBUS STREET TERMINAL	CHARLESTON	CHARLESTON	COLUMBUS STREET TERMINAL	UNKNOWN SHEEN	WATER	UNKNOWN OIL
595888	3/7/2002	NAVY BASEPIER "S"	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
597624	3/26/2002	COOPER RIVER / NAVAL BASE / PIER P	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
597855	3/28/2002	UNKNOWN SHEEN INCIDENT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
603040	5/9/2002	526 BRIDGE / CLOUTER CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
605622	5/21/2002	COOPER RIVER < ATLANTIC OCEAN	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
624326	9/30/2002	UNKNOWN SHEEN INCIDENTPIER HNAT. RESERVE FLEET	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL (MIGHT BE BUNKER C)
							number =	43
610886	6/13/2002	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	EAST COAST PAINTING	FIXED	WATER	PAINT
618487	7/31/2002	62 SPORING STREET	CHARLESTON	CHARLESTON	SC E & G	FIXED	WATER	OIL MISC: TRANSFORMER
618487	7/31/2002	62 SPORING STREET	CHARLESTON	CHARLESTON	SC E & G	FIXED	WATER	POLYCHLORINATED BIPHENYLS
618490	7/31/2002	62 SPRINGS ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS CO.	FIXED	WATER	OIL MISC: TRANSFORMER
618490	7/31/2002	62 SPRINGS ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS CO.	FIXED	WATER	POLYCHLORINATED BIPHENYLS

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
584788	10/30/2001	ATLANTIC	CHARLESTON	CHARLESTON	N/A	VESSEL	AIR	DIETHYL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
		OCEAN						ETHER
589445	12/24/2001	VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO	FIXED	AIR	NITROGEN OXIDE
589445	12/24/2001	VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO	FIXED	AIR	SULFUR DIOXIDE
589589	12/26/2001	VIRGINIA AVE	CHARLESTON	CHARLESTON	WEST FAYCO CHEMICAL AND PAPER MILL	FIXED	AIR	NITROGEN OXIDE
589589	12/26/2001	VIRGINIA AVE	CHARLESTON	CHARLESTON	WEST FAYCO CHEMICAL AND PAPER MILL	FIXED	AIR	SULPHER DIOXDE
576902	8/17/2001	RAILYARD - MILEPOST SC7 -	CHARLESTON	CHARLESTON	RINECO CHEMICALS	RAILROAD	AIR	ACETONE
583520	10/18/2001	BENNETT YARD2700 BENNETT YARD ROAD	CHARLESTON	CHARLESTON	CSX TRANSPORTATION	RAILROAD	BALLAST	OIL: DIESEL
588317	12/10/2001	NORFOLK SOUTHERN RAIL YARD MILE POST SC72200 GOER DR	CHARLESTON	CHARLESTON	N/A	MOBILE	LAND	VANADIUM TENTOXIDE CONSENTRATE
564014	4/25/2001	CHILDREN HOSPITALSAB1 N STREET	CHARLESTON	CHARLESTON	MEDICAL UNIVERSITY OF SC	FIXED	LAND	OIL: DIESEL
556079	2/7/2001	ATLANTIC OCEANNORTH OF BAHAMASAND EAST OF CAROLINAS	UNKNOWN	CHARLESTON	PATRIOT CONTRACT SERVICES	VESSEL	OTHER	BILGE SLOPS
568612	6/7/2001	CHARLESTON MUNICIPAL GOLF COURSE	CHARLESTON	CHARLESTON	N/A	STORAGE TANK	UNKNOWN	OIL, MISC: TRANSFORMER
578865	9/5/2001	COOPER RIVER< ALONG SIDE PIER U2075 THOMPSON AVE	CHARLESTON	CHARLESTON	MORAN TOWING OF CHARLESTON	VESSEL	WATER	OIL, FUEL: NO. 2-D
579426	9/10/2001	CHARLESTON HARBOR NARINA	CHARLESTON	CHARLESTON	N/A	STORAGE TANK	WATER	(null)
579396	9/10/2001	UNKNOWN SHEEN INCIDENT / THE STONO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
581625	10/2/2001	17 LOCKWOOD DR	CHARLESTON	CHARLESTON	CAPE FEAR YACHT SALES	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
583382	10/16/2001	WESTVACO PAPER MILL ON THE COOPER RIVER NEAR THE DON HOLT BRIDGEVIRGIN IA AVE	CHARLESTON	CHARLESTON	WESTVACO	FIXED	WATER	UNKNOWN MATERIAL
584523	10/28/2001	CITY MARINAFUEL DOCK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: FUEL: NO. 2-D
588184	12/9/2001	UNKNOWN SHEEN INCIDENTCOOP ER RIVERMILE MARKER 64	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
588257	12/10/2001	UNKNOWN SHEEN INCIDENT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
588378	12/11/2001	CHARLESTON NAVAL BASE / PIER JULIET	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
588369	12/11/2001	UNKNOWN SHEEN INCIDENT - FORMER CHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
588657	12/14/2001	100 WEST STEWART AVE	CHARLESTON	CHARLESTON	CHARLESTON AIR FORCE BASE	AIRCRAFT	WATER	JET FUEL: JP-8
589368	12/23/2001	UNKNOWN SHEEN INCIDENTLIME HOUSE BRIDGEMAIN ROAD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
591486	1/17/2002	COOPER RIVERGREEN DOCK	CHARLESTON	CHARLESTON	KARLIN NAVIGATION	VESSEL	WATER	OIL: DIESEL
570116	6/19/2001	CITY MARINA	CHARLESTON	CHARLESTON	MEISEL AND COHEN	VESSEL	WATER	OIL: DIESEL
570020	6/19/2001	PIER H, FORMER CHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
570308	6/20/2001	UNKNOWN SHEEN INCIDENTNORT H CHARLESTON TERMINALCOO PER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
570311	6/20/2001	UNKNOWN SHEEN INCIDENTWANDO CONTAINER TERMINALWANDO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
571213	6/27/2001	6 CONCORDE ST	CHARLESTON	CHARLESTON	CHARLESTON HARBOR PILOTS	VESSEL	WATER	OIL, FUEL: NO. 2-D
571465	7/1/2001	UNKNOWN SHEEN INCIDENT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
571716	7/3/2001	KINDER MORGAN #2	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
572085	7/6/2001	ASHELY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
572048	7/6/2001	ASHLEY MARINA33 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	OWNER OF THE VESSEL	VESSEL	WATER	OIL, FUEL: NO. 2-D
572015	7/6/2001	NAVAL SHIPYARD, PIER S.	CHARLESTON	CHARLESTON	M/V CAPE DOUGLAS	VESSEL	WATER	OIL, MISC: LUBRICATING
572009	7/6/2001	PIER S/CHARLESTON NAVY BASE	CHARLESTON	CHARLESTON	MARAD SOUTH ATLANTIC REGION OP	VESSEL	WATER	OIL, MISC: LUBRICATING
572830	7/13/2001	CHARLESTON HARBOR MARINA, PATRIOTS POINT	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
573531	7/18/2001	UNKNOWN SHEEN INCIDENTPIER IN THE DOWNTOWNAREA OF CHARLESTONHISTORIC DISTRICT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
574712	7/29/2001	56 ASHLEY POINT DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	(null)
574815	7/30/2001	STONO RIVER ADJACENT TO BUZZARD ROOST MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
574774	7/30/2001	T DOCKLOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
576249	8/12/2001	CITY MARINA17 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	GOVERNOR	VESSEL	WATER	OIL, FUEL: NO. 2-D

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
576668	8/15/2001	UNKNOWN SHEEN INCIDENT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
577373	8/22/2001	UNKNOWN SHEEN INCIDENT / SHEM CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
553307	1/11/2001	COOPER RIVER	CHARLESTON	CHARLESTON	HESS TERMINAL	FIXED	WATER	HYDRAULIC OIL
556632	2/12/2001	COOPER RIVER NEAR PIER S AND T	CHARLESTON	CHARLESTON	MORAN TOWING OF CHARLESTON	VESSEL	WATER	OIL, FUEL: NO. 2-D
556421	2/12/2001	OLD NAVY BASE : PIER S	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
556423	2/12/2001	UNKNOWN SHEEN INCIDENTCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
556854	2/15/2001	POLE MOUNTED TRANSFORMER 19 HAGOOD ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER
558278	3/1/2001	WANDO TERMINALBERTH 7	CHARLESTON	CHARLESTON	US SHIP MANAGEMENT	VESSEL	WATER	NBUNKER C
559740	3/15/2001	UNION PIERCHARLESTON HARBOR	CHARLESTON	CHARLESTON	CANADIAN NAVAL VESEL	VESSEL	WATER	OIL: DIESEL
560839	3/27/2001	UNKNOWN SHEEN INCIDENTSHIP YARD CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
562203	4/7/2001	SOUTH CHANNEL AT NORTH DYNAMITE WHOLE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
562663	4/11/2001	UNKNOWN SHEEN INCIDENT17 LOCKWOOD DRCENTRAL WALKWAY	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
562743	4/12/2001	ALLIED OIL TERMINAL / BUOY 47 ON THE COOPER RIVER	CHARLESTON	CHARLESTON	MORAN TOWING OF CHARLESTON	VESSEL	WATER	OIL: DIESEL
562744	4/12/2001	ALLIED TERMINAL1500 GREENLEAF ST.	CHARLESTON	CHARLESTON	"N.V" CAPE MAY	VESSEL	WATER	OIL: DIESEL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
566157	5/4/2001	CHARLESTON HARBOR. CRAB BANKS SHOALS	CHARLESTON	CHARLESTON	M/V SIMPLE INTEREST	VESSEL	WATER	OIL, FUEL: NO. 2-D
566157	5/4/2001	CHARLESTON HARBOR. CRAB BANKS SHOALS	CHARLESTON	CHARLESTON	M/V SIMPLE INTEREST	VESSEL	WATER	OIL, MISC MOTOR
569001	6/10/2001	IN THE VICINITY OF THE CHARLESTON HARBOR "C" BUOY.	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
569171	6/11/2001	CITY MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
569990	6/18/2001	UNKNOWN SHEEN INCIDENTCITY MARINALOCK WOOD BLVD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
537497	8/3/2000	HANNAH HAN RD	CHARLESTON	CHARLESTON	WATER TREATMENT COMMISIONER	STORAGE TANK	AIR	CHLORINE
537485	8/3/2000	WATER TREATMENT PLANT1104 HANAHAN RD.	BERKELEY	CHARLESTON	CHARLESTON COMMISSIONER	MOBILE	AIR	CHLORINE
544074	10/3/2000	ALLIED TERMINAL1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINAL INC.	PIPELINE	LAND	METHYL ALCOHOL
520266	2/17/2000	CHARLESTON INTERNATIONA L AIRPORTEAST GATE 12	CHARLESTON	CHARLESTON	PIEDMONT HAWTHORNE AVIATION CHARLESTON	MOBILE	LAND	JET FUEL: JP-8
519553	2/11/2000	COOPER RIVERPIER U	CHARLESTON	CHARLESTON	MORAN TOWING OF CHARLESTON	VESSEL	OTHER	OIL, FUEL: NO. 2-D
543426	9/27/2000	ADJACENT TO DAY MARKER 6	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
543737	9/29/2000	UNKNOWN SHEEN INCIDENT UPPER TOOGOODOO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
543904	9/30/2000	CITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
544683	10/6/2000	ASHLEY RIVER / NEAR THE CITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
544796	10/11/2000	THE OLD NAVY BASEPIER U2115 THOMPSON AVE	CHARLESTON	CHARLESTON	MORAN TOWING OF CHARLESTON	VESSEL	WATER	OIL, MISC: LUBRICATING
544808	10/11/2000	UNKNOWN SHEEN INCIDENTACROSS FROM BUOY BEACON 47	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
545750	10/17/2000	CUMMINS DIESEL4500 LEEDS AVE.	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	OILY SUBSTANCE
546635	10/28/2000	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
546675	10/28/2000	UNKNOWN SHEEN INCIDENT17 LOCKWOOD DRDOCK IDOCK K	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
547282	11/4/2000	CITY MARINALOCK WOOD BLVD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
547409	11/6/2000	COLUMBUS STREET MARINE TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
547623	11/7/2000	CITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
548115	11/13/2000	CITADEL COLLEGE	CHARLESTON	CHARLESTON	CITADEL COLLEGE	STORAGE TANK	WATER	ETHYLENE GLYCOL
548598	11/18/2000	ASHLEY RIVER MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
548627	11/18/2000	PRIVATE BOAT DOCKAT TALL SAIL DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (4.23G PB/G
549082	11/24/2000	FOLLY BEACH	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	ACETYLENE
549736	12/1/2000	UNKNOWN SHEEN INCIDENT17 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
551275	12/18/2000	OLD NAVY BASE	CHARLESTON	CHARLESTON	USCG - CUTTER DALLAS	VESSEL	WATER	OIL: DIESEL
551437	12/19/2000	COOPER RIVER MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
536134	7/21/2000	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	MOTOR VESSEL PILAR	VESSEL	WATER	OIL: DIESEL
537510	8/3/2000	BREECH INLET BETWEEN SULLIVAN'S ISLAND AND ISLE OF PALMS	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
538138	8/9/2000	INTRACOASTA WATERWAY /MILE MARKER: 19A	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
538474	8/12/2000	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	WATERSPORT	VESSEL	WATER	OIL, FUEL: NO. 2-D
538713	8/15/2000	TOOGOODOO RIVER / ICW NEAR YOUNGS ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
539240	8/19/2000	UNKNOWN SHEEN INCIDENTONE MILE UPSTREAM FROMPARADISE LANDING OFF OF USHWY 17 AT ROAD 1453	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
539620	8/21/2000	ISLE OF PALM MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
539675	8/23/2000	33 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
539706	8/23/2000	CHARLESTON CITY MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	WASTE OIL
539923	8/25/2000	THE COOPER RIVERREMLEY POINT BOAT LANDING	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	UNKNOWN OIL
540486	8/30/2000	PIER SIERRA, OLD NAVAL STATION	CHARLESTON	CHARLESTON	US MARITIME ADMIN.	VESSEL	WATER	WASTE OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
540579	8/31/2000	THE VESSEL IS DOCKED AT THE GRAIN ELEVATORNORTH CHARLESTON TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
541016	9/4/2000	196 TRADD ST.	CHARLESTON	CHARLESTON	CGC MADRONA	VESSEL	WATER	OIL: DIESEL
541102	9/5/2000	STONO MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	BILGE SLOPS
541951	9/13/2000	SHIPYARD>COOPER RIVER>CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	UNKNOWN MATERIAL
542170	9/14/2000	UNKNOWN SHEEN INCIDENTSHEM CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
542728	9/20/2000	ASHLEY RIVER BRIDGE	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	OIL, MISC: MOTOR
543328	9/26/2000	CRAB HOUSE RESTAURANT1 16 RIPLEY PT DRIVE	CHARLESTON	CHARLESTON	SYSCO FOOD SERVICES	MOBILE	WATER	OIL: DIESEL
529250	5/17/2000	COOPER RIVERCOOPER RIVERNEAR CHARLESTON HARBOR	CHARLESTON	CHARLESTON	MILITARY SEALIFT COMMAND	VESSEL	WATER	OIL, FUEL: NO. 6
529193	5/17/2000	UNKNOWN SHEEN INCIDENTSTONO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
529853	5/22/2000	UNKNOWN SHEEN INCIDENTCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	PAINT
530089	5/24/2000	PRICE'S CREEK INLET	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	BILGE SLOPS
530156	5/25/2000	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED MARINE TERMINAL	FIXED	WATER	OIL: DIESEL
531233	6/4/2000	1610 BEN SAWYER BLVD	CHARLESTON	CHARLESTON	TOLERS COVE MARINA	FIXED	WATER	OIL: DIESEL
531004	6/4/2000	17 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
531748	6/12/2000	UNKNOWN SHEEN INCIDENT1801 MILFORD ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
531969	6/13/2000	UNKNOWN SHEEN INCIDENTLOCK WOOD DRIVE	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
532019	6/13/2000	UNKNOWN SHEEN INCIDENTSHIP YARD CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL, FUEL: NO. 2-D
532233	6/15/2000	CHARLESTON HARBOR JETTY	CHARLESTON	CHARLESTON	20 FOOT FISHING VESSEL	VESSEL	WATER	FUEL OIL MIX
532947	6/20/2000	UNKNOWN SHEEN INCIDENTCHAR LESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
533546	6/21/2000	ASHLEY MARINALOCK WOOD DRIVE	CHARLESTON	CHARLESTON	SAVANNH BEND MARINE	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
532948	6/21/2000	UNKNOWN SHEEN INCIDENTLOCK WOOD DRIVE"D" DOCK	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
534413	7/5/2000	UNKNOWN SHEEN INCIDENT17 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
534664	7/7/2000	25 MILES OFFSHORE	CHARLESTON	CHARLESTON	USAF	AIRCRAFT	WATER	JET FUEL: JP-8
534900	7/7/2000	CITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
534932	7/10/2000	UNKNOWN SHEEN INCIDENTSULL IVANS ISLANDBREAC H INLET	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
535012	7/11/2000	LINE HOUSE BRIDGE INTRACOASTA L WATERWAY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN MATERIAL
535779	7/18/2000	CHARLESTON CITY MARINA17 LOCKWOOD DR.	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
520264	2/17/2000	CHARLESTON INT'L AIRPORT5500 INTERNATIONA L BLVD	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	JET FUEL: JP-4
520873	2/23/2000	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	M/V KACHARAVA	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
520888	2/23/2000	ALLIED TERMINALADD RESS UNKNOWN	CHARLESTON	CHARLESTON	COLUMBIA SHIP MANAGEMENT	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
520985	2/24/2000	COOPER RIVER	CHARLESTON	CHARLESTON	CGC DALLAS	VESSEL	WATER	OIL: DIESEL
521035	2/24/2000	OLD CHARLESTON NAVY BASEPIER "P"	CHARLESTON	CHARLESTON	USCG CUTTER "DALLAS"	VESSEL	WATER	OIL, FUEL: NO. 2-D
522452	3/9/2000	9330 MEDICAL PLAZA DR.	CHARLESTON	CHARLESTON	TRIDENT HOSP	STORAGE TANK	WATER	OIL: DIESEL
524109	3/25/2000	1500 GREENLEAF STAT END OF THE ROAD	CHARLESTON	CHARLESTON	DANN MARINE	VESSEL	WATER	OIL: DIESEL
524165	3/26/2000	COOPER RIVER NEAR SHIPYARDCRE EK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	HYDRAULIC OIL
524178	3/26/2000	UNKNOWN SHEEN INCIDENTNEAR YORKTOWN MUSEUM	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
525067	4/4/2000	3390 RENTAL CAR LANE	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	JET FUEL: JP-8
525073	4/4/2000	DANIEL ISLAND / FOOT OF HUBERT STREET	CHARLESTON	CHARLESTON	BEAN EVACUATION	VESSEL	WATER	HYDRAULIC OIL
526562	4/19/2000	BERESFORD'S CREEKADJACE NT TO INTERSTATE 526	CHARLESTON	CHARLESTON	MCCLAM AND ASSOC	MOBILE	WATER	OIL: DIESEL
527362	4/28/2000	CHARLESTON HBRMUNICIPA L MARINA	CHARLESTON	CHARLESTON	CHARTER VESSEL MARINER	VESSEL	WATER	OIL, MISC: LUBRICATING
527771	5/2/2000	ASHLEY RIVER / MILE MARKER: 469.5	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
527748	5/2/2000	PIER MIKE	CHARLESTON	CHARLESTON	OMI MARINE SERVICES	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
527899	5/3/2000	UNKNOWN SHEEN INCIDENTCOLU MBUS STREET TERMINALCOO PER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL

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528017	5/4/2000	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
528882	5/13/2000	196 TRAD ST	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN MATERIAL
515973	1/1/2000	NEAR COOPER RIVER BRIDGENORTH OF THE YORKTOWN	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN OIL
516516	1/9/2000	COAST GUARD BASE CHARLESTON1 96 TRADD STREET	CHARLESTON	CHARLESTON	USCGC MADRONA	VESSEL	WATER	HYDRAULIC OIL
516766	1/12/2000	PIER HNAVAL BASE CHARLESTON	CHARLESTON	CHARLESTON	MARINE TRANSPORT LINE	VESSEL	WATER	THINNER AND PAINT MIXTURE
517145	1/17/2000	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	AMERICAN CHAMPIONS	VESSEL	WATER	OIL, FUEL: NO. 2
518912	2/6/2000	COLUMBUS STREET TERMINAL	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
							number =	80
548115	11/13/2000	CITADEL COLLEGE	CHARLESTON	CHARLESTON	CITADEL COLLEGE	STORAGE TANK	WATER	ETHYLENE GLYCOL
529853	5/22/2000	UNKNOWN SHEEN INCIDENTCOOP ER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	PAINT
516766	1/12/2000	PIER HNAVAL BASE CHARLESTON	CHARLESTON	CHARLESTON	MARINE TRANSPORT LINE	VESSEL	WATER	THINNER AND PAINT MIXTURE

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498698	9/14/1999	ALLBRIGHT AND WILSON	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON	FIXED	AIR	PHOSPHORIC ACID
498698	9/14/1999	ALLBRIGHT AND WILSON	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON	FIXED	AIR	PHOSPHORIC ACID
481473	4/24/1999	2200 RICH STREETIN THE RAIL YARD	CHARLESTON	CHARLESTON	N/A	RAILROA D	LAND	SODIUM HYDROXIDE
489834	7/2/1999	1104 HANAHAN ROAD	BERKELEY	CHARLESTON	CHARLESTON COMMISSIONER	FIXED	LAND	OIL, FUEL: NO. 2-D

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
469475	1/3/1999	1705 NORTH MEETING ST.	CHARLESTON	CHARLESTON	CLEAN SPECIALIST INC.	MOBILE	UNKNOWN	OIL: DIESEL
490882	7/11/1999	HESS DOCK	CHARLESTON	CHARLESTON	PREMUDA	UNKNOWN SHEEN	WATER	UNKNOWN OIL
491485	7/15/1999	ASHLEY MARINAASHLEY RIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
491411	7/15/1999	LOCKWOOD DRIVET-DOCK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
491595	7/16/1999	COLUMBUS STREETBERTH 2	CHARLESTON	CHARLESTON	M/V CLIPPER CONFIDENCE	VESSEL	WATER	UNKNOWN MATERIAL
492161	7/21/1999	217 FT JOHNSON RD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
492238	7/22/1999	WANDO TERMINAL	CHARLESTON	CHARLESTON	NORFOLK DREDGING CO.	FIXED	WATER	HYDRAULIC OIL
492537	7/24/1999	TRANSIENT SLIPMAIN DOCK56 ASHLEY PT DR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
493440	8/1/1999	CHARLESTON HARBORDANIELS ISLAND & WANDORIVER	CHARLESTON	CHARLESTON	GREAT LAKES DREDGE & DOCK	VESSEL	WATER	OIL, FUEL: NO. 2-D
494839	8/12/1999	1441 S EDGEWATER DR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	(null)
495325	8/17/1999	1210 TRUXTON AVEPIER C	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
498606	9/13/1999	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	M/V APPLEJACK	VESSEL	WATER	OIL, MISC: MOTOR
500341	9/15/1999	104 HICKORY STREET	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER
500343	9/15/1999	2125 NORTH DALLERTONSTREET	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER (NON PCB)
500344	9/15/1999	804 MELROSE DRIVE	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER (NON PCB)
500347	9/15/1999	993 MIKELL STREET	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER (NON PCB)
500673	9/29/1999	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
501167	10/4/1999	CHARLESTON NAVAL COMPLEX1690 TURNBULL AVEBLDG MH-51/COOPER RIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN OIL
501238	10/5/1999	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
481525	4/23/1999	DENTONS SHIPYARD	CHARLESTON	CHARLESTON	GOVT OF PRC	VESSEL	WATER	UNKNOWN OIL
481571	4/26/1999	BETWEEN BEN SAWYER SWINGBRIDGE AND NEWLYCONST RUCTED BRIDGE	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
482169	4/30/1999	SOLOMONS DRUDGING CORP1884 HERBERT ST/DOCKSHIPY ARD CREEK	CHARLESTON	CHARLESTON	EMPIRE SANDY	VESSEL	WATER	OIL, FUEL: NO. 2-D
482140	4/30/1999	WEST OF COOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
482987	5/6/1999	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	TRANS OCEAN	VESSEL	WATER	OIL, FUEL: NO. 2-D
482920	5/7/1999	COOPER RIVER / COLUMBUSSTR EET TERMINAL	CHARLESTON	CHARLESTON	M/V KURIE	VESSEL	WATER	BILGE SLOPS
483140	5/9/1999	SHEEN LOCATED NEXT TOCALLERS ADDRESS	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
483389	5/12/1999	UNKNOWN	CHARLESTON	CHARLESTON	COLE RIVER TERMINAL	FIXED	WATER	ASPHALT
483836	5/15/1999	ALLIED MARINE TERMINALS150 0 GREENLEAF STCOOPER RIVER	CHARLESTON	CHARLESTON	TUGBOAT CARIB CHALLENGER	VESSEL	WATER	OIL: DIESEL
484785	5/23/1999	PIER U OLD NAVY BASE	CHARLESTON	CHARLESTON	WHITE STACK MARITIME CORP	VESSEL	WATER	BILGE SLOPS/FUEL
486699	6/8/1999	ASHLEY MARINA33 LOCKWOOD DRIVEASHLEY RIVER	CHARLESTON	CHARLESTON	F/V STIHL LEADER	VESSEL	WATER	OIL, FUEL: NO. 2-D

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
486626	6/8/1999	CALLER HAD NO PHYSICALLOC ATION	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
487900	6/17/1999	LOCKWOOD DRIVET DOCK	CHARLESTON	CHARLESTON	VESSEL: SEA SECTION	VESSEL	WATER	OIL, FUEL: NO. 2-D
488163	6/20/1999	STONO MARINASTONO RIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
488317	6/21/1999	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
488735	6/24/1999	LOCKWOOD DRIVEFUEL DOCK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
489385	6/29/1999	LOCKWOOD DRIVEASHLEY MARINAPIER 70	CHARLESTON	CHARLESTON	M/V CMAR	VESSEL	WATER	WASTE OIL
490689	7/9/1999	196 TRADD ST.	CHARLESTON	CHARLESTON	USCGC MADRONA	VESSEL	WATER	HYDRAULIC OIL
472159	1/27/1999	INTERSECTION OF HAGOODAVE AND DISCHER ST	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	WASTE OIL
472981	2/5/1999	SALMON DREDGING CO. INC.	CHARLESTON	CHARLESTON	STEVENS TOWING CO. INC.	VESSEL	WATER	OIL: DIESEL
474298	2/18/1999	UNION PIER TERMINAL32 WASHINTON ST.	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	HYDRAULIC OIL
475493	2/27/1999	167 EAST BAY ST	CHARLESTON	CHARLESTON	EVERGREEN AMERICA INCORP	FIXED	WATER	OIL: DIESEL
476132	3/8/1999	PIER ZOLD NAVY BASE	CHARLESTON	CHARLESTON	SS GREEN HARBOR	VESSEL	WATER	HYDRAULIC OIL
476275	3/9/1999	PIER Z, OLD NAVY BASE	CHARLESTON	CHARLESTON	LMS SHIP MANAGEMENT	VESSEL	WATER	HYDRAULIC OIL
478462	3/29/1999	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	EXXON LUBE	FIXED	WATER	OIL, MISC: LUBRICATING
480689	4/17/1999	WANDO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
501467	10/6/1999	LOCKWOOD DRIVEFUEL DOCK	CHARLESTON	CHARLESTON	MOTOR YACHT	VESSEL	WATER	OIL, FUEL: NO. 2-D
501714	10/8/1999	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
501703	10/8/1999	56 ASHLEY POINT DRIVEACROSS FROM THE FUEL DOCK(SOUTHW EST CORNER)	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
501709	10/8/1999	LOCKWOOD DRIVEDOCK P-27	CHARLESTON	CHARLESTON	PRIVATE VESSEL FRANSHIP	VESSEL	WATER	OIL, FUEL: NO. 2-D
502123	10/12/1999	10 WHARF SIDE STCOOPER RIVER/BETWEENMARKERS 10 AND 12	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
502586	10/16/1999	TOLLIERS COVE MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
503827	10/27/1999	ASHELEY RIVER OUTSIDECITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
506058	11/17/1999	OLD NAVY BASEPIER UNIFORM	CHARLESTON	CHARLESTON	TURECAMO ENVIRONMENTAL SE	VESSEL	WATER	BILGE SLOPS
507541	12/2/1999	330 CONCORD STREET	CHARLESTON	CHARLESTON	DOCKSIDE CONDOMINIUMS	FIXED	WATER	OIL, FUEL: NO. 2-D
507697	12/3/1999	INTERSECTION OF KING ANDQUEEN STREETS	CHARLESTON	CHARLESTON	ATLANTA FOOD INTL	MOBILE	WATER	OIL: DIESEL
508744	12/12/1999	COOPER RIVER BRIDGEI-17 NORTHBOUND	CHARLESTON	CHARLESTON	QUALITY DISTRIBUTION INC	MOBILE	WATER	OIL: DIESEL
508725	12/12/1999	US HWY 17 ON NEW COOPERRIVER BRIDGE	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	OIL, FUEL: NO. 2-D
509575	12/20/1999	COLUMBUS STREET TERMINAL	CHARLESTON	CHARLESTON	MING OCEAN LINES	VESSEL	WATER	HYDRAULIC OIL
515162	12/22/1999	UNKNOWN SHEEN INCIDENTSHEM CREEK > CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
515859	12/31/1999	56 ASHLEY POINT DRIVE	CHARLESTON	CHARLESTON	RIPLEY LIGHT MARINA	FIXED	WATER	OIL, FUEL: NO. 2-D
483389	5/12/1999	UNKNOWN	CHARLESTON	CHARLESTON	COLE RIVER TERMINAL	FIXED	WATER	ASPHALT

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
448261	7/29/1998	2204 RICH STREET	CHARLESTON	CHARLESTON	TEXACO LUBE CO.	RAILROAD	LAND	OIL, MISC: LUBRICATING
455541	9/15/1998	MILEPOST:SC10	CHARLESTON	CHARLESTON	NORFOLK SOUTHERN RR	RAILROAD	LAND	ACETYLFURAN

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
444689	7/6/1998	4200 AZALEA DRIVE	CHARLESTON	CHARLESTON	SOUTHCHEM	FIXED	LAND	OIL, MISC: MOTOR)(15W MOTOR OIL)
432642	4/15/1998	159 RUTLEDGE	CHARLESTON	CHARLESTON	MEDICAL UNIV. S.C.	FIXED	LAND	HYDRAULIC OIL
418085	1/3/1998	CSX RAILYARD2700 BENNETT YARD RD	CHARLESTON	CHARLESTON	CSX TRANSPORTATIO N	RAILROA D	LAND	OIL: DIESEL
447791	7/27/1998	RAILYARD2700 BENNETT YARD ROAD	CHARLESTON	CHARLESTON	CSX TRANSPORTATIO N	RAILROA D	RAIL REPOR T (N/A)	SODIUM HYDROXIDE
453082	8/30/1998	INTERMODAL RAMP NEARDORCHES TER ROAD	CHARLESTON	CHARLESTON	N/A	RAILROA D	RAIL REPOR T (N/A)	(null)
466885	12/9/1998	CALLER HAD NO PHYSICALLOC ATION	CHARLESTON	CHARLESTON	N/A	RAILROA D NON-RELEASE	RAIL REPOR T (N/A)	(null)
446534	7/19/1998	D DOCKASHLEY MARINA	CHARLESTON	CHARLESTON	F/V SWEET REALITY	VESSEL	WATER	OIL: DIESEL
447767	7/27/1998	LAT 32-46.3NLON 079-52.3W	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
448092	7/29/1998	PIER Z AT COOPER RIVERCAROLIN A MARINA HANDLINGPIER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
450868	8/14/1998	SHEM CREEK AT THE MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
450696	8/15/1998	AT PIER TANGO AT THE OLDNAVAL BASE IN CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
450687	8/15/1998	TANGO PIER	CHARLESTON	CHARLESTON	DAN OCEAN TOWING	VESSEL	WATER	HYDRAULIC OIL
453382	9/1/1998	ASHLEY RIVERMILE MARKER 470	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
454479	9/9/1998	196 TRADD ST	CHARLESTON	CHARLESTON	USCGC METOMPKIN	VESSEL	WATER	OIL: DIESEL
454884	9/11/1998	56 ASHLEY POINTE DRIVE	CHARLESTON	CHARLESTON	RIPLEY LIGHT MARINA	FIXED	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
454985	9/12/1998	GREEN CREEK	CHARLESTON	CHARLESTON	BACKMAN BROTHERS	VESSEL	WATER	OIL: DIESEL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
456038	9/18/1998	ASHLEY RIVERMM:UNKNOWN	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
456196	9/20/1998	PORT OF CHARLSTON SCMASSEY COAL TERMINALSHIP YARD RIVER	CHARLESTON	CHARLESTON	CHATHAM TOWING CO.	VESSEL	WATER	BLEN OF NO 6 OIL AND DIESEL
458751	10/6/1998	COOPER RIVER NEARTHE COLUMBUS STREETTERMINAL	CHARLESTON	CHARLESTON	CHATHAM TOWING CO.	VESSEL	WATER	HYDRAULIC OIL
459767	10/14/1998	SALT WATER PUMPHOUSE PIER	CHARLESTON	CHARLESTON	RICHARDS MARINE	VESSEL	WATER	OIL: DIESEL
459942	10/15/1998	SOUTH OF MARKER 49 ONINTRACOATAL WATERWAY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
460910	10/20/1998	PIER PU.S. NAVAL BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
435684	5/6/1998	ASHLEY RIVERT-DOCKMILE MARKER: 470	CHARLESTON	CHARLESTON	M/V MAX 98 FT MOTOR YACHT	VESSEL	WATER	OIL, FUEL: NO. 2-D
435646	5/6/1998	COOPER RIVER	CHARLESTON	CHARLESTON	STRACHAN	VESSEL	WATER	UNKNOWN OIL
435848	5/7/1998	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
436113	5/9/1998	DIESEL FUEL DOCKASHLEY MARINACHARLESTON, SC	CHARLESTON	CHARLESTON	ASHLEY MARINA	VESSEL	WATER	OIL, FUEL: NO. 2-D
436675	5/13/1998	CITY MARINA DOCK17 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
436675	5/13/1998	CITY MARINA DOCK17 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, MISC: MOTOR
437922	5/21/1998	2408 MAYBANK HIGHWAY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
441340	5/25/1998	15 MILES EAST OF STONORIVER INLET	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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439459	5/29/1998	ALUMAX FACILITY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL BASED PAINT
439208	5/29/1998	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL, FUEL: NO. 2-D
440046	6/3/1998	COLUMBUS STREET TERMINALCOO PER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
440138	6/4/1998	ASHLEY MARINADOCK NUMBER T-94	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
440849	6/9/1998	LOCKWOOD DRIVEASHLEY MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
441280	6/11/1998	COOPER RIVER / ALLIEDTERMIN AL	CHARLESTON	CHARLESTON	WHITE STACK MARITIME	VESSEL	WATER	OIL: DIESEL
441555	6/14/1998	LOCKWOOD DRIVESLIP T-63	CHARLESTON	CHARLESTON	P/C INNOVATION V1	FIXED	WATER	OIL: DIESEL
442075	6/17/1998	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
443422	6/26/1998	LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	M/V PATENT PENDING	VESSEL	WATER	OIL, FUEL: NO. 2-D
443449	6/26/1998	PIERSIDE STREET/NORTH SIDE OF PIER ZULU ATOLD NAVAL BASE	CHARLESTON	CHARLESTON	INCHCAPE SHIPPING SVS	VESSEL	WATER	UNKNOWN OIL
445159	7/9/1998	1050 OSPREY STPIER PAPA	CHARLESTON	CHARLESTON	USCGC DALLAS	VESSEL	WATER	JET FUEL: JP-5 (KEROSENE, HEAVY)
419323	1/11/1998	(null)	CHARLESTON	CHARLESTON	EASTERN DREDGING CONSTRUC	VESSEL	WATER	OIL: DIESEL
423447	2/7/1998	COOPER RIVERDENTON SHIPYARDPIER D	CHARLESTON	CHARLESTON	TURKISH NAVY	VESSEL	WATER	OIL, FUEL: NO. 2-D
426157	2/26/1998	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	SODIUM HYDROXIDE
426500	3/1/1998	CSX RAILYARD	CHARLESTON	CHARLESTON	CSX TRANSPORTATIO N	RAILROA D	WATER	NITROGEN FERTERLIZER SOLUTION
428337	3/15/1998	861 RIVERLAND DR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
428526	3/17/1998	HESS TERMINAL	CHARLESTON	CHARLESTON	UNICOM MGT SERVICES	VESSEL	WATER	SULFUR

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429371	3/20/1998	CITY MINAOFF OF LOCKWOOD DR.	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
429994	3/27/1998	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED MARINE TERMINAL	VESSEL	WATER	ASPHALT
429993	3/27/1998	ALLIED DOCK / CALLER DIDNOT KNOW ADDRESS ORWATERWAY	CHARLESTON	CHARLESTON	ALLIED DOCK	FIXED	WATER	ASPHALT
430239	3/29/1998	BRAVO PIERNAVAL WEAPONS STATION	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
431939	4/8/1998	CITY MARINA	CHARLESTON	CHARLESTON	SALMAONS DREDGING	VESSEL	WATER	HYDRAULIC OIL
433028	4/18/1998	ASHLEY MARINA33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	UNKNOWN OIL
433163	4/18/1998	FUEL PIERASHLEY MARINACHARL ESTON, SC	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
433257	4/20/1998	OLD CHARLESTON NAVY BASEPIER ZULU	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
433720	4/22/1998	COLUMBUS STREETTERMIN AL DOCK	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
433662	4/22/1998	NORTH CHARLESTON TERMINAL	CHARLESTON	CHARLESTON	MEDITERRANEA N SHIPPING	VESSEL	WATER	OIL, MISC: LUBRICATING
434315	4/23/1998	FOLLEY RIVER AT OPENINGTO CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
434870	4/30/1998	FARMERS COOP GRAINTERMIN AL	CHARLESTON	CHARLESTON	NORTO LILLY	VESSEL	WATER	OIL, FUEL: NO. 2-D
434856	4/30/1998	MILE MARKERNORT H CHARLESTON PORTAUTHORI TY /	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 6

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
418844	1/8/1998	ASHLEY RIVER /GROUP CHARLESTON BASE	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
462017	10/30/1998	DELTA PIERNAVY SHIPYARDCOO PER RIVER	CHARLESTON	CHARLESTON	EGYPTIAN NAVY	VESSEL	WATER	OIL, FUEL: NO. 2-D
462202	10/31/1998	RILEY LIGHT MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	VEGETABLE OIL
462582	11/3/1998	CHARLESTON HARBORENTR ANCE CHANNEL	CHARLESTON	CHARLESTON	EGYPTIAN NAVY	VESSEL	WATER	(null)
462572	11/3/1998	WANDO RIVER / HALSEYCANNO N BOAT YARD	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
463362	11/8/1998	1 MILE EAST OF FOLOYBEACH	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
463250	11/9/1998	BUZZARDS ROAST MARINASTONO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
465081	11/22/1998	196 TRADD ST.	CHARLESTON	CHARLESTON	COSCO SHIPPING	FIXED	WATER	(null)
465972	12/1/1998	UNDER BRIDGE OF I526ON BANK OF HOOPER RIVER	BERKELEY	CHARLESTON	TB POWELL	UNKNOW N SHEEN	WATER	OIL, FUEL: NO. 2-D
466357	12/4/1998	PIER SIERRACOOPE R RIVEROLD NAVY BASE	CHARLESTON	CHARLESTON	US MARITIME ADMIN/DOT	VESSEL	WATER	UNKNOWN OIL
468557	12/17/1998	APROX. 3 MILES S. BOUNDINTO KIAWAH RIVER	CHARLESTON	CHARLESTON	DOCK& MARINE CONSTRUCT CO	VESSEL	WATER	OIL: DIESEL
							number =	64
429993	3/27/1998	ALLIED DOCK / CALLER DIDNOT KNOW ADDRESS ORWATERWAY	CHARLESTON	CHARLESTON	ALLIED DOCK	FIXED	WATER	ASPHALT
429994	3/27/1998	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED MARINE TERMINAL	VESSEL	WATER	ASPHALT
428526	3/17/1998	HESS TERMINAL	CHARLESTON	CHARLESTON	UNICOM MGT SERVICES	VESSEL	WATER	SULFUR

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426500	3/1/1998	CSX RAILYARD	CHARLESTON	CHARLESTON	CSX TRANSPORTATIO N	RAILROA D	WATER	NITROGEN FERTERLIZER SOLUTION
439459	5/29/1998	ALUMAX FACILITY	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL BASED PAINT
426157	2/26/1998	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	SODIUM HYDROXIDE

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413263	11/25/1997	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	AIR	CHLOROBENZ ENE
413263	11/25/1997	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	AIR	ETHYL CHLORIDE
413263	11/25/1997	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	AIR	ETHYLENE OXIDE
413263	11/25/1997	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	AIR	METHYL CHLORIDE
413263	11/25/1997	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	AIR	PROPYLENE OXIDE
402795	9/9/1997	1500 GREENLEAF STAT FUEL DOCK	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	LAND	OIL, FUEL: NO. 2-D
395490	7/17/1997	4500 LEEDS AVE	CHARLESTON	CHARLESTON	CUMMINS ENGINE CO	FIXED	LAND	OIL, FUEL: NO. 2-D
395490	7/17/1997	4500 LEEDS AVE	CHARLESTON	CHARLESTON	CUMMINS ENGINE CO	FIXED	LAND	OIL, MISC: MOTOR
374717	1/29/1997	ATLANTIC GENERALCONT AINER	CHARLESTON	CHARLESTON	MAKHTESHIM CHEMICAL	FIXED	LAND	AZINPHOS-METHYL
376057	2/10/1997	2700 BENNETT YARD RD.	CHARLESTON	CHARLESTON	CSX TRANSPORTATIO N	RAILROA D	LAND	OIL: DIESEL
376268	2/11/1997	DEYTENS DRYDOCK #5THIRD AVE.	CHARLESTON	CHARLESTON	BRYAN OIL COMPANY	MOBILE	LAND	OIL: DIESEL
412920	11/23/1997	NORTHBOUND HWY 17 FROMINTERST ATE 95 EXIT 33 TOCHARLESTO N	CHARLESTON	CHARLESTON	N/A	MOBILE	LAND	UNKNOWN OIL
415002	11/24/1997	900 SAVAGE RD	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	LAND	(null)

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416419	12/18/1997	5862 NORTH RHETT---THIS IS A DRILL---	CHARLESTON	CHARLESTON	DEFENSE LOGISTIC AGENCY	PIPELINE	LAND	JET FUEL: JP-8
384482	4/21/1997	MILEPOST:A380	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPORT (N/A)	(null)
398893	8/9/1997	S.P.A. NORTH CHARLESTONPIER #3	CHARLESTON	CHARLESTON	VESSELS AGENT	VESSEL	UNKNOWN	NAPHTHA. AROMATIC
405143	9/26/1997	HWY 41 AT HWY 33	CHARLESTON	CHARLESTON	FLEET TRANSPORT	MOBILE	UNKNOWN	(null)
384439	4/21/1997	WANDO TERMINAL	CHARLESTON	CHARLESTON	CONTERM	VESSEL	UNKNOWN	ACIDIC ORGANICS (CORROSIVE LIQUID UN 3265)
384439	4/21/1997	WANDO TERMINAL	CHARLESTON	CHARLESTON	CONTERM	VESSEL	UNKNOWN	FLAMMABLE LIQUID (ESSENTIAL OIL OF LEMON PEELS UN)
384439	4/21/1997	WANDO TERMINAL	CHARLESTON	CHARLESTON	CONTERM	VESSEL	UNKNOWN	SUSTITUTE NITROTHUNOL PESTISIDE (DINOCAP XYLENE UN
397309	7/30/1997	CONSTRUCTION SITECHARLESTON AQUARIUM	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
397295	7/30/1997	COOPER RIVER, IVO OLDNAVY BASE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
397569	7/31/1997	4201 MEETING ST	CHARLESTON	CHARLESTON	CSX INTERMODAL	FIXED	WATER	OIL, FUEL: NO. 2-D
398513	8/7/1997	ASHLEY RIVERUSCG PEIR	CHARLESTON	CHARLESTON	USCGC KEY LARGO	VESSEL	WATER	HYDRAULIC OIL
400670	8/23/1997	COLUMBUS STREETPORT AUTHORITY DOCK	CHARLESTON	CHARLESTON	MCALLISTER TOWING	VESSEL	WATER	UNKNOWN OIL
401144	8/27/1997	861 RIVERLAND DRAROUND THE MARINA DOCKS	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
401908	9/2/1997	CHARLESTON NAVAL BASEPIER PP	CHARLESTON	CHARLESTON	USCG-USCGC DALLAS	VESSEL	WATER	OIL: DIESEL

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402603	9/7/1997	17 LOCKWOOD DRIVECHARLESTON CITY MARINA	CHARLESTON	CHARLESTON	P/C PHEREBIE II	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
402702	9/7/1997	ASHLEY MARINA	CHARLESTON	CHARLESTON	P/C NAUGHTY BOUY	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
402640	9/8/1997	HESS TERMINAL	CHARLESTON	CHARLESTON	PREMUDA	VESSEL	WATER	OIL, FUEL: NO. 6
404154	9/18/1997	CHARLESTON COLUMBUS CREEKTERMINAL 700 EAST BAY ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	CREOSOTE
404241	9/19/1997	WADMALAY RIVERICW NEAR YOUNGS ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
405099	9/25/1997	135 CHURCH ST	CHARLESTON	CHARLESTON	SC ELECTRIC AND GAS	FIXED	WATER	OIL, MISC: TRANSFORMER
405405	9/26/1997	UNION PIER TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
406469	10/7/1997	BUOY 23, WANDO RIVERCHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
407127	10/12/1997	17 LOOKWOOD DR	CHARLESTON	CHARLESTON	P/C PELLOGO	FIXED	WATER	OIL: DIESEL
408341	10/21/1997	RIPLEY LIGHT MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
388679	5/26/1997	ASHLEY MARINA	CHARLESTON	CHARLESTON	P/C KNOT TIDE	VESSEL	WATER	OIL: DIESEL
388655	5/26/1997	OUTER DOCKCITY MARINALOCKWOOD DR	CHARLESTON	CHARLESTON	M/V GRYPHON	VESSEL	WATER	WASTE OIL
388993	5/28/1997	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	ASHLEY MARINA	VESSEL	WATER	OIL, FUEL: NO. 2-D
389144	5/29/1997	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	P/C FAST LANCE	VESSEL	WATER	OIL, FUEL: NO. 2-D
389505	5/31/1997	WANDO RIVERDRUM ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
389516	6/2/1997	CG PIERGROUP CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
390022	6/5/1997	SALMON MARINE SERVICE1884 HERBERT STREETCHARLESTON, SC 29405	CHARLESTON	CHARLESTON	GREAT LAKES DREDGE & DOCK	VESSEL	WATER	HYDRAULIC OIL
390786	6/11/1997	33 LOCKWOOD DRSLIP # T113	CHARLESTON	CHARLESTON	P/C HAT TRICK	VESSEL	WATER	OIL, FUEL: NO. 2-D
391688	6/18/1997	COLUMBUS ST TERMINALBERTH 1	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
391946	6/18/1997	COLUMBUS STREET PIER	CHARLESTON	CHARLESTON	NORTON-LILY INTERNATIONAL	VESSEL	WATER	HYDRAULIC OIL
394284	7/8/1997	OLD NAVAL BASE	CHARLESTON	CHARLESTON	USCGC GALLATIN	VESSEL	WATER	UNKNOWN OIL
394400	7/9/1997	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
394999	7/14/1997	BUOY 22, CHARLESTON HBR	CHARLESTON	CHARLESTON	USCGC MADRONA	VESSEL	WATER	HYDRAULIC OIL
395610	7/18/1997	33 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
395713	7/19/1997	ASHLEY MARINAT DOCK SLIP 63	CHARLESTON	CHARLESTON	P/C CAPTAIN'S LADY	VESSEL	WATER	OIL, FUEL: NO. 2-D
396077	7/22/1997	ALLIED TERMINALSOIL TERMINALS	CHARLESTON	CHARLESTON	COLONIAL OIL CO	FIXED	WATER	OIL: DIESEL
396712	7/25/1997	DETYNS SHIPYARDPIER D	CHARLESTON	CHARLESTON	DYNE MARINE SERVICES	VESSEL	WATER	WASTE OIL
396765	7/26/1997	56 ASHLEY POINT DRBOAT LAUNCH AREA	CHARLESTON	CHARLESTON	RIPLEY LIGHT MARINA	UNKNOWN SHEEN	WATER	HYDRAULIC OIL
378150	2/26/1997	100 WEST STEWART STPARKING SPOT #7 ON THEAPRON	CHARLESTON	CHARLESTON	USAF	FIXED	WATER	HYDRAULIC OIL
378119	2/26/1997	USCG BASE CHARLESTON196 TRADD ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
379766	3/11/1997	UPPER END OF SHIPYARDRIVER	CHARLESTON	CHARLESTON	MARINEX CONSTRUCTION CO.	FIXED	WATER	HYDRAULIC OIL
380258	3/14/1997	ANCHORAGEOFF OF REBELION REACHNEAR BUOY #22	CHARLESTON	CHARLESTON	M/V EAGLE I (340FT)(US)	VESSEL	WATER	WASTE OIL: BILGE WATER/OILY MIXTURE

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
382109	3/30/1997	56 ASHLEY POINT DR	CHARLESTON	CHARLESTON	RIPLEY LIGHT MARINA	FIXED	WATER	HYDRAULIC OIL
382077	3/30/1997	WEST OF WAPPOO CUT BRIDGE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
382564	4/3/1997	4 MILES EAST OF THECHARLESTOWN SEA BUOY	CHARLESTON	CHARLESTON	MERCHANT PRINCE	VESSEL	WATER	WASTE OIL
385066	4/26/1997	2044 WAPPOO HALL RD	CHARLESTON	CHARLESTON	P/C GENESIS	VESSEL	WATER	UNKNOWN OIL
385345	4/28/1997	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	WASTE OIL
386334	5/7/1997	UNION PEIR TERMINAL	CHARLESTON	CHARLESTON	S.C. STATE PORT AUTHORITY	FIXED	WATER	HYDRAULIC OIL
387452	5/16/1997	ICW BETWEEN SULLIVAN'SISLAND AND ISLE OF PALMS	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
387628	5/17/1997	"D" DOCK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
387703	5/18/1997	ASHLEY RIVER	CHARLESTON	CHARLESTON	MUSIC MAN & HONEST LE IV	VESSEL	WATER	OIL, FUEL: NO. 2-D
387811	5/19/1997	33 LOCKWOOD DRIVEAT T DOCK	CHARLESTON	CHARLESTON	P/C LADY R	VESSEL	WATER	OIL: DIESEL
388246	5/22/1997	220 CONCORD STPASSENGER TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
388824	5/24/1997	ASHLEY RIVER MARINAASHLEY RIVERMM:NONE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
372274	1/5/1997	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	CAUSTIC SODA
372272	1/5/1997	ALLIED TERMINALS	CHARLESTON	CHARLESTON	ALLIED CHEMICALS	FIXED	WATER	CAUSTIC SODA
373596	1/19/1997	COAL RIVER TERMINAL	CHARLESTON	CHARLESTON	M/V BJORN	VESSEL	WATER	OIL, FUEL: NO. 2-D
373717	1/20/1997	CHARLESTON HARBORNEXT TO PATRIOTS POINT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
374319	1/25/1997	DETYNES SHIPYARD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
376945	2/17/1997	DENTYENES SHIPYARDSPIER D	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL

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376944	2/17/1997	DETYENS SHIP YARDPIER DELTA	CHARLESTON	CHARLESTON	EGYPTIAN NAVY	VESSEL	WATER	OIL, FUEL: NO. 2-D
377504	2/21/1997	NEWCOR SLIPCOOPER RIVER	BERKELEY	CHARLESTON	WHITESTACK MARITIME	VESSEL	WATER	HYDRAULIC OIL
409771	10/31/1997	CHARLESTON HARBOR NEARCRAB BANK	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
410401	11 6/1997	CHARLESTON NAVAL BASEENTIRE WATERFRONT	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
411571	11/14/1997	ASHLEY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
412223	11 19/1997	MARK CLARK EXPRESSWAY ATVIRGINIA AVENUE	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	KEROSENE
412939	11/23/1997	MKR 21 / STONO RIVER1NM SOUTH OF ELLET'S CUT	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
414411	12 1/1997	BUSHY PARK	BERKELEY	CHARLESTON	DETYENS MARINE INDUSTRIES	VESSEL	WATER	OIL: DIESEL
415460	12 6/1997	ASHELY RIVER MARINA33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
415046	12/9/1997	GOOSE CREEK ADJACENT TOBUSHY PARK	BERKELEY	CHARLESTON	USCG-USCGC RAMBLER	VESSEL	WATER	OIL: DIESEL
415038	12/9/1997	NEAR LIGHT 99	CHARLESTON	CHARLESTON	USCG - USCGC RAMBLER	VESSEL	WATER	OIL: DIESEL
415547	12 11/1997	196 TRADD STREETBASE PIER	CHARLESTON	CHARLESTON	USCG-USCGC RAMBLER	VESSEL	WATER	OIL, MISC: LUBRICATING
							number =	69
404154	9/18/1997	CHARLESTON COLUMBUS CREEKTERMIN AL 700 EAST BAY ST	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	CREOSOTE
372274	1 5/1997	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	CAUSTIC SODA
372272	1 5/1997	ALLIED TERMINALS	CHARLESTON	CHARLESTON	ALLIED CHEMICALS	FIXED	WATER	CAUSTIC SODA

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353867	7/29/1996	2151 KING STREET EXT.ON THE ASHLEY RIVER	CHARLESTON	CHARLESTON	ALBRIGHT & WILSON AMERICA	UNKNOWN SHEEN	AIR	PHOSPHORUS
343839	5/25/1996	NORTH CHARLESTON SPATERMINAL	CHARLESTON	CHARLESTON	M/V EVER ROYAL	FIXED	AIR	HYDROGEN CHLORIDE
365266	10/22/1996	2204 RICH ST	CHARLESTON	CHARLESTON	NORFOLK SOUTHERN	RAILROAD	LAND	PAINT
365549	10/25/1996	1643-B SAVANNAH HIGHWAY	CHARLESTON	CHARLESTON	DRY CLEAN USA COASTAL	FIXED	LAND	PERCHLOROETHYLENE
365638	10/25/1996	SMILE GAS STATIONDOGWOOD RD & HWY 61	CHARLESTON	CHARLESTON	SMILE GAS STATION	FIXED	LAND	GASOLINE: AUTOMOTIVE (UNLEADED)
340226	5/7/1996	CSX RAIL YARD	CHARLESTON	CHARLESTON	BAYER CORP	FIXED	LAND	HYDRAZINE AQUEOUS SOLUTION
346612	6/11/1996	1801 SHIPYARDCREEK RD	CHARLESTON	CHARLESTON	FOSTER WEELER	FIXED	LAND	OIL, FUEL: NO. 2-D
347592	6/17/1996	WAMPLER DRNEAR JAMES ISLAND YACHTCLUB	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	LAND	UNKNOWN MATERIAL
350745	7/7/1996	NS RAILYARD	CHARLESTON	CHARLESTON	N/A	RAILROAD	LAND	VANILLIN BLACK LIQUOR
334457	4/2/1996	2200 RICH ST	CHARLESTON	CHARLESTON	NORFOLK SOUTHERN	RAILROAD	LAND	DIALLYLDIMETHYLAMMONIUM CHORIDE MONOMER
359145	8/31/1996	OLTRANTO BLVD ANDEAGLE LANDING	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPORT (N/A)	(null)
364695	10/17/1996	B FERRY RD BEFORE MARKCLARK (I526 INTERCHANGE)	CHARLESTON	CHARLESTON	N/A	MOBILE	UNKNOWN	OIL, FUEL: NO. 2-D
320280	1/16/1996	(null)	CHARLESTON	CHARLESTON	N/A	VESSEL	UNKNOWN	ISOPHORONE DILSOCYANATE
320284	1/16/1996	(null)	CHARLESTON	CHARLESTON	STRACHAN SHIPPING	VESSEL	UNKNOWN	ISOPHORONE DILSOCYANATE
353881	7/29/1996	1801 MILLFORD ST	CHARLESTON	CHARLESTON	SHIPYARD RIVER COAL TERML	FIXED	WATER	ASPHALT
354579	8/2/1996	1000 JUNEAU ROAD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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354915	8/5/1996	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
356788	8/14/1996	ENTRANCE TO CHARLESTONHARBOR	CHARLESTON	CHARLESTON	F/V CAPT. NHAN	VESSEL	WATER	OIL: DIESEL
358391	8/26/1996	WANDO RIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
358853	8/29/1996	NAVAL WEAPONS STA	CHARLESTON	CHARLESTON	USS O'BANNON	VESSEL	WATER	OIL: DIESEL
358832	8/29/1996	NAVAL WEAPONS STATIONGOOSE CREEK	CHARLESTON	CHARLESTON	COLONIAL OIL INDUSTRIES	VESSEL	WATER	OIL: DIESEL
360057	9/4/1996	ASHLEY MARINA33 LOCKWOOD BLVD	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
360276	9/5/1996	MARKER 25 STONO RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
360188	9/7/1996	RIPLEY LIGHT MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
360393	9/9/1996	861 RIVERLAND DRCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
364729	10/6/1996	ASHLEY MARINE33 LOCKWOOD BLVD	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
364659	10/16/1996	106 MAIN ROAD	CHARLESTON	CHARLESTON	PANTRY GAS STATION	FIXED	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
365372	10/23/1996	1500 GREENLEAF STMARINE FACILITY	CHARLESTON	CHARLESTON	ALLIED TERMINAL	FIXED	WATER	OTHER OIL
339996	5/6/1996	COOPER RIVERFT OF LAURENS ST	CHARLESTON	CHARLESTON	WHITESTACK TOWING	VESSEL	WATER	OIL, MISC: LUBRICATING
340250	5/8/1996	COOPER RIVER BRIDGEEAST SPAN	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
343905	5/26/1996	ASHLEY MARINA33 LOCKWOOD DRIVE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
344119	5/28/1996	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
344753	5/31/1996	NAVAL WEAPONS STATIONPIER BRAVOCOOPER RIVER	BERKELEY	CHARLESTON	USS SANTA BARBERA	VESSEL	WATER	OTHER OIL

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344973	6/3/1996	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
345479	6/5/1996	ASHLEY MARINA	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
345869	6/6/1996	BENNETT YARD	CHARLESTON	CHARLESTON	CSX TRANSPORTATION	RAILROAD	WATER	OIL, FUEL: NO. 2-D
346628	6/12/1996	BENSAWYER BRIDGEICW	CHARLESTON	CHARLESTON	SC DEPT OF TRANSPORTATION	VESSEL	WATER	HYDRAULIC OIL
347311	6/15/1996	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
347745	6/18/1996	56 ASHLEY POINT DRCENTER OF MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
348110	6/20/1996	56 ASHLEY POINT DR	CHARLESTON	CHARLESTON	RIPLEY LIGHT MARINA	UNKNOWN SHEEN	WATER	UNKNOWN OIL
348554	6/23/1996	196 TRADD STREET	CHARLESTON	CHARLESTON	USCGC METOMPKIN	VESSEL	WATER	OIL: DIESEL
353058	7/23/1996	NAVAL WEAPONS STATIONCHARLESTONWHARF ALPHA/BERTH ALPHA I	CHARLESTON	CHARLESTON	USS LEYTE GULF (CG-55)	VESSEL	WATER	OIL: DIESEL
353550	7/26/1996	NAVAL WEAPONS STATIONPIER BRAVO	DORCHESTER	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
320205	1/16/1996	COLUMBUS ST TERMINALE. BAY ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
320315	1/16/1996	N. CHARLESTON TERMINAL,BIRTH 3, ON THE COOPERRIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	HYDRAULIC OIL
321386	1/21/1996	ASHLEY RIVERNEAR CITY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
324411	2/6/1996	CHARLESTON PORT OFFICEPIER R	CHARLESTON	CHARLESTON	NOAA-MALCOM BALDRIDGE	VESSEL	WATER	HYDRAULIC OIL
326069	2/14/1996	FPO-AP 96657NAVAL BASEPIER: ZULU	CHARLESTON	CHARLESTON	USN-USS FRANK CABLE	VESSEL	WATER	OIL, FUEL: NO. 2-D
328003	2/26/1996	CLOTER CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
329117	3/2/1996	COOPER RIVER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN MATERIAL

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329237	3/4/1996	196 TRADD STREET	CHARLESTON	CHARLESTON	USCGC METOMPKIN	VESSEL	WATER	WASTE OIL
329613	3/5/1996	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	INCHCAPE SHIPPING	VESSEL	WATER	OIL, FUEL: NO. 6
330072	3/7/1996	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
329911	3/7/1996	ASHLEY RIVER	CHARLESTON	CHARLESTON	UNKNOWN	VESSEL	WATER	OIL: DIESEL
329937	3/7/1996	ASHLEY RIVER105 BROSWELL ST	CHARLESTON	CHARLESTON	SOUTHERN DREDGING CO INC	VESSEL	WATER	OIL: DIESEL
330373	3/11/1996	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	ASPHALT
331574	3/16/1996	M/V BAY BAR KAIRIPLEY LAKE MARINA - B35416A RIVERS AVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
333731	3/28/1996	NORTH BRIDGE TERRACESUBS TATION / HWY 7	CHARLESTON	CHARLESTON	SOUTH CAROLINA ELECTRIC	FIXED	WATER	OIL, MISC: TRANSFORME R
338041	4/24/1996	OFF ADGERS WHARFDOWNT OWN CHARLESTON	CHARLESTON	CHARLESTON	COLLEGE OF CHARLESTON	MOBILE	WATER	(null)
338585	4/27/1996	N. CHARLESTON TERMINALREM OUNT RD	CHARLESTON	CHARLESTON	S.C. STATE PORT AUTHORITY	FIXED	WATER	HYDRAULIC OIL
319240	1/7/1996	SHIPYARD RIVER COALTERMINA L ON PITTSBURGHA VE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	HYDRAULIC OIL
319569	1/9/1996	COOPER RIVER IN FRONTOF NAVAL STATION BETWEENPIERS "Z" AND "D"	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
320150	1/15/1996	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
320277	1/16/1996	196 TRADD ST	CHARLESTON	CHARLESTON	CG STA CHARLESTON	FIXED	WATER	HYDRAULIC OIL

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365946	10/29/1996	PIER PAPA - OLD NAVALRESERV E STATION	CHARLESTON	CHARLESTON	USCG-USCGC DALLAS	VESSEL	WATER	OILY WATER MIXTURE
367953	11/18/1996	SHEM CREEKCHARLE STON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
368267	11/21/1996	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	M/V NOVA GALICIA	VESSEL	WATER	PAINT
369112	12/2/1996	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
369449	12/5/1996	800 HERBERT STREETSHIPYA RD CREEK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
370681	12/17/1996	NAVSTA COOPER RIVER	CHARLESTON	CHARLESTON	USCG-USCGC GALLITIN	VESSEL	WATER	OIL, FUEL: NO. 2-D
370798	12/18/1996	800 HERBERT ST	CHARLESTON	CHARLESTON	BRASWELL SERVICES GROUP	FIXED	WATER	HYDRAULIC OIL
371533	12/27/1996	COOPER RIVERADJACE NT TO THE COLUMBUSST TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	DIESEL AND BILGE SLOPS
371712	12/30/1996	COLUMBUS STREET TERMINALPO BOX 817	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	UNKNOWN OIL
353881	7/29/1996	1801 MILLFORD ST	CHARLESTON	CHARLESTON	SHIPYARD RIVER COAL TERML	FIXED	WATER	ASPHALT
368267	11/21/1996	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	M/V NOVA GALICIA	VESSEL	WATER	PAINT
330373	3/11/1996	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	ASPHALT

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296235	6/20/1995	CYPRESS GARDENS RD	BERKELEY	CHARLESTON	DUPONT	FIXED	AIR	POLYCHLORIN ATED BIPHENYLS
304944	8/23/1995	1000 HERBERT STBOX 63009	CHARLESTON	CHARLESTON	NORTH CHARLESTON SEWER	RAILROAD	AIR	CHLORINE
304997	8/23/1995	NORTH CHARLESTON TERMINALREM OUNT ROAD	BERKELEY	CHARLESTON	BAYER INC	FIXED	LAND	COMBUSTIBLE LIQUIDS

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275357	1/6/1995	COURTNEY DR	CHARLESTON	CHARLESTON	UNKNOWN CONSTRUCTIO N COM	MOBILE	LAND	OIL, MISC: MOTOR
279591	2/12/1995	6950 WHITCOMB DR	CHARLESTON	CHARLESTON	N/A	FIXED	LAND	(null)
281696	3/1/1995	MILEPOST SC7	CHARLESTON	CHARLESTON	NORFOLK SOUTHERN	FIXED	LAND	2-(2-AMINOETHOXY)ETHANOL
282687	3/10/1995	CYPRESS GARDEN RD	BERKELEY	CHARLESTON	DUPONT	FIXED	LAND	DOWTHERM
310134	10/7/1995	1500 GREENLEAF STREET1/4 MILE FROM NEARESTWATE R - TANK FARM AREA	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	LAND	OIL, FUEL: NO. 6
310510	10/11/1995	1500 GREENLEAF STREET	CHARLESTON	CHARLESTON	ALLIED TERMINALS	FIXED	LAND	ASPHALT
312785	11/1/1995	BENNETT SWITCH YARD	CHARLESTON	CHARLESTON	KOCH CHEMICAL CO	RAILROAD	LAND	PARAXYLENE
313441	11/8/1995	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	WATER RESOURCES SYSTEMS	FIXED	LAND	WASTE OIL W/WATER
313980	11/13/1995	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	PIPELINE	LAND	OIL: DIESEL
314111	11/14/1995	1500 GREENLEAF ST	CHARLESTON	CHARLESTON	SUTTLES TRUCKING	MOBILE	LAND	METHYL ALCOHOL
315065	11/22/1995	CHARLESTON TRANSMISSION SUB STATION	CHARLESTON	CHARLESTON	SOUTH CAROLINA ELECTRIC	FIXED	LAND	OIL, MISC: TRANSFORME R (NON "PCB")
306893	9/9/1995	MILE POST A 380.5	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPOR T (N/A)	(null)
295665	4/27/1995	TANK NO. 2 NEAR BLDG 24	CHARLESTON	CHARLESTON	USN - WPNSTA CHARLESTON	FIXED	SUBSU RFACE	OIL, FUEL: NO. 2
287262	4/17/1995	EARTHQUAKE	CHARLESTON	CHARLESTON	N/A	FIXED	UNKNO WN	(null)
275938	1/11/1995	NAVAL WEAPONS STATIONPIER B NORTH	BERKELEY	CHARLESTON	USN - USS SANTA BARBRA	VESSEL	UNKNO WN	OIL, MISC: LUBRICATING
280019	2/14/1995	2811 CARNER AVE	CHARLESTON	CHARLESTON	INFINGER TRANSPORTAT ION	FIXED	UNKNO WN	(null)
285146	3/31/1995	FT OF LAURENS ST	CHARLESTON	CHARLESTON	WHITESTACK TOWING	FIXED	WATER	HYDRAULIC OIL
285135	3/31/1995	PEIR RCHARLESTON NAVY BASE	CHARLESTON	CHARLESTON	NOAH VSL FERREL	VESSEL	WATER	OIL, FUEL: NO. 2-D

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287417	4/18/1995	PIER M	CHARLESTON	CHARLESTON	USN-USS FRANK CABLE	VESSEL	WATER	OIL, FUEL: NO. 2-D
287436	4/18/1995	PIER M	CHARLESTON	CHARLESTON	USN - CHARLESTON NSY	VESSEL	WATER	OIL, FUEL: NO. 2-D
289580	5/2/1995	.75 MILES FROM THECHARLESTON JETTY	CHARLESTON	CHARLESTON	M V WEALTHY RIVER	VESSEL	WATER	OIL, FUEL: NO. 6
291869	5/17/1995	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	M/V 18-8	VESSEL	WATER	OIL, FUEL: NO. 2-D
292312	5/20/1995	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	ASHLEY MARINA	VESSEL	WATER	OIL, FUEL: NO. 2-D
294868	6/9/1995	ASHLEY MARINA33 LOCKWOOD BLVE	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
294895	6/9/1995	PIER C	UNKNOWN	CHARLESTON	USN - NAVSTA CHARLESTON	FIXED	WATER	OIL, MISC: LUBRICATING
297404	6/27/1995	SHEM CREEK	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	WASTE OIL
297405	6/28/1995	ELLOITS CUTICW	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
300841	7/21/1995	COOPER RIVERUNION ST PIER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	WASTE OIL
301511	7/26/1995	JAMES ISLAND CONNECTERBRIDGE AT ASHLEY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
302437	8/1/1995	MCALLISTER TOWING50 IMMIGRATION ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL SHEEN
303087	8/7/1995	SHIP YARD AREACHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-USS NICHOLSON	VESSEL	WATER	FUEL OIL F76
275814	1/10/1995	WEAPONS STATIONCHARLESTONPIER C	CHARLESTON	CHARLESTON	USN-USS WARRIOR MCM10	VESSEL	WATER	OIL: DIESEL
277304	1/23/1995	US NAVAL BASEWHARF ALPHANAVAL WEAPONS STATION	CHARLESTON	CHARLESTON	US NAVY	VESSEL	WATER	OIL: DIESEL
277559	1/25/1995	NAVAL WEAPONS STATIONBRAVO SOUTH	BERKELEY	CHARLESTON	USN-USS SAM E. MORRISON	VESSEL	WATER	OIL, MISC: MINERAL SEAL

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277558	1/25/1995	USS MORRISONUS NAVAL WEAPONS STA	CHARLESTON	CHARLESTON	US NAVY	VESSEL	WATER	OIL: DIESEL
277899	1/28/1995	WAPPOO CUTICW SOUTH	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
279700	2/13/1995	196 TRADD STREET	CHARLESTON	CHARLESTON	USCGC METOMPKIN	VESSEL	WATER	(null)
280571	2/20/1995	33 LOCKWOOD DRNEAR B DOCK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	(null)
281984	3/4/1995	US NAVAL BASE (N00612)FISC CHARLESTONA T FUEL PIER ("K")	CHARLESTON	CHARLESTON	USN - CHARLESTON NSY	FIXED	WATER	OIL: DIESEL
282802	3/11/1995	ALLIED TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
284910	3/29/1995	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
285026	3/30/1995	UNIVERSAL TERMINAL	CHARLESTON	CHARLESTON	MAERSK LINES	VESSEL	WATER	OIL, FUEL: NO. 6
311801	10/24/1995	315 ANADALE CTASHLEY RIVERMM:UNK NOWN	DORCHESTER	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
312267	10/27/1995	BOUY 20 & 16 NORTH SIDEOF CHANNEL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
312752	11/1/1995	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
314708	11/19/1995	NWS NEAR PIER XCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
316399	12/7/1995	NAVAL WEAPONS STATIONBERT H BRAVO SOUTH	CHARLESTON	CHARLESTON	US NAVY	VESSEL	WATER	OIL, MISC: LUBRICATING (ORGANIC)
316769	12/11/1995	33 LOCKWOOD DR	CHARLESTON	CHARLESTON	VETERANS AFFAIRS	VESSEL	WATER	UNKNOWN OIL
317161	12/14/1995	TOWN CREEK REACH	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
317566	12/18/1995	SHEM CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL

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235690	4/19/1994	4201 MEETING STREETCHASSIS LOTTRACK 5	CHARLESTON	CHARLESTON	CSX INTERMODEL	MOBILE	AIR	CARBON DISULFIDE
250269	7/17/1994	1530 BUSHY PARK RD	BERKELEY	CHARLESTON	MILES INC	FIXED	AIR	AMMONIA, ANHYDROUS
218254	1/24/1994	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	EUROTAINER	FIXED	AIR	MONOCHLORO ACETIC ACID
274257	12/24/1994	2409 EAGLE DRIVENEAR RIVERS AVE	CHARLESTON	CHARLESTON	N/A	PIPELINE	AIR	NATURAL GAS
259522	9/7/1994	TEXACO LUBRICANTS CORAIL YARD	CHARLESTON	CHARLESTON	N/A	RAILROAD	LAND	ZINC DITHIOPHOSPHATE
262381	9/26/1994	CHARLESTON YARDSC-7	CHARLESTON	CHARLESTON	NORFOLK SOUTHERN	RAILROAD	LAND	UNKNOWN MATERIAL
264094	10/3/1994	337 MCCLAIN ST	CHARLESTON	CHARLESTON	N/A	FIXED	LAND	UNKNOWN OIL
268984	11/9/1994	96 WENTWORTH ST	CHARLESTON	CHARLESTON	DRY CLEAN USA	FIXED	LAND	PERCHLOROETHYLENE
270919	11/25/1994	PIGGY BACK YARD	CHARLESTON	CHARLESTON	PURCELL COMPANY	MOBILE	LAND	HYDRAULIC OIL
235658	4/19/1994	CHARLESTON INNER MOTORRAMP	CHARLESTON	CHARLESTON	CSX	RAILROAD	LAND	CARBON DISULFIDE
243647	6/13/1994	CHARLESTON NAVAL SHIPYARDDRY DOCK NO.5	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	LAND	OIL, MISC: LUBRICATING
222860	2/22/1994	CHARLESTON RAIL YARD2200 RICH ST	CHARLESTON	CHARLESTON	N/A	RAILROAD	LAND	NAPHTHALENE
229634	3/12/1994	5600 VIRGINIA AV	CHARLESTON	CHARLESTON	WEST VACO CORP	FIXED	LAND	WATER PH 12.53
219820	2/2/1994	CHARLESTON NAVAL SHIPYARDDRY DOCK 5	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	FIXED	LAND	OIL: DIESEL
251034	7/20/1994	BLDG NO. 644	CHARLESTON	CHARLESTON	USN - CHARLESTON NSY	UNKNOWN SHEEN	SUBSURFACE	UNKNOWN OIL
236269	4/22/1994	C S X RAILYARD	CHARLESTON	CHARLESTON	C S X RAILROAD	FIXED	UNKNOWN	CARBON DISULFIDE
238315	5/6/1994	COOPER RIVER	CHARLESTON	CHARLESTON	USN - NAVSTA CHARLESTON	VESSEL	UNKNOWN	OIL: DIESEL/MARINE
248231	7/8/1994	NAV BASE CHARLESTONRIVERS AVE	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL SHIP	FIXED	UNKNOWN	MERCURIC CHLORIDE

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222180	2/17/1994	NORTH CHARLESTON TERMINAL	CHARLESTON	CHARLESTON	EVERGREEN	MOBILE	UNKNOWN	XYLENE (O-, M-, P-, & MIXTURES)
231255	3/22/1994	COLUMBUS STREET CONTAINERTERMINAL	CHARLESTON	CHARLESTON	BSI SERVICES	MOBILE	UNKNOWN	RESIN SOLUTION POLYGLASSVE)
234844	4/14/1994	5600 VIRGINIA AVENORTH CHARLESTON	CHARLESTON	CHARLESTON	WESTVACO CO	FIXED	UNKNOWN	WATER WITH A HIGH PH
235514	4/18/1994	CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	FIXED	UNKNOWN	OTHER OIL OIL/WATER MIXTURE)
222234	2/17/1994	EVERGREEN AMERICAFACILITY	CHARLESTON	CHARLESTON	HOECHST CELANESE	FIXED	UNKNOWN	PHENYLSULFONATE CAY
222180	2/17/1994	NORTH CHARLESTON TERMINAL	CHARLESTON	CHARLESTON	EVERGREEN	MOBILE	UNKNOWN	DIETHYLENE GLYCOL DIMETHYL ETHER
222180	2/17/1994	NORTH CHARLESTON TERMINAL	CHARLESTON	CHARLESTON	EVERGREEN	MOBILE	UNKNOWN	GLYCOL ETHER
251764	7/26/1994	1851 SOL LEGARE	CHARLESTON	CHARLESTON	BACKMANS SEAFOOD	VESSEL	WATER	OIL: DIESEL
251764	7/26/1994	1851 SOL LEGARE	CHARLESTON	CHARLESTON	BACKMANS SEAFOOD	VESSEL	WATER	WASTE OIL
253558	8/4/1994	CHARLESTON NAVAL BASEPIER M BERTH 2A	CHARLESTON	CHARLESTON	USN-USS SAND LANCE	VESSEL	WATER	WASTE OIL
253821	8/5/1994	PIER ZBERTH 2 ALPHA	CHARLESTON	CHARLESTON	USN-NS CHARLESTON	VESSEL	WATER	JET FUEL: JP-5 KEROSENE, HEAVY)
254219	8/8/1994	COOPER RIVER BUOY NO. 73	CHARLESTON	CHARLESTON	SOUTHERN DREDGING	VESSEL	WATER	HYDRAULIC OIL
255546	8/12/1994	PIER N3A	CHARLESTON	CHARLESTON	USN-USS JOHN ROGERS	VESSEL	WATER	WASTE OIL
257397	8/26/1994	AA FPO	CHARLESTON	CHARLESTON	USN-HALY BURTON FFG-40	VESSEL	WATER	WASTE OIL
258370	8/31/1994	CHARLESTON NAVAL SHIPYARDPIER DELTA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
258390	8/31/1994	PIER "D"	CHARLESTON	CHARLESTON	USN - NAVSTA CHARLESTON	UNKNOWN SHEEN	WATER	OTHER OIL
265530	10/16/1994	CORNER OF SHADOW MOSS PKYMULROY CT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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267372	10/28/1994	FTOAAPIER N	CHARLESTON	CHARLESTON	USN-USS RICHMOND K TURNER	VESSEL	WATER	WASTE OIL
267558	10/30/1994	ICW/ ELLIOTS CUTMARKERS 19-22 A	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	OIL: DIESEL
269568	11/14/1994	TC DOCKNAVAL WEAPONS STATIONCHAR LESTON HARBOR	BERKELEY	CHARLESTON	SOUTHERN DREDGING	VESSEL	WATER	OIL, MISC: MOTOR
269568	11/14/1994	TC DOCKNAVAL WEAPONS STATIONCHAR LESTON HARBOR	BERKELEY	CHARLESTON	SOUTHERN DREDGING	VESSEL	WATER	OIL: DIESEL
236807	4/26/1994	55 PADDLE CREEKNEAR CROSS CREEK ONJAMES ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN MATERIAL
237900	5/4/1994	CHARLESTON NAVAL SHIPYARDPIER F NORTHBERTH 1	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	UNKNOW N SHEEN	WATER	UNKNOWN OIL
240052	5/19/1994	NAVWEPSTA CHARLESTONP IER A	BERKELEY	CHARLESTON	USN - USS LADY GULF	VESSEL	WATER	OIL: DIESEL
240597	5/23/1994	COAST GAURD STATION	CHARLESTON	CHARLESTON	USCG - CGC RAMBLER	VESSEL	WATER	OIL, FUEL: NO. 2-D
241141	5/26/1994	COOPER RIVERPIER PNAVAL STATION CHARLESTON	DORCHESTER	CHARLESTON	USN-USS RICHMOND K TURNER	VESSEL	WATER	OIL, FUEL: NO. 2-D
241194	5/26/1994	DETYENS SHIPYARDSHW Y 41 WANDO RIVER BRIDGE	BERKELEY	CHARLESTON	USCG - USCGC LAUREL	FIXED	WATER	PAINT (CG BLUE)
241112	5/26/1994	NAVSTA CHARLESTONP IER S	CHARLESTON	CHARLESTON	USN-USS CHAMPION	VESSEL	WATER	WASTE OIL
241300	5/27/1994	CHARLESTON NAVAL BASEPIER N	CHARLESTON	CHARLESTON	USN - USS THORN	VESSEL	WATER	WASTE OIL
241590	5/31/1994	ASHLEY MARINA33 LOCKWOOD BLVD	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
243337	6/10/1994	DOLPHIN COVE MARINA	CHARLESTON	CHARLESTON	BRASWELL SHIPYARD	UNKNOW N SHEEN	WATER	UNKNOWN OIL

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243494	6/11/1994	2333 TALL SAIL DRIVESEAGATE CONDO PIER	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	WASTE OIL
244341	6/16/1994	PIER R AND S	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
245263	6/21/1994	1351 1ST STSOUTHSIDE OF PIER-N	CHARLESTON	CHARLESTON	CHARLESTON NAVAL SHIP YRD	FIXED	WATER	OIL: DIESEL
223171	2/24/1994	350 CONCORD ST	CHARLESTON	CHARLESTON	KILLAM ASSOCIATES	FIXED	WATER	BENTONITE MUD / WATER MIXTURE
224355	3/4/1994	CHARLESTON NAVAL SHIPYARDSLIP CD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	UNKNOWN SHEEN	WATER	OIL, MISC: LUBRICATING
224697	3/4/1994	END OF GREENLEAF STREET	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
230109	3/15/1994	1905 TITTSBURG AVE	CHARLESTON	CHARLESTON	DETYENS SHIP YARD	FIXED	WATER	WASTE OIL/LUBRICANTS - POSS. CON
230140	3/15/1994	SHIP YARD RIVER COALTERMINAL	CHARLESTON	CHARLESTON	PENN MARITIME	VESSEL	WATER	OTHER OIL(BILGE OIL)
230584	3/18/1994	CHARLESTON NAVAL SHIPYARDDRY DOCK NO.5S QUAYWALL	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	UNKNOWN OIL
231868	3/27/1994	PIER MIKE	CHARLESTON	CHARLESTON	USN - NAVSTA CHARLESTON	UNKNOWN SHEEN	WATER	UNKNOWN OIL
232528	3/30/1994	CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	JET FUEL: JP-5 (KEROSENE, HEAVY)
232965	4/2/1994	FPO AAPIER Z1A	CHARLESTON	CHARLESTON	USN - USS DEYO	VESSEL	WATER	COSMALINE
233049	4/3/1994	5600 VIRGINIA AV	CHARLESTON	CHARLESTON	WEST VACO CORP	FIXED	WATER	HIGH PH WATER (12.61)
233197	4/4/1994	CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	UNKNOWN SHEEN	WATER	UNKNOWN OIL
233163	4/4/1994	PO BOX 118005	CHARLESTON	CHARLESTON	WESTVACO CO	FIXED	WATER	HIGH PH WATER (12.62)
233434	4/5/1994	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CO	FIXED	WATER	HIGH PH WATER (12.63)
233617	4/6/1994	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CO	UNKNOWN SHEEN	WATER	HIGH PH LIQUID (12.61 PH)
215470	1/6/1994	PIER XNWS CHARLESTON	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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216314	1/12/1994	PIER S	CHARLESTON	CHARLESTON	USN - NAVSTA CHARLESTON	VESSEL	WATER	OIL: DIESEL
218019	1/22/1994	PIER B SOUTH	CHARLESTON	CHARLESTON	USN-NWS CHARLESTON	VESSEL	WATER	OIL: DIESEL
218697	1/26/1994	BLDG 900AND BLDG 60	BERKELEY	CHARLESTON	USN-NWS CHARLESTON	MOBILE	WATER	OIL: DIESEL
218860	1/26/1994	PIER C	CHARLESTON	CHARLESTON	USN -NSY CHARLESTON	FIXED	WATER	OIL, MISC: LUBRICATING
219215	1/28/1994	NAVSTA CHARLESTONP IER QUEBEC	CHARLESTON	CHARLESTON	USS GUARDIAN	VESSEL	WATER	WASTE OIL/LUBRICAN TS - POSS. CON
219210	1/28/1994	PIER QCHARLESTON NAVAL STATION	CHARLESTON	CHARLESTON	USN-USS GUARDIAN	VESSEL	WATER	WASTE OIL
220165	2/4/1994	RIPLEY LIGHT MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
220744	2/8/1994	CHARLESTON NAVY YARDCOOPER RIVERPIER Y	CHARLESTON	CHARLESTON	CAPE ROMAIN CONTRACTORS	VESSEL	WATER	OIL, FUEL: NO. 2-D
221074	2/10/1994	BUZZARDS ROOST MARINA2144 MAY BANK HWY	CHARLESTON	CHARLESTON	M/V ESCAPE 10	VESSEL	WATER	GASOLINE: AUTOMOTIVE (UNLEADED)
221386	2/12/1994	RIVER RDSTONO RIVERMARSH	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	YELLOW PAINT
221789	2/15/1994	ASHLEY RIVER BRIDGE	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
222123	2/17/1994	CHARLESTON NAVAL SHIPYARDQUA YWALL CD	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	UNKNOWN OIL
271314	11/29/1994	CHARLESTON NAVAL SHIPYARDPIER C SOUTHBERTH 46	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	UNKNOW N SHEEN	WATER	UNKNOWN OIL
274013	12/21/1994	1500 GREENLEAF STMARINE FACILITY	CHARLESTON	CHARLESTON	ALLIED TERMINALS INC	FIXED	WATER	OIL, FUEL: NO. 6
							number =	56
221386	2/12/1994	RIVER RDSTONO RIVERMARSH	CHARLESTON	CHARLESTON	N/A	UNKNOW N SHEEN	WATER	YELLOW PAINT

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233617	4/6/1994	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CO	UNKNOWN SHEEN	WATER	HIGH PH LIQUID (12.61 PH)
233163	4/4/1994	PO BOX 118005	CHARLESTON	CHARLESTON	WESTVACO CO	FIXED	WATER	HIGH PH WATER (12.62)
233434	4/5/1994	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CO	FIXED	WATER	HIGH PH WATER (12.63)
233049	4/3/1994	5600 VIRGINIA AV	CHARLESTON	CHARLESTON	WEST VACO CORP	FIXED	WATER	HIGH PH WATER (12.61)
241194	5/26/1994	DETYENS SHIPYARDSHWY 41 WANDO RIVER BRIDGE	BERKELEY	CHARLESTON	USCG - USCGC LAUREL	FIXED	WATER	PAINT (CG BLUE)

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234837	11/14/1993	250 SPRING ST	CHARLESTON	CHARLESTON	HOWARD JOHNSON RIVERFRONT	FIXED	AIR	FREON
153414	1/14/1993	2152 KING ST EXTENSION	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON INC	FIXED	AIR	1,2-DICHLOROETHANE
153414	1/14/1993	2152 KING ST EXTENSION	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON INC	FIXED	AIR	ETHYLENE OXIDE
205976	11/2/1993	CYPRESS GARDEN ROAD	CHARLESTON	CHARLESTON	EI DUPONT	FIXED	LAND	BIPHENYL
208637	11/18/1993	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	SEALAND SERVICES INC	FIXED	LAND	DIMETHYLTHIOPHOSPHORYL CHLORIDE
211668	12/8/1993	CYPRESS GARDENS RD	BERKELEY	CHARLESTON	DUPONT	FIXED	LAND	BIPHENYL AS A PART OF THERMINOL
194794	8/26/1993	SC SPA NORTH CHARLESTONTERMINAL	CHARLESTON	CHARLESTON	HOECHST CELANESE	FIXED	LAND	PHENODUR PR 612
194943	8/27/1993	CONHOY RD. SOUTH	CHARLESTON	CHARLESTON	BURRIS CHEMICAL	FIXED	LAND	SODIUM HYDROXIDE
196717	9/8/1993	HARBOR VIEW ROAD	CHARLESTON	CHARLESTON	HESS GASOLINE STATION	FIXED	LAND	GASOLINE: AUTOMOTIVE
177956	6/3/1993	HAZARDOUS WASTE STORAGEFACILITYNAVAL WEAPONS	BERKELEY	CHARLESTON	USN-NAVAL WEAPONS STA	MOBILE	LAND	SILVER CONTAINING SOLUTION

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161661	3/2/1993	HATCH NO. 5COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	SEA-LAND SERVC	VESSEL	LAND	TETRACHLOROETHYLENE
172822	5/10/1993	4090 AZALEA DR	CHARLESTON	CHARLESTON	NORTH HAND PROTECTION	FIXED	LAND	ALIPHATIC HYDROCARBON
174579	5/18/1993	RIVER RD BETWEEN PIER KAND LOADING FACILITYCHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	D & S CONSTRUCTION	PIPELINE	LAND	OIL, FUEL: NO 2-D
175327	5/21/1993	IMMIGRATION STREETCOLUMBUS STREET TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	LAND	OIL: DIESEL
161058	3/7/1993	MILE A 390CHARLESTON SUBDIVISION	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPORT (N/A)	(null)
194722	8/26/1993	COLUMBUS STREET DOCKTERMINAL	CHARLESTON	CHARLESTON	BARTHCO INTERNATIONAL	UNKNOWN SHEEN	UNKNOWN	MONOCHLOROACETIC ACID
183883	6/30/1993	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	FIXED	UNKNOWN	SULFURIC ACID
199788	9/27/1993	PIER Z	CHARLESTON	CHARLESTON	USN-FLEET INDUS SUPPLY	FIXED	WATER	OIL: DIESEL
201448	10/6/1993	NAVSTA CHARLESTONPIER U	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
201406	10/6/1993	NEAR COLUMBUS STREETTERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
201478	10/6/1993	SOUTHEND OF COLUMBUS STSTATE PORT	CHARLESTON	CHARLESTON	SOUTHERN DREDGING	VESSEL	WATER	OIL, MISC: MOTOR
202171	10/10/1993	PIER P	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	UNKNOWN OIL
202844	10/14/1993	NAVAL WEAPONS STATIONCHARLESTON	CHARLESTON	CHARLESTON	USN - USS TAYLOR	VESSEL	WATER	WASTE OIL
203114	10/15/1993	COLUMBUS CREEK TERMINALCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL

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203107	10/15/1993	COOPER RIVERMOUTH OF THE RIVER	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
203263	10/17/1993	ASHELY RIVER BRIDGEHWY 17N	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
203708	10/19/1993	BETWEEN PIER X AND A	CHARLESTON	CHARLESTON	USN-NWS CHARLESTON	FIXED	WATER	OIL, MISC LUBRICATING
205039	10/27/1993	CHARSTON NAVAL BASEPIER Z	CHARLESTON	CHARLESTON	USN - USS SANTA BARBARA	VESSEL	WATER	HYDRAULIC OIL
205018	10/27/1993	NEAR PIER R	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	WASTE OIL
206021	11/2/1993	ASHLEY RIVER6 MI N OF CHARLESTONH ARBOR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL NO. 2-D
206186	11/3/1993	PIER A / NAV WEAPONS STA	BERKELEY	CHARLESTON	CAPE ROMAIN CONTRACTOR S	FIXED	WATER	HYDRAULIC OIL
207539	11/11/1993	PIER X-RAY NORTH	BERKELEY	CHARLESTON	USN-NWS CHARLESTON	FIXED	WATER	OIL: DIESEL
208117	11/15/1993	SHORT STATE RECREATIONP ARK	BERKELEY	CHARLESTON	USN-CHARLESTON NAVAL STA	FIXED	WATER	GASOLINE: AUTOMOTIVE (4.23G PB/G
186980	7/17/1993	STONO RIVER INLET	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
189638	7/30/1993	196 TRADD ST	CHARLESTON	CHARLESTON	USCGC-MADRONA	VESSEL	WATER	OIL, MISC LUBRICATING
189652	7/30/1993	NAVSTA CHARLESTONP IER Z	CHARLESTON	CHARLESTON	USN-USS TAYLOR	VESSEL	WATER	OIL: DIESEL
190205	7/31/1993	CHARLESTON NAVAL BASEOFF OF PIER NOVEMBERSO UTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	WASTE OIL(BILGE OIL)
189998	8/1/1993	PIER N	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL, MISC LUBRICATING
190363	8/3/1993	PIER SIERA TANGO SLIP	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	WASTE OIL
190502	8/3/1993	USN-CHARLESTON NAVY BASEPIER NOVEMBER	CHARLESTON	CHARLESTON	USN-USS SAND LANTE	VESSEL	WATER	WASTE OIL

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191797	8/11/1993	COLUMBUS ST WHARF	CHARLESTON	CHARLESTON	SEALAND SERVICE INC	VESSEL	WATER	UNKNOWN MATERIAL
194468	8/23/1993	180 MORRISON DRIVE	CHARLESTON	CHARLESTON	S.C. ELECTRIC & GAS	FIXED	WATER	OIL, MISC: TRANSFORME R
194308	8/24/1993	NAS-CHARLESTON	CHARLESTON	CHARLESTON	USN-USS ORTOLAN	VESSEL	WATER	HYDRAULIC OIL
195239	8/30/1993	TOWN CREEKMARKE R RED BOUY NO.2	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
195478	8/31/1993	FPO-AA 34086PIER M	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
196572	9/8/1993	437TH AIRLIFT WINGCHARLES TON AIR FORCE BASE	CHARLESTON	CHARLESTON	USAF-CHARLESTON AFB	FIXED	WATER	JET FUEL: JP-4
196825	9/9/1993	NAVAL WEAPONS STATIONCHAR LESTON SOUTH OF PIERC	BERKELEY	CHARLESTON	USN-NAVAL WEAPONS STA	UNKNOWN SHEEN	WATER	UNKNOWN OIL
197835	9/15/1993	BETWEEN PIER A AND X	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
199782	9/27/1993	PIER Z	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	FIXED	WATER	OIL, FUEL: NO. 1-D
175269	5/21/1993	US NAVAL STATIONFOXT ROT NORTH PIER	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL: DIESEL
176347	5/26/1993	4970 LAMBS RD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL(FO AMY SUBSTANCE)
177557	6/1/1993	US NAVAL STATIONPIER K SOUTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL: DIESEL
178057	6/4/1993	NAVAL WEAPONS STATIONTC DOCK	CHARLESTON	CHARLESTON	CROWLEY AMERICAN TRANS	VESSEL	WATER	HYDRAULIC OIL
178468	6/7/1993	CHARLESTON NAVAL BASEFPO-AAPIER M-2A	CHARLESTON	CHARLESTON	USN-USS SEA HOURSE	VESSEL	WATER	WASTE OIL
182335	6/17/1993	NAVSTA CHARLESTONP IER BRAVO	CHARLESTON	CHARLESTON	USN-USS FRANK CABLE	VESSEL	WATER	OIL: DIESEL

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181456	6/20/1993	BUILDING 200NEAR PIER P	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
182029	6/22/1993	ASHLEY MARINAOFF OF LOCKWOOD BLVD	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL, FUEL: NO. 2-D
182159	6/23/1993	NAVAL STATION CHARLESTONP IER L	CHARLESTON	CHARLESTON	USN-USS PEGASUS	VESSEL	WATER	HYDRAULIC OIL
184321	7/4/1993	PEIR M	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
184513	7/6/1993	OLD COAL TIPPLE DOCKBUOY 7	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
184666	7/6/1993	USS FRANK CABLEPIER MIKE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
184865	7/7/1993	PIER ZULUCHARLES TON NAVSTA	CHARLESTON	CHARLESTON	USN - USS SANTA BARBARA	VESSEL	WATER	OIL, FUEL: NO. 2-D
185441	7/10/1993	PIER G / CHARLESTONN AVAL SHIPYARD	CHARLESTON	CHARLESTON	CHARLESTON NAVAL SHIPYARD	VESSEL	WATER	OTHER OIL
185450	7/10/1993	PIER G AT SHIPYARD	CHARLESTON	CHARLESTON	CHARLESTON NAVAL SHIPYARD	VESSEL	WATER	OTHER OIL /BLACK INDUSTRIAL
186082	7/13/1993	USN WEAPONS STA	DORCHESTER	CHARLESTON	USN-USS MOUNT BAKER AE34	VESSEL	WATER	MIXURE OF AFFF, WATER, AND F76 FUEL
186480	7/15/1993	CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	WASTE OIL
186746	7/16/1993	CHARLESTO NAVAL WEAPONSSTAT ION	BERKELEY	CHARLESTON	USN-USS MOUNT BAKER	VESSEL	WATER	OIL: DIESEL
158237	2/16/1993	PIER NOVEMBER	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL: DIESEL
159833	2/26/1993	NAVSTA CHARLESTONP IER N	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL, FUEL: NO. 2
160388	3/2/1993	QR QUAYWALLNS Y CHARLESTONC OOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
161494	3/10/1993	US NAVAL STATIONPIER PAPA NORTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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161830	3/11/1993	US NAVAL STATIONPIER ZULU 2 ALPHA	CHARLESTON	CHARLESTON	USN-USS DAYO	VESSEL	WATER	OIL: DIESEL
163247	3/20/1993	JAMES ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
164505	3/28/1993	NAVAL BASEDOCK Z1A	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL, FUEL: NO. 2-D
165003	3/31/1993	CHARLESTON NAVAL SHIPYARDPIER G NORTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	HYDRAULIC OIL
167059	4/12/1993	USN NAVAL STA CHARLESTONPIER H	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	OTHER OIL (2190 OIL)
167973	4/16/1993	PIER S	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL: DIESEL
169361	4/23/1993	PIER U	CHARLESTON	CHARLESTON	USCG-CGC ESCAPE	VESSEL	WATER	OIL, FUEL: NO. 2-D
170051	4/27/1993	NAVAL BASEPIER H NORTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
173471	5/13/1993	MZ SLIPNASTA CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
175294	5/21/1993	CHARLESTON NAVAL SHIPYARDPIER F NORTH	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	UNKNOWN SHEEN	WATER	UNKNOWN OIL
175348	5/21/1993	COLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	WANDO TRUCKING CO	MOBILE	WATER	OIL: DIESEL
151817	1/5/1993	1882 MILFORD STSHIPYARD CREEK	CHARLESTON	CHARLESTON	TL JAMES CO	VESSEL	WATER	OIL, FUEL: NO. 2
152438	1/8/1993	CHARLESTON NAVAL SHIPYARDBETWEEN DRYDOCK 4 &PIER KILO	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	OIL: DIESEL
152989	1/12/1993	CHARLESTONPIER Z	CHARLESTON	CHARLESTON	USN-USS MT BAKER	VESSEL	WATER	HYDRAULIC OIL
154324	1/21/1993	1882 MILFORD ST	CHARLESTON	CHARLESTON	CHEVRON, USA	FIXED	WATER	WASTE OIL/LUBRICANTS - POSS. CON
155859	1/30/1993	USN-NAVSTA CHARLESTONPIER S	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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156271	2/2/1993	CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
157282	2/9/1993	PIER MIKENAVAL STATION	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	UNKNOWN OIL
158277	2/16/1993	NAVAL BASE CHARLESTONPIER PAPA	CHARLESTON	CHARLESTON	USN - USS SIERRA	VESSEL	WATER	OIL: DIESEL
213155	12/18/1993	SHIP YARD CREEK	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
213357	12/20/1993	PIER B SOUTH	BERKELEY	CHARLESTON	USN-NWS CHARLESTON	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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112323	3/30/1992	CYPRESS GARDEN ROAD	BERKELEY	CHARLESTON	DUPONT COOPER RIVER PLANT	CONTINUOUS	(null)	(null)
113202	4/6/1992	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CORP.	FIXED	AIR	BIPHENOL
106457	2/11/1992	(null)	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON	AIRCRAFT	AIR	NO CHRIS CODE
142312	10/28/1992	2045 AUSTIN AVE	CHARLESTON	CHARLESTON	LAND PORT TRUCKING	MOBILE	LAND	THIO GLYCOLIC ACID
111582	3/24/1992	1882 MILFORD STREET	CHARLESTON	CHARLESTON	BP OIL	MOBILE	LAND	MEDIUM NEUTRAL PETROLEUM OIL
105148	1/30/1992	I-26 AND US 17 NORTH	CHARLESTON	CHARLESTON	BULL DOG HWY EXPRESS CO	MOBILE	LAND	OIL: DIESEL
106005	2/7/1992	TACOOPA RIVER PLANT	BERKELEY	CHARLESTON	DUPONT CO	FIXED	LAND	DOWTHERM: THERMINAL VP1
149915	12/18/1992	(null)	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPORT (N/A)	(null)
142314	10/28/1992	2045 AUSTIN AVE	CHARLESTON	CHARLESTON	SOUTHERN STEAMSHIP	FIXED	UNKNOWN	THIOGLYCOLIC ACID
118802	5/22/1992	2151 KINGS STREET	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER	FIXED	UNKNOWN	SULFURIC ACID
102015	1/3/1992	PORT OF CHARLESTON	CHARLESTON	CHARLESTON	E N F LINES	VESSEL	UNKNOWN	UNKNOWN POSSIBLE TOXIC MATERIAL

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102097	1/8/1992	PORT OF CHARLESTOW NPIER UNKNOWN	CHARLESTON	CHARLESTON	M/V SANTA CLARA	VESSEL	UNKNO WN	MAGNESIUM PHOSPHIDE
130756	8/7/1992	NAV STA CHARLESTONB ETWEEN PIERS K & L	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
130969	8/9/1992	NAS CHARLESTONB ETWEEN PIERS SIERRA ANDUNIFORM	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
132166	8/17/1992	NAVAL WEAPONS STATIONWHAR F ALPHA NORTHCOOPER RIVER	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
133737	8/26/1992	CHARLESTON NAVAL STATIONROME O SIERRA SLIP	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
134154	8/28/1992	CYPRESS GARDEN RDAT DEAD END	BERKELEY	CHARLESTON	DUPONT	FIXED	WATER	OIL, FUEL: NO 6
134700	9/1/1992	WADMALAW RIVERBY LIGHT 771CWW	CHARLESTON	CHARLESTON	USCG-USCGC RAMBLER	VESSEL	WATER	WASTE OIL/LUBRICAN TS - POSS. CON
135145	9/3/1992	QR WALL	DORCHESTER	CHARLESTON	USN-CHARLESTO N NAVAL STA	VESSEL	WATER	WASTE OIL
135506	9/5/1992	FPOAA 34093-3006	CHARLESTON	CHARLESTON	USN-NAVSTA CHARLESTO N	VESSEL	WATER	PAINT
135749	9/8/1992	NP QUEWAL	CHARLESTON	CHARLESTON	USN-NAVSTA CHARLESTO N	FIXED	WATER	OIL, FUEL: NO. 2-D
136046	9/10/1992	PIER K	CHARLESTON	CHARLESTON	USN-CHARLESTO N NAVAL STA	FIXED	WATER	WASTE OIL/LUBRICAN TS - POSS. CON
136786	9/15/1992	PIER PAPA QUEBEC SLIP	CHARLESTON	CHARLESTON	USN-CHARLESTO N NAVAL STA	VESSEL	WATER	OIL, FUEL: NO. 2-D
137074	9/17/1992	CHARLESTON NAVAL BASEPIER Z, BERTH 4-B	CHARLESTON	CHARLESTON	USN-USS JESSE L BROWN	VESSEL	WATER	OIL: DIESEL
138470	9/28/1992	BUILDING 200	CHARLESTON	CHARLESTON	USN-CHARLESTO N NAVAL STA	VESSEL	WATER	OIL: DIESEL

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139458	10/6/1992	PIER KILO	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	OIL: DIESEL
140597	10/14/1992	NAVAL SUPPLY CENTERCODE 700	CHARLESTON	CHARLESTON	MC CULLUM	FIXED	WATER	OIL: DIESEL
143603	11/5/1992	NAV STA CHARLESTON	CHARLESTON	CHARLESTON	USN-USS OBANON	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
143604	11/5/1992	NAV STA CHARLESTON	CHARLESTON	CHARLESTON	USN-USS OBANON	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
143714	11/6/1992	USN NAVSTA CHARLESTONPIER UNIFORM	CHARLESTON	CHARLESTON	USN-USS AVENGER	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
119371	5/27/1992	TOWN CREEK UNDER THECOOPER RIVER BRIDGES	CHARLESTON	CHARLESTON	CAROLINIA SEA SERVICE	VESSEL	WATER	OIL: DIESEL FUEL
120080	6/2/1992	HJ SLIPCHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	CHARLESTON NAVAL SHIPYARD	VESSEL	WATER	BILGE SLUDGE
121039	6/8/1992	437TH AIRLIFT WING	CHARLESTON	CHARLESTON	USAF AIR BASE CHARLESTON	FIXED	WATER	JET FUEL: JP-4
121917	6/15/1992	BUILDING 200	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	OIL: DIESEL
121946	6/15/1992	CHEVRON OIL TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
122020	6/15/1992	PIER N4CHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	USN-NAV BASE CHARLESTON	VESSEL	WATER	UNKNOWN OIL
121971	6/15/1992	PIER ZCHARLESTON NAVY BASE	CHARLESTON	CHARLESTON	USN-USS THORN	VESSEL	WATER	UNKNOWN OIL
122479	6/18/1992	WAPPOO CUT	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN MATERIAL
122682	6/19/1992	USS HALYBURTONFFG-40PIER Z4A	CHARLESTON	CHARLESTON	USN-CHARLESTON	VESSEL	WATER	JET FUEL: JP-5 (KEROSENE, HEAVY)
123264	6/22/1992	1369 HARBORVIEW RD	CHARLESTON	CHARLESTON	TRAYLOR BROS INC	VESSEL	WATER	HYDRAULIC OIL
122961	6/22/1992	NAVAL STATION	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
122962	6/22/1992	NAVSTA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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123171	6/23/1992	CODE 340CHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	CHARLESTON NAVAL SHIPYARD	UNKNOWN SHEEN	WATER	UNKNOWN OIL
123984	6/28/1992	PIER QCHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	USN	VESSEL	WATER	WASTE OIL (OILY BILGE WATER)
125568	7/8/1992	COOPER RIVERBUOY 52	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
126553	7/14/1992	BUILDING 200	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	FIXED	WATER	OIL, FUEL: NO. 2-D
128754	7/24/1992	CHARLESTON NAVAL STATIONPIER N	CHARLESTON	CHARLESTON	USN - USS JOSEPH HEWES	VESSEL	WATER	WASTE OIL
128948	7/26/1992	NAVAL STATION CHARLESTONPIER KILO SOUTH	DORCHESTER	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
129061	7/27/1992	IMMIGRATION STCOLUMBUS ST TERMINAL	CHARLESTON	CHARLESTON	PORTS AUTHORITY	FIXED	WATER	OIL: DIESEL
130527	8/5/1992	NAVSTA CHARLESTONBETWEEN PIER Q & R	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
106658	2/13/1992	SHIP YARD PIER C	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	FIXED	WATER	OIL: DIESEL
106840	2/14/1992	NAVAL STATIONPIER M & N	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
107056	2/17/1992	NAVY STATION CHARLESTONPIER Z4A. USS DAYO	CHARLESTON	CHARLESTON	US NAVY, USS DAYO	VESSEL	WATER	OIL, MISC: LUBRICATING
107829	2/23/1992	CHARLESTON HARBORBEANS PATRIOT POINT	CHARLESTON	CHARLESTON	US NAVY	UNKNOWN SHEEN	WATER	UNKNOWN OIL
108810	3/2/1992	PIER N US NAVAL STATION	CHARLESTON	CHARLESTON	US NAVY	VESSEL	WATER	OIL: DIESEL
108886	3/2/1992	PIER SIERRA SOUTH	CHARLESTON	CHARLESTON	USN-NAVAL BASE CHARLESTON	VESSEL	WATER	GASOLINE: AUTOMOTIVE (4.23G PB/G
108886	3/2/1992	PIER SIERRA SOUTH	CHARLESTON	CHARLESTON	USN-NAVAL BASE CHARLESTON	VESSEL	WATER	OIL, MISC: MOTOR

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110105	3/11/1992	CHARLESTON NSYDRYDOCK 5	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
111801	3/25/1992	PIER P, BERTH 4CHARLESTON NAVAL STATION	CHARLESTON	CHARLESTON	USN - USS MACDONOUGH	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
112205	3/28/1992	SST 1089 FTO AACHARLESTON NAVY BASEBERTH 4A	CHARLESTON	CHARLESTON	USN-USS JESSE L BROWN	VESSEL	WATER	OIL: DIESEL
115307	4/23/1992	CHARLESTON NAVAL BASEPIER N	CHARLESTON	CHARLESTON	USN - USS SANTA BARBARA	VESSEL	WATER	PAINT
116200	4/30/1992	NAVSTA CHARLESTONPIER Q 4A	CHARLESTON	CHARLESTON	USN-USS TAYLOR	VESSEL	WATER	AQUEOUS FILM FORMING FOAM
116974	5/7/1992	FOOT OF PITTSBURG AVE	CHARLESTON	CHARLESTON	L & B MARINE CORPORATION	VESSEL	WATER	OIL: DIESEL
117015	5/7/1992	PIER MIKE	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	OIL: DIESEL
117436	5/11/1992	PIER X	CHARLESTON	CHARLESTON	USN - WEAPONS STATION	VESSEL	WATER	OIL: DIESEL
117928	5/15/1992	CHARLESTON NAVSTADRYDOCK NO. 2	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
101668	1/5/1992	CHARLESTON NAVAL BASEPIER ZULU	CHARLESTON	CHARLESTON	USN - USS MACDONOUGH	VESSEL	WATER	OIL: DIESEL
101799	1/6/1992	PIER MIKEBERTH 2BRAVO	CHARLESTON	CHARLESTON	USN- USS SEAHORSE	VESSEL	WATER	OIL: DIESEL
102223	1/9/1992	CHARLESTON NSY	CHARLESTON	CHARLESTON	USN - USS SANTA BARBARA	VESSEL	WATER	OIL: DIESEL
102605	1/13/1992	1882 MILFORD ST	CHARLESTON	CHARLESTON	BP OIL	FIXED	WATER	OIL, MISC: LUBRICATING
103716	1/21/1992	FPO AA 34091-1478	CHARLESTON	CHARLESTON	USS FAHRION	VESSEL	WATER	A FFF FIRE FOGHTING FOAM
104655	1/27/1992	FPO AA 34090-1227	CHARLESTON	CHARLESTON	USS DEYO	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
143848	11/8/1992	PIER PAPA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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146406	11/24/1992	CHARLESTON NAVAL STATIONDELTA FOXTROT SLIP	CHARLESTON	CHARLESTON	USN-CHARLESTON NAVAL STA	UNKNOWN SHEEN	WATER	OIL: DIESEL
147461	12/3/1992	BETWEEN PIERS P AND Q	DORCHESTER	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL, FUEL: NO. 2-D
149403	12/16/1992	CHARLESTON NAVAL STATIONPIER P4A	CHARLESTON	CHARLESTON	USN - USS NICHOLSON	VESSEL	WATER	WASTE OIL AND BILGE WATER
149654	12/17/1992	CHARLESTON NAV BASEPIER M	CHARLESTON	CHARLESTON	USS-USS FRANK CABLE	VESSEL	WATER	OIL: DIESEL
149671	12/17/1992	CHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	USS-USS FRANK CABLE	VESSEL	WATER	OIL: DIESEL (OTH=PINT)
149807	12/17/1992	CHARLESTON NAVAL SHIPYARDPIER C BERTH NO. 4	CHARLESTON	CHARLESTON	USN-CHARLESTON NSY	VESSEL	WATER	HYDRAULIC OIL
149678	12/17/1992	NAVBASE CHARLESTONPIER M	CHARLESTON	CHARLESTON	USN-USS BILLFISH SSN 676	VESSEL	WATER	WASTE OIL
150402	12/21/1992	CHARLESTON NSYSC PIER C BERTH 4	CHARLESTON	CHARLESTON	USN - USS DANIEL WEBSTER	VESSEL	WATER	WASTE OIL AND WATER
103716	1/21/1992	FPO AA 34091-1478	CHARLESTON	CHARLESTON	USS FAHRION	VESSEL	WATER	A FFF FIRE FOGHTING FOAM
116200	4/30/1992	NAVSTA CHARLESTONPIER Q 4A	CHARLESTON	CHARLESTON	USN-USS TAYLOR	VESSEL	WATER	AQUEOUS FILM FORMING FOAM
115307	4/23/1992	CHARLESTON NAVAL BASEPIER N	CHARLESTON	CHARLESTON	USN - USS SANTA BARBARA	VESSEL	WATER	PAINT
135506	9/5/1992	FPOAA 34093-3006	CHARLESTON	CHARLESTON	USN-NAVSTA CHARLESTON	VESSEL	WATER	PAINT

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
62646	3/8/1991	BERTH 1STATE PIER NO.15	CHARLESTON	CHARLESTON	N/A	FIXED	AIR	TRIMETHYL PHOSPHITE
90347	9/30/1991	7 MILE YARDM.M. SC7	CHARLESTON	CHARLESTON	N/A	RAILROAD	LAND	OIL, MISC: MOTOR
77937	7/2/1991	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CORP.	FIXED	LAND	BLACK LIQUOR

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81318	7/29/1991	PO BOX 10288HWY 503	BERKELEY	CHARLESTON	MOBAY CORP.	FIXED	LAND	BROMINE
69732	4/26/1991	EXXON CO USA TERMINAL	CHARLESTON	CHARLESTON	EXXON CO USA	FIXED	LAND	ASPHALT
72015	5/15/1991	COPPERS YARD	CHARLESTON	CHARLESTON	CSX TRANSPORT ATION	MOBILE	LAND	ETHYL ALCOHOL
75929	6/17/1991	2151 KING ST EXTENSION	CHARLESTON	CHARLESTON	ALBRIGHT & WILSON	FIXED	LAND	N-BUTYL ALCOHOL
69725	4/26/1991	1445 GREENLEAF STREET	CHARLESTON	CHARLESTON	EXXON USA	UNKNOWN SHEEN	LAND	ASPHALT SEALER
61637	3/1/1991	BLDG 200NAVAL STATIONBERT H M3A	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	LAND	OIL: DIESEL
67816	4/13/1991	(null)	CHARLESTON	CHARLESTON	N/A	RAILROAD	RAIL REPOR T (N/A)	(null)
85575	8/21/1991	ON THE ASHLEY RIVERNEAR THE ASHLEY MARINA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
85573	8/21/1991	ON WAPPOO CREEKNEAR WAPPOO CUT BRIDGE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
85122	8/23/1991	PIER N 3ANAVAL STA CHARLESTON	CHARLESTON	CHARLESTON	USN - USS JOSEPH HEWES	VESSEL	WATER	F76 MARINE OIL: DIESEL
85354	8/25/1991	CHARLESTON NAVY YARDPAST THE PORT AUTHORITY	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
86121	8/29/1991	COLUMBUS STREET TERMINAL(CO OPER RIVER)	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL, FUEL: NO. 6
86753	9/3/1991	CHARLESTON NAVAL BASEPIER Q3A	CHARLESTON	CHARLESTON	USN-USS CARR	VESSEL	WATER	JET FUEL: JP-5 (KEROSENE, HEAVY)
86931	9/4/1991	PIER KILO	CHARLESTON	CHARLESTON	MCCULLUM CONSTRUCT ION	FIXED	WATER	WASTE OIL/LUBRICAN TS
87443	9/9/1991	PIER RCHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	USN-USS ORTOLAN	VESSEL	WATER	HYDRAULIC OIL
87980	9/11/1991	QR SLIPNAV BASE	CHARLESTON	CHARLESTON	USN NAVAL STA, PORT SERV.	PIPELINE	WATER	OIL: DIESEL
88601	9/11/1991	(null)	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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88108	9/11/1991	(null)	UNKNOWN	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
88523	9/16/1991	NAVY STATION CHARLESTONP IER A	CHARLESTON	CHARLESTON	USNS VEGA (TAK 286	FIXED	WATER	WASTE OIL/LUBRICAN TS - POSS. CON
89140	9/20/1991	CHARLESTON NAVAL BASEPIER Q	CHARLESTON	CHARLESTON	USN - USS MAHAN	VESSEL	WATER	OIL: DIESEL
89827	9/26/1991	60 BRASWELL STREETASHLE Y RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
90805	10/3/1991	PIERS R AND SNAVAL STATION CHARLESTONC OOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
91750	10/10/1991	PIER P AND Z	CHARLESTON	CHARLESTON	USN-CHARLESTO N NAVAL STA	UNKNOWN SHEEN	WATER	OIL: DIESEL
92917	10/19/1991	BAINBRIDGE AVEON THE NAVAL STATION	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	GASOLINE: AUTOMOTIVE (4.23G PB/G
92917	10/19/1991	BAINBRIDGE AVEON THE NAVAL STATION	CHARLESTON	CHARLESTON	N/A	MOBILE	WATER	OIL, MISC: MOTOR
93034	10/21/1991	NAVAL WEAPONS STATIONTC TERMINAL	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	JET FUEL: JP-4
76170	6/19/1991	CENTER OF RIVER NEAR TCADOCK, AT THE NAVAL WEAPONSTA.	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
76597	6/23/1991	PIER NO. PCOOPER RIVER	DORCHESTER	CHARLESTON	USN NAVAL STA, PORT SERV.	UNKNOWN SHEEN	WATER	UNKNOWN OIL
77798	7/2/1991	NAVAL STATION CHARLESTONB ETWEEN PIER LIMA ANDPIER ZULU	CHARLESTON	CHARLESTON	USN NAVAL STA, PORT SERV.	UNKNOWN SHEEN	WATER	OIL, FUEL: NO. 2-D
77867	7/3/1991	L Z SLIPCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
78050	7/4/1991	LOCKWOOD BLVDASHLEY RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
78731	7/9/1991	NAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL

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78802	7/10/1991	CHARLESTON CITY MARINALOCK WOOD DRIVE	CHARLESTON	CHARLESTON	JJ FISHING CO	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
78786	7/10/1991	PIER R AND SNAVAL STATION CHARLESTONCOOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
80482	7/21/1991	NAVAL WEAPONS STATION	BERKELEY	CHARLESTON	US NAVY	FIXED	WATER	OIL: DIESEL
80628	7/23/1991	NAVAL STATION CHARLESTONCOOPER RIVER	CHARLESTON	CHARLESTON	FLEET MINE WARFARE TRACEN	FIXED	WATER	WASTE OIL/LUBRICANTS - POSS. CON
80540	7/23/1991	US NAVAL STATIONPIER PAPA	CHARLESTON	CHARLESTON	USS SIERA AD18	VESSEL	WATER	OIL: DIESEL
81707	7/31/1991	NAVSTA CHARLESTONPIER QBERTH 4A	CHARLESTON	CHARLESTON	USN- USS SEMMS	VESSEL	WATER	WASTE OIL/LUBRICANTS
82714	8/7/1991	BUILDING 200NAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	USN NAVAL STA. PORT SERV.	VESSEL	WATER	OIL: DIESEL
82966	8/8/1991	PIER DBERTH 6A	CHARLESTON	CHARLESTON	USS ORTOLAN	VESSEL	WATER	JET FUEL: JP-5 (KEROSENE. HEAVY)
83379	8/12/1991	BUILDING 200NAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
84003	8/15/1991	NAVAL STATION CHARLESTONPIER Q, BERTH 3A	CHARLESTON	CHARLESTON	USN - USS HALYBURTON	VESSEL	WATER	OIL: DIESEL
84067	8/16/1991	NAVAL WEAPONS STATIONPIER B	BERKELEY	CHARLESTON	USN - USS MOUNT BAKER	VESSEL	WATER	OIL: DIESEL
84239	8/17/1991	COLUMBUS TERMINALPIER NO. 1	CHARLESTON	CHARLESTON	LYKES BROTHERS STEAMSHIP	VESSEL	WATER	OIL, FUEL: NO. 6 (6 OZ.)
69833	4/27/1991	BUILDING 200NAVAL STATION CHARLESTONPIER N	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	WASTE OIL/LUBRICANTS
70502	4/27/1991	NAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON

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70048	4/29/1991	NAVAL STATION CHARLESTONBERTH Q4A	CHARLESTON	CHARLESTON	USS BLAKELY	VESSEL	WATER	OILY WATER
70043	4/29/1991	PIER Q BERTH 4	DORCHESTER	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	OIL, FUEL NO. 2
69965	4/29/1991	SLIP ZMNAVAL STATION	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
71024	5/6/1991	COLMUBUS STREET TERMINAL	CHARLESTON	CHARLESTON	SEALAND SERVICE INC	VESSEL	WATER	OIL: DIESEL
72460	5/17/1991	ON FOLLY CREEK AT THEFOLLY RD BRIDGE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
72673	5/20/1991	PIER PAPA 4 ALPHA	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	UNKNOWN OIL
73039	5/23/1991	50 IMMIGRATION ST	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
73367	5/26/1991	PIER QCOOPER RIVER	CHARLESTON	CHARLESTON	USS HALEY BURTON	VESSEL	WATER	OIL, MISC: LUBRICATING
73601	5/27/1991	CHARLESTON NAVAL BASEPIER U	CHARLESTON	CHARLESTON	USS EXULTANT (441)	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
73517	5/28/1991	PK SLIPNAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL, MISC: LUBRICATING
73590	5/29/1991	NAVAL STATION CHARLESTONPIER Q	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
74734	6/6/1991	COOPER RIVERDAY MARKER 49 CLOSESTNAVAID; DANIEL ISLAND	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
75436	6/13/1991	BETWEEN D & F DOCKSNAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	UNKNOWN SHEEN	WATER	OIL: DIESEL
75705	6/15/1991	PIER CHARLIEGOOSE CREEK	BERKELEY	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
75783	6/16/1991	NAVAL WEAPON STATIONPIER C	BERKELEY	CHARLESTON	USS HOLLAND	VESSEL	WATER	OIL: DIESEL (F76)
63752	3/16/1991	PIER S/T QUAYWALLNAVAL STATION	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL

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63987	3/18/1991	BUILDING 200NAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	NAVAL STATION SUPPORT SRV	FIXED	WATER	WASTE OIL/LUBRICANTS - Poss. Con
64836	3/23/1991	AMOCO CHEMICAL PLANTCOOPER RIVER	CHARLESTON	CHARLESTON	AMOCO TRANSPORT COMPANY	VESSEL	WATER	OIL, MISC: MOTOR
65005	3/25/1991	BUILDING 200NAVAL STATION CHARLESTONPIER PAPA	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	WASTE OIL/LUBRICANTS - Poss. Con
65018	3/25/1991	PIER ZCOOPER RIVER	CHARLESTON	CHARLESTON	USS MACDONOUGH	VESSEL	WATER	OTHER OIL (SF76) FUEL OIL
66525	4/4/1991	PQ SLIP	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	FIXED	WATER	OIL, FUEL: NO. 2
67087	4/8/1991	COOPER RIVERCHARLESTON NAVAL BASE	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	OIL, MISC: LUBRICATING
67192	4/9/1991	PIER QNAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
68033	4/15/1991	BUILDING 200NAVAL STATION CHARLESTONPIER Y	CHARLESTON	CHARLESTON	USS GUARDIAN	VESSEL	WATER	WASTE OIL/LUBRICANTS - Poss. Con
68348	4/16/1991	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
68377	4/17/1991	SC PORT AUTHORITYBERTH NO. 3	CHARLESTON	CHARLESTON	HARRINGTON SHIPPING AGNCY	VESSEL	WATER	OIL: DIESEL
69701	4/20/1991	NAVAL BASE CHARLESTONNEAR PIER A	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
68839	4/21/1991	PIER PBERTH 4	CHARLESTON	CHARLESTON	USN	VESSEL	WATER	OIL: DIESEL
69498	4/24/1991	CHARLESTON HARBORNEAR BOUY NO. 26	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
69351	4/24/1991	NAVAL STATION CHARLESTONPIER D SOUTH	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	OIL, MISC: LUBRICATING
69502	4/24/1991	NAVAL STATION CHARLESTONPIER J	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
69336	4/24/1991	NAVAL STATION CHARLESTONPIER P	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	UNKNOWN SHEEN	WATER	OIL: DIESEL
69523	4/25/1991	NAVAL STATION CHARLESTONPIER QUEBEC-4A	CHARLESTON	CHARLESTON	USN NAVAL STATION SUPPORT	VESSEL	WATER	OIL: DIESEL
54852	1/14/1991	PIER QNAVAL BASE	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
59422	1/23/1991	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
59423	1/28/1991	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	UNKNOWN OIL
57095	1/29/1991	NAVSTA CHARLESTONCOOPER RIVER	DORCHESTER	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
57360	1/31/1991	SOLOMONS TERMINALSHIP YARD CREEK	CHARLESTON	CHARLESTON	USN-MILITARY SEALIFT CO	VESSEL	WATER	WASTE OIL/LUBRICANTS
59420	2/5/1991	CHARLESTON HARBORCOOPER RIVER BOUY 10	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
62253	2/5/1991	CHARLESTON HARBORCOOPER RIVER BUOY NO. 10	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
58513	2/7/1991	196 TRADD ST	CHARLESTON	CHARLESTON	USCG CUTTER METOMPKIN	VESSEL	WATER	HYDRAULIC OIL
59424	2/7/1991	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
59418	2/13/1991	USN COOPER RIVERNAVAL STATION CHARLESTON	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
62268	2/18/1991	SHEM CREEKAT CHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
60628	2/21/1991	PIER FCHARLESTON NAVAL SHIPYARD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
60749	2/22/1991	BLDG 200NAVAL STATIONPIER P3	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	WASTE OIL/LUBRICANTS - Poss. Con

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62254	2/22/1991	CHARLESTON HARBOR	UNKNOWN	CHARLESTON	USN US NAVY	VESSEL	WATER	WASTE OIL/LUBRICANTS - Poss. Con
60941	2/24/1991	BETWEEN PIERS M AND NNAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	UNKNOWN SHEEN	WATER	WASTE OIL/LUBRICANTS
61379	2/27/1991	2079 AUSTIN AVE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	WASTE OIL/LUBRICANTS - Poss. Con
65503	3/11/1991	CHARLESTON HARBOR	CHARLESTON	CHARLESTON	TURECAMO TOWING	VESSEL	WATER	OIL: DIESEL
63711	3/15/1991	STONO RIVER BETWEENMARKER 21 AND 21A	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
93033	10/21/1991	T C TERMINALARMY TERMINAL	CHARLESTON	CHARLESTON	OMI CORP	VESSEL	WATER	JET FUEL: JP-4
93370	10/22/1991	BETWEEN JETTIES	CHARLESTON	CHARLESTON	N/A	VESSEL	WATER	OIL: DIESEL
95738	11/10/1991	BETWEEN PIERS P AND Q	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
95824	11/11/1991	PIER QCHARLESTON NAVAL STATION	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
96048	11/12/1991	BRASWELL SHIP YARDASHLEY RIVERNEAR THE NORTH BRIDGE	CHARLESTON	CHARLESTON	BRASWELL SHIP YARD	FIXED	WATER	BLACK DIAMOND DUST
98521	12/5/1991	NAVAL STATIONPIER T	CHARLESTON	CHARLESTON	USN-USS AVENGER	VESSEL	WATER	OIL: DIESEL
99724	12/14/1991	CLOUDER CREEK REACHON THE COOPER RIVER	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
99923	12/16/1991	WANDO TERMINAL	CHARLESTON	CHARLESTON	LYKES SHIPPING LINES	VESSEL	WATER	3-TRIFLOUROMETHYLANILINE
101094	12/29/1991	2079 AUSTIN AVE	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
99923	12/16/1991	WANDO TERMINAL	CHARLESTON	CHARLESTON	LYKES SHIPPING LINES	VESSEL	WATER	3-TRIFLOUROMETHYLANILINE

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96048	11/12/1991	BRASWELL SHIP YARDASHLEY RIVERNEAR THE NORTH BRIDGE	CHARLESTON	CHARLESTON	BRASWELL SHIP YARD	FIXED	WATER	BLACK DIAMOND DUST

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40322	9/21/1990	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CORP.	CONTINUOUS	(null)	(null)
40823	9/24/1990	2151 KINGS ST. EXT.	CHARLESTON	CHARLESTON	ALBRIGHT AND WILSON AMER.	CONTINUOUS	(null)	(null)
30954	7/14/1990	5600 VIRGINIA AVE	CHARLESTON	CHARLESTON	WESTVACO CORP.	FIXED	LAND	SULFURIC ACID
39311	9/14/1990	1 MILE ON HARBOR VIEW RD.FROM FOLLOY RD.	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	LAND	UNKNOWN OIL
6987	2/4/1990	AMERICAN STREET AND I-17	CHARLESTON	CHARLESTON	BOAT TRANSPORT	MOBILE	LAND	OIL: DIESEL
7657	2/8/1990	1882 MILFORD ST	CHARLESTON	CHARLESTON	BP OIL COMPANY	FIXED	LAND	GASOLINE: AUTOMOTIVE (4.23G PB/G
8133	2/11/1990	COOPER RIVER BRIDGEHWY 17	CHARLESTON	CHARLESTON	N/A	MOBILE	LAND	OIL, FUEL: NO. 2
14563	3/27/1990	477 MANOR ROAD APT 1A WANDO TERMINAL	CHARLESTON	CHARLESTON	USCG MSO CHARLESTO N	FIXED	LAND	CYCLOHEXAN E
13751	3/21/1990	AT DUQUESNE FACILITY ON ACHARLESTON SHIPYARDCOD E 460	CHARLESTON	CHARLESTON	CHARLESTO N NAVAL SHIPYARD	PIPELINE	SUBSU RFACE	SULFURIC ACID
47200	11/10/1990	PIER AT THE NAVAL BASENAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	UNKNO WN	PETROLEUM CLEANING SOLVENT
42527	10/5/1990	PIERS C AND D	CHARLESTON	CHARLESTON	CHARLESTO N NAVAL SHIPYARD	FIXED	WATER	OIL, FUEL: NO. 2
43027	10/10/1990	NAVAL STATION	CHARLESTON	CHARLESTON	USN USS ELROD	VESSEL	WATER	WASTE OIL/LUBRICAN TS - Poss. Con

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44126	10/18/1990	BLDG 200NAVAL STATIONBETWEEN PIER Q AND R	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
44913	10/24/1990	PIER N2ANAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL, FUEL: NO. 2
45396	10/29/1990	PIER X-RAYNAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
46125	11/2/1990	NAVAL SHIPYARD	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OTHER OIL
46110	11/2/1990	NAVAL SUPPLY CENTER PIERALPHA	CHARLESTON	CHARLESTON	USN MILITARY SEALIFT CMD	VESSEL	WATER	OIL, BUNKER C
47820	11/15/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	WASTE OIL/LUBRICANTS - Poss. Con
47701	11/15/1990	PIER QR QUAYWALL	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	UNKNOWN SHEEN	WATER	OIL, MISC: LUBRICATING
47955	11/16/1990	WALPOLE CUT BRIDGE ON THEINTRACOASTAL WATERWAY	CHARLESTON	CHARLESTON	SC DEPT OF HIGHWAYS	VESSEL	WATER	OIL, MISC: LUBRICATING
49351	11/29/1990	BLDG 200NAVAL STATIONPIER C	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
49606	12/2/1990	ARMY TRANS. TERM	CHARLESTON	CHARLESTON	M/V CHINA SEA	VESSEL	WATER	JET FUEL: JP-4
49976	12/4/1990	CHARLESTON HARBORREBEL LION REACH	CHARLESTON	CHARLESTON	WATERMAN STEAMSHIP	VESSEL	WATER	UNKNOWN MATERIAL
50303	12/7/1990	BETWEEN PIER J & ZNAVAL STATION	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	OIL: DIESEL
50307	12/7/1990	PIER C SOUTHNAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	FIXED	WATER	WASTE OIL/LUBRICANTS - Poss. Con
50818	12/12/1990	NAVAL STATION CHARLESTONPIER ZULU	CHARLESTON	CHARLESTON	USS MOUNT BAKER	VESSEL	WATER	BILGE OIL

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
51529	12/18/1990	NAVAL WEAPONS STATIONPIER C COOPER RIVER	CHARLESTON	CHARLESTON	US NAVY	UNKNOWN SHEEN	WATER	OIL, MISC: LUBRICATING
52368	12/24/1990	PIER K4ANAVAL STATION	CHARLESTON	CHARLESTON	USN USS WILLIAM V PRATT	VESSEL	WATER	OIL: DIESEL
101717	1/6/1991	NAVSTA CHARLESTONP IER ZBERTH 4B	CHARLESTON	CHARLESTON	USN - USS MACDONOU GH	VESSEL	WATER	OIL: DIESEL, MARINE
27188	6/17/1990	NAVAL STATION CHARLESTONU SNS MOHAWK T-ATF 170	CHARLESTON	CHARLESTON	US NAVY	VESSEL	WATER	BILGE OIL
27201	6/17/1990	NAVAL STATIONMN-QW	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	OIL: DIESEL
28569	6/27/1990	NAVAL STATIONST, TU SLIP	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
33855	8/3/1990	1882 MILFORD ST	CHARLESTON	CHARLESTON	BP OIL	FIXED	WATER	WASTE OIL
33877	8/3/1990	NAVAL STAPIER Z	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	OIL, FUEL: NO. 2
34322	8/7/1990	COLUMBUS STREET WHARFPIER NO. 1	CHARLESTON	CHARLESTON	MIKES BROTHERS STEAMSHIP	VESSEL	WATER	OIL, FUEL: NO. 6 .99 = 1 OZ.
34937	8/10/1990	PIER MIKENAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	UNKNOWN OIL
35137	8/12/1990	SHIP YARDNAVAL STATIONPIER G	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	WASTE OIL/LUBRICAN TS - POSS. CON
40100	8/15/1990	437 CSG/DEEV	CHARLESTON	CHARLESTON	CHARLESTO N AF BASE	FIXED	WATER	JET FUEL: JP-4
36108	8/20/1990	BLDG 200NAVAL STATIONPIER P	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	OIL: DIESEL
37642	8/30/1990	SHIP YARD PIER CHARLIE	CHARLESTON	CHARLESTON	USN US NAVE	VESSEL	WATER	HYDRAULIC OIL
38410	9/6/1990	PIER Q-1ANAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTO N	VESSEL	WATER	OIL: DIESEL
39062	9/11/1990	217 FORT JOHNSON ROAD	CHARLESTON	CHARLESTON	SC WILDLIFE AND MARINE	UNKNOWN SHEEN	WATER	OIL, FUEL: NO. 2 (QUANTITY IS EST.)

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
39205	9/13/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	SIMA DIVERS	FIXED	WATER	OIL: DIESEL
39207	9/13/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USS FEARLESS	VESSEL	WATER	WASTE OIL/LUBRICANTS - Poss. Con
41461	9/28/1990	PK PIER SLIPNAVAL STATION	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
7764	2/9/1990	PIER PAPABERTH 3A	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
8902	2/19/1990	113 ARENDELL ST PORT OF CHARLESTON	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
10341	3/1/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL, FUEL: NO. 2
17571	4/17/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
18072	4/19/1990	BOHICKET MARINA1880 ANDELL BLUFF	CHARLESTON	CHARLESTON	SOUTHEAST MARINE TRANSP.	VESSEL	WATER	OIL: DIESEL (NR 2)
18596	4/23/1990	COOPER RIVERCHARLESTON HARBOR	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
20057	5/1/1990	COOPER RIVER BY THE NAVYYARD	CHARLESTON	CHARLESTON	N/A	UNKNOWN SHEEN	WATER	UNKNOWN OIL
21752	5/14/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL, FUEL: NO. 2
21858	5/14/1990	PC DOCKSNORTH TERMINAL	CHARLESTON	CHARLESTON	MAR SHIP OPERATORS	VESSEL	WATER	OIL: DIESEL
22063	5/15/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	OIL: DIESEL
22115	5/15/1990	NAVAL BASE CHARLESTONPIER UNIFORM	CHARLESTON	CHARLESTON	USN-NAVAL BASE CHARLESTON	VESSEL	WATER	WASTE OIL/LUBRICANTS - POSS. CON
22512	5/17/1990	NAVAL WEAPONS STATION	BERKELEY	CHARLESTON	US NAVY	FIXED	WATER	OIL: DIESEL MARINE
23629	5/24/1990	166 TALL PINES RD	BERKELEY	CHARLESTON	N/A	FIXED	WATER	OIL, MISC: MOTOR

NRC Report#	Incident Date	Street	Location County	City	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
27126	6/16/1990	17 LOCKWOOD BLVD	CHARLESTON	CHARLESTON	N/A	FIXED	WATER	OIL, MISC: MOTOR
27193	6/17/1990	BLDG 200NAVAL STATION	CHARLESTON	CHARLESTON	USN PORT SERV CHARLESTON	VESSEL	WATER	BILGE OIL

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#41-43	27-Jun-1982		Pier K	PCB Oil	Unknown	Unknown	Unknown	Unknown	AbSorbent pads and Varsol wash down
Outside DB#48H and 48-I/48-M	12-Apr-1988	NL	Pier X-ray Quay wall	Lube Oil	1 gal.	Plastic bag filled with lube oil dropped over quay wall. Left by unknown personnel	8- x 8-foot slick. No threat to property, wildlife or other resources.	Contained by quay wall. Removed with absorbents.	
Outside DB#44/46-A	12-Oct-1989	NL	Pier November South and Papa	DFM	450 gal.	Unknown	400- x 1500-foot light to dark brown slick.	Contained with boom. Removed with Dip and sorbents.	
Outside DB#44/46-A	2-Nov-1989	NL	Pier Papa South	Unknown. Light brown oil-based substance.	55 gal.	Unknown	75- x 500-foot light brown slick on Cooper R. No apparent damage to property or wildlife.	Samples were taken. Contained with boom. Removed with DIP 3001 skimmer and sorbents.	
Outside DB#41-43A	2-Dec-1989	NL	Pier Lima Zulu Slip	Oil/water mixture	35 gal.	Possible crack in waste oil barge hull	5- x 10-foot dark brown slick on the Cooper R. with no apparent damage.	Samples were taken. Contained with boom.	
Outside DB#44/46-A	11-Jan-1990	NL	P N	NL	5 gal.	NL	NL	Good containment	
	16-Jan-1990	NL	Pier ?	NL	250 gal.	NL	NL	NL	
Outside DB#44/46-A	9-Feb-1990	NL	Pier P	Fuel Oil	300 gal.	Tank Overflow	NL	NL	
Outside DB#44/46-A	9-Feb-1990	NL	Pier Papa Berth 4A	Fuel Oil	300 gal.	Tank overflowed during fuel transfer.	100- x500–foot dull brown slick on the Cooper R. No apparent damage to property or wildlife.	Spill removed using sorbents and DIP 3001.	
Outside DB#41-43A	1-Mar-1990	NL	Pier Z Slip M	NL	60 gal.	Inaccurate tank level indicator.	NL	NL	
Outside DB#43-A	1-Mar-1990	NL	Berth Z 4A	DFM/Water Mix	40 gal.	Spill during filling. Inaccurate tank level indicator.	5- x 75-foot light brown transient sheen barely visible	Contained with boom, camels, and water spray. Removed with sorbents	
Outside DB#26	30-Mar-1990	NL	C-South	Shipyard Oil	5 gal.	NL	Spill into Cooper	NL	
Outside DB#41-43	17-Apr-1990	NL	K-South	NL	65 gal.	Nl	Spill into Cooper	NL	
Outside DB#26	1-May-1990	NL	C-South	NL	20 gal.	NL	NL	Removed with camel sub and dip	

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Outside DB#43-A	9-May-1990	NL	Pier Z Berth 3A	DFM	70 gal.	Valve misalignment during defueling.	10- x20-foot reddish brown slick.	Contained between ship's hull and solid pier wall using fire hoses. Removed with adsorbent pads.	
Outside DB#43-A	9-May-1990	NL	Pier Zulu	NL	70 gal.	NL	Brown slick	Spill was cleaned up.	
Outside DB#48-A/48-G	15-May-1990	NL	Pier S	NL	4 gal.	While refueling	NL	NL	
Outside DB#44/46-A and 43-A	24-May-1990	NL	M-Z	NL	5 gal.	NL	NL	Removed with Dip and sorbents.	
	15-Jun-1990	NL	Wep. Sta.	NL	40 gal.	NL	NL	Wep. Sta. handled	
Outside DB#44/46-A,47,46-B,48-A/48-G	15-Jun-1990	NL	ST QU	NL	17 gal.	Fuel hose broke on truck	NL	Removed with Dip	
Outside DB#44/46-A,47,46-B,48-A/48-G	17-Jun-1990	NL	M, N, Q, U	NL	5 gal.	NL	NL	Removed with boom barge. No sample collected.	
Outside DB#27, 28-A	18-Jun-1990	NL	D-South	Paint	2 gal	NL	NL	NL	
Outside DB#48-A/48-G	27-Jun-1990	NL	T-NIS	NL	4 gal.	NL	NL	No sample taken	
Outside DB#43-A	27-Jun-1990	NL	Z-R	NL	100 gal.	NL	NL	No sample taken	
Outside DB#44/46-A,47,47-A	20-Aug-1990	NL	P, R Slip	NL	45	NL	NL	NL	
Outside DB#26	30-Aug-1990	NL	CNCY C	NL	7	NL	NL	NL	
Outside DB#44/46-A,47,46-B	4-Sep-1990		ATC to Pier Q	Diesel Fuel	75 gal	75 gal	Unknown	1.5 mi x 300' slick	Dip skimmer, Sorbents
Outside DB#44/46-A,47,46-B	9-Sep-1990	NL	Q-1-A	NL	2	NL	NL	NL	
Outside DB#48-A/48-G	13-Sep-1990	NL	T-1-A	NL	2	NL	NL	NL	
Outside DB#44/46-A	20-Sep-1990	NL	P-3	Disposed oil	5	NL	NL	NL	
Outside DB#44/46-A,47,46-B	27-Sep-1990	NL	P, Q Quay wall	NL	15	NL	NL	NL	
Outside DB#44/46-A,47,46-B	28-Sep-1990	NL	P, Q Quay wall	NL	10	NL	NL	NL	
	5-Oct-1990	NL	Shipyard	NL	50	In deck drain	NL	NL	

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#43-A	10-Oct-1990	NL	Z-1	NL	15	NL	NL	NL	
Outside DB#44/46-A,47,47-A,46-B	18-Oct-1990	NL	Q-R Slip	NL	150	NL	NL	NL	
Outside DB#44/46-A	24-Oct-1990	NL	N-ZA	NL	75	NL	NL	NL	
Outside DB#48H and 48-I/48-M	29-Oct-1990	NL	X-A	NL	5	NL	NL	NL	
	2-Nov-1990	NL	ATC	NL	2	Most oil contained on deck	NL	NL	
Outside DB#44/46-A	10-Nov-1990	NL	Pier M	Oil Mixture	25	NL	NL	NL	
Outside DB#44/46-A	15-Nov-1990	NL	N-2A	NL	105	NL	NL	NL	
Outside DB#44/46-A,47,47-A,46-B	15-Nov-1990	NL	Q-R	Bilge Oil	200	NL	NL	NL	
Outside DB#41-43	19-Nov-1990	NL	K	NL	400	NL	NL	Land spill/we boomed and sounded	
Outside DB#26	29-Nov-1990	NL	C	NL	1	NL	NL	NL	
	3-Dec-1990	NL	Army Dock SC	NL	1.5 gal.	NL	NL	NL	
Outside DB#41-43	7-Dec-1990	NL	K-Z Slip	NL	50	NL	NL	NL	
Outside DB#26	7-Dec-1990	NL	C	NL	10	NL	NL	NL	
Outside DB#43-A	12-Dec-1990	NL	Z-M	NL	5	NL	NL	Used Dip only	
Outside DB#48-A/48-G	14-Dec-1990		S/T	NL	2	While pump bilge in YOS 10	NL	Boom Dip	
Outside DB#26,27,28-A,29,30	15-Dec-1990		C-F	NL	50	Hess oil spill	NL	NL	
	18-Dec-1990		Wep. Sta.	NL	300	NL	NL	NL	
Outside DB#41-43	19-Dec-1990		From Kilo	NL	2	Left over from 12/18/90	NL	NL	
	4-Jan-1991	Memo	Cooper River	Gray water	Unknown	Unknown	Gray water discharged from sink of YFN 1205 barge	Unknown	Sink removed.
Outside DB#44/46-A,47,46-B	14-Jan-1991	54852	Pier Q 3A	Diesel Fuel	10 gal	10 gal	Fueling, air in tank or lines	25' x 6' slick	Sorbents
Outside DB#44/46-A,47,47-A,46-B	14-Jan-1991		Q/R Slip		20	20	Ship admitted spill		

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CNC Related Spills/Releases
Cooper River 1982-1994

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Drainage Basin#30	14-Jan-1991	91-15	storm sewer at NW corner of Bldg 1199	Paint	Unknown	Unknown	Contractor washing paint brushes into storm sewer	Unknown	Contractor removed and collected all wastewater in the storm catch basin and properly disposed of wastewater into sanitary sewer system.
Outside DB#26	18-Jan-1991		C		2	2			
Outside DB#43-A	29-Jan-1991		Z-4		70	70	Transferring fuel		
Outside DB#44/46-A	9-Feb-1991		Pier P-4A		300	300	PFM-Internal fuel transfer		
Outside DB#48-A/48-G	12-Feb-1991		U		1	1	Spill off donut		
Outside DB#44/46-A,47,46-B	13-Feb-1991		Q-1A		3	3			
Outside DB#27,28-A,29,30	22-Feb-1991		D-F Slip		30	30	UB 31 San South Port Pump		
Outside DB#44/46-A	22-Feb-1991		P3A		15	15			Ship did most of clean up
Outside DB#27,28-A,29,30	22-Feb-1991	60628	D-F Slips	Oil/Water	30 gal	30 gal	Valve misalignment	600' x150' slick	Dip skimmer, Sorbents
Outside DB#44/46-A,47,47-A,46-B	24-Feb-1991		Q-R		10	10			Dip and Sorbent
Outside DB#44/46-A	25-Feb-1991	60941	Pier Mike to Pier Papa	Diesel Fuel	10 gal	10 gal	Unknown	35' x 40' slick	Dip skimmer, Sorbents
Outside DB#44/46-A	1-Mar-1991		M-3A		30	30			Ship did nothing to contain, involved 3 slips DFM
Outside DB#43-A	11-Mar-1991		Z-4A		15	15			DFM
Outside DB#48-A/48-G	16-Mar-1991	63752	Pier S-T wall	Used Lube Oil	5 gal	5 gal	Unknown	4' x 5' slick	Dip skimmer, Sorbents
Outside DB#47, 47-A, 47-B, 48-A/48-G	18-Mar-1991		R/S Slip		30	30			Oil went to sewage drain from fire fighting
Outside DB#27,28-A	24-Mar-1991		D-2A		25	25	Ship overfilled tank		
	25-Mar-1991		2-4A		60	60			Ship shifted, delayed clean up

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CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#44/46-A,47,46-B	25-Mar-1991		Q-A		15	15	Oil had been in water for some time		
Outside DB#44/46-A,47,46-B	25-Mar-1991	65005	Pier Q-P	Diesel	15 gal	15 gal	Unknown	150' x 50' slick	Dip skimmer, Sorbents
Outside DB#44/46-A	3-Apr-1991		P-4		55	55	Hydro line busted; dumping in water		
Outside DB#44/46-A	4-Apr-1991		Pier Papa	Hydraulic Oil	55 gal	10 gal	Hydraulic line vibrated loose	Slick contained by pier	Oil dry and Sorbent booms
Outside DB#44/46-A	8-Apr-1991		P-8		10	10	Heavy oil over the side		
Outside DB#44/46-A,47,46-B	9-Apr-1991	67192	Pier Q and ½ mile south	Diesel Fuel	50 gal	50 gal	Unknown	150' x 2,000' slick	dip skimmer, Sorbents
Outside DB#51-G	15-Apr-1991		Y		10	10		spread and tide change	
Outside DB#27,28-A,33,33-A	19-Apr-1991		D/G		3	3			DG investigated yesterdays spill
Outside DB#44/46-A	20-Apr-1991		N-4		20	20			Ships force clean up
Outside DB#44/46-A	21-Apr-1991		Berth P 4 A	Oil/Water	20 gal	20 gal	Overflow during dewatering of tanks		Cleaned up by ship's crew
	24-Apr-1991				<1 gal	<1 gal	Faulty tank level indicator		
Outside DB#27,28-A	24-Apr-1991		D-4 South		10	10			Ship force rigged Sorbent boom some crossed
Outside DB#27,28-A	24-Apr-1991		Pier Delta B6	Diesel Fuel	5 gal	5 gal	Hose dislodged during fueling	150' x 10' slick	Sorbent pads
Outside DB#36,37,38	24-Apr-1991	69336	Pier Juliette, N. side	Diesel Fuel	10 gal	10 gal		50' x 150' slick	Sorbents, dip skimmer
Outside DB#44/46-A,47,46-B	26-Apr-1991		Pier Q 4A	Navy distillate F-76	50 gal	50 gal	Unknown, possible structural failure	1000' x 100' slick	
Outside DB#36,37,38	26-Apr-1991		Pier J	DFM	10	10			
Outside DB#44/46-A	28-Apr-1991	64833	Pier November	Lube, Hydraulic Oils	15 gal	15 gal	Misalignment of an eductor	20' x 3' slick	Sorbent pads
Outside DB#44/46-A	29-Apr-1991	69465	Pier Mike	Diesel Fuel	50 gal	50 gal	Unknown	1,100' x 600' slick	
Outside DB#44/46-A,47,46-B	29-Apr-1991		Q-4	Wastes, water oil mixture	500	500	Pumping from wastes water tank to mach. rm.		

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CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
	30-Apr-1991			Oil/Water	200-300 gal	200-300 gal	Tank overflow	Minor residue remained	Sorbents and surface skimmer
	30-Apr-1991		Across from NSCA		5	5			Went in grass, did what we could.
Outside DB#43-A	9-May-1991		Pier Z	DFM	70	70			
Outside DB#44/46-A	20-May-1991		Pier Papa	Fuel oil	25 gal	25 gal	Overfill	Unknown	Cleanup complete
Outside DB#44/46-A,47,46-B	27-May-1991		Pier Q		5	5	Looked like out bound sub		
Outside DB#44/46-A,47,46-B	27-May-1991	73367	Pier Quebec Berth 1A	Oil/Water	5 gal	5 gal	Overfill during transfer	Small slick	Sorbents
Outside DB#44/46-A	28-May-1991	73517	Pier Mike to ½ mile South	Hydraulic Oil	20 gal	20 gal	Unknown	100' x 2,000' slick	Dip and Sorbents
Outside DB#44/46-A,47,46-B	29-May-1991		Q-North		5	5			
Outside DB#48-A/48-G	6-Jun-1991	74734	Pier Uniform to Daymark 49	Diesel	5 gal	5 gal	Unknown	10' x 10' slick	Dip skimmer
Outside DB#48-A/48-G	7-Jun-1991		Pier U		5	5			
Outside DB#26	14-Jun-1991		Pier Charlie	oil/Bilge Waste	15-30 gal	15-30 gal	Bilge dewatering vacuum can failure	30' x 40' slick	Sorbents
Outside DB#27,28-A	14-Jun-1991		D		1	1			
Outside DB#44/46-A	23-Jun-1991	76597	Pier Papa N	Diesel Fuel	30 gal	30 gal	Unknown	Unknown	Sorbents
Outside DB#41-43A	2-Jul-1991		L-4		10	10			
Outside DB#41-43A	3-Jul-1991	77867	Pier Lima	Unknown	<5 gal	<5 gal	Unknown	10' x 20' slick	Sorbents
Outside DB#47, 47-A, 47-B, 48-A/48-G	7-Jul-1991	82714	Pier Romeo/Sierra	Diesel	10 gal	10 gal	Unknown	40' x 40' slick	Dip skimmer and Sorbent
	9-Jul-1991		Marker #49	20	20			Dusk in middle of river with strong ebb	
Outside DB#47,47-A	10-Jul-1991	787786	Pier Romeo	Unknown	2 gal	2 gal	Unknown	50' x 100' slick	Sorbents and dip
Outside DB#41-43A	22-Jul-1991		L-4		0.5	0.5			CO said he would take care of it
Outside DB#44/46-A	23-Jul-1991	80540	Pier Papa	Diesel	<1 gal	<1 gal	Dewatering bilge, Improper hose connection	13' x 10' slick	Sorbents

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Outside DB#47, 47-A, 47-B, 48-A/48-G	24-Jul-1991	80628	R & S Slips	Diesel	30 gal	30 gal	Pump cont. failure at lift station	40' x 20' slick	Skimmer and Sorbents
Outside DB#48-A/48-G	24-Jul-1991		S & T		10	10			
Outside DB#44/46-A	30-Jul-1991		M-3		1	1	Burped oil		S/F contained clean up & sent message
	31-Jul-1991		Cooper River	Oily Waste	2 gal	2 gal	Hose slipped out of donut		Skimmer
Outside DB#44/46-A	3-Aug-1991		Pier N		20	20	Over flow piped directs over side		
Outside DB#47, 47-A, 47-B, 48-A/48-G	7-Aug-1991		R-S Slip		10	10	oil like it had been in river for awhile		
Outside DB#27,28-A	8-Aug-1991		D South	JP-5	15	15			SF performed good
	12-Aug-1991		River V-R		50	50		Long rainbow	
	12-Aug-1991	83374	In Middle River from Clouter Reach South east of Bouy 50 to Daniel Island Bend	Diesel	50 gal	50 gal	Unknown	700 yds x 150 yds slick	Sorbents and dip skimmer
Outside DB#44/46-A,47,46-B	15-Aug-1991		Q-3		1	1	Leaked from valve on YON 269 shipyard		
Outside DB#44/46-A	23-Aug-1991		Pier N	Fuel	20 gal	20 gal	Tank overflow	unknown	Cleaned up
	29-Aug-1991		Columbus Street Pier		100	100			FIN Vae responded
Outside DB#44/46-A,47,46-B	3-Sep-1991		Q-1A		10	10			Cheng to send msg/cost to NRC 1,173.00.
Outside DB#41-43	4-Sep-1991		K-North		5	5		35 spilled on pier/5 in water	
Outside DB#47, 47-A, 47-B, 48-A/48-G	11-Sep-1991		R & S Slip		10	10	Came from FF School		
Outside DB#6,7	16-Sep-1991		A		10	10			CO Vega will send meg.
Outside DB#44/46-A,47,46-B	20-Sep-1991		Q-4A		5	5		50 in deck	

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#44/46-A	28-Sep-1991		M-3		3	3		Rainbow after dark	
Outside DB#48-A/48-G,48-H	2-Oct-1991		U & V	mixed with sludge	3	3			
Outside DB#47, 47-A, 47-B, 48-A/48-G	3-Oct-1991		R & S		10	10	FMWTC fire fighting		
Outside DB#43,44/46-A	10-Oct-1991		P-L-M		120	120		100 gl at P with pockets at L, M maybe C, F 2-4	
Outside DB#44/46-A	10-Oct-1991		P		15	15	maybe AD-40 no proof		
Outside DB#44/46-A,47,46-B	11-Oct-1991		Q		2	2			
	19-Oct-1991		Bainbridge		6		van over turned 4rts oil approx. 5 gl gas		
Outside DB#27,28-A,29,30	23-Oct-1991		D & F		30	30	Gasket blown on YSR		
Outside DB#44/46-A	1-Nov-1991		Pier M	Bilge water	2	2			
Outside DB#44/46-A	2-Nov-1991		P-South		55	55			
Outside DB#44/46-A,47,47-A,46-B	11-Nov-1991	95824	Pier Quebec/Romeo	Diesel	2-3 gal	2-3 gal	Unknown	40' x 10' slick	Sorbents
Outside DB#44/46-A	12-Nov-1991		Pier Mike	Oil/Water Bilge Waste	2 gal	2 gal	Bilge dewatering, tank level indicator failure	6' x 6' slick	None
Outside DB#27,28-A,29,30	3-Dec-1991		Pier F D/F Slip	Oil/Water Bilge Waste	5-10 gal	5-10 gal	Bilge dewatering, vacuum can failure	500' x 30' slick	Dip skimmer, Sorbents
Outside DB#29,30	3-Dec-1991		Dry Dock #2	Oil/Water Bilge Waste	10	10	Being pumped from dry dock		
Outside DB#48-A/48-G	10-Dec-1991		T & U		3	3	Cleaning thinner washed into water		
Outside DB#48-A/48-G	15-Dec-1991	99724	Pier Tango	Diesel Fuel	50 gal	50 gal	Unknown	600' x 300' slick	Dip skimmer and Sorbents
	31-Dec-1991				20	20			
Outside DB#43-A	5-Jan-1992		Z		20 gals	20 gals			
Outside DB#44/46-A	6-Jan-1992		M		12 gals	12 gals	Burped from truck after filling		

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#30	9-Jan-1992	102223	Pier Foxtrot	Fuel	75-125 gals	75-125 gals	Overfill of tank during fueling	600' x 800' slick on Cooper River	Dip and oil skimmer
Outside DB#30	10-Jan-1992		F		125 gals	125 gals			
Outside DB#30	11-Jan-1992		F		15 gals	15 gals	Same Spill		
Outside DB#30	13-Jan-1992		F		10 gals	10 gals	Same spill		
Outside DB#33,33-A	15-Jan-1992		G		15 gals	15 gals	Overflow		
Outside DB#44/46-A	26-Jan-1992		N-2A		100 gals	100 gals			
Outside DB#43-A	27-Jan-1992		Z-4A		20 gals	20 gals	Overflow		
Outside DB#44/46-A	10-Feb-1992		M-N		5 gals	5 gals			Dip and sorbents
Outside DB#26	13-Feb-1992		Pier C		8 gals	8 gals	Dewatering from SSN		
	14-Feb-1992		Ship channel, bouy 52		25 gals	25 gals			
Outside DB#33,33-A	14-Feb-1992		G south	Lube/fuel gunk mix	5 gals	5 gals			
Outside DB#43-A	17-Feb-1992		Z		25 gals	25 gals			
Outside DB#44/46-A	2-Mar-1992		N-1A		100 gals	100 gals			
Outside DB#48-A/48-G	3-Mar-1992	108886	Pier Sierra	Gasoline and Lube Oil	Gas 40 gal / Oil 40 gal	Gas 40 gal / Oil 40 gal	Collision and ruptured fuel tanks	20' x 20' slick	Sorbents
Outside DB#31,32	3-Mar-1992	Memo	NE side of Dry Dock #5	Oil	5-10 gals	Unknown	Unknown	Oil Spill in Cooper River.	Investigating spill into River-cleaned up spill on ground. Report to be issued to Code 106.2 when investigation of spill is complete.
Outside DB#31,32	11-Mar-1992	110105	Dry dock 5 - South east end	DFM	20 - 25 gal.	50% (?)	Unknown	5x200 ft brightly colored banded slick on Cooper R.	Contained within F&G Pier slip with boom. Removed with DIP 3001 skimmer and sorbents.
Outside DB#44/46-A	19-Mar-1992		N&M Slips		25 gals	25 gals	Eductor pumping oil		
Outside DB#44/46-A	25-Mar-1992		P-3		20 gals	20 gals	Oil hose slipped from barge		
Outside DB#41-43A	28-Mar-1992		L4A		25 gals	25 gals	Defueling bilge		
Outside DB#44/46-A	2-Apr-1992		P-4A		5 gals	5 gals			

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#29,30	5-May-1992	92-001	West end of Dry Dock #2	Gasoline	27 gals	27 gals	Gasoline truck driver lowering hose to bottom of dry dock when hose ruptured spilling gas.	Spilled gas to bottom of dry dock.	Absorbent placed on spill and material placed in 55 gal drum.
Outside DB#44/46-A	8-May-1992		M-N Slip		15 gals	15 gals			
Outside DB#43-A,44/46-A	14-May-1992	173471	M-Z Slip	Hydraulic fluid	3 gals	3 gals	Unknown	50' x 50' slick	Dip skimmer and Sorbent pads
Outside DB#29,30	15-May-1992	92-011	NE end of Dry Dock #2	Oil	25-50 gals	25-50 gals	Broken sewer line under pier spilled oil into river	Oil on water in Cooper River	Mandate oily wastes not to be discharged to sanitary sewer. Port services to remove oil from River.
Outside DB#30	15-May-1992		F		10 gals	10 gals			
Outside DB#35	3-Jun-1992		H		5 gals	5 gals	Small crack		
Outside DB#35,36,37,38	4-Jun-1992	123171	Piers H & J - Slip	Oil/Water Mixture 50%	3 - 5 gal.	3 - 5 gal	Unknown	5x50 ft brightly colored banded slick on Cooper R.	Contained within H&J slip with booms, ship's hull and camel. Removed with sorbents.
Outside DB#44/46-A	10-Jun-1992		P		10 gals	10 gals	Rain washed oil off of barge		
Outside DB#43-A	15-Jun-1992		Z		10 gals	10 gals			
Outside DB#43-A	15-Jun-1992		Z		4 gals	4 gals			
Outside DB#44/46-A	15-Jun-1992		Pier N		5 gals	5 gals			Dip skimmer
Outside DB#35,36,37,38	16-Jun-1992	120080	Piers H & J - Slip	Oil/Water Mixture 50%	3 - 5 gal.	3 - 5 gal.	Pumping operation: Crack in upper rub rail.	5x50 ft brightly colored banded slick on Cooper R.	Contained within H&J slip with booms, ship's hull and camel. Removed with sorbents.
Outside DB#44/46-A	16-Jun-1992		Pier N		5 gals	5 gals	Valve misalignment		
Outside DB#43-A	19-Jun-1992		Z	JP-5	125 gals	125 gals			
Outside DB#35	23-Jun-1992		H		40 gals	40 gals			
Outside DB#44/46-A	27-Jun-1992		P-2-B		5 gals	5 gals	hose failure		
Outside DB#41-43A	3-Jul-1992		Pier L		5 gals	5 gals			
Outside DB#43-A	7-Jul-1992	184865	Pier Zulu	Diesel Fuel	5 gal	5 gal	Refueling tank overfilled	60' x 60' slick	Sorbents, not completely effective

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Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
	8-Jul-1992		various		12 gals				
Outside DB#44/46-A	24-Jul-1992		Pier N-3	Oil/water	20 gals	20 gals			
	24-Jul-1992				18 gals	18 gals			
Outside DB#44/46-A,47,47-A,46-B	5-Aug-1992	92-022	Quay Wall between piers Q and R	Waste Oil	120 gals	120 gals	Spill occurred shortly after Shop 02 discharged the waste oil into the barge.	Spill occurred to Cooper River	Port Serves boomed spill and collected oil. Disposed of waste oil to Code 106.25.
Outside DB#44/46-A,47,47-A,46-B	6-Aug-1992	130527	Quebec Romeo Quaywall and slip	Oil/oil and water, slop	120 gal	120 gal	Barge full and tank lid left open allowing spill	1000' x 400' slick on river	Dip and Sorbents
Outside DB#41-43	7-Aug-1992		Kilo/Libh slip	Diesel fuel	18 gals	18 gals			
Outside DB#48-A/48-G	9-Aug-1992		Pier S to U	Bilge waste	75 gals	75 gals			
Outside DB#43-A,44/46-A	25-Aug-1992		Pier N,Z	Black water					
Outside DB#47, 47-A, 47-B, 48-A/48-G	28-Aug-1992		R/S Slip	diesel	75 gals	75 gals			
Outside DB#43-A	3-Sep-1992		Pier Z		18 gals	18 gals			
Outside DB#43-A	3-Sep-1992		25b-Pier Z		30 gals	30 gals	Over flow by truck		
Outside DB#44/46-A	8-Sep-1992		M&N Quaywall	Diesel	5 gals	5 gals	Spilled from crane		
Outside DB#41-43	10-Sep-1992		L&K Slip		200 gals	200 gals	Over fill while securing pump		
Outside DB#44/46-A	15-Sep-1992		P-2-5		25 gals	25 gals	Internal fuel transfer		
Outside DB#43-A	17-Sep-1992	NL	Pier Z	Unknown	<1 gal.	<1 gal.	Unknown. While cleaning tanks.	1x50 ft barely visible slick in Cooper R.	Contained with booms, ship's hull, and water spray. Removed with sorbents.
Outside DB#43-A	17-Sep-1992		Z-4		5 gals	5 gals	Pumping		
Outside DB#43-A	17-Sep-1992		Z-2		2 gals	2 gals	Barge to barge pumping		
Outside DB#48-A/48-G	20-Sep-1992		S	Fuel	4 gals	4 gals	Monitoring error		
	30-Sep-1992		Texaco Docks		182 Gals	182 gals	1000 Barrels ?		
Outside DB#43-A	3-Oct-1992		Z		5 gals	5 gals			
Outside DB#41-43	6-Oct-1992	139458	Pier Kilo	Diesel	15 gal	15 gal	Fuel transfer overflow	600' x 300' slick	Dip and Sorbents

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Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#36,37,38	14-Oct-1992		J	J-P5 Fuel	22 gals	22 gals		Storm Drain	
Drainage Basin#38	14-Oct-1992	92-030	west side Hobson Ave. and Viaduct Rd intersection, berm of tank 3900-G	No. 2 Fuel Oil (diesel)	4,000 gal.	Unknown	Backhoe outrigger ruptured underground fuel line.	Spill went to catch basin but no oil reached the Cooper River.	Confirmed that spill had not entered sewer system. Contractor removed soil and regraded area.
Outside DB#48-A/48-G	26-Oct-1992		S&T				Pulled bilge plug		
	28-Oct-1992		Patriots Point		200 gals	200 gals			
Outside DB#27,28-A	5-Nov-1992		D-5	Diesel	45 gals	45 gals	Overfilled compensating tank		
Outside DB#48-A/48-G	6-Nov-1992		T-U	Bilge waste	50 gals	50 gals	Monitoring error during bilge pumping		
Outside DB#27,28-A	24-Nov-1992		D		12 gals	12 gals			
Outside DB#27,28-A	1-Dec-1992	NL	Pier D	Oil/Water Mixture	1 gal.	1 gal.	Drainage of oily waste vacuum can. Cracked hose.	25x25 ft dull brown slick on Cooper R.	Removed with sorbents.
	1-Dec-1992		Shipyard		1 gal	1 gal			
Outside DB#26	2-Dec-1992	NL	Pier C - Berth 4	Oil/Water 75% Waste Oil	50 gal.	50 gal.	Topside discharge valve misalignment	No Info.	No Info.
Outside DB#26	3-Dec-1992		C-Y	Bilge/Cht Waste	4 gals	4 gals			
Outside DB#44/46-A	16-Dec-1992		Pier P4A	Bilge Waste	10 gals	10 gals	Bilge dewatering to truck		
Outside DB#44/46-A	17-Dec-1992	149678	Pier Mike 2B	Bilge waste	<1 gal	<1 gal	Drain system flush monitoring error	25' x 25' slick	Oil Sorbent pads
Outside DB#26	17-Dec-1992	149807	Pier C - Berth 4	Hydraulic Oil	51 gal.	1 gal.	Valve misalignment	1x2 ft silvery slick on Cooper R.	Contained with boom. Removed with sorbents.
Outside DB#26	21-Dec-1992		Pier C		65 gals	65 gals	Misaligned valve		
	22-Dec-1992		Shipyard Creek		1 gal	1 gal			
Outside DB#44/46-A	24-Dec-1992	92-031	N. side of Pier C	Hydraulic Oil	50 gal	1 gal	Flushing of hydraulic system of ship. Lack of communication between oversight folks during pumping of oil.	50 gals released total. 1 gal released to Cooper River.	Kitty litter spread over spill on Pier. Nothing mentioned about spill in Cooper River.
Outside DB#44/46-A	30-Dec-1992		Pier P	Lube oil	25 gals	25 gals			

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Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#26	30-Dec-1992	147461	Pier C to Y	Bilge waste	35 gal	35 gal	Unknown	Scattered pockets 10' x 20'	Sorbents
Outside DB#41	8-Jan-1993	152438	Quay wall between Dry Dock #4 and Pier Kilo	Diesel	10-20 gal.	Boat sank, fuel emanated from bilge and fuel tank.	50x100 ft brown slick on Cooper R.	Removed with Dip 3001 skimmer and sorbents.	
Outside DB#43-A	12-Jan-1993	NA	Pier Zulu	Hydraulic Fluid	3-5 gal	2-3 gal	Line Rupture	Unknown	Containment
Outside DB#48-A/48-G	30-Jan-1993	155859	Sierra-Tango Slip Cooper River	Bilge Oil	1-2 gal.	1-2 gal.	Unknown	30' x 20' slick	Sorbent boom and dip oil skimmer
Outside DB#30	3-Feb-1993	156271	Pier Foxtrot North	Oil/Water 50%	10 gal	10 gal	Bilge dewatering	30' x 50' oil slick	Sorbents
Outside DB#44/46-A	10-Feb-1993	NA	Pier Mike	Diesel Fuel	1.5-2 gal	1.5-2 gal	Unknown	Unknown	Sorbents and dip oil skimmer
Outside DB#44/46-A	16-Feb-1993	158277	Pier Papa	Diesel Fuel	<1 gal	<1 gal	Valve blown out	10' x 1' slick	Sorbent pads
Outside DB#44/46-A	16-Feb-1993	158237	Pier Nov. Two Alpha	Fuel	2-5 gal	2-5 gal	Fuel transfer from barge to ship	10' x 20' slick	Skimmer and Sorbents
Outside DB#44/46-A	26-Feb-1993	159833	Pier Nov. 3-Alpha	DFM Water Mixture	<1 gal	<1 gal	Fueling	10' x 15' slick	Sorbents
Outside DB#43-A,44/46-A	10-Mar-1993	NA	Pier Z,M,P,N	Diesel Fuel,	5 gal	5 gal	Dredging pulled up pockets of material	3' x 75' patches in River	Sorbent boom
Outside DB#43-A	28-Mar-1993	164505	Pier Zulu 1	DFM	7-10 gal	7-10 gal	Under investigation	20' x 20' slick	Sorbent sweeps
Outside DB#33,33-A	1-Apr-1993	165003	Pier Golf North	Hydraulic Oil	1 gal	1 gal	Hose failure	20' x 20' slick	Sorbents
Outside DB#33,33-A,34-A,34-B,35	12-Apr-1993	167054	Piers G-H	Lube Oil	15 gal	15 gal	Unknown	20' x 20' slick	AbSorbent boom
Outside DB#48-A/48-G	16-Apr-1993	167973	Sierra North	DFM	10 gal	10 gal	Reach rod packing gland failure	75' x 75' slick	Sorbent booms
	23-Apr-1993	NA	Cooper River	Diesel	5 gal	5 gal	Reserve tank valve left open	Unknown	Unknown
Outside DB#29,30	14-May-1993	175294	Dry dock 2, Pier F - N. Cooper R.	DFM	1 qt.	Unknown, spill discovered during changing tide	25x25 ft slick on Cooper R.	Contained with ship's hull and pier. Removed with sorbents.	
Outside DB#29,30	21-May-1993	175294	Dry Dock #2, Pier F N	Diesel Fuel	1 quart	1 quart	Unknown	25' x 25' slick	Sorbents
Outside DB#41-43	1-Jun-1993	177557	Kilo South	Diesel Fuel	10 gal	10 gal	Fuel transfer from farm to oiler	50' x 50' slick	Sorbents, dip skimmer

Table 5.2
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Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#44/46-A	7-Jun-1993	1788468	Pier M Berth 2A	Oil/Water	10-20 gal	10-20 gal	Bilge Dewatering	7' x 50' slick	Sorbents
Outside DB#44/46-A	20-Jun-1993	181456	Pier Papa 1A	Oily Waste	4 gal	4 gal	Unknown	4' x 25' slick	AbSorbent sweeps
Outside DB#41-43A	23-Jun-1993	182159	Pier Lima	Hydraulic fluid	5 gal	5 gal	Hose failure	20' x 40' slick	Sorbents
Outside DB#44/46-A	6-Jul-1993	NA	Pier November	Oily Waste	2-3 gal	2-3 gal	Cleaning Bilges	Unknown	Absorbtion sheets
Outside DB#43-A,44/46-A	6-Jul-1993	NA	Piers Zulu and Mike	Oily Waste	1 pint	1 pint	Unknown	10' x 10' slick	Unknown
Outside DB#43-A	7-Jul-1993	184865	Pier Zulu	Diesel Fuel Marine	5 gal	5 gal	Valve Misalignment	60' x 60'	Water spray; use of sorbents attempted, insufficient amount of fuel to be completely effective
Outside DB#33,33-A	10-Jul-1993	185450	Pier Golf A Mard ship Cape Alava	Fuel Oil	2 gal	2 gal	Internal fuel transfer	150' x 100' slick	Sorbents, dip skimmer
Outside DB#33,33-A	15-Jul-1993	186480	Pier Golf A Mard ship Cape Alava	Oil/Water (60% oil)	15-20 gal	15-20 gal	Bilge dewatering structural failure	50' x 100' slick	Sorbents and oil boom
Outside DB#43-A	30-Jul-1993	NA	Pier Zulu Berth 4 A	Diesel Fuel	50 gal	50 gal	fueling	300' x 300' slick	AbSorbent pads
Drainage Basin#41,42	31-Jul-1993	93-006	13th Street and River Road	Sewage	Unknown	very little"	Clogged line-sewage overflow at manhole	Mostly water released to ground and very little release to entered river.	Battery shop and other surrounding buildings discontinue sewer releases until problem resolved. No follow-up action planned.
Outside DB#44/46-A	1-Aug-1993	189998	Cooper River Nov. South	Bilge waste	10 gal	10 gal	Unknown	15' x 10' slick	Sorbents, dip skimmer
Outside DB#44/46-A	3-Aug-1993	190502	Pier Nov. South	Bilge waste	30 gal	30 gal	Overfilled tank	Unknown	Sorbents and dip skimmer
Outside DB#48-A/48-G	3-Aug-1993	190363	Sierra/Tango Quaywall	Waste oil	15 gal	15 gal	Packing gland failure	75' x 100' slick	Skimmer and Sorbents
Outside DB#47,47-A	24-Aug-1993	144308	Pier Romeo	Hydraulic Oil	3 gal	3 gal	Hydraulic filling rupture	15' x 20' slick	Sorbents
Outside DB#43-A	27-Sep-1993	199788	Pier Zulu	Diesel fuel	20 gal +	20 gal +	Structural failure during filling	Contained within pier structure	Sorbent pads
Outside DB#44/46-A	10-Oct-1993	202171	Pier Papa	Diesel fuel	10 gal	10 gal	Unknown	Unknown	Skimmer and Sorbents
Outside DB#47,47-A,47-B,48-A/48-G	27-Oct-1993	205018	Cooper River-Piers Romeo & Sierra, N & S	Bilge waste	30-35 gal	30-35 gal	Unknown	350' x 75' slick, small amount of shore impacted	Sorbents Shoreline was cleaned and removed.

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	15-Nov-1993	208117	Navy Short Stay Rec. Park-Lake Moultrie SSRA	Gasoline	100-150 gal	<1 gal	Weak coupling in underground fuel line	Soil and 5' x 10' slick, and groundwater	Sorbent pads Soil removal recommended.
Outside DB#48-A/48-G	12-Jan-1994	NA	Cooper River Sierra North	Fuel Oil	5-10 gal.	5-10 gal.	Fuel transfer	Spilled in River/ Oil Slick	Sorbent boom
Outside DB#26	26-Jan-1994	218860	Pier C - Berth 4/6, Cooper R.	Lube Oil	5 gal.	Procedural error during bilge dewatering with vacuum can.	6x12 ft yellowish slick in Cooper R.	Contained with ship's hull and pier. Removed with sorbents.	
Outside DB#26	26-Jan-1994	218860	Pier Charlie Berth 4 b	Lube Oil	5 gals	5 gals	Bilge dewatering	6' x 12' slick	Sorbents
Outside DB#44/46-A,47,46-B	28-Jan-1994	NA	Pier Quebec	Oil/Oil Water	1 gal	1 gal	Bilge Dewatering	Oil Slick	Sorbent pads
Outside DB#31,32	2-Feb-1994	NL	Dry dock 5 Basin Cooper R.	Diesel	200 gal (est.)	Personnel emptied a full vacuum canister. Canister was assumed to contain water, but contained fuel instead	Diesel poured into Dry dock 5 Basin	Dry dock pumps were secured. Fuel was removed with vacuum pumps and sorbents.	
Outside DB#44/46-A	15-Feb-1994	221763	Pier Mike	Kodak Developing Solution	10-12 gal	5-6 gal	Color processor being refilled	5-6 gal dissolved in water	50% of spill contained in a punt
Outside DB#26	17-Feb-1994	Haz Mat Spill Sheet	Pier C -West end Quay wall	Oil	approx. 1 gal.	approx. 1 gal.	Unknown (20'x20' sheen on water noted)	20 x 20 foot slick on Cooper River. A live seagull was found injured in the oil sheen. CNSY Pest Control notified/responded	None reported
Outside DB#26	17-Feb-1994	222123	Piers C and D, quaywall	Oil	approx. 1 gal.	approx. 1 gal.	Unknown (10'x10' sheen on water noted)	10'x10' foot slick on Cooper River	Recovered with boom and sorbent.
Outside DB#26	2-Mar-1994	Haz Mat Spill Sheet	Beginning of Pier C	Sea Dye Marker or Antifreeze	unknown	unknown	Personnel pumped bilge over pier	Spill on Cooper River	Ships personnel to clean up spill.
Outside DB#26	4-Mar-1994	NL	Pier C	Fuel Oil	4 gal.	4 gal.	Operator error during fuel transfer	Cooper River during slack tide.	Recovered with sorbent.
Outside DB#26	4-Mar-1994	224355	C-D Slip	Lube Oil	4 gal	4 gal	Removing oil hose from sludge barge	30' x 30' oil slick	Recovered with sorbent.

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Outside DB#28-A,29,30	9-Mar-1994	Haz Mat Spill Sheet	North E Pier, Dry Dock #1	Oil, heavy glob, size of silver dollar	size of silver dollar	size of silver dollar	Unknown	Oil on water	Port Services contacted at 1520
Outside DB#26	11-Mar-1994	Haz Mat Spill Sheet	Pier C	Oil	unknown	unknown	Could not confirm - from barge near USS O'Bannon	Spill confined to barge top adjacent to USS O'Bannon	X71 barge crew to clean up
Outside DB#31,32	18-Mar-1994	230584	Dry Dock #5, South Quaywall	Lube Oil	10 gal	10 gal	Drainage pump discharge	50' x 50' slick	Boom and Sorbents
Outside DB#44/46-A	27-Mar-1994	231686	Cooper River Mike 2 Alpha	Diesel	15 gal	15 gal	Unknown	25' x 25' slick	Sorbent material
Outside DB#26	30-Mar-1994	232528	Cooper River C-D Slip	JP-5	30 gal	30 gal	Onboard fuel transfer	200' x 2' slick	Sorbents
Outside DB#26	30-Mar-1994	NL	Pier C	Fuel oil	30 gal.	30 gal.	Faulty fuel valve	Cooper River	Spill contained between ship, outboard crane and camels. Oil absorbing pads.
Outside DB#43-A	2-Apr-1994	NA	Pier Zulu 1-A	Cosmoline	50 gal	50 gal	Plug removed during underwater repairs	400' x 30' slick	Oil sorbing pads
Outside DB#26	4-Apr-1994	233197	C-North Berth 1	Unknown	7.5 gal	7.5 gal	Unknown	50' x 50' slick	Sorbents
Outside DB#31,32	18-Apr-1994	235514	Dry Dock #5	Oil	up to 3 gals	up to 3 gals	Overfilled canister of Shop 99 vacuum	Contained in dry dock #5	Sorbents
Outside DB#35	19-Apr-1994	Haz Mat Spill Sheet	H-Pier	Gas or Oil	fine sheen"	fine Sheen"	Unknown	Fine sheen on water	None reported
Outside DB#35	19-Apr-1994	Haz Mat Spill Sheet	H-Pier	Gas or Oil	fine sheen"	fine Sheen"	Unknown	Fine sheen on water	None reported
Outside DB#30	3-May-1994	NA	Pier F North	Fuel Oil	1/2 gal	1/2 gal	Pumping YSR to YSO	100' x 100' slick	Sorbents
Outside DB#30	4-May-1994	237900	Pier F N. Berth 1	Diesel Fuel	20 gal	20 gal	Bilge dewatering	100' x 100' slick	Sorbents
Outside DB#30	4-May-1994	NL	Pier F	Diesel Fuel	150 gal.	150 gal.	Misaligned valves/Personnel error	Cooper River	Absorbent booms and rolls were used to recover the spill
Outside DB#30	4-May-1994	Haz Mat Spill Sheet	F-Pier	Fuel Oil	20 gals	20 gals	Spill from X71 barge	Oil on water	Port Services cleaned up"
	19-May-1994	NL	Naval Weapons Station Pier A	Oily waste	5-10 gal.	5-10 gal.	Structural failure in waste oil tank	Cooper River	Contained and recovered
Outside DB#44/46-A	23-May-1994	Haz Mat Spill Sheet	Pier M	CHT (waste)	unknown	unknown	Discharge overboard from USS Frank Cable	Unknown	Cleaned up by USS Frank Cable personnel

Table 5.2
CNC Related Spills/Releases
Cooper River 1982-1994

Drainage Basin Number	Spill Date/ Time	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume	How Spill Occurred	Resulting Impact	Corrective Action Taken
Outside DB#44/46-A	26-May-1994	Haz Mat Spill Sheet	Papa 2 Alpha	Diesel Fuel	75-80 gals	75-80 gals	from USS Turner	Unknown	Unknown
Outside DB#48-A/48-G	26-May-1994	NL	Pier S -North	Oily bilge waste	10 gal.	10 gal.	Personnel error/valve misalignment	Cooper River	Contained and recovered
Outside DB#44/46-A	26-May-1994	241141	Pier P	F-76	70-80 gal.	70-80 gal.	Error reading sounding chart while filling	Cooper River 10x20 ft slick Dull brown	Containment/Recovery
Outside DB#44/46-A	26-May-1994	NL	Pier P	DFM	75-80 gal.	75-80 gal.	Personnel error/valve misalignment	Cooper River	Contained and recovered
	27-May-1994	NL	Unknown	Lube Oil	10 gal.	10 gal.	Personnel carelessness	Cooper River	Absorbent
Outside DB#30	2-Jun-1994	NL	Pier F -North	Sewage	Unknown	Unknown	Camel lodged in pipe during tidal change, broke pipe for 12 days	Cooper River	Sources to line were isolated, repairs were made
Outside DB#31,32	13-Jun-1994	243647	Dry dock #5	TEP Lube Oil	10 gal.	10 gal.	Propeller seals failed	Potential to harm Cooper River	Contained within dry dock. Recovered with sorbent.
Outside DB#47,47-A	16-Jun-1994	244341	Pier R North	Fuel Oil	20 gal	20 gal	Unknown	100' x 100' slick	Sorbent rolls and pads
Outside DB#44/46-A	21-Jun-1994	NL	Pier N - South	DFM	15 gal.	15 gal.	Undetermined	None known.	Contained with booms. Recovered with sorbent.
DMA?	9-Aug-1994	Memo	Spoils area south end of CNSY	Hazardous Waste	Unknown	Unknown	Haz Waste debris disposed of at spoils area of landfill at south end of Naval Base Charleston	Unknown	Material "cleaned up"
Outside DB#44/46-A	12-Aug-1994	NA	Pier November Berth 3A	Waste Oil	10 gal	10 gal	Transferring waste oil to truck on pier	5' x 5' slick	Sorbent pads
Drainage Basin#26	26-Aug-1994	Haz Mat Spill Sheet	C-Pier near entrance to Bldg 62 and manhole	CHT	20 gals	20 gals	Unknown	Manhole/also hose connection on C-Pier at PWD 8 sewer station	Unknown
Outside DB#36,37,38			Navsta Pier J and south	Dip skimmer, Sorbents					
Outside DB#44/46-A			all around Pier M	Dip and Sorbents					

6.0 CONCLUSIONS AND RECOMMENDATIONS

The investigative objectives for the *Zone J Storm Water Effluent Evaluation Report Addendum* were designed to collect sufficient storm water runoff data to accomplish the following:

- Characterize the storm water runoff from listed RCRA sites throughout the CNC
- Define contaminant migration pathways and potential receptors (on and offsite, where applicable)
- Define the nature and extent of contamination, if any
- Characterize reference values
- Identify storm water COPCs

Identified potential storm water effluent COPCs for each water body will be further evaluated in a COPC refinement report. The COPC refinement reports will also include potential surface water and groundwater COPCs. COPCs identified in the COPC refinement reports will be further evaluated in the SLERA. A summary of potential storm water COPCs for the Cooper River are presented in Table 6.1. Additional characterization of storm water effluent, soil and groundwater COPCs is recommended for Drainage Basins 3, 20, 23, 30, 37, 41, 45, 47, and 51.

Table 6.1
Potential Storm Water COPCs for the Cooper River
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
2	Bis(2-Ethylhexyl)phthalate	No	No
3	Arsenic	No	No
	Bis(2-Ethylhexyl)phthalate	No	No
	Lead	Yes-Soil	Yes
	Mercury	Yes-Soil and Groundwater	Yes
	Pentachlorophenol	No	No
	Vanadium	Yes-Soil	Yes
18	Mercury	No	No
	2-Methylphenol (o-Cresol)	No	No
20	Aluminum	Yes-Groundwater	Yes
	Bis(2-Ethylhexyl)phthalate	Yes-Soil	Yes
	2,4-Dimethylphenol	No	No
	Iron	Yes-Soil and Groundwater	Yes
	Lead	Yes-Soil	Yes
	Manganese	No	No
	Zinc	Yes-Soil	Yes

Table 6.1
Potential Storm Water COPCs for the Cooper River
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
22	Manganese	No	No
	Zinc	No	No
23	Antimony	Yes-Soil	Yes
26	Zinc	No	No
27	Copper	No	No
30	Copper	Yes-Soil and Groundwater	Yes
	Nickel	Yes-Soil and Groundwater	Yes
30A	Benzo(g,h,i)perylene	No	No
	Copper	No	No
31	Cobalt	No	No
	Copper	No	No
	Nickel	No	No
	Vanadium	No	No
	Zinc	No	No
33	Copper	No	No
	Manganese	No	No
34	Manganese	No	No
	Tin	No	No
37	Benzo(a)pyrene	No	No
	Benzo(g,h,i)perylene	Yes-Soil	Yes
	Bis(2-Ethylhexyl)phthalate	No	No
	1,4-Dichlorobenzene	No	No
	Indeno(1,2,3-cd)pyrene	No	No
38	Aluminum	No	No
41	Aluminum	Yes-Soil	Yes
	Cobalt	No	No
	Iron	Yes-Soil	Yes
	Lead	No	No
	Manganese	No	No
42A	Copper	No	No
	Bis(2-Ethylhexyl)phthalate	No	No
45	Aluminum	No	No
	Antimony	No	No
	Arsenic	Yes-Soil	Yes
	Barium	Yes-Soil	Yes
	Beryllium	No	No
	Chromium	No	No
	Copper	No	No
	Iron	No	No
	Lead	Yes-Soil	Yes
	Manganese	No	No
	Nickel	Yes-Soil	Yes
	Tin	No	No
	Vanadium	Yes-Soil	Yes
	Zinc	No	No
47	Benzo(a)pyrene	No	No
	Benzo(b)fluoranthene	No	No
	Benzo(k)fluoranthene	No	No

Table 6.1
Potential Storm Water COPCs for the Cooper River
Charleston Naval Complex, Charleston, South Carolina

Drainage Basin	Potential Storm Water COPCs	Upland Linkage	Further Evaluation Needed
	Benzo(g,h,i)perylene	No	No
	Bis(2-Ethylhexyl)phthalate	Yes-Soil	Yes
	Carbazole	No	No
	Chrysene	No	No
	Dimethylphenol	No	No
	Fluoranthene	No	No
	Indeno(1,2,3-cd)pyrene	No	No
	Methylphenol	No	No
	2-Methylphenol	No	No
	Phenanthrene	No	No
	Pyrene	No	No
47A	4,4'-DDD	No	No
47B	2-Methylphenol (o-Cresol)	No	No
48	Methoxychlor	No	No
	2-Methylphenol (o-Cresol)	No	No
48AtoG	Aluminum	No	No
	Bis(2-Ethylhexyl)phthalate	No	No
	Copper	No	No
	4,4'-DDD	No	No
	4,4'-DDT	No	No
	Endosulfan II	No	No
	Heptachlor	No	No
	Iron	No	No
	Lead	No	No
	Mercury	No	No
	Nickel	No	No
	Tin	No	No
	Vanadium	No	No
	Zinc	No	No
48H	Bis(2-Ethylhexyl)phthalate	No	No
	Copper	No	No
49	Bis(2-Ethylhexyl)phthalate	No	No
51	Antimony	No	No
	Bis(2-Ethylhexyl)phthalate	Yes-Release and Soil	Yes
	Copper	Yes-Soil	Yes
	Fluorene	No	No
	Nickel	No	No
	Pyrene	No	No
51C	Aluminum	No	No
53	beta-BHC	No	No
	gamma-BHC	No	No
	Heptachlor	No	No
	Manganese	No	No

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8.0 SIGNATORY REQUIREMENT

Condition I.E. of the Hazardous and Solid Waste Amendments (HSWA) portion of RCRA Part B Permit (EPA SCO 170 022 560) states: *All applications, reports, or information submitted to the Regional Administrator shall be signed and certified in accordance with 40 CFR §270.11.* The certification reads as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Robert A. Harrell, Jr., P.E.
Engineer-In-Charge

12 Dec 02
Date

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT ADDENDUM

REVISION: 1

VOLUME III OF IV – APPENDIX A

SOUTHDIV Contract Number:
N62467-89-D-0318

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

ENSAFE INC.
313 WINGO WAY
MOUNT PLEASANT, SOUTH CAROLINA 29464
(843) 884-0029

July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

Appendix A

Chains of Custody, Analytical Data, Data Validation Reports

ENSAFE

800-988-7962
MEMPHIS, TENNESSEE
CHARLESTON,SC; CINCINNATI,OH; DALLAS,TX; JACKSON,TN; KNOXVILLE,TN; LANCASTER,PA; NASHVILLE,TN; NORFOLK,VA; PADUCAH,KY; PENSACOLA,FL; RALEIGH,NC; COLOGNE, GERMANY

Revised Chain 102

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-0 000-00
COC NO:
PO NO: ~~4770~~ 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO: 843-884-0029 | 843-856-0107
SAMPLERS: (SIGNATURE) Julie Sheff, Robert L. Bagley

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCB	TAL Metals	Cyanide	Salinity **	REMARKS
EQP001	1/15/02	1130	W	* SVOC/PT/PCB = 2 L amber MT = 500 ml poly CN = 125 ml poly Salinity = 125 ml poly	4°C	* MT = HNO3 CN = NaOH	6	X²	X²	X¹	X¹		
CAP001	↓	1015	↓	↓	↓	↓	7	2	2	1	1	1	
REF002 A*	↓	1050	↓	↓	↓	↓	7	2	2	1	1	1	

15 JAN 02 RLB

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Robert L. Bagley	1/15/02						
PRINTED: Robert L. Bagley	TIME 1400	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: ENSAFE		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX PRIORITY OVNT
SHIPMENT NO. 346 6998 026
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: ** Please post salinity Results ~~prior~~ on Dataview prior to running other analysis.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-0[redacted]09-600-00
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843-884-0029/843-856-0107
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	TAL Metals	Cyanide	Salinity						REMARKS
REF 004	1-25-02	0940	W	*	4°C	MT=HNO3 CN=NaOH	7	2	2	1	1	1						
REF 003	1-25-02	1005					7	2	2	1	1	1						
EFF 010	1-25-02	1405					7	2	2	1	1	1						
REF 010	1-25-02	1355					7	2	2	1	1	1						
EFF 058	1-25-02	1335					7	2	2	1	1	1						
EFF 009	1-25-02	1425					7	2	2	1	1	1						

LeB 1-25-02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Julie Shaffer	1-25-02						
PRINTED: Julie Shaffer	TIME 1500	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FEDEX Priority OVNT
SHIPMENT NO. 3462588701/3447867026/3462588586
SEND RESULTS TO: Charlie Vernoy

COMMENTS: LeB
~~**: Please Page Salinity Results on Data View PRIOR to running other ANALYSES~~
*: SVOC & Pest/PCB 1L Amber, Metals 500 ml poly (HNO3), CN 125 ml poly (NaOH) & SALINITY 125 ml poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF [illegible]
PROJECT/JOB NO: 0154-00[illegible]9-000-00
COC NO:
PO NO: [illegible] 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
LOCATION: Charleston, SC
SAMPLERS: (SIGNATURE) Julie Shaffer

PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO. 843-884-0029 / 843-856-0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	TAL Metals	Cyanide	Salinity						REMARKS
EFF008	2/7/02	0855	W	* SVOC = 1L amber PT/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF004	↓	0915	↓	MT = 500ml poly CN = 500ml poly Salinity = 250ml poly	↓		7	2	2	1	1	1						
EFF006**		0930					7	2	2	1	1	1						**
EFF005**		0945					7	2	2	1	1	1						**
REF012**	↓	1030	↓		↓		7	2	2	1	1	1						**
REF011 **		0930					7	2	2	1	1	1						**
REF011D**		0930					7	2	2	1	1	1						**
EFF065		1000					7	2	2	1	1	1						
EFF067		1015					7	2	2	1	1	1						
EFF068		1030					7	2	2	1	1	1						

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Julie Shaffer	2/7/02						
PRINTED: Julie Shaffer	TIME	PRINTED:	TIME	PRINTED	TIME	PRINTED	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO.
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: ** Analyze Salinity FIRST - Post Results on DataView - EnSafe will contact with instructions to proceed with other analytes.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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MEMPHIS, TENNESSEE
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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: 0154-001-000-00

COC NO:

PO NO: 4770

REL NO:

LAB NAME: STL Savannah

CLIENT: US Navy - Zone J

LOCATION: Charleston, SC

SAMPLERS: (SIGNATURE) Julie Shaff

PROJECT MANAGER: Charlie Vernoy

TELE/FAX NO. 843-884-0029 / 843 856 0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCB	TAL metals	cyanide	salinity **						REMARKS
EFF014 **	2/7/02	1625	W	SVOC = 1 L amber PTAB = 1 L amber MT = 500ml poly	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF013 **		1635		CN = 500ml poly Salinity = 250ml			7	2	2	1	1	1						
EFF012 **		1555					7	2	2	1	1	1						
EFF011 **		1610					7	2	2	1	1	1						
EFF003 **		1540					7	2	2	1	1	1						
EFF002 **		1530					7	2	2	1	1	1						
EFF001 **		1505					7	2	2	1	1	1						

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Julie Shaff	2/8/02						
PRINTED: Julie Shaff	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX

SHIPMENT NO. 344357 6297; 346329 8081; 346829 2721

SEND RESULTS TO: CHARLIE VERNOY

COMMENTS; ** Run Salinity FIRST - Post Results on DataView - EnSafe will contact lab with instructions to proceed with other analyses.

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: Ø154-Ø[redacted]Ø9-ØØØ-ØØ

COC NO:

PO NO: 4270

REL NO:

LAB NAME: STL- Savannah

CLIENT: US Navy - Zone J

LOCATION: Charleston, SC

SAMPLERS: (SIGNATURE) Julie Shaffer

PROJECT MANAGER: Charlie Vernoy

TELE/FAX NO. 843-884-0029 / 843-856-0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	TAL Metals	Cyanide	Salinity **						REMARKS
EFFØ43 **	2/8/02	13:2Ø	W	SVOC = 1L amber PT/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFFØ41 **	↓	13:3Ø	↓	MT = 500ml poly CN = 250ml poly	↓	↓	7	2	2	1	1	1						
EFFØ63 **	↓	13:45	↓	salinity = 125ml poly	↓	↓	7	2	2	1	1	1						
EFFØ42 **	↓	14:ØØ	↓	↓	↓	↓	7	2	2	1	1	1						
EFFØ4Ø **	↓	14:15	↓	↓	↓	↓	7	2	2	1	1	1						
EFFØ44 **	↓	1435	↓	↓	↓	↓	7	2	2	1	1	1						
EFFØ47 **	↓	1445	↓	↓	↓	↓	7	2	2	1	1	1						
EFFØ45 **	↓	1500	↓	↓	↓	↓	7	2	2	1	1	1						

Julie Shaffer 2/8/02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Julie Shaffer	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX

SHIPMENT NO. 3468330722; 3468330573; 3443614684

SEND RESULTS TO: Charlie Vernoy 3463336642

COMMENTS: ** Run Salinity first - post results on Data View - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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CHAIN OF CUSTODY RECORD

Amended COC 3/11/02

COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL-Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO.: 843-884-0029 / 884-856-0107
SAMPLERS: (SIGNATURE) Charlie Vernoy / Pete Bayley
Charles A. Vernoy

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCBs	TAL Metals	Cyanide	Salinity **					REMARKS
EFF019**	3/2/02	16:30	W	SVOC: 1 Amber Pest/PCB: 1 Amber	4°C	MT=HNO3 CN=NaOH	7	2	2	1	1	1					
EFF003**		16:45		MT: 500ml poly CN: 250ml poly			7	2	2	1	1	1					
REF007**		16:50		Salinity: 125ml poly			7	2	2	1	1	1					
EFF007**		16:55					7	2	2	1	1	1					
EFF012**		17:00					7	2	2	1	1	1					
EFF013**		17:10					7	2	2	1	1	1					
EFF64** EFF064		17:25					7	2	2	1	1	1					EFF064
~~EFF66~~ CW 3/5/02 EFF066		18:05					7	2	2	1	1	1					
EFF069**		18:20					7	2	2	1	1	1					EFF069

Charles A. Vernoy 3/4/02

RELINQUISHER: Charles Vernoy	DATE 3/4/02	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Charles Vernoy	TIME 17:00	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 3444704602/3444704672/3444704742
SEND RESULTS TO: Charlie Vernoy 3464426831

COMMENTS: ** Run Salinity first - Post Results on DataView - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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EnSafe

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CHAIN OF CUSTODY RECORD

PROJECT/JOB NO: 0154-0[illegible]9-000-00
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL-Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO.: 843-884-0029 / 843-856-0107
SAMPLERS: (SIGNATURE) Charlie Vernoy / Pete Bayley / Julie Shaffer / James Watson

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pest/PCBs	TAL Metals	Cyanide	Salinity						REMARKS
EFF 031 **	3/2/02	18:00	W	SVOC = 1L amber Pest/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	2	2	1	1	1						
EFF 034 **		17:25		MT = 500ml poly CN = 250ml poly			7	2	2	1	1	1						
EFF 035 **		17:30		Salinity = 125ml poly			7	2	2	1	1	1						
EFF 036 **		17:38					7	2	2	1	1	1						
EFF 044 **		17:00					7	2	2	1	1	1						
EFF 048 **		16:56					7	2	2	1	1	1						
EFF 057 **		17:05					7	2	2	1	1	1						
EFF 063 **		17:12					7	2	2	1	1	1						

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Charlie Vernoy	3/4/02						
PRINTED: Charles Vernoy	TIME 17:00	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FedEx
SHIPMENT NO. 3464426472 / 3444704541 / 3469420701 / 3469420753
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ** Run Salinity first - post results on Data View - EnSafe will contact lab with instructions to proceed with other analyses

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-[redacted]-09-XXX-0
COC NO:
PO NO: 4770
REL. NO:
LAB NAME: STL SAVANNAH

CLIENT: US NAVY - ZONE J
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843-834-0029 / 843-856-0107
SAMPLERS: (SIGNATURE)

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticides/PCBs	TAL Metals	Cyanide	Salinity						REMARKS
EFF050**	4.18.02	1700	W	SVOC - Amber Pest/PCB - 1 Amber	4°C	MT - HNO3 CN - NaOH	7	2	2	1	1	1						
EFF051**		1640		MT - 500ml poly CN - 250ml poly			7	2	2	1	1	1						
EFF054**		1630		Salinity - 125ml poly			7	2	2	1	1	1						
EFF055**		1615					7	2	2	1	1	1						

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: J. Watts	TIME 1530	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: ENSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: Fedex
SHIPMENT NO.
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ** Run Salinity first. Post Results on Data View - ENSafe will contact lab with instructions to proceed with other analyses.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154[illegible]1-09-[illegible]
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL SAVANNAH

CLIENT: US NAVY - Zone J
LOCATION: Charleston, SC
SAMPLERS: (SIGNATURE) [signature]
PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO.: 843-884-0029 / 843-856-0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCBs	TAL Metals	Cyanide	Salinity						REMARKS
EFF070	5-18-02	1945	W	SVOC - Amber Pest/PCB - Amber	4°C	MT - HNO3 CN - NaOH	7	2	2	1	1	1						
EFF070D	↓	1945	↓	MT - 500ml poly CN - 250ml poly	↓	↓	7	2	2	1	1	1						
EFF038	↓	1950	↓	Salinity - 125ml poly	↓	↓	7	2	2	1	1	1						
EFF037	↓	2000	↓	↓	↓	↓	7	2	2	1	1	1						
EFF036	↓	2005	↓	↓	↓	↓	7	2	2	1	1	1						
EFF033	↓	2010	↓	↓	↓	↓	7	2	2	1	1	1						
EFF056	↓	2020	↓	↓	↓	↓	7	2	2	1	1	1						

[signature] 5-20-02

RELINQUISHER	DATE	TIME	RECEIVER	DATE	TIME	RELINQUISHER	DATE	TIME	RECEIVER	DATE	TIME
[signature]	5-20-02	1545									
PRINTED: J. Watson			PRINTED:			PRINTED:			PRINTED:		
COMPANY: ENSAFE			COMPANY:			COMPANY:			COMPANY:		

METHOD OF SHIPMENT: FedEx
SHIPMENT NO.: 7904 2361 2227 / 7904 2361 2249 / 7904-2361-2190
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ** RUN SALINITY FIRST - POST RESULTS ON Data View - ENSAFE will contact lab with instructions to proceed with other ANALYSIS.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

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Amended COC 6/19/02
CHAIN OF CUSTODY RECORD

PAGE ___ OF ___

PROJECT/JOB NO: 0154-00[redacted]9-000-00
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL SAVANNAH

CLIENT: U.S. NAVY
PROJECT MANAGER: Charlie Vernoy
LOCATION: CHARLESTON SC
TELE/FAX NO.: 843-984-0029 pl / 856-0107 fax
SAMPLERS: (SIGNATURE) [signature]

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pest/PCBs	TAL Metals	CYANIDE	SALINITY *						REMARKS
~~EFF016~~ EFF029 PBL 6-19-02	6-18-02	~~0915~~ 0915 PBL 6-19-02	WATER	* *	4°C	Met-HNO3 CN-NaOH	7	2	2	1	1	1						
EFF028		0920					7	2	2	1	1	1						
EFF015		0930					7	2	2	1	1	1						
~~EFF016~~ EFF017 PBL 6-18-02		0938					7	2	2	1	1	1						
EFF018		0945					7	2	2	1	1	1						
EFF020		0948					7	2	2	1	1	1						
EFF024		0955					7	2	2	1	1	1						

Revised chain 6-19-02 [signature]

18 JUN 02 [signature]

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
[signature] PETER L. BAYLEY	6-14-02	PRINTED:		PRINTED:		PRINTED:	
COMPANY: ENSAFE	TIME 1700	COMPANY:	TIME	COMPANY:	TIME	COMPANY:	TIME

METHOD OF SHIPMENT: Fed Ex Priority Ovnt
SHIPMENT NO. 7984-5600-1019; 7984-5600-1177, 7984-5600-1225
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: *RUN SALINITY FIRST - POST SALINITY RESULT ON DATA VIEW
ENSAFE WILL CALL LAB W/ INSTRUCTIONS TO PROCEED PENDING SALINITY RESULTS

** 1-L AMBER (SVOC & Pest/PCB); 500 ml POLY (MET ONLY); 250 ml POLY (CN); 125 ml Poly (SALINITY)

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2 REV. 05/93

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Amended CC[redacted]6/24/02

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1 [redacted]
PROJECT/JOB NO: 0154-0[redacted]9-000-00
COC NO:
PO NO: 4990
REL NO:
LAB NAME: STL-Savannah

CLIENT: U.S. Navy
PROJECT MANAGER: Charlie Vernoy
LOCATION: Charleston SC
TELE/FAX NO. 843-884-0029 / 843-856-0107
SAMPLERS: (SIGNATURE) Pete Bayley / Charlie Vernoy

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pest/PCBs	TAL Metals	Cyanide	Salinity *	REMARKS
EFF021	6-22-02	12:58	Water	**	4°C	Met-HNO3 CN-NaOH	7	2	2	1	1	1	
EFF022		13:40					7	2	2	1	1	1	
EFF023		13:30					7	2	2	1	1	1	
~~EFF025~~	CW 6-24-02	~~13:28~~											
EFF026		13:15					7	2	2	1	1	1	
EFF027		13:24					7	2	2	1	1	1	
EFF030		13:20					7	2	2	1	1	1	
EFF046		13:05					7	2	2	1	1	1	

CAW 6-24-02

RELINQUISHER: Charles A. Vernoy	DATE 6-24-02	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Charles A. Vernoy	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FedEx Priority Ovnt.
SHIPMENT NO. 790462583452, 790550695264, 790550695253
SEND RESULTS TO: Charlie Vernoy

COMMENTS: * Run Salinity First - Post Salinity Results on Data View
EnSafe Will Call Lab w/ instructions to Proceed Pending Salinity
** 1-L Amber (SVOC + Pest/PCB) 500ml Poly metals 250ml Poly (CN) 125ml Poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0154-01-09-0000-000
COC NO:
PO NO: 4770
REL NO:
LAB NAME: STL Savannah

CLIENT: US Navy - Zone J
PROJECT MANAGER: Charles Vernoy
LOCATION: Charleston, SC
TELE/FAX NO. 843 884 0029 / 843 856 0107
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	PT/PCB	TAL metals	cyanide	Salinity**					REMARKS
EFF028★	7/11/02	1632	W	SVOC, PT/PCB = 1L amber	4°C	MT = HNO3 CN = NaOH	7	X	X	X	X	X					★ Limited Qty of SVOC/PT/PCB
EFF032		1636		MT = 500 ml poly CN = 250 ml poly Salinity = 125 ml poly			7	X	X	X	X	X					
EFF039		1640					7	X	X	X	X	X					
EFF053		1648					7	X	X	X	X	X					
EFF052		1651					7	X	X	X	X	X					
EFF049		1654					7	X	X	X	X	X					
EFF072		1702					7	X	X	X	X	X					

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Julie Shaffer	7/12/02						
PRINTED: Julie Shaffer	TIME 1530	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 7984 8325 2773; 7985 6242 0860; 7984 8325 2821
SEND RESULTS TO: Charlie Vernoy

COMMENTS: ** Analyze Salinity first - post results on data view. EnSafe will contact lab if to proceed with other analysis.

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: 0154-00[redacted]-000-00
COC NO:
PO NO: 4970
REL NO:
LAB NAME: STL- SAVANNAH

CLIENT U.S. NAVY
LOCATION CHARLESTON, SC
SAMPLERS: (SIGNATURE) [signature]

PROJECT MANAGER CHARLIE VIERNOY
TELE/FAX NO. 843.884.0029 / 854.0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pest/PCBs	TAL Metals	CYANIDE	SALINITY *						REMARKS
EFF025	7/15.02	2000	WATER	**	4°C	met-HNO3 CN-NaOH	7	2	2	1	1	1						
EFF071	7.15.02	2005	"	**	↓	↓	7	2	2	1	1	1						

[signature] 11 Jul 02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: [signature]	7-16-02	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: ENSAFE	TIME 1500	COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: Fed Ex Priority Overnight
SHIPMENT NO. 7918 8438 2305
SEND RESULTS TO: CHARLIE VIERNOY

COMMENTS: * Run SALINITY FIRST - POST SALINITY RESULT ON DATA VIEW. ENSAFE WILL CALL LAB W/INSTRUCTIONS & PROCEED PENDING SALINITY
** Pest/PCB & SVOC - Liter Amber; Metals 500ml Poly; CN 250ml Poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE) SALINITY 250ml Poly

ENSCOC2
REV. 05/98

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CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: 0154-001-[redacted]-000-00

COC NO:

PO NO: 4970

REL NO:

LAB NAME: STL-SAVANNAH

CLIENT U.S. NAVY

PROJECT MANAGER CHARLIE VERNOY

LOCATION CHARLESTON, SC

TELE/FAX NO. 843-884-0029/856-0107

SAMPLERS: (SIGNATURE) Peter W. Bayly

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	PEST/PCB's	TAL Metals	CYANIDE	SALINITY *						REMARKS
EFF028	7.23.02	1500	WATER	**	4°C	Met-HNO3 CN-NaOH	7	✓	✓	✓	✓	✓						

7-24-02 P. W. Bayly

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
PRINTED: Peter W. Bayly	TIME 1500	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: ENSAFE		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: Fed Ex Priority Ovnt

SHIPMENT NO. 7904964800047

SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: * RUN SALINITY FIRST - POST SALINITY RESULTS ON DATA VIEW
ENSAFE WILL CALL LAB w/instruction to Proceed PENDING SALINITY RESULTS

** - Pest/PCB & SVOC - Liter Amber; Metals 500 ml poly; SALINITY & CN - 250 ml Poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

ENSAFE

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MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: 0158-001-[illegible]-000-00

COC NO:

PO NO: 4970

REL NO:

LAB NAME: STL-SAVANNAH

CLIENT: U S NAVY

PROJECT MANAGER: CHARLIE VERNOY

LOCATION: CHARLESTON, SC

TELE/FAX NO. 843.884.0029/856.0107

SAMPLERS: (SIGNATURE) Peter W. Bagley

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pest/PCB's	TAL Metals	CYANIDE	SALINITY *	REMARKS
EFF-059	8-30-02	1100	WATER	* *	4°C	Metals-HNO3 CN-NaOH	7	✓	✓	✓	✓	✓	

8-30-02 Peter W. Bagley

RELINQUISHER	DATE	RECEIVER	DATE	RELINQUISHER	DATE	RECEIVER	DATE
Peter W. Bagley	8-30-02						
PRINTED: Peter W. Bagley	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: ENSAFE		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: Fed Ex Priority Overnight Del

SHIPMENT NO. 7919.1987.4710

SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: * RUN SALINITY FIRST - POST SALINITY RESULTS ON DATA VIEW ENSAFE WILL CALL LAB W/ INSTRUCTION TO PROCEED PENDING SALINITY RESULTS

** Pest/PCB & SVOC - 1 Liter Amber; Metals - 500 ml Poly; SALINITY & CN - 250 ml Poly

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2

ENSAFE

800-588-7962
MEMPHIS, TENNESSEE
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN; LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PADUCAH, KY; PENSACOLA, FL; RALEIGH, NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT/JOB NO: 0154-0[illegible]09-00[illegible]20
COC NO:
PO NO: 4970
REL NO:
LAB NAME: STL-Savannah

CLIENT: US NAVY
LOCATION: Charleston SC
SAMPLERS: (SIGNATURE) [signature]

PROJECT MANAGER: Charlie Vernoy
TELE/FAX NO. 843 884.0029
843/ 856/0107

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	PEST/PCB's	TAL Metals	CYANIDE	SALINITY *			REMARKS
* EFF016	9-25-02	1745	Water	**	4°C	Meth-Acid CN-NaOH	7	X	X	X	X	X			* RUSH!! Called Linda Wolfe 9/26/02 Julie

[signature] 9-26-02

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
James Watson	9/26/02						
PRINTED: James Watson	TIME 1700	PRINTED:	TIME	PRINTED:	TIME	PRINTED:	TIME
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY:	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO. 7900 8356 8747
SEND RESULTS TO: CHARLIE VERNOY

COMMENTS: * Run Salinity First - Post Salinity Results on Data View. EnSafe will call back w/ instruction to proceed pending salinity Results.
** Pest/PCB & SVOC - 1 Lit Amber, Metals 500ml poly, Salinity & CN - 250 ml poly
~~24 hr.~~ TAT on salinity ~~[illegible]~~ 7 day TAT for other parameters

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE) 3-5 DAY

ENSCOC2
REV. [illegible]

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
CAP001	01/15/02	10:15:00 AM	E-10242	Salinity	2	U	ppt	NBCJ02
CAP001	01/15/02	10:15:00 AM	7429-90-5	Aluminum	250		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-36-0	Antimony	3	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-38-2	Arsenic	35		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-39-3	Barium	5.6	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-70-2	Calcium	19000		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-47-3	Chromium	11		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-48-4	Cobalt	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-50-8	Copper	18	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7439-89-6	Iron	190		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7439-92-1	Lead	4.3	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7439-95-4	Magnesium	560		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7439-96-5	Manganese	4.2	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-02-0	Nickel	3.1	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-09-7	Potassium	10000	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-22-4	Silver	0.7	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-23-5	Sodium	21000		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-28-0	Thallium	5.2	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-31-5	Tin	4.2	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-62-2	Vanadium	21		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7440-66-6	Zinc	28	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7439-97-6	Mercury	0.22		µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
CAP001	01/15/02	10:15:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
CAP001	01/15/02	10:15:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	1.4	J	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ02

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
CAP001	01/15/02	10:15:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ02
CAP001	01/15/02	10:15:00 AM	57-12-5	Cyanide, Total	5.4	J	µg/l	NBCJ02
EFF001	02/07/02	3:05:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF001	02/07/02	3:05:00 PM	7429-90-5	Aluminum	200	J	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-39-3	Barium	19		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-70-2	Calcium	29000		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-47-3	Chromium	1.2	J	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-50-8	Copper	7.8	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7439-89-6	Iron	440		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7439-92-1	Lead	4.5	J	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7439-95-4	Magnesium	1200		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7439-96-5	Manganese	14		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-09-7	Potassium	1100		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-23-5	Sodium	3100		µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-62-2	Vanadium	2.6	J	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7440-66-6	Zinc	150	J	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF001	02/07/02	3:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF001	02/07/02	3:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF001	02/07/02	3:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF001	02/07/02	3:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF005	02/07/02	9:45:00 AM	E-10242	Salinity	2	U	ppt	NBCJ04
EFF005	02/07/02	9:45:00 AM	7429-90-5	Aluminum	520		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-36-0	Antimony	6	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-39-3	Barium	7.6	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-43-9	Cadmium	0.52	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-70-2	Calcium	20000		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-47-3	Chromium	2.4	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-48-4	Cobalt	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-50-8	Copper	12	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7439-89-6	Iron	870		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7439-92-1	Lead	15		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7439-95-4	Magnesium	6300		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7439-96-5	Manganese	20		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-02-0	Nickel	1.8	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-09-7	Potassium	2500		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-23-5	Sodium	51000		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-62-2	Vanadium	8.5	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7440-66-6	Zinc	73		µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF005	02/07/02	9:45:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF005	02/07/02	9:45:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	4	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF005	02/07/02	9:45:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	87-86-5	Pentachlorophenol	14	J	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
EFF005	02/07/02	9:45:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	E-10242	Salinity	2	J	ppt	NBCJ04
EFF006	02/07/02	9:30:00 AM	7429-90-5	Aluminum	1200		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-36-0	Antimony	20	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-38-2	Arsenic	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-39-3	Barium	17		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-41-7	Beryllium	4	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-43-9	Cadmium	0.6	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-70-2	Calcium	66000		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-47-3	Chromium	4.7	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-48-4	Cobalt	1.4	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-50-8	Copper	34		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7439-89-6	Iron	2100		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7439-92-1	Lead	80		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7439-95-4	Magnesium	10000		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7439-96-5	Manganese	41		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-02-0	Nickel	4.5	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-09-7	Potassium	5100		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7782-49-2	Selenium	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-22-4	Silver	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-23-5	Sodium	81000		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-28-0	Thallium	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-31-5	Tin	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-62-2	Vanadium	8.8	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7440-66-6	Zinc	51		µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF006	02/07/02	9:30:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF006	02/07/02	9:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	106-44-5	3&4-Methylphenol (m&p-Cresol)	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ04

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF006	02/07/02	9:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	621-64-7	N-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	87-86-5	Pentachlorophenol	14	J	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ04
EFF006	02/07/02	9:30:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ04
EFF013	02/07/02	4:35:00 PM	E-10242	Salinity	7		ppt	NBCJ05
EFF013	03/02/02	5:10:00 PM	E-10242	Salinity	2.5		ppt	NBCJ06
EFF013	03/02/02	5:10:00 PM	7429-90-5	Aluminum	1200		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-38-2	Arsenic	3.9	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-39-3	Barium	9.9	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-41-7	Beryllium	0.54	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-70-2	Calcium	66000		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-47-3	Chromium	2.2	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-50-8	Copper	8.7	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7439-89-6	Iron	1500		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7439-92-1	Lead	4.7	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7439-95-4	Magnesium	93000		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7439-96-5	Manganese	39		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-02-0	Nickel	2.1	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-09-7	Potassium	41000		µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-23-5	Sodium	800000	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF013	03/02/02	5:10:00 PM	7440-62-2	Vanadium	5.3	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7440-66-6	Zinc	44	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7439-97-6	Mercury	0.12	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF013	03/02/02	5:10:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	95-48-7	2-Methylphenol (o-Cresol)	4.3	J	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF013	03/02/02	5:10:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF013	03/02/02	5:10:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF014	02/07/02	4:25:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF014	02/07/02	4:25:00 PM	7429-90-5	Aluminum	3600		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-38-2	Arsenic	4	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-39-3	Barium	44		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-41-7	Beryllium	0.15	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-70-2	Calcium	50000		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-47-3	Chromium	11		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-48-4	Cobalt	1.2	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-50-8	Copper	35		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7439-89-6	Iron	5100		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7439-92-1	Lead	38		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7439-95-4	Magnesium	10000		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7439-96-5	Manganese	110		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-02-0	Nickel	6	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-09-7	Potassium	4400		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF014	02/07/02	4:25:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-23-5	Sodium	74000		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-28-0	Thallium	5.5	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-62-2	Vanadium	14		µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7440-66-6	Zinc	530	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF014	02/07/02	4:25:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	105-67-9	2,4-Dimethylphenol	1	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	106-44-5	3&4-Methylphenol (m&p cresol)	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	2.6	J	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF014	02/07/02	4:25:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	[illegible]	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	[illegible]	Fluorene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	[illegible]	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF014	02/07/02	4:25:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF015	06/18/02	9:30:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF015	06/18/02	9:30:00 AM	7429-90-5	Aluminum	1300		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-39-3	Barium	22		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-43-9	Cadmium	0.75	J	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-70-2	Calcium	8500		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-47-3	Chromium	7.2	J	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-48-4	Cobalt	1.2	J	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-50-8	Copper	36		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7439-89-6	Iron	3900		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7439-92-1	Lead	33		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7439-95-4	Magnesium	5200		µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF015	06/18/02	9:30:00 AM	7439-96-5	Manganese	88		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-02-0	Nickel	5.8	J	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-09-7	Potassium	2700		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-23-5	Sodium	45000		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-62-2	Vanadium	7.9	J	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7440-66-6	Zinc	1000		µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF015	06/18/02	9:30:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF015	06/18/02	9:30:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF015	06/18/02	9:30:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF016	09/25/02	5:45:00 PM	E-10242	Salinity	2	U	ppt	NBCJ16
EFF016	09/25/02	5:45:00 PM	7429-90-5	Aluminum	170	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-36-0	Antimony	6.6	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-38-2	Arsenic	5	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-39-3	Barium	21		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-70-2	Calcium	30000		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-47-3	Chromium	1.1	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ16

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF016	09/25/02	5:45:00 PM	7440-50-8	Copper	22	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7439-89-6	Iron	490		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7439-92-1	Lead	7.4	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7439-95-4	Magnesium	41000		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7439-96-5	Manganese	49		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-02-0	Nickel	3.4	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-09-7	Potassium	20000	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7782-49-2	Selenium	3.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-22-4	Silver	3.4	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-23-5	Sodium	380000		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-28-0	Thallium	6.8	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-31-5	Tin	2.[illegible]	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-62-2	Vanadium	3.4	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7440-66-6	Zinc	300		µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ16

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF016	09/25/02	5:45:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	106-46-7	1,4-Dichlorobenzene	0.31	J	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl)ether)	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ16

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF016	09/25/02	5:45:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ16
EFF016	09/25/02	5:45:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ16
EFF017	06/18/02	9:38:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF017	06/18/02	9:38:00 AM	7429-90-5	Aluminum	540		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-39-3	Barium	7.5	J	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF017	06/18/02	9:38:00 AM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-70-2	Calcium	3700		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-47-3	Chromium	4.9	J	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-48-4	Cobalt	0.94	J	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-50-8	Copper	30		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7439-89-6	Iron	1100		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7439-92-1	Lead	16		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7439-95-4	Magnesium	3000		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7439-96-5	Manganese	28		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-02-0	Nickel	2.9	J	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-09-7	Potassium	1700		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-23-5	Sodium	26000		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-62-2	Vanadium	3.3	J	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7440-66-6	Zinc	480		µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF017	06/18/02	9:38:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF017	06/18/02	9:38:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF017	06/18/02	9:38:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF018	06/18/02	9:45:00 AM	7429-90-5	Aluminum	180	J	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF018	06/18/02	9:45:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-39-3	Barium	8.8	J	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-70-2	Calcium	8500		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-47-3	Chromium	1.8	J	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-48-4	Cobalt	[illegible]	[illegible]	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-50-8	Copper	[illegible]		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7439-89-6	Iron	300		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7439-92-1	Lead	11		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7439-95-4	Magnesium	17000		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7439-96-5	Manganese	13		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-02-0	Nickel	3.1	J	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-09-7	Potassium	6200		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-23-5	Sodium	140000		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-62-2	Vanadium	7	J	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7440-66-6	Zinc	240		µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF018	06/18/02	9:45:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	11104-28-2	Aroclor-1221	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	534-52-1	2 Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF018	06/18/02	9:45:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF018	06/18/02	9:45:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF018	06/18/02	9:45:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF019	03/02/02	4:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF019	03/02/02	4:30:00 PM	7429-90-5	Aluminum	98	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-38-2	Arsenic	15		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-39-3	Barium	4.2	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-41-7	Beryllium	0.6	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-70-2	Calcium	5800		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-47-3	Chromium	4.6	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-50-8	Copper	16	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7439-89-6	Iron	190		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7439-92-1	Lead	3.3	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7439-95-4	Magnesium	6000		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7439-96-5	Manganese	7.2	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-09-7	Potassium	3000		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-23-5	Sodium	48000	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-62-2	Vanadium	1.4	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7440-66-6	Zinc	74	J	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF019	03/02/02	4:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF019	03/02/02	4:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	16		µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF019	03/02/02	4:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF019	03/02/02	4:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF020	06/18/02	9:48:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF020	06/18/02	9:48:00 AM	7429-90-5	Aluminum	590		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-39-3	Barium	13		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-70-2	Calcium	2600		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-47-3	Chromium	4.2	J	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-50-8	Copper	99		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7439-89-6	Iron	1100		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7439-92-1	Lead	13		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7439-95-4	Magnesium	790		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7439-96-5	Manganese	22		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-02-0	Nickel	12	J	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-09-7	Potassium	600	J	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-23-5	Sodium	5900		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-62-2	Vanadium	5.6	J	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7440-66-6	Zinc	250		µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF020	06/18/02	9:48:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	12674-11-2	Aroclor 1016	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF020	06/18/02	9:48:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	29	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	84-74-2	Di-n-butylphthalate	1.4	J	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF020	06/18/02	9:48:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF020	06/18/02	9:48:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF021	06/22/02	12:58:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF021	06/22/02	12:58:00 PM	7429-90-5	Aluminum	460		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-39-3	Barium	33		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-70-2	Calcium	4200		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-47-3	Chromium	5.3	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-50-8	Copper	190		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7439-89-6	Iron	720		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7439-92-1	Lead	30		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7439-95-4	Magnesium	240	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7439-96-5	Manganese	10		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-02-0	Nickel	1.9	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-09-7	Potassium	490	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-22-4	Silver	0.5	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-23-5	Sodium	860		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-62-2	Vanadium	3.1	J	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7440-66-6	Zinc	180		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF021	06/22/02	12:58:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF021	06/22/02	12:58:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	191-24-2	Benzo(g,h,i)perylene	10		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF021	06/22/02	12:58:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	108-95-2	Phenol	16		µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF021	06/22/02	12:58:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF022	06/22/02	1:40:00 PM	7429-90-5	Aluminum	280		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-39-3	Barium	60		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-70-2	Calcium	5500		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-47-3	Chromium	1.9	J	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-48-4	Cobalt	2.8	J	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-50-8	Copper	46		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7439-89-6	Iron	1100		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7439-92-1	Lead	3.3	J	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7439-95-4	Magnesium	570		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7439-96-5	Manganese	27		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-02-0	Nickel	240		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-09-7	Potassium	760	J	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-23-5	Sodium	4900		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-62-2	Vanadium	130		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7440-66-6	Zinc	340		µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF022	06/22/02	1:40:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	319-84-6	alpha-BHC	0.023	J	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	58-89-9	gamma-BHC (Lindane)	0.0074	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF022	06/22/02	1:40:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	95-48-7	2-Methylphenol(o-Cresol)	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	106-44-5	3&4-Methylphenol(m&p cresol)	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	91-94-1	3,3-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF022	06/22/02	1:40:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	621-64-7	Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF022	06/22/02	1:40:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF023	06/22/02	1:30:00 PM	7429-90-5	Aluminum	110	J	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-39-3	Barium	11		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-70-2	Calcium	2000		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-47-3	Chromium	1.9	J	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-50-8	Copper	27		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7439-89-6	Iron	170		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7439-95-4	Magnesium	720		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7439-96-5	Manganese	6.5	J	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-09-7	Potassium	390	J	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-23-5	Sodium	5400		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF023	06/22/02	1:30:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-62-2	Vanadium	1.4	J	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7440-66-6	Zinc	130		µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	76-44-8	Heptachlor	0.018	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF023	06/22/02	1:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF023	06/22/02	1:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF023	06/22/02	1:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF024	06/18/02	9:55:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF024	06/18/02	9:55:00 AM	7429-90-5	Aluminum	860		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-39-3	Barium	16		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-70-2	Calcium	6300		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-47-3	Chromium	8.2	J	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-48-4	Cobalt	1.1	J	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-50-8	Copper	160		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7439-89-6	Iron	1900		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7439-92-1	Lead	20		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7439-95-4	Magnesium	1100		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7439-96-5	Manganese	90		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-02-0	Nickel	5.5	J	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-09-7	Potassium	1700		µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF024	06/18/02	9:55:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-23-5	Sodium	5600		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-62-2	Vanadium	6.5	J	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7440-66-6	Zinc	300		µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	72-20-8	Endrin	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF024	06/18/02	9:55:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF024	06/18/02	9:55:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF024	06/18/02	9:55:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF025	07/15/02	8:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ13
EFF025	07/15/02	8:00:00 PM	7429-90-5	Aluminum	1100		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-38-2	Arsenic	5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-39-3	Barium	8.1	J	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-70-2	Calcium	3400		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-47-3	Chromium	4	J	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-50-8	Copper	18	J	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7439-89-6	Iron	1900		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7439-92-1	Lead	28		µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF025	07/15/02	8:00:00 PM	7439-95-4	Magnesium	1800		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7439-96-5	Manganese	80		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-02-0	Nickel	1.5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-09-7	Potassium	1300		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7782-49-2	Selenium	3.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-23-5	Sodium	14000		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-28-0	Thallium	6.2	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-31-5	Tin	3.8	J	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-62-2	Vanadium	5.8	J	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7440-66-6	Zinc	100		µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF025	07/15/02	8:00:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF025	07/15/02	8:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ13
EFF025	07/15/02	8:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ13
EFF026	06/22/02	1:15:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF026	06/22/02	1:15:00 PM	7429-90-5	Aluminum	430		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-39-3	Barium	4.8	J	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-70-2	Calcium	5600		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-47-3	Chromium	1.8	J	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF026	06/22/02	1:15:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-50-8	Copper	9.2	J	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7439-89-6	Iron	560		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7439-92-1	Lead	9.5		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7439-95-4	Magnesium	690		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7439-96-5	Manganese	15		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-09-7	Potassium	570	J	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-22-4	Silver	0.7	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-23-5	Sodium	3700		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-62-2	Vanadium	3	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7440-66-6	Zinc	64		µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	12674-11-2	Aroclor 1016	1	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF026	06/22/02	1:15:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) ("bis-2-Chloroisopropyl Ether")	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF026	06/22/02	1:15:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF026	06/22/02	1:15:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF027	06/22/02	1:24:00 PM	7429-90-5	Aluminum	49	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-39-3	Barium	6	J	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF027	06/22/02	1:24:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-70-2	Calcium	2200		µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-50-8	Copper	20	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7439-89-6	Iron	54		µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7439-95-4	Magnesium	170	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7439-96-5	Manganese	2.4	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-09-7	Potassium	320	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-23-5	Sodium	1300		µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-62-2	Vanadium	1.3	J	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7440-66-6	Zinc	34		µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF027	06/22/02	1:24:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF027	06/22/02	1:24:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF027	06/22/02	1:24:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF028	06/18/02	9:20:00 AM	E-10242	Salinity	16		ppt	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF028	07/11/02	4:32:00 PM	E-10242	Salinity	3.9		ppt	NBCJ12
EFF028	07/23/02	3:00:00 PM	E-10242	Salinity	3.3		ppt	NBCJ14
EFF028	07/23/02	3:00:00 PM	7429-90-5	Aluminum	890		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-38-2	Arsenic	5	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-39-3	Barium	15		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-70-2	Calcium	55000		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-47-3	Chromium	8.8	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-50-8	Copper	9.3	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7439-89-6	Iron	1300		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7439-92-1	Lead	10		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7439-95-4	Magnesium	140000		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7439-96-5	Manganese	29		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-02-0	Nickel	2.4	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-09-7	Potassium	51000		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7782-49-2	Selenium	3.1	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-23-5	Sodium	1100000		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-28-0	Thallium	6.2	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-31-5	Tin	4.9	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-62-2	Vanadium	9.2	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7440-66-6	Zinc	41		µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ14

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF028	07/23/02	3:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	11141-16-5	Aroclor-1232		UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ14

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF028	07/23/02	3:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	50-32-8	Benzo(a)pyrene	0.78	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	191-24-2	Benzo(g,h,i)perylene	0.71	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	1.5	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	84-74-2	Di-n-butylphthalate	0.76	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	0.71	J	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ14

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF028	07/23/02	3:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ14
EFF028	07/23/02	3:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ14
EFF029	06/18/02	9:15:00 AM	E-10242	Salinity	2	U	ppt	NBCJ10
EFF029	06/18/02	9:10:00 AM	7429-90-5	Aluminum	2600		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-39-3	Barium	18		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-70-2	Calcium	21000		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-47-3	Chromium	9.2	J	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-48-4	Cobalt	1	J	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-50-8	Copper	25		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7439-89-6	Iron	2900		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7439-92-1	Lead	26		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7439-95-4	Magnesium	9700		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7439-96-5	Manganese	66		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-02-0	Nickel	3.5	J	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-09-7	Potassium	4100		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7782-49-2	Selenium	3.3	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-22-4	Silver	0.5	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-23-5	Sodium	76000		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-31-5	Tin	4.5	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-62-2	Vanadium	9.6	J	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7440-66-6	Zinc	250		µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF029	06/18/02	9:10:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF029	06/18/02	9:10:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	84-74-2	Di-n-butylphthalate	0.68	J	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ10

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF029	06/18/02	9:10:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ10
EFF029	06/18/02	9:10:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ10
EFF030	06/22/02	1:20:00 PM	E-10242	Salinity	2	J	ppt	NBCJ11
EFF030	06/22/02	1:20:00 PM	7429-90-5	Aluminum	59	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-39-3	Barium	1.9	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-70-2	Calcium	2800		µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-50-8	Copper	8.4	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7439-89-6	Iron	66		µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7439-95-4	Magnesium	86	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7439-96-5	Manganese	2	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-09-7	Potassium	98	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-23-5	Sodium	430	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-62-2	Vanadium	1.8	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7440-66-6	Zinc	9.5	J	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF030	06/22/02	1:20:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF030	06/22/02	1:20:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF030	06/22/02	1:20:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF030	06/22/02	1:20:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF031	03/02/02	6:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF031	03/02/02	6:00:00 PM	7429-90-5	Aluminum	51	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-39-3	Barium	3.6	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-41-7	Beryllium	0.35	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-70-2	Calcium	6900		µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-50-8	Copper	35		µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7439-89-6	Iron	74		µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7439-95-4	Magnesium	960		µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7439-96-5	Manganese	5.1	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-09-7	Potassium	770	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-23-5	Sodium	8100	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-62-2	Vanadium	2.9	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7440-66-6	Zinc	57	J	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF031	03/02/02	6:00:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	11104-28-2	Aroclor-1221	2	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF031	03/02/02	6:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF031	03/02/02	6:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF031	03/02/02	6:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF032	07/11/02	4:36:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF032	07/11/02	4:36:00 PM	7429-90-5	Aluminum	4100		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-38-2	Arsenic	11	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-39-3	Barium	28	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-41-7	Beryllium	0.2	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-70-2	Calcium	29000		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-47-3	Chromium	13		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-48-4	Cobalt	2.1	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-50-8	Copper	39		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7439-89-6	Iron	11000		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7439-92-1	Lead	140		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7439-95-4	Magnesium	30000		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7439-96-5	Manganese	160		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-02-0	Nickel	5.9	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-09-7	Potassium	14000		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-23-5	Sodium	250000		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF032	07/11/02	4:36:00 PM	7440-62-2	Vanadium	15		µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7440-66-6	Zinc	180	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	5103-71-9	alpha-Chlordane	0.013	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	1031-07-8	Endosulfan sulfate	0.022	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF032	07/11/02	4:36:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	0.6	J	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF032	07/11/02	4:36:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF032	07/11/02	4:36:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12
EFF033	05/18/02	8:10:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09
EFF033	05/18/02	8:10:00 PM	7429-90-5	Aluminum	130	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-38-2	Arsenic	5.7	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-39-3	Barium	6.6	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-70-2	Calcium	11000		µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-47-3	Chromium	1.4	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-50-8	Copper	49		µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7439-89-6	Iron	170	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7439-92-1	Lead	3.9	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7439-95-4	Magnesium	2300		µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7439-96-5	Manganese	6	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-09-7	Potassium	1500		µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF033	05/18/02	8:10:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-23-5	Sodium	19000	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-62-2	Vanadium	5.2	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7440-66-6	Zinc	48	J	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF033	05/18/02	8:10:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	14		µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF033	05/18/02	8:10:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF033	05/18/02	8:10:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF034	03/02/02	5:25:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF034	03/02/02	5:25:00 PM	7429-90-5	Aluminum	440		µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-38-2	Arsenic	4.8	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-39-3	Barium	8.1	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-41-7	Beryllium	0.38	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-70-2	Calcium	23000		µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-47-3	Chromium	2.4	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-50-8	Copper	5	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7439-89-6	Iron	520		µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7439-92-1	Lead	2.5	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7439-95-4	Magnesium	7100		µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF034	03/02/02	5:25:00 PM	7439-96-5	Manganese	13		µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-09-7	Potassium	3700		µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-23-5	Sodium	59000	J	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-62-2	Vanadium	3.8	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7440-66-6	Zinc	35	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF034	03/02/02	5:25:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	106-44-5	3&4-Methylphenol (m&p cresol)	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF034	03/02/02	5:25:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF034	03/02/02	5:25:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF035	03/02/02	5:30:00 PM	7429-90-5	Aluminum	970		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-39-3	Barium	20		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-41-7	Beryllium	0.43	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-70-2	Calcium	39000		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-47-3	Chromium	2.3	J	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF035	03/02/02	5:30:00 PM	7440-50-8	Copper	10	J	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7439-89-6	Iron	710		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7439-92-1	Lead	6.1		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7439-95-4	Magnesium	36000		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7439-96-5	Manganese	23		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-09-7	Potassium	18000		µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-23-5	Sodium	320000	J	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-62-2	Vanadium	4	J	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7440-66-6	Zinc	33	J	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF035	03/02/02	5:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF035	03/02/02	5:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF035	03/02/02	5:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF036	03/02/02	5:38:00 PM	E-10242	Salinity	8.6		ppt	NBCJ06
EFF036	05/18/02	8:05:00 PM	E-10242	Salinity	3.5		ppt	NBCJ09
EFF036	05/18/02	8:05:00 PM	7429-90-5	Aluminum	900	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-36-0	Antimony	5.7	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-38-2	Arsenic	4.8	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-39-3	Barium	26	J	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF036	05/18/02	8:05:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-70-2	Calcium	45000		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-47-3	Chromium	25		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-50-8	Copper	15	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7439-89-6	Iron	2000	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7439-92-1	Lead	10		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7439-95-4	Magnesium	110000		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7439-96-5	Manganese	66		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-02-0	Nickel	6.1	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-09-7	Potassium	53000		µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7782-49-2	Selenium	3.3	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-23-5	Sodium	8800	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-62-2	Vanadium	8.1	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7440-66-6	Zinc	59	J	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF036	05/18/02	8:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF036	05/18/02	8:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF036	05/18/02	8:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF037	05/18/02	8:00:00 PM	7429-90-5	Aluminum	180	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-39-3	Barium	3.8	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-70-2	Calcium	9300		µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-47-3	Chromium	1.2	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-50-8	Copper	8.2	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7439-89-6	Iron	280	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7439-95-4	Magnesium	760		µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7439-96-5	Manganese	12		µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-09-7	Potassium	740	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-23-5	Sodium	8400	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-62-2	Vanadium	13		µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7440-66-6	Zinc	17	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF037	05/18/02	8:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.0095	J	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF037	05/18/02	8:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF037	05/18/02	8:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF037	05/18/02	8:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09
EFF038	05/18/02	7:50:00 PM	7429-90-5	Aluminum	280	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-39-3	Barium	9	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-70-2	Calcium	15000		µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-50-8	Copper	12	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7439-89-6	Iron	260	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7439-95-4	Magnesium	1800		µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7439-96-5	Manganese	13		µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-09-7	Potassium	1400		µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-23-5	Sodium	34000	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-62-2	Vanadium	8.5	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7440-66-6	Zinc	21	J	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF038	05/18/02	7:50:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF038	05/18/02	7:50:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF038	05/18/02	7:50:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF038	05/18/02	7:50:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF039	07/11/02	4:40:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF039	07/11/02	4:40:00 PM	7429-90-5	Aluminum	16000		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-36-0	Antimony	9.9	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-38-2	Arsenic	12	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-39-3	Barium	140	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-41-7	Beryllium	0.88	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-43-9	Cadmium	1.4	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-70-2	Calcium	290000		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-47-3	Chromium	62		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-48-4	Cobalt	6.7	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-50-8	Copper	85		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7439-89-6	Iron	16000		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7439-92-1	Lead	110		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7439-95-4	Magnesium	7600		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7439-96-5	Manganese	300		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-02-0	Nickel	31	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-09-7	Potassium	6200		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7782-49-2	Selenium	4	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-23-5	Sodium	270000		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-31-5	Tin	5.8	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-62-2	Vanadium	64		µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7440-66-6	Zinc	460	J	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	72-54-8	4,4'-DDD	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	72-55-9	4,4'-DDE	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	50-29-3	4,4'-DDT	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	309-00-2	Aldrin	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	319-84-6	alpha-BHC	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	5103-71-9	alpha-Chlordane	0.05	UR	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF039	07/11/02	4:40:00 PM	319-85-7	beta-BHC	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	57-74-9	Chlordane (technical)	0.5	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	319-86-8	delta-BHC	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	60-57-1	Dieldrin	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	959-98-8	Endosulfan I	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	33213-65-9	Endosulfan II	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	1031-07-8	Endosulfan sulfate	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	72-20-8	Endrin	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7421-93-4	Endrin aldehyde	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	53494-70-5	Endrin ketone	0.1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	5103-74-2	gamma-Chlordane	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	76-44-8	Heptachlor	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	1024-57-3	Heptachlor epoxide	0.05	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	72-43-5	Methoxychlor	0.5	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	8001-35-2	Toxaphene	5	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	12674-11-2	Aroclor-1016	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	11104-28-2	Aroclor-1221	2	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	11141-16-5	Aroclor-1232	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	53469-21-9	Aroclor-1242	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	12672-29-6	Aroclor-1248	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	11097-69-1	Aroclor-1254	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	11096-82-5	Aroclor-1260	1	UR	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF039	07/11/02	4:40:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF039	07/11/02	4:40:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF039	07/11/02	4:40:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12
EFF040	02/08/02	2:15:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF040	02/08/02	2:15:00 PM	7429-90-5	Aluminum	2300		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-39-3	Barium	11		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-70-2	Calcium	12000		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-47-3	Chromium	6.6	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-50-8	Copper	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7439-89-6	Iron	1800		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7439-92-1	Lead	9.6		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7439-95-4	Magnesium	2100		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7439-96-5	Manganese	73		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-09-7	Potassium	1700		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-23-5	Sodium	6500		µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-62-2	Vanadium	8.7	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7440-66-6	Zinc	120	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF040	02/08/02	2:15:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	1031-07-8	Endosulfan sulfate	0.053	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	105-67-9	2,4-Dimethylphenol	0.53	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF040	02/08/02	2:15:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	95-48-7	2-Methylphenol (o-Cresol)	0.38	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	106-44-5	3&4-Methylphenol (m&p cresol)	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	91-94-1	3,3-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	50-32-8	Benzo(a)pyrene	0.95	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	205-99-2	Benzo(b)fluoranthene	1.2	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	207-08-9	Benzo(k)fluoranthene	1.1	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	1.2	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	86-74-8	Carbazole	0.56	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	218-01-9	Chrysene	2.2	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	206-44-0	Fluoranthene	4.1	J	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF040	02/08/02	2:15:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	621-64-7	N-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	85-01-8	Phenanthrene	2.6	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	129-00-0	Pyrene	3.1	J	µg/l	NBCJ05
EFF040	02/08/02	2:15:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF041	02/08/02	1:30:00 PM	7429-90-5	Aluminum	320		µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-39-3	Barium	8.7	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-70-2	Calcium	3500		µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-47-3	Chromium	2	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-50-8	Copper	5.5	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7439-89-6	Iron	280		µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7439-92-1	Lead	25		µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7439-95-4	Magnesium	310	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7439-96-5	Manganese	8.7	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-09-7	Potassium	300	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-23-5	Sodium	1600		µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7440-62-2	Vanadium	1.9	J	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF041	02/08/02	1:30:00 PM	7440-66-6	Zinc	57	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF041	02/08/02	1:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	0.9	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	0.75	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	50-32-8	Benzo(a)pyrene	1.3	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	205-99-2	Benzo(b)fluoranthene	1.5	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	191-24-2	Benzo(g,h,i)perylene	0.75	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	207-08-9	Benzo(k)fluoranthene	1.6	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	0.62	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	218-01-9	Chrysene	2.1	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF041	02/08/02	1:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	206-44-0	Fluoranthene	4.1	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	0.62	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	85-01-8	Phenanthrene	2.1	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	129-00-0	Pyrene	2.6	J	µg/l	NBCJ05
EFF041	02/08/02	1:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF042	02/08/02	2:00:00 PM	7429-90-5	Aluminum	86	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-39-3	Barium	13		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-70-2	Calcium	14000		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-47-3	Chromium	0.96	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-50-8	Copper	6.2	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7439-89-6	Iron	140		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7439-92-1	Lead	2.7	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7439-95-4	Magnesium	25000		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7439-96-5	Manganese	8.2	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-02-0	Nickel	2.6	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-09-7	Potassium	9200		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF042	02/08/02	2:00:00 PM	7440-23-5	Sodium	210000		µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-62-2	Vanadium	3.2	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7440-66-6	Zinc	71	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF042	02/08/02	2:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	0.7	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	0.69	J	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF042	02/08/02	2:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF042	02/08/02	2:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF043	02/08/02	1:20:00 PM	7429-90-5	Aluminum	140	J	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-39-3	Barium	5	J	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-70-2	Calcium	9200		µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-47-3	Chromium	1.1	J	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-50-8	Copper	6.3	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7439-89-6	Iron	220		µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7439-95-4	Magnesium	2900		µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7439-96-5	Manganese	16		µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF043	02/08/02	1:20:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-09-7	Potassium	1700		µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-23-5	Sodium	20000		µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-62-2	Vanadium	2.3	J	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7440-66-6	Zinc	56	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF043	02/08/02	1:20:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	105-67-9	2,4-Dimethylphenol	1.3	J	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF043	02/08/02	1:20:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF043	02/08/02	1:20:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF044	02/08/02	2:35:00 PM	E-10242	Salinity	7.6		ppt	NBCJ05
EFF044	03/02/02	5:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF044	03/02/02	5:00:00 PM	7429-90-5	Aluminum	320		µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-39-3	Barium	3.4	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-41-7	Beryllium	0.32	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-70-2	Calcium	5700		µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-47-3	Chromium	0.7	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-48-4	Cobalt	0.8	J	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF044	03/02/02	5:00:00 PM	7440-50-8	Copper	10	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7439-89-6	Iron	160		µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7439-92-1	Lead	2.2	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7439-95-4	Magnesium	1800		µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7439-96-5	Manganese	4.6	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-09-7	Potassium	4300		µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-23-5	Sodium	9500	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-62-2	Vanadium	1.6	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7440-66-6	Zinc	16	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	72-54-8	4,4'-DDD	0.065	J	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF044	03/02/02	5:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF044	03/02/02	5:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF044	03/02/02	5:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF045	02/08/02	3:00:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF045	02/08/02	3:00:00 PM	7429-90-5	Aluminum	84	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-39-3	Barium	3.3	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF045	02/08/02	3:00:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-70-2	Calcium	9300		µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-50-8	Copper	5.4	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7439-89-6	Iron	95		µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7439-95-4	Magnesium	520		µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7439-96-5	Manganese	3.1	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-09-7	Potassium	670	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-23-5	Sodium	2600		µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-62-2	Vanadium	6.6	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7440-66-6	Zinc	31	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF045	02/08/02	3:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	5.2	J	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF045	02/08/02	3:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF045	02/08/02	3:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF046	06/22/02	1:05:00 PM	E-10242	Salinity	2	U	ppt	NBCJ11
EFF046	06/22/02	1:05:00 PM	7429-90-5	Aluminum	120	J	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF046	06/22/02	1:05:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-39-3	Barium	5	J	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-70-2	Calcium	11000		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-50-8	Copper	[illegible]	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7439-89-6	Iron	130		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7439-92-1	Lead	2.8	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7439-95-4	Magnesium	9700		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7439-96-5	Manganese	4.7	J	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-09-7	Potassium	3700		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-23-5	Sodium	77000		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-62-2	Vanadium	2.3	J	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7440-66-6	Zinc	32		µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	72-54-8	4,4'-DDD	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	72-55-9	4,4'-DDE	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	50-29-3	4,4'-DDT	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	309-00-2	Aldrin	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	319-84-6	alpha-BHC	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	5103-71-9	alpha-Chlordane	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	319-85-7	beta-BHC	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	57-74-9	Chlordane (technical)	0.5	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	319-86-8	delta-BHC	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	60-57-1	Dieldrin	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	959-98-8	Endosulfan I	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	33213-65-9	Endosulfan II	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	72-20-8	Endrin	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7421-93-4	Endrin aldehyde	0.1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	53494-70-5	Endrin ketone	0.1	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF046	06/22/02	1:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	5103-74-2	gamma-Chlordane	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	76-44-8	Heptachlor	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	72-43-5	Methoxychlor	0.5	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	8001-35-2	Toxaphene	5	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	12674-11-2	Aroclor-1016	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	11104-28-2	Aroclor-1221	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	11141-16-5	Aroclor-1232	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	53469-21-9	Aroclor-1242	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	12672-29-6	Aroclor-1248	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	11097-69-1	Aroclor-1254	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	11096-82-5	Aroclor-1260	1	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF046	06/22/02	1:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ11

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF046	06/22/02	1:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ11
EFF046	06/22/02	1:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ11
EFF047	02/08/02	2:45:00 PM	E-10242	Salinity	2	U	ppt	NBCJ05
EFF047	02/08/02	2:45:00 PM	7429-90-5	Aluminum	36	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-39-3	Barium	2.6	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-43-9	Cadmium	0.6	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-70-2	Calcium	2900		µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-47-3	Chromium	0.9	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-50-8	Copper	7.1	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7439-89-6	Iron	55		µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7439-95-4	Magnesium	290	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7439-96-5	Manganese	3.2	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-09-7	Potassium	360	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-23-5	Sodium	2100		µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-62-2	Vanadium	4.2	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7440-66-6	Zinc	37	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF047	02/08/02	2:45:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	72-43-5	Methoxychlor	0.17	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	95-48-7	2-Methylphenol (o-Cresol)	0.8	J	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF047	02/08/02	2:45:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ05

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF047	02/08/02	2:45:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ05
EFF047	02/08/02	2:45:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ05
EFF048	03/02/02	4:56:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF048	03/02/02	4:56:00 PM	7429-90-5	Aluminum	260	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-38-2	Arsenic	3.4	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-39-3	Barium	9.9	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-41-7	Beryllium	0.33	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-70-2	Calcium	23000		µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-47-3	Chromium	2	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-48-4	Cobalt	0.96	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-50-8	Copper	14	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7439-89-6	Iron	290		µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7439-92-1	Lead	4.4	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7439-95-4	Magnesium	18000		µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7439-96-5	Manganese	17		µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-09-7	Potassium	8200		µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-23-5	Sodium	140000	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-62-2	Vanadium	2.2	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7440-66-6	Zinc	58	J	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF048	03/02/02	4:56:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF048	03/02/02	4:56:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF048	03/02/02	4:56:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF048	03/02/02	4:56:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF049	07/11/02	4:54:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF049	07/11/02	4:54:00 PM	7429-90-5	Aluminum	210		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-39-3	Barium	19	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-43-9	Cadmium	1	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-70-2	Calcium	7800		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-47-3	Chromium	4.5	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-50-8	Copper	100		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7439-89-6	Iron	220		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7439-92-1	Lead	5.1		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7439-95-4	Magnesium	550		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7439-96-5	Manganese	16		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-02-0	Nickel	1.9	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-09-7	Potassium	1400		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7782-49-2	Selenium	6.4	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-23-5	Sodium	3500		µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-62-2	Vanadium	4.3	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7440-66-6	Zinc	190	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7439-97-6	Mercury	0.17	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF049	07/11/02	4:54:00 PM	319-84-6	alpha-BHC	0.018	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	76-44-8	Heptachlor	0.0086	J	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	95-50-1	1,2-Dichlorobenzene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	105-67-9	2,4-Dimethylphenol	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	121-14-2	2,4-Dinitrotoluene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	91-58-7	2-Chloronaphthalene	10	UR	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF049	07/11/02	4:54:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	88-74-4	2-Nitroaniline	50	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	88-75-5	2-Nitrophenol	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	100-01-6	4-Nitroaniline	50	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	100-02-7	4-Nitrophenol	50	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	50-32-8	Benzo(a)pyrene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	207-08-9	Benzo(k)fluoranthene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	85-68-7	Butylbenzylphthalate	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	132-64-9	Dibenzofuran	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	84-66-2	Diethylphthalate	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	131-11-3	Dimethylphthalate	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	117-84-0	Di-n-octylphthalate	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	206-44-0	Fluoranthene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF049	07/11/02	4:54:00 PM	87-68-3	Hexachlorobutadiene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	78-59-1	Isophorone	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	85-01-8	Phenanthrene	10	UR	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF049	07/11/02	4:54:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12
EFF050	04/10/02	5:00:00 PM	E 10242	Salinity	2	U	ppt	NBCJ08
EFF050	04/10/02	5:00:00 PM	7429-90-5	Aluminum	1500		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-38-2	Arsenic	3.9	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-39-3	Barium	38		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-70-2	Calcium	140000		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-47-3	Chromium	9.3	J	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-48-4	Cobalt	1	J	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-50-8	Copper	140		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7439-89-6	Iron	2000		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7439-92-1	Lead	4.6	J	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7439-95-4	Magnesium	2700		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7439-96-5	Manganese	50		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-02-0	Nickel	8.3	J	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-09-7	Potassium	2700		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-23-5	Sodium	3700		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-28-0	Thallium	6.3	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-62-2	Vanadium	11		µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7440-66-6	Zinc	80	J	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF050	04/10/02	5:00:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF050	04/10/02	5:00:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	106-44-5	3&4-Methylphenol (m&p cresol)	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF050	04/10/02	5:00:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ08
EFF050	04/10/02	5:00:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	E-10242	Salinity	2	U	ppt	NBCJ08
EFF051	04/10/02	4:40:00 PM	7429-90-5	Aluminum	6400		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-38-2	Arsenic	3.9	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-39-3	Barium	49		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-41-7	Beryllium	0.14	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-70-2	Calcium	45000		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-47-3	Chromium	26		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-48-4	Cobalt	1.8	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-50-8	Copper	370		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7439-89-6	Iron	4300		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7439-92-1	Lead	35		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7439-95-4	Magnesium	2100		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7439-96-5	Manganese	60		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-02-0	Nickel	9.3	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-09-7	Potassium	1700		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-22-4	Silver	0.53	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-23-5	Sodium	2700		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF051	04/10/02	4:40:00 PM	7440-31-5	Tin	5	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-62-2	Vanadium	43		µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7440-66-6	Zinc	170	J	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF051	04/10/02	4:40:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF051	04/10/02	4:40:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ08
EFF051	04/10/02	4:40:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ08
EFF052	07/11/02	4:51:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF052	07/11/02	4:51:00 PM	7429-90-5	Aluminum	4700		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-39-3	Barium	20	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-41-7	Beryllium	0.18	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-70-2	Calcium	16000		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-47-3	Chromium	11		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-48-4	Cobalt	0.72	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-50-8	Copper	29		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7439-89-6	Iron	2300		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7439-92-1	Lead	8		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7439-95-4	Magnesium	1000		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7439-96-5	Manganese	54		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-02-0	Nickel	4.6	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-09-7	Potassium	2500		µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF052	07/11/02	4:51:00 PM	7782-49-2	Selenium	3.5	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-23-5	Sodium	2700		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-62-2	Vanadium	41		µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7440-66-6	Zinc	53	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	72-54-8	4,4'-DDD	0.033	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	72-55-9	4,4'-DDE	0.1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	50-29-3	4,4'-DDT	0.034	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	309-00-2	Aldrin	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	319-84-6	alpha-BHC	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	5103-71-9	alpha-Chlordane	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	319-85-7	beta-BHC	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	57-74-9	Chlordane (technical)	0.5	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	319-86-8	delta-BHC	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	60-57-1	Dieldrin	0.023	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	959-98-8	Endosulfan I	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	33213-65-9	Endosulfan II	0.018	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	1031-07-8	Endosulfan sulfate	0.021	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	72-20-8	Endrin	0.1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7421-93-4	Endrin aldehyde	0.1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	53494-70-5	Endrin ketone	0.1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	5103-74-2	gamma-Chlordane	0.014	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	76-44-8	Heptachlor	0.038	J	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	1024-57-3	Heptachlor epoxide	0.05	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	72-43-5	Methoxychlor	0.5	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	8001-35-2	Toxaphene	5	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	12674-11-2	Aroclor-1016	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	11104-28-2	Aroclor-1221	2	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	11141-16-5	Aroclor-1232	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	53469-21-9	Aroclor-1242	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	12672-29-6	Aroclor-1248	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	11097-69-1	Aroclor-1254	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	11096-82-5	Aroclor-1260	1	UR	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF052	07/11/02	4:51:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	91-58	2-Chloronaphthalene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	J	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF052	07/11/02	4:51:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF052	07/11/02	4:51:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF053	07/11/02	4:48:00 PM	7429-90-5	Aluminum	13000		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-39-3	Barium	53	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-41-7	Beryllium	0.36	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-70-2	Calcium	36000		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-47-3	Chromium	26		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-48-4	Cobalt	3	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-50-8	Copper	22		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7439-89-6	Iron	6500		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7439-92-1	Lead	17		µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF053	07/11/02	4:48:00 PM	7439-95-4	Magnesium	2100		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7439-96-5	Manganese	98		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-02-0	Nickel	10	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-09-7	Potassium	2700		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7782-49-2	Selenium	8.3	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-23-5	Sodium	3300		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-62-2	Vanadium	48		µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7440-66-6	Zinc	62	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	72-54-8	4,4'-DDD	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	72-55-9	4,4'-DDE	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	50-29-3	4,4'-DDT	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	309-00-2	Aldrin	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	319-84-6	alpha-BHC	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	5103-71-9	alpha-Chlordane	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	319-85-7	beta-BHC	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	57-74-9	Chlordane (technical)	0.5	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	319-86-8	delta-BHC	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	60-57-1	Dieldrin	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	959-98-8	Endosulfan I	0.022	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	33213-65-9	Endosulfan II	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	1031-07-8	Endosulfan sulfate	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	72-20-8	Endrin	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7421-93-4	Endrin aldehyde	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	53494-70-5	Endrin ketone	0.1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	5103-74-2	gamma-Chlordane	0.0088	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	76-44-8	Heptachlor	0.013	J	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	1024-57-3	Heptachlor epoxide	0.05	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	72-43-5	Methoxychlor	0.5	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	8001-35-2	Toxaphene	5	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	12674-11-2	Aroclor-1016	1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	11104-28-2	Aroclor-1221	2	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	11141-16-5	Aroclor-1232	1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	53469-21-9	Aroclor-1242	1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	12672-29-6	Aroclor-1248	1	UR	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF053	07/11/02	4:48:00 PM	11097-69-1	Aroclor-1254	1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	11096-82-5	Aroclor-1260	1	UR	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF053	07/11/02	4:48:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF053	07/11/02	4:48:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12
EFF054	04/10/02	4:30:00 PM	E-10242	Salinity	2	U	ppt	NBCJ08
EFF054	04/10/02	4:30:00 PM	7429-90-5	Aluminum	660		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-38-2	Arsenic	3.9	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-39-3	Barium	17		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-43-9	Cadmium	0.8	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-70-2	Calcium	11000		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-47-3	Chromium	7.9	J	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF054	04/10/02	4:30:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-50-8	Copper	62		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7439-89-6	Iron	1000		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7439-92-1	Lead	14		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7439-95-4	Magnesium	640		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7439-96-5	Manganese	20		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-02-0	Nickel	6.2	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-09-7	Potassium	1100		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7782-49-2	Selenium	3.3	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-22-4	Silver	1.4	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-23-5	Sodium	3200		µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-31-5	Tin	4.5	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-62-2	Vanadium	6.7	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7440-66-6	Zinc	160	J	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF054	04/10/02	4:30:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl)ether)	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF054	04/10/02	4:30:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ08
EFF054	04/10/02	4:30:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	E-10242	Salinity	2	U	ppt	NBCJ08
EFF055	04/10/02	4:15:00 PM	7429-90-5	Aluminum	1100		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-38-2	Arsenic	3.9	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-39-3	Barium	30		µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF055	04/10/02	4:15:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-43-9	Cadmium	1.5	J	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-70-2	Calcium	12000		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-47-3	Chromium	22		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-48-4	Cobalt	0.88	J	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-50-8	Copper	170		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7439-89-6	Iron	2600		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7439-92-1	Lead	49		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7439-95-4	Magnesium	1400		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7439-96-5	Manganese	52		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-02-0	Nickel	7.9	J	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-09-7	Potassium	1800		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-23-5	Sodium	7000		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-28-0	Thallium	5.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-62-2	Vanadium	15		µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7440-66-6	Zinc	310	J	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF055	04/10/02	4:15:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ08

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF055	04/10/02	4:15:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ08
EFF055	04/10/02	4:15:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ08
EFF056	05/18/02	8:20:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF056	05/18/02	8:20:00 PM	7429-90-5	Aluminum	94	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-38-2	Arsenic	12		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-39-3	Barium	9.1	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-70-2	Calcium	6600		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-47-3	Chromium	0.3	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-48-4	Cobalt	0	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-50-8	Copper	50		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7439-89-6	Iron	150	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7439-92-1	Lead	6		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7439-95-4	Magnesium	680		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7439-96-5	Manganese	14		µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-02-0	Nickel	2.7	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-09-7	Potassium	980	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-23-5	Sodium	3900	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-62-2	Vanadium	7.5	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7440-66-6	Zinc	180	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF056	05/18/02	8:20:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	5103-74-2	gamma-Chlordane	0.013	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	11104-28-2	Aroclor-1221	1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	11141-16-5	Aroclor-1232		UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	12672-29-6	Aroclor-1248		UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF056	05/18/02	8:20:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	3.1	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	131-11-3	Dimethylphthalate	7.9	J	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF056	05/18/02	8:20:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF056	05/18/02	8:20:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF057	03/02/02	5:05:00 PM	E-10242	Salinity	2	U	ppt	NBCJ06
EFF057	03/02/02	5:05:00 PM	7429-90-5	Aluminum	250	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-38-2	Arsenic	2.7	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-39-3	Barium	7.1	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-41-7	Beryllium	0.34	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-70-2	Calcium	43000		µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-47-3	Chromium	0.95	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-50-8	Copper	4.5	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7439-89-6	Iron	190		µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7439-92-1	Lead	2.4	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7439-95-4	Magnesium	40000		µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7439-96-5	Manganese	9.4	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-09-7	Potassium	17000		µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-23-5	Sodium	300000	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-62-2	Vanadium	3.5	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7440-66-6	Zinc	46	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF057	03/02/02	5:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF057	03/02/02	5:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	0.66	J	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ06

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF057	03/02/02	5:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ06
EFF057	03/02/02	5:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ06
EFF058	01/25/02	1:35:00 PM	E-10242	Salinity	2	U	ppt	NBCJ03
EFF058	01/25/02	1:35:00 PM	7429-90-5	Aluminum	240		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-36-0	Antimony	3.8	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-38-2	Arsenic	[illegible]	[illegible]	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-39-3	Barium	13		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-41-7	Beryllium	0.3	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-70-2	Calcium	61000		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-47-3	Chromium	2	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-48-4	Cobalt	0.8	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-50-8	Copper	6.5	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7439-89-6	Iron	290		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7439-92-1	Lead	4.3	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7439-95-4	Magnesium	47000		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7439-96-5	Manganese	49		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-02-0	Nickel	2	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-09-7	Potassium	24000		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7782-49-2	Selenium	4.9	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-22-4	Silver	1.4	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-23-5	Sodium	310000		µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-28-0	Thallium	6.3	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-31-5	Tin	4.1	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-62-2	Vanadium	3.4	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7440-66-6	Zinc	110	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ03

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF058	01/25/02	1:35:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF058	01/25/02	1:35:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	83-32-9	Acenaphthene	6.4	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	1.1	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	132-64-9	Dibenzofuran	0.94	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	206-44-0	Fluoranthene	1.7	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	86-73-7	Fluorene	0.4	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ03

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF058	01/25/02	1:35:00 PM	67-72-1	Hexachlorocthane	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	129-00-0	Pyrene	0.97	J	µg/l	NBCJ03
EFF058	01/25/02	1:35:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ03
EFF059	08/30/02	11:00:00 AM	E-10242	Salinity	2	U	ppt	NBCJ15
EFF059	08/30/02	11:00:00 AM	7429-90-5	Aluminum	3600		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-38-2	Arsenic	5.9	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-39-3	Barium	7.3	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-70-2	Calcium	28000		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-47-3	Chromium	5.5	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-50-8	Copper	10	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7439-89-6	Iron	2000		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7439-92-1	Lead	2.1	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7439-95-4	Magnesium	13000		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7439-96-5	Manganese	64		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-02-0	Nickel	4.2	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-09-7	Potassium	18000		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7782-49-2	Selenium	3.1	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-22-4	Silver	1.4	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-23-5	Sodium	130000		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-28-0	Thallium	6.2	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-31-5	Tin	2.7	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-62-2	Vanadium	14		µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7440-66-6	Zinc	18	J	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ15

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF059	08/30/02	11:00:00 AM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ15

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF059	08/30/02	11:00:00 AM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	120-12-7	Anthracene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	111-44-4	bis(2-Chloroethyl)ether	10	UJ	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	86-74-8	Carbazole	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	218-01-9	Chrysene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ15

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF059	08/30/02	11:00:00 AM	86-73-7	Fluorene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	78-59-1	Isophorone	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	91-20-3	Naphthalene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	108-95-2	Phenol	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	129-00-0	Pyrene	10	U	µg/l	NBCJ15
EFF059	08/30/02	11:00:00 AM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ15
EFF070	05/18/02	7:45:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09
EFF070	05/18/02	7:45:00 PM	7429-90-5	Aluminum	790	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-38-2	Arsenic	9.3	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-39-3	Barium	15	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-70-2	Calcium	25000		µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-47-3	Chromium	9.5	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-50-8	Copper	12	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7439-89-6	Iron	1800	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7439-92-1	Lead	8		µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7439-95-4	Magnesium	10000		µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7439-96-5	Manganese	110		µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-09-7	Potassium	8200		µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-23-5	Sodium	83000	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7440-62-2	Vanadium	8.1	J	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070	05/18/02	7:45:00 PM	7440-66-6	Zinc	150	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	319-85	beta-BHC	0.0026	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	58-89-9	gamma-BHC (Lindane)	0.025	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	76-44-8	Heptachlor	0.0086	J	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070	05/18/02	7:45:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	106-44-5	3&4-Methylphenol (m&p cresol)	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070	05/18/02	7:45:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF070	05/18/02	7:45:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	E-10242	Salinity	2	U	ppt	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7429-90-5	Aluminum	170	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-38-2	Arsenic	13		µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-39-3	Barium	8.7	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-70-2	Calcium	17000		µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-47-3	Chromium	3	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-48-4	Cobalt	0.7	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-50-8	Copper	11	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7439-89-6	Iron	300	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7439-92-1	Lead	2.5	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7439-95-4	Magnesium	2100		µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7439-96-5	Manganese	42		µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-02-0	Nickel	1.7	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-09-7	Potassium	2900		µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-22-4	Silver	0.5	UJ	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070D	05/18/02	7:45:00 PM	7440-23-5	Sodium	10000	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-62-2	Vanadium	7.4	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7440-66-6	Zinc	48	J	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7439-97-6	Mercury	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	319-84-6	alpha-BHC	0.011	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070D	05/18/02	7:45:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ09

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF070D	05/18/02	7:45:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ09
EFF070D	05/18/02	7:45:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ09
EFF071	07/15/02	8:05:00 PM	E-10242	Salinity	2	U	ppt	NBCJ13
EFF071	07/15/02	8:05:00 PM	7429-90-5	Aluminum	1500		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-36-0	Antimony	9.5	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-38-2	Arsenic	8.1	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-39-3	Barium	14		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-43-9	Cadmium	0.5	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-70-2	Calcium	43000		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-47-3	Chromium	5	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-48-4	Cobalt	1.2	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-50-8	Copper	5000		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7439-89-6	Iron	3900		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7439-92-1	Lead	220		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7439-95-4	Magnesium	29000		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7439-96-5	Manganese	1200		µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF071	07/15/02	8:05:00 PM	7440-02-0	Nickel	46		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-09-7	Potassium	19000		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7782-49-2	Selenium	3.1	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-22-4	Silver	2	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-23-5	Sodium	230000		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-28-0	Thallium	6.2	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-31-5	Tin	290		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-62-2	Vanadium	9.8	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7440-66-6	Zinc	260		µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7439-97-6	Mercury	0.1	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF071	07/15/02	8:05:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	106-46-7	1,4-Dichlorobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ13

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF071	07/15/02	8:05:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	84-74-2	Di-n-butylphthalate	0.34	J	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ13
EFF071	07/15/02	8:05:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ13
EFF072	07/11/02	5:02:00 PM	E-10242	Salinity	2	U	ppt	NBCJ12
EFF072	07/11/02	5:02:00 PM	7429-90-5	Aluminum	1400		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-36-0	Antimony	3.9	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-38-2	Arsenic	3.9	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-39-3	Barium	18	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-41-7	Beryllium	0.1	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-43-9	Cadmium	0.6	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-70-2	Calcium	6900		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-47-3	Chromium	4.1	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-48-4	Cobalt	0.7	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-50-8	Copper	21		µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF072	07/11/02	5:02:00 PM	7439-89-6	Iron	2700		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7439-92-1	Lead	18		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7439-95-4	Magnesium	2900		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7439-96-5	Manganese	26		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-02-0	Nickel	2.4	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-09-7	Potassium	3200		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7782-49-2	Selenium	3.3	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-22-4	Silver	0.5	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-23-5	Sodium	20000		µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-28-0	Thallium	5.1	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-31-5	Tin	4.5	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-62-2	Vanadium	8.3	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7440-66-6	Zinc	89	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7439-97-6	Mercury	0.1	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	72-54-8	4,4'-DDD	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	72-55-9	4,4'-DDE	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	50-29-3	4,4'-DDT	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	309-00-2	Aldrin	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	319-84-6	alpha-BHC	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	5103-71-9	alpha-Chlordane	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	319-85-7	beta-BHC	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	57-74-9	Chlordane (technical)	0.5	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	319-86-8	delta-BHC	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	60-57-1	Dieldrin	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	959-98-8	Endosulfan I	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	33213-65-9	Endosulfan II	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	1031-07-8	Endosulfan sulfate	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	72-20-8	Endrin	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7421-93-4	Endrin aldehyde	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	53494-70-5	Endrin ketone	0.1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	58-89-9	gamma-BHC (Lindane)	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	5103-74-2	gamma-Chlordane	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	76-44-8	Heptachlor	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	1024-57-3	Heptachlor epoxide	0.05	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	72-43-5	Methoxychlor	0.5	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	8001-35-2	Toxaphene	5	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	12674-11-2	Aroclor-1016	1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	11104-28-2	Aroclor-1221	2	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	11141-16-5	Aroclor-1232	1	UJ	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF072	07/11/02	5:02:00 PM	53469-21-9	Aroclor-1242	1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	12672-29-6	Aroclor-1248	1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	11097-69-1	Aroclor-1254	1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	11096-82-5	Aroclor-1260	1	UJ	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	120-82-1	1,2,4-Trichlorobenzene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	95-50-1	1,2-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	541-73-1	1,3-Dichlorobenzene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	106-46-7	1,4-Dichlorobenzene	0.33	J	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	108-60-1	2,2'-Oxybis(1-chloropropane) [bis(2-Chloroisopropyl)ether]	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	95-95-4	2,4,5-Trichlorophenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	88-06-2	2,4,6-Trichlorophenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	120-83-2	2,4-Dichlorophenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	105-67-9	2,4-Dimethylphenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	51-28-5	2,4-Dinitrophenol	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	121-14-2	2,4-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	606-20-2	2,6-Dinitrotoluene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	91-58-7	2-Chloronaphthalene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	95-57-8	2-Chlorophenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	534-52-1	2-Methyl-4,6-dinitrophenol	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	91-57-6	2-Methylnaphthalene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	95-48-7	2-Methylphenol (o-Cresol)	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	88-74-4	2-Nitroaniline	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	88-75-5	2-Nitrophenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	106-44-5	3&4-Methylphenol (m&p-cresol)	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	91-94-1	3,3'-Dichlorobenzidine	20	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	99-09-2	3-Nitroaniline	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	101-55-3	4-Bromophenylphenyl ether	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	59-50-7	4-Chloro-3-methylphenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	106-47-8	4-Chloroaniline	20	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	7005-72-3	4-Chlorophenylphenyl ether	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	100-01-6	4-Nitroaniline	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	100-02-7	4-Nitrophenol	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	83-32-9	Acenaphthene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	208-96-8	Acenaphthylene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	120-12-7	Anthracene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	56-55-3	Benzo(a)anthracene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	50-32-8	Benzo(a)pyrene	10	U	µg/l	NBCJ12

Storm Water Effluent Analytical Data for the Cooper River

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	CAS NUMBER	COMPOUND NAME	RESULT	VALIDATION QUALIFIER	UNITS	SDG NUMBER
EFF072	07/11/02	5:02:00 PM	205-99-2	Benzo(b)fluoranthene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	191-24-2	Benzo(g,h,i)perylene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	207-08-9	Benzo(k)fluoranthene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	111-91-1	bis(2-Chloroethoxy)methane	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	111-44-4	bis(2-Chloroethyl)ether	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	117-81-7	bis(2-Ethylhexyl)phthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	85-68-7	Butylbenzylphthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	86-74-8	Carbazole	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	218-01-9	Chrysene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	53-70-3	Dibenzo(a,h)anthracene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	132-64-9	Dibenzofuran	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	84-66-2	Diethylphthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	131-11-3	Dimethylphthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	84-74-2	Di-n-butylphthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	117-84-0	Di-n-octylphthalate	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	206-44-0	Fluoranthene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	86-73-7	Fluorene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	118-74-1	Hexachlorobenzene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	87-68-3	Hexachlorobutadiene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	77-47-4	Hexachlorocyclopentadiene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	67-72-1	Hexachloroethane	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	193-39-5	Indeno(1,2,3-cd)pyrene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	78-59-1	Isophorone	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	91-20-3	Naphthalene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	98-95-3	Nitrobenzene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	621-64-7	n-Nitrosodi-n-propylamine	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	86-30-6	N-Nitrosodiphenylamine	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	87-86-5	Pentachlorophenol	50	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	85-01-8	Phenanthrene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	108-95-2	Phenol	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	129-00-0	Pyrene	10	U	µg/l	NBCJ12
EFF072	07/11/02	5:02:00 PM	57-12-5	Cyanide, Total	10	U	µg/l	NBCJ12

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ02
Date:	February 27, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	January 14 - 15, 2002
Number of Samples:	8 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seaffer
for Paul B. Humburg, President

2-27-02
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ02

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF014	WATER	X		X		X		X	
REF013	WATER	X		X		X		X	
REF015	WATER	X		X		X		X	
REF016	WATER	X		X		X		X	
REF005	WATER	X		X		X		X	
CAP001	WATER	X		X		X		X	
REF002	WATER	X		X		X		X	
EQP001	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		8	0	8	0	8	0	8	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ02

A validation was performed on the Semivolatile Data from SDG #NBCJ02. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ02

A validation was performed on the Pesticides/PCB Data from SDG NBCJ02. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The calibration verification standard MJA23016 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

REF015 methoxychlor (26.8%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
REF013	DCB	18%/18%
REF015	DCB	14%/20%
REF005	DCB	20%/24%
REF002	DCB	24%/22%

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.

2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.

3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.

4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
REF005	beta-BHC	154.7	P	U	3

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF015	methoxychlor (26.8%)	+	J
REF013 REF015 REF005 REF002	All Compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ02

A validation was performed on the Metals and cyanide Data from SDG NBCJ02. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Calibrations
- Blanks
- * Interferences
- * Matrix Spike Recovery
- * Matrix Duplicates
- * Field Duplicates
- * Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	31.2 ug/l	all water samples below 155 ug/l
Barium	0.96 ug/l	no impact
Calcium	12.8 ug/l	all water samples below 64.0 ug/l
Copper	8.72 ug/l	all water samples below 44.0 ug/l
Selenium	4.66 ug/l	no impact

Zinc	2.16 ug/l	all water samples below 11.0 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

Serial Dilution results

The serial dilution results for waters for Copper, Potassium and Zinc were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 155 ug/l	Al.	+	U
all water samples below 64.0 ug/l	Ca.		
all water samples below 44.0 ug/l	Cu.		
all water samples below 11.0 ug/l	Zn.		
all water samples	Cu. K and Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ03
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	January 25, 2002
Number of Samples:	6 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scarpa — 3-20-02.

Paul B. Humburg, President — Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ03

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
REF004	WATER	X		X		X		X	
REF003	WATER	X		X		X		X	
EEF010	WATER	X		X		X		X	
REF010	WATER	X		X		X		X	
EEF058	WATER	X		X		X		X	
EFF009	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		6	0	6	0	6	0	6	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ03

A validation was performed on the Semivolatile Data from SDG #NBCJ03. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

The blank(s) associated with samples in this SDG exhibited contamination. Qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

Associated blank	Compound	Concentration	Action Level
0131C-GMB	di-n-butylphthalate	0.44J ug/L	4.4 ug/L

Samples	Compound	Qualification
REF003	di-n-butylphthalate	CRQL

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF003	di-n-butylphthalate	+	CRQL
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ03

A validation was performed on the Pesticides/PCB Data from SDG NBCJ03. The data was evaluated based on the following parameters:

*	•	Data Completeness
	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Holding Times

The following sample was re-extracted seven days outside the recommended extraction holding time of seven days for water samples. All reported positive and non-detect results in the sample are qualified as estimated, J/UJ.

REF004RE

DATA ASSESSMENT NARRATIVE
PESTICIDES/PCB

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
REF003	DCB	13/14
EEF010	DCB	28/28
REF010	DCB	12/15
EFF058	DCB	14/16
EFF009	DCB	22/24
REF004RE	DCB	15/14

Compound Quantitation

The following sample exhibited surrogate recoveries less than 10%. The reported results are not used in favor of the results reported from the RE analysis of the sample.

REF004

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
REF004RE	All compounds	+/-	J/UJ
REF003 EEF010 REF010 EFF058 EFF009 REF004RE	All compounds	+/-	J/UJ
REF004	All compounds	+/-	Do Not Use

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ03

A validation was performed on the Metals and cyanide Data from SDG NBCJ03. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Arsenic	3.31 ug/l	all water samples below 16.5 ug/l
Calcium	10.8 ug/l	no impact
Lead	2.48 ug/l	all water samples below 12.5 ug/l
Zinc	1.79 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Sodium	-13.0 ug/l	no impact
Mercury	-0.10 ug/l	all water samples below 1.0 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 16.5 ug/l	As.	+	U
all water samples below 12.5 ug/l	Pb.		
all water samples below 1.0 ug/l	Hg.	+/U	J/UJ
all water samples	Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ04
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	February 7, 2002
Number of Samples:	10 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson — 3-20-02.

Paul B. Humburg, President — Date

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SDG# NBCJ04

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF008	WATER	X		X		X		X	
EFF004	WATER	X		X		X		X	
EFF065	WATER	X		X		X		X	
EFF067	WATER	X		X		X		X	
EFF068	WATER	X		X		X		X	
EFF006	WATER	X		X		X		X	
EFF005	WATER	X		X		X		X	
REF012	WATER	X		X		X		X	
REF011	WATER	X		X		X		X	
REF011D	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		10	0	10	0	10	0	10	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ04

A validation was performed on the Semivolatile Data from SDG #NBCJ04. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
* Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data as presented requires no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ04

A validation was performed on the Pesticides/PCB Data from SDG NBCJ04. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF004	DCB	28/16
EFF065	DCB	24
EFF067	DCB	26/18
EFF068	DCB	28/18
EFF005	DCB	24
REF012	DCB	24/14
REF011	DCB	19/14
REF011D	DCB	24/17

Compound Quantitation

One sample exhibited a column quantitation %D greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.
2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.
3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.
4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
REF011D	lindane	48.6	P	J	2

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF004 EFF065 EFF067 EFF068 EFF005 REF012 REF011 REF011D	All compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ04

A validation was performed on the Metals and cyanide Data from SDG NBCJ04. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	38.6 ug/l	no impact
Magnesium	7.31 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Nickel	-1.72 ug/l	all water samples below 17.2 ug/l

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 17.2 ug/l	Ni.	+/U	J/UJ
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ05
Date:	March 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	February 8, 2002
Number of Samples:	10 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Searson
for Paul B. Humburg, President

3-20-02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ05

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF014	WATER	X		X		X		X	
EFF011	WATER	X		X		X		X	
EFF002	WATER	X		X		X		X	
EFF001	WATER	X		X		X		X	
EFF043	WATER	X		X		X		X	
EFF041	WATER	X		X		X		X	
EFF042	WATER	X		X		X		X	
EFF040	WATER	X		X		X		X	
EFF047	WATER	X		X		X		X	
EFF045	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		10	0	10	0	10	0	10	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ05

A validation was performed on the Semivolatile Data from SDG #NBCJ05. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
* Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The data as presented requires no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ05

A validation was performed on the Pesticides/PCB Data from SDG NBCJ05. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification standard MFB18005 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF047	methoxychlor (47.9%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF014	DCB	17/19
EFF011	DCB	18/20
EFF002	DCB	19/22
EFF001	DCB	20/24
EFF043	DCB	26/28
EFF041	DCB	24/28
EFF042	DCB	20/18
EFF040	DCB	22/24
EFF047	DCB	20/19
EFF045	DCB	15/17

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF047	methoxychlor (47.9%)	+	J
EFF014	All compounds	+/-	J/UJ
EFF011			
EFF002			
EFF001			
EFF043			
EFF041			
EFF042			
EFF040			
EFF047			
EFF045			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ05

A validation was performed on the Metals and cyanide Data from SDG NBCJ05. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Barium	0.37 ug/l	no impact
Calcium	21.0 ug/l	no impact
Copper	2.79 ug/l	all water samples below 14.0 ug/l
Magnesium	17.5 ug/l	no impact
Zinc	16.7 ug/l	all water samples below 83.5 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-30.6 ug/l	all water samples below 306 ug/l
Cadmium	-0.78 ug/l	all water samples below 7.8 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 14.0 ug/l	Cu.	+	U
all water samples below 83.5 ug/l	Zn.		
all water samples below 306 ug/l	Al.	+/U	J/UJ
all water samples below 7.8 ug/l	Cd.		
all water samples	Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ06
Date:	April 23, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	March 2, 2002
Number of Samples:	15 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scayben — 4.23.02

Paul B. Humburg, President — Date

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SDG# NBCJ06

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF019	WATER	X		X		X		X	
EFF003	WATER	X		X		X		X	
EFF007	WATER	X		X		X		X	
EFF012	WATER	X		X		X		X	
EFF013	WATER	X		X		X		X	
EFF64	WATER	X		X		X		X	
EFF066	WATER	X		X		X		X	
EFF069	WATER	X		X		X		X	
EFF031	WATER	X		X		X		X	
EFF034	WATER	X		X		X		X	
EFF035	WATER	X		X		X		X	
EFF044	WATER	X		X		X		X	
EFF048	WATER	X		X		X		X	
EFF057	WATER	X		X		X		X	
EFF063	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		15	0	15	0	15	0	15	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ06

A validation was performed on the Semivolatile Data from SDG NBCJ06. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0307B-KMB - 4.1J ug/L; 0313D-KMB - 4.3J ug/L)

Compound Quantitation

For the following sample, the reported results are not used, in favor of the results reported in the original analysis of the sample. Although the original sample exhibited two non-compliant surrogate recoveries, based on the validation guidance, qualification of the data was not required.

EFF003RE

For the following sample, the reported results are not used, in favor of the results reported in the original analysis of the sample. Although the RE sample was extracted slightly outside the holding time (2 days), it exhibited acceptable surrogate recoveries - and qualifications were not required based on the exceeded holding time as there were no positive results reported in the sample.

EFF034

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	All B flagged TICs within 10X contamination concentration	+B	R
EFF003RE	All compounds	+/-	Do Not Use
EFF034	All compounds	+/-	Do Not Use

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ06

A validation was performed on the Pesticides/PCB Data from SDG NBCJ06. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification standard MMR10047 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF012	heptachlor (34.5/27.4%)

Calibration (continued)

The calibration verification standard MMR10047 exhibited one compound with a %D greater than 50% but less than 90% for which qualifications were required. For the following sample and non-compliant compound, the reported positive and non-detect results are qualified as estimated, J/UJ.

EFF019	methoxychlor (54.6%)
EFF003	
EFF007	
EFF012	
EFF013	
EFF64	
EFF066	
EFF069	
EFF031	
EFF034	
EFF035	
EFF044	

The calibration verification standard MMR10078 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF044	4,4,'-DDD (18.7%)

The calibration verification standard MMR10088 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF044	4,4,'-DDD (17.7/21.2%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated. J/UJ.

Sample ID	Surrogate Compound	%R
EFF019	DCB	28
EFF003	DCB	26/24
EFF007	DCB	22/20
EFF012	DCB	15/13
EFF013	DCB	22/19
EFF64	DCB	19/17
EFF066	DCB	15/13
EFF069	DCB	15/13
EFF034	DCB	22/19
EFF035	DCB	28
EFF044	DCB	17/14
EFF048	DCB	24/22
EFF057	DCB	26/26
EFF063	DCB	21/20

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF012	heptachlor	+	J
EFF019	methoxychlor	+/-	J/UJ
EFF003			
EFF007			
EFF012			
EFF013			
EFF64			
EFF066			
EFF069			
EFF031			
EFF034			
EFF035			
EFF044			
EFF044	4,4,'-DDD	+	J
EFF044	4,4,'-DDD	+	J
EFF019	All Compounds	+/-	J/UJ
EFF003			
EFF007			
EFF012			
EFF013			
EFF64			
EFF066			
EFF069			
EFF034			
EFF035			
EFF044			
EFF048			
EFF057			
EFF063			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ06

A validation was performed on the Metals and cyanide Data from SDG NBCJ06. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Beryllium	0.58 ug/l	all water samples below 2.9 ug/l
Zinc	2.35 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-26.5 ug/l	all water samples below 265 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc and Sodium were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 2.9 ug/l	Be.	+	U
all water samples below 265 ug/l	Al.	+/U	J/UJ
all water samples	Zn and Na.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ08
Date:	May 15, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	April 10, 2002
Number of Samples:	4 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sempson
for Paul B. Humburg, President

5-15-02
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ08

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF050	WATER	X		X		X		X	
EFF051	WATER	X		X		X		X	
EFF054	WATER	X		X		X		X	
EFF055	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		4	0	4	0	4	0	4	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ08

A validation was performed on the Semivolatile Data from SDG NBCJ08. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0416C-DMB - 3.65 at 5.7JA ug/L; 17.56 at 11J ug/L & 18.86 at 31J)

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	All B flagged TICs within 10X contamination concentration	+B	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ08

A validation was performed on the Pesticides/PCB Data from SDG NBCJ08. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF050	DCB	24/17
EFF051	DCB	28/17
EFF054	DCB	18
EFF055	DCB	28/19

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF050	All Compounds	+/-	J/UJ
EFF051			
EFF054			
EFF055			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ08

A validation was performed on the Metals and cyanide Data from SDG NBCJ08. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Calibrations
- Blanks
- * Interferences
- * Matrix Spike Recovery
- * Matrix Duplicates
- * Field Duplicates
- * Laboratory Control Samples
- Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	47.9 ug/l	no impact
Calcium	14.7 ug/l	no impact
Copper	2.68 ug/l	no impact
Iron	20.4 ug/l	no impact
Manganese	0.27 ug/l	no impact

Selenium	3.4 ug/l	no impact
Sodium	435 ug/l	no impact
Vanadium	0.90 ug/l	no impact
Zinc	1.14 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Arsenic	-4.41 ug/l	all water samples below 44.0 ug/l
Thallium	-5.48 ug/l	all water samples below 54.8 ug/l

Serial Dilution results

The serial dilution results for waters for Zinc was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 44.1 ug/l	As.	+/U	J/UJ
all water samples below 54.8 ug/l	Tl.		
all water samples	Zn.	+	J
all "B" results	all analytes	B	J

SDG# NBCJ09

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF070	WATER	X		X		X		X	
EFF070D	WATER	X		X		X		X	
EFF038	WATER	X		X		X		X	
EFF037	WATER	X		X		X		X	
EFF036	WATER	X		X		X		X	
EFF033	WATER	X		X		X		X	
EFF056	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		7	0	7	0	7	0	7	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ09

A validation was performed on the Semivolatile Data from SDG #NBCJ09. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	"B" flagged TICs	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ09

A validation was performed on the Pesticides/PCB Data from SDG NBCJ09. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification standard RMA29005 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF070	heptachlor (15.4%)

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J UJ.

Sample ID	Surrogate Compound	%R
EFF070	DCB	20/17
EFF070D	DCB	24/24
EFF038	DCB	11/12
EFF037	DCB	13/14
EFF036	DCB	22/20
EFF033	DCB	24/24
EFF056	DCB	13/16

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.

2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.

3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, UJ.

4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
EFF070	beta-BHC	89.8	P	J	2
	Heptachlor	79.7	P	J	2

Compound Quantitation (continued)

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
EFF070D	alpha-BHC	158.9	P	U	3
EFF056	gamma-chlordane	105.4	P	U	3

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

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UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF070	heptachlor	+	J
EFF070 EFF070D EFF038 EFF037 EFF036 EFF033 EFF056	All Compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ09

A validation was performed on the Metals and cyanide Data from SDG NBCJ09. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	23.9 ug/l	no impact
Copper	2.22 ug/l	all water samples below 11.1 ug/l
Sodium	158 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Cobalt	-0.75 ug/l	all water samples below 7.5 ug/l
Silver	-0.65 ug/l	all water samples below 6.5 ug/l

Matrix Spike Recovery results

The matrix spike recovery results for soils for Mercury (60%) was below the lower control limits (>30% but <75%). All positive and non-detect results are qualified as estimated, "J" or "UJ".

The matrix spike recovery results for soils for Iron (145%) and Aluminum (154%) were above the upper control limits (>125%). All positive results are qualified as estimated, "J".

Serial Dilution results

The serial dilution results for soils for Barium, Sodium and Zinc were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 11.1 ug/l	Cu.	+	U
all water samples below 7.5 ug/l	Co..	+/U	J/UJ
all water samples below 6.5 ug/l	Ag.		
all water samples	Hg.	+/U	+/U
all water samples	Fe and Al.	+	J
all water samples	Ba, Na and Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ09
Date:	August 7, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	May 18, 2002
Number of Samples:	7 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scanlon
for Paul B. Humburg, President

8-7-02
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ10
Date:	August 23, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	June 18, 2002
Number of Samples:	6 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scurfon
for Paul B. Humburg, President

8-28-02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ10

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF015	WATER	X		X		X		X	
EFF017	WATER	X		X		X		X	
EFF018	WATER	X		X		X		X	
EFF020	WATER	X		X		X		X	
EFF024	WATER	X		X		X		X	
EFF029	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		6	0	6	0	6	0	6	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ10

A validation was performed on the Semivolatile Data from SDG #NBCJ10. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
* Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Blank

The blank(s) associated with samples in this SDG exhibited contamination. Qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

Associated blank	Compound	Concentration	Action Level
0621B-EMB	bis(2-ethylhexyl)phthalate	9.5J ug/L	95 ug/L

Samples	Compound	Qualification
EFF020	bis(2-ethylhexyl)phthalate	U
EFF024 EFF029	bis(2-ethylhexyl)phthalate	CRQL

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	"B" flagged TICs	+	R
EFF020	bis(2-ethylhexyl)phthalate	+	U
EFF024 EFF029	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ10

A validation was performed on the Pesticides/PCB Data from SDG NBCJ10. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

DATA ASSESSMENT NARRATIVE
PESTICIDES/PCB

PAGE 2

Surrogate Recoveries

The following samples exhibited surrogate recoveries below the QC limits as noted below. All reported positive and non-detect results in the samples are qualified as estimated, J/UJ.

Sample ID	Surrogate Compound	%R
EFF015	DCB	20/15
EFF029	DCB	20/16

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF015 EFF029	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ10

A validation was performed on the Metals and cyanide Data from SDG NBCJ10. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	20.4 ug/l	no impact
Calcium	19.5 ug/l	no impact
Sodium	143.0ug/l	no impact
Zinc	1.01 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Selenium	-5.85 ug/l	all water samples below 58.4 ug/l
Thallium	-8.9 ug/l	all water samples below89.0 ug/l

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 58.4 ug/l	Se.	+/U	J/UJ
all water samples below 89.0 ug/l	Tl.		
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ11
Date:	August 23, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	June 22, 2002
Number of Samples:	7 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Searles
Paul B. Humburg, President

8-23-02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ11

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF021	WATER	X		X		X		X	
EFF022	WATER	X		X		X		X	
EFF023	WATER	X		X		X		X	
EFF026	WATER	X		X		X		X	
EFF027	WATER	X		X		X		X	
EFF030	WATER	X		X		X		X	
EFF046	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		7	0	7	0	7	0	7	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270C; the National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # NBCJ11

A validation was performed on the Semivolatile Data from SDG #NBCJ11. The data was evaluated based on the following parameters.

* Data Completeness
* Holding Times
* GC/MS Tuning
* Calibrations
  Internal Standard Performance
  Blanks
* Surrogate Recoveries
* Laboratory Control Samples
* Matrix Spike/Matrix Spike duplicate
* Field Duplicates
* Compound Identification/Quantitation

* - All criteria were met for this parameter

Internal Standards

Sample EFF046 exhibited high internal standard area recoveries for all standards. Qualify all positive results as estimated (J).

Blank

The blank(s) associated with samples in this SDG exhibited contamination. Qualifications were required. The end user should note that the action levels indicated for the blank analysis may not involve the same weights, volumes, dilution factors, or percent moisture as associated samples. These factors must be taken into considerations when applying the 5X and 10X criteria to field samples.

Associated blank	Compound	Concentration	Action Level
0627B-EMB	benzo(g,h,i)perylene	0.93J ug/L	9.3 ug/L

Samples	Compound	Qualification
EFF021	benzo(g,h,i)perylene	CRQL

Reject all TICs in the samples flagged with a "B" qualifier due to method blank contamination.

System Performance and Overall Assessment

The data as presented requires qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

UR = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	"B" flagged TICs	+	R
EFF046	all results	+	J
EFF021	benzo(g,h,i)perylene	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ11

A validation was performed on the Pesticides/PCB Data from SDG NBCJ11. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.

2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.

3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.

4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
EFF022	alpha-BHC	90.5	P	J	2
	gamma-BHC	114.0	P	U	3
EFF023	heptachlor	143.8	P	U	3

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ11

A validation was performed on the Metals and cyanide Data from SDG NBCJ11. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	13.0 ug/l	no impact
Copper	1.10ug/l	all water samples below 5.5 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 5.5 ug/l	Cu.	+	U
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ12
Date:	August 30, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	July 11, 2002
Number of Samples:	6 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson
Paul B. Humburg, President

8·30·02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ12

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF032	WATER	X		X		X		X	
EFF039	WATER	X		X		X		X	
EFF053	WATER	X		X		X		X	
EFF052	WATER	X		X		X		X	
EFF049	WATER	X		X		X		X	
EFF072	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		6	0	6	0	6	0	6	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles: the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ12

A validation was performed on the Semivolatile Data from SDG NBCJ12. The data was evaluated based on the following parameters:

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Holding Times

The sample EFF049RE is not used in favor of the original extraction. The RE was performed twelve days outside of the extraction holding time.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0718D-GMB - 3.16 at 26JA ug/L; 17.32 at 15J ug/L)

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF049RE	All Compounds	+/-	Do Not Use
All Samples	All B flagged TICs within 10X contamination concentration	+B	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ12

A validation was performed on the Pesticides/PCB Data from SDG NBCJ12. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The continuing calibration standard RJL19007 exhibited one compound with a %D greater than 15% but less than 50% for which qualifications were required. For the following sample and non-compliant compound, the reported positive result is qualified as estimated, J.

EFF052 4,4'-DDD

Surrogate Recoveries

The following samples exhibited surrogate recoveries less than 10% on one or both columns. All reported positive results are qualified as estimated, J, and non-detect results are rejected, UR.

Sample ID	Surrogate	%R
EFF039	DCB	8/9
	TCX	28
EFF053	DCB	10/9
	TCX	28
EFF052	DCB	10/8
	TCX	28

The following samples exhibited surrogate recoveries below the QC limit but above 10% on one or both columns. All reported positive and non-detect results are qualified as estimated, J/UJ.

Sample ID	Surrogate	%R
EFF032	DCB	20/18
EFF049	DCB	15/18
EFF072	DCB	10/11

Compound Quantitation

Several samples exhibited column quantitation %Ds greater than 40%. The following guidelines were used to qualify the data:

1. No qualifications are required for positive sample results which exhibited column quantitation differences <40%. The "P" flag is removed from the result.

2. The positive sample result which exhibited a column quantitation difference >40%, but ≤100% is qualified as estimated, J.

3. The positive sample result which exhibited a column quantitation difference >100% and is <10X the respective compound CRQL, is qualified as non-detect, U.

4. The positive sample result which exhibited a column quantitation difference >100% and >10X the respective compound CRQL, is qualified as presumptively present at an estimated concentration, NJ.

Compound Quantitation (continued)

The following samples and compounds have been qualified for high column quantitation %Ds.

Sample ID	Compound	%D	Lab Qual.	HESI Qual.	Ref. #
EFF032	endosulfan sulfate	103.3	P	U	3
EFF053	heptachlor	89.4	P	J	2
	gamma-chlordane	106.9	P	U	3
EFF052	gamma-chlordane	106.7	P	U	3
	dieldrin	106.1	P	U	3
	endosulfan II	100.0	P	J	2
EFF049	heptachlor	70.7	P	J	2

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF052	4,4'-DDD	+	J
EFF039 EFF053 EFF052	All compounds	+/-	J/UR
EFF032 EFF049 EFF072	All compounds	+/-	J/UJ
ALL	All P < 40%	+	
ALL	All P > 40% But ≤ 100%	+	J
ALL	All P > 100% And < 10X CRQL	+	U
ALL	All P > 100% And > 10X CRQL	+	NJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ12

A validation was performed on the Metals and cyanide Data from SDG NBCJ12. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	35.5 ug/l	no impact
Calcium	7.07 ug/l	no impact
Selenium	5.42 ug/l	all water samples below 27.1 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Arsenic	-4.52 ug/l	all water samples below 45.2 ug/l

Serial Dilution results

The serial dilution results for soils for Barium and Zinc were greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 27.1 ug/l	Se.	+	U
all water samples below 45.2 ug/l	As..	+/U	J/UJ
all water samples	Ba and Zn.	+	J
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ13
Date:	September 6, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	July 15, 2002
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson
for Paul B. Humburg, President

9-6-02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ13

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF025	WATER	X		X		X		X	
EFF071	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		2	0	2	0	2	0	2	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles: the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ13

A validation was performed on the Semivolatile Data from SDG NBCJ13. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0719C-JMB - 3.54 at 30JA ug/L)

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	All B flagged TICs within 10X contamination concentration	+B	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ13

A validation was performed on the Pesticides/PCB Data from SDG NBCJ13. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following sample exhibited surrogate recoveries below the QC limit but above 10% on one or both columns. All reported positive and non-detect results are qualified as estimated, J/UJ.

Sample ID	Surrogate	%R
EFF071	DCB	16/19

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF071	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ13

A validation was performed on the Metals and cyanide Data from SDG NBCJ13. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	24.9 ug/l	no impact
Copper	2.15 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ14
Date:	September 20, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	July 23, 2002
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Searson
Paul B. Humburg, President

9.20.02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
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SDG# NBCJ14

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF028	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		1	0	1	0	1	0	1	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ14

A validation was performed on the Semivolatile Data from SDG NBCJ14. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The continuing calibration standard DQ191 exhibited two compounds with %Ds greater than 20% but less than 50% for which qualifications were required. For the following sample and non-compliant compounds, the reported positive result is qualified as estimated, J.

EFF028	indeno(1,2,3-cd)pyrene
	Benzo(g,h,i)perylene

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF028	indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ14

A validation was performed on the Pesticides/PCB Data from SDG NBCJ14. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following sample exhibited surrogate recoveries below the QC limit but above 10% on one or both columns. All reported positive and non-detect results are qualified as estimated, J/UJ.

Sample ID	Surrogate	%R
EFF028	TCX	28%
	DCB	11/12

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF028	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ14

A validation was performed on the Metals and cyanide Data from SDG NBCJ14. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Copper	0.97 ug/l	no impact
Tin	3.07 ug/l	all water samples below 15.0 ug/l
Zinc	4.3 ug/l	no impact

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

The preparation blanks exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Calcium	-35.6 ug/l	no impact

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 15.0 ug/l	Sn.	+	U
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ15
Date:	October 9, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	August 30, 2002
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Senyson
Paul B. Humburg, President

10-9-02.
Date

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SDG# NBCJ15

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P/P		MET		CN	
EFF059	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		1	0	1	0	1	0	1	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ15

A validation was performed on the Semivolatile Data from SDG NBCJ15. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The continuing calibration standard JQ003 exhibited one compound with a %D greater than 50% but less than 90%. For the following sample and non-compliant compounds, the reported positive or non-detect result is qualified as estimated, J or UJ.

EFF059	bis(2-chloroethyl)ether

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0905A-MB - 39JA ug/L)

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF059	bis(2-chloroethyl)ether	+/-	J/UJ
All Samples	All B flagged TICs within 10X contamination concentration	+B	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ15

A validation was performed on the Pesticides/PCB Data from SDG NBCJ15. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

The following sample exhibited surrogate recoveries below the QC limit but above 10% on one or both columns. All reported positive and non-detect results are qualified as estimated, J/UJ.

Sample ID	Surrogate	%R
EFF059	DCB	15/13

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
EFF059	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ15

A validation was performed on the Metals and cyanide Data from SDG NBCJ15. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
*	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions

* - All criteria were met for this parameter.

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	NBCJ16
Date:	October 22, 2002
Client Name:	Ensafe
Project/Site Name:	Charleston Zone J
Date Sampled:	September 25, 2002
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data
QA/QC Level:	DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Pesticides/PCBs, Metals and Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sexton
Paul B. Humburg, President

10·22·02.
Date

4127 Plaza 94 South • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# NBCJ16

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	SVOA		P P		MET		CN	
EFF016	WATER	X		X		X		X	
Total Billable Samples (Water/Soil)		1	0	1	0	1	0	1	0

SVOA= Semivolatiles
P/P= Pesticides/PCBs
MET= Metals
CN= Cyanide

DATA ASSESSMENT NARRATIVE

PESTICIDES/PCB

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Methods 8081A and 8082; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # NBCJ16

A validation was performed on the Pesticides/PCB Data from SDG NBCJ16. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Laboratory Control Samples
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

Method Deviation

According to the method SW-846 8081A, Revision 1, 12/96, page 12, paragraph 7.4.1.2 "For calibration verification (each 12 hour shift) all target analytes required in the project plan must be injected." The laboratory did not include Toxaphene in the calibration verification sequence. There were no qualifications required based on this method deviation.

System Performance and Overall Assessment

The data, as reported, did not require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
NO QUALIFICATIONS WERE REQUIRED			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 8270C for GC/MS Semivolatiles; the National Functional Guidelines for Organic Data Validation, 10/99, as applicable; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #NBCJ16

A validation was performed on the Semivolatile Data from SDG NBCJ16. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Internal Standard Performance
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Blanks

All B flagged TICs are rejected if they are within 10X the concentration reported in the associated method blank. (0930C-MB - 4.32 @ 48JA ug/L)

System Performance and Overall Assessment

The data, as reported, did require qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

L = Result is estimated and biased low.

K = Result is estimated and biased high.

R = Result is rejected and unusable

D = Result value is based on dilution analysis

BLANK QUALIFICATION CODES

RL =	The sample result for the blank contaminant is less than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the RL for that compound is reported.
U =	The sample result for the blank contaminant is greater than the sample RL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.
No Action =	The sample result for the blank contaminant is greater than the sample RL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

RL - indicates Reporting Limit

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All Samples	All B flagged TICs within 10X contamination concentration	+B	UR

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 methods: the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDGs # NBCJ16

A validation was performed on the Metals and cyanide Data from SDG NBCJ16. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions

* - All criteria were met for this parameter.

Preparation and Field Blanks

The preparation and calibration blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	13.5 ug/l	no impact
Copper	8.2 ug/l	all water samples below 41.0 ug/l
Lead	2.6 ug/l	all water samples below 13.0 ug/l

The USEPA requires that all sample values below five times the preparation or calibration blank contamination be qualified as non-detect, "U".

Serial Dilution results

The serial dilution results for waters for Potassium was greater than 10%. All positive results are qualified as estimated, "J".

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B". Value is below the CRDL but greater than the IDL.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples below 41.0 ug/l	Cu.	+	U
all water samples below 13.0 ug/l	Pb.		
all water samples	K.	+	J
all "B" results	all analytes	B	J

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0154

ZONE J RFI STORM WATER EFFLUENT EVALUATION REPORT ADDENDUM

REVISION: 1

VOLUME IVOF IV – APPENDIX B

SOUTHDIV Contract Number:
N62467-89-D-0318

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

Prepared by:

ENSAFE INC.
313 WINGO WAY
MOUNT PLEASANT, SOUTH CAROLINA 29464
(843) 884-0029

July 2003

Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina

Appendix B

Incident Reports and Website Instructions

GENERAL MESSAGE LOG SHEET

SPILL MSG. CY 1992

MSG FILE NAME

FM	DTG	MTH/YR	CLASS	SUBJ.	INIT
CNSY	112020 Z	MAR 92	U	OIL SPILL RPT	[illegible]
CNSY	021035 Z	Jun 92	U	OIL SPILL RPT	[illegible]
CNSY	231047 Z	Jun 92	U	OIL SPILL RPT	[illegible]
CNSY	181655 Z	Sep 92	U	OIL SPILL RPT	[illegible]
CNSY	021432 Z	Dec 92	U	OIL SPILL RPT	[illegible]
CNSY	181531 Z	Dec 92	U	OIL SPILL RPT	[illegible]
SSBN 626	212115 Z	Dec 92	U	OIL SPILL RPT	[illegible]

GENERAL MESSAGE LOG SHEET

SPILL MSG CY 1993

MSG FILE NAME

FM	DTG	MTH/YR	CLASS	SUBJ.	INIT
CNSY	082238Z	JAN 93	U	OIL SPILL REPORT – Sunken Work Boat	E
CNSY	031344Z	FEB 93	U	OIL SPILL REPORT – Bilge Dewatering (X71) CAPE ALEXANDER	E
CNSY	011428Z	APR 93	U	OIL SPIL REPORT – HYD OIL CAPE ARCHWAY.	A
NAVSTA ~~CNSY~~	091221Z	APR 93	U	OIL SPIL RPT Summary	A
CNSY	121356Z	Jul 93	U	OIL SPILL CAPE ALAVA	A
NAVSTA	061700Z	MAY 93	U	OIL SPILL RPT Summary	A
NAVSTA	091245	Jul 93	U	OIL SPILL RPT Summary	A
CNSY	151635Z	Jul 93	U	OIL SPILL CAPE ALAVA.	
CNSY	211743Z	MAY 93	U	OIL SPILL CNSY DRYDOCK #2 PIER EN	V
			CY 94		
NS	812307Z	JAN 94	U	OIL SPILL REPORT SUMMARY	
CNSY	271200Z	JAN 94	U	OIL SPILL PIER C	
CNSY	021700Z	FEB 94	U	OIL SPILL DD #5	
CNSY	171808Z	FEB 94	U	OIL SPILL C-D QUAYWALL	
CNSY	041539Z	MAR 94	U	OIL SPILL C-D SLIP	
CNSY	181451Z	MAR 94	U	OIL SPILL DDS QUAYWALL	
CNSY	301950Z	MAR 94	U	OIL SPILL DD-987 & CD SLIP	
CNSY	041640Z	APR 94	U	OIL SPILL CN	
NS	071530Z	APR 94	U	OIL SPILL REPORT SUMMARY	
CNSY	191209Z	APR 94	U	DD #5	
CNSY	031750Z	MAY 94	U	FN YSR-45 ½ GAL	
CNSY	041235Z	MAY 94	U	FN YSR-45 +20 GAL	
CNSY	021430Z	JUN 94	U	FN HAZARDOUS SUBSTANCE SPILL (SEWAGE)	

→ 440.3

.440.3

Code 440.312A:ADW
6240
Ser 440-2504
13 JUL 1982

MEMORANDUM

From: Code 440.312A
To: File
Via: Code 440.3

Subj: Hazardous material incident report

1. Nature of incident:
P.C.B. spill from transformer

2. Location of incident:
Head of pier K

3. When notified: Date: 27 June 1982 Time: Approximately 0915

4. Notified by:

5. Immediate action taken: Art Green and Matt Warhurst arrived at Bldg 12 Approximately 1000. A phone call to the chief of the watch, LCDR Beely, indicated the spill was from a transformer at pier K. Green and Warhurst investigated and secured the site.

6. Follow up action taken or planned:
Absorbent material was spread by shop 03 personnel at approximately 0930. The oil soaked material was then drummed and labeled. Varsol was used to wash down the asphalt. The site was secured at approximately 1415.
On 28 June 1982 the drums were banded and transported to the old corral From there, they will be disposed of by contract.

No further action required.

Doug Ferguson
DOUG FERGUSON

Copy to:
400/401
→440/440.3
PWD Circ

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UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

INE

R 121915Z APR 88

FM NAVSTA CHARLESTON SC

TO COMDT COGARD WASHINGTON DC
COMNAVBASE CHARLESTON SC

INFO CNO WASHINGTON DC
EPA REGION IV ATLANTA GA
NEESA PORT HUENEME CA
CINCLANTFLT NORFOLK VA
COMNAVFACENGCOM ALEXANDRIA VA
COMNAVSEASYSCOM WASHINGTON DC
CCGDSEVEN MIAMI FL
NSC CHARLESTON SC

UNCLAS//N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

A. COMNAVBASECHASN/SOPA(ADMIN)INST 5400.1F

1. CNO FOR OP-45 AND CHINFO

2. 0920152 APR 88, NAVSTA MARINA (UIC 01165)

3. NAVSTA CHARLESTON SC, PIER XRAY QUAYWALL, COOPER RIVER

4 QUARTS

5. LUBE OIL

6. PLASTIC BAG FILLED WITH LUBE OIL DROPPED OVER QUAYWALL, LEFT BY UNKNOWN PERSONNEL.

7. PERSONNEL ERROR, LEFT UNATTENDED.

8. 8 FT BY 8 FT SLICK, DARK COLOR, WINDS 315 DEGREES, 12 KTS, SEA STATE 0, NO SLICK MOVEMENT.

9. COOPER RIVER. NO THREAT TO PROPERTY, WILDLIFE, OR OTHER RESOURCES.
10. NOT MADE.
11. NOT TAKEN.

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 04020/ 3/0123
01(1) 08(1) 11(1) 16(1) 18(1) 20(1) 00(1)

RTD:000-163/COPIES:0008

171097/103 1 OF 2 MATA1221 103/21:36Z
CSN:VDTJ00109

INFTE 121915Z APR 88
NAVSTA CHARLES

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
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DISTRO

13. QUAYWALL.
ABSORBANTS.
14. NAVSTA PORT SERVICES PERSONNEL.
15. NONE
16. PORT SERVICES OFFICER, CODE 13; NAVSTA CHARLESTON SC. PHONE COMMERCIAL: 803-743-6411, A/V: 563-6411.

BT

JOINT MESSAGE FORM

SECURITY CLASSIFICATION
UNCLASSIFIED

PAGE	DTG/RELEASER TIME			PRECEDENCE		CLASS	SPECAT	LMF	CIC	ORIG/MSG IDENT
	DATE-TIME	MONTH	YR							
01 OF	1312402	OCT	89	PP	PP	UUUU				2861240

FROM: NAVSTA CHARLESTON SC

TO: COMDT COGARD WASHINGTON DC COMNAVBASE, CHARLESTON SC

INFO: CNO WASHINGTON DC (1)

~~COMNAVBASE CHARLESTON SC~~

US EPA REGION FOUR (10)

345 CORTLAND ST NE

ATLANTA GA 30365

COMNAVSEASYSCOM WASHINGTON DC (7)

NEESA PORT HUENEME CA (8)

COMDESRON FOUR (5)

COMNAVFACENGCOM ALEXANDRIA VA (6)

CINCLANTFLT NORFOLK VA (2)

COMNAVSURFLANT NORFOLK VA (3)

CCGD SEVEN MIAMI FL (4)

USS SIERRA (11)

USS DEWEY (12)

NSC CHARLESTON SC (9)

UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 AND CHINFO

2. 120825 OCT 89 NAVAL STATION CHASN PIER NOVEMBER SOUTH AND PAPA

PORT SERVICES OPS, CODE 13, 36411

13 OCT 89

R. J. VENTGEN, CDR, USN, 36411

UNCLASSIFIED 1312402 OCT 89

SECURITY CLASSIFICATION

JOINT MESSAGE FORM UNCLASSIFIED

PAGE	DTG/RELEASER TIME			PRECEDENCE		CLASS	SPECAT	CMF	CIC	ORIG MSG IDENT
	DATE-TIME	MONTH	YR	ACT	INFO					
01	131240Z	OCT	89	PP	PP	UUUU				2861240

FROM: NAVSTA CHARLESTON SC

TO COMDT COGARD WASHINGTON DC

COMNAVBASE CHARLESTON SC

INFO CNO WASHINGTON DC

CINCLANTFLT NORFOLK VA

COMNAVSURFLANT NORFOLK VA

CCGD SEVEN MIAMI FL

COMDESRON FOUR

COMNAVFACENGCOM ALEXANDRIA VA

COMNAVSEASYSCOM WASHINGTON DC

NEESA PORT HUENEME CA

NSC CHARLESTON SC

US EPA REGION FOUR

345 CORTLAND ST NE

ATLANTA GA 30365

USS SIERRA

USS DEWEY

UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 AND CHINFO

2. 120825 OCT 89 NAVAL STATION CHASN PIER NOVEMBER SOUTH AND PAPA

PORT SERVICES OPS, CODE 13, 36411

13 OCT 89

R. J. VENTGEN, CDR, USN, 36411

UNCLASSIFIED 131240Z OCT 89

JOINT MESSAGE FORM

SECURITY CLASSIFICATION
UNCLASSIFIED

PAGE	DTG RELEASER TIME	PRECEDENCE	CLASS	SPECIAL	LMF	CIC	ORIG/MSG IDENT
02 02	PP	PP	UUUU				2861240

. NORTH SLIP, VICINITY USS SIERRA AND USS DEWEY

3. NAVSTA CHARLESTON SC NOVEMBER-PAPA SLIP

4. APPROXIMATELY 450 GALLONS

5. DFM

6. UNKNOWN

7. CONTAINED

(A) 400' X 1500'

(B) LIGHT TO DARK BROWN

(C) NO. NORTHEAST

(D) CALM, EBB TIDE

(E) NONE

8. NONE

9. YES, CALL MADE

10. YES, SAMPLE TAKEN

11. BOOM

12. DIP AND SORBENTS

13. PORT SERVICES, NAVSTA CHARLESTON SC

14. NONE

15. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL: (803) 743-6411, A/V: 563-6411

JOINT MESSAGE FORM

SECURITY CLASSIFICATION: UNCLASSIFIED

PAGE	DTG/RELEASER TIME			PRECEDENCE		CLASS	SPECAT	LMF	CIC	ORIG/MSG IDENT
	DATE-TIME	MONTH	YR	ACT	INFO					
OF	021030	NOV	89	PP	PP	UUUU				

BOOK

MESSAGE HANDLING INSTRUCTIONS

FROM: NAVSTA CHARLESTON SC

TO: COMDT COGARD WASHINGTON DC

INFO CNO WASHINGTON DC

COM NAVFACENGCOM ALEXANDRIA VA

COM NAVSEASYSCOM WASHINGTON DC

NEESA PORT HUENEME CA.

EPA REGION III ATLANTA GA

SOPA ADMIN CHARLESTON

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. 300 FOR OP-45 CHINFO
2. NAVSTA CHARLESTON SC. UIC 61165 021030 NOV 89
3. NAVSTA CHARLESTON SC [illegible] PARK [illegible]
4. APROX 55 GALS
5. BROWN LIGHT [illegible] OIL BASED SOLVENT
6. UNKNOWN
7. UNKNOWN
8. DEEP BY 500 LIGHT BROWN WITH CALM, CLEAR, STATIONARY
9. SPILL OCCURED IN COOPER RIVER WITH NO APPARENT DAMAGE TO PROPERTY OR WILDLIFE
10. SAMPLES WERE TAKEN
11. BOOM
12. DAP 3001 SKIMMER, SORBENTS
13. NAVSTA CHARLESTON SC PORTSERVICES PERSONNEL
14. NONE
15. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL 803 743-6411 - AUV 563-6411

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DISTR:

DRAFTER TYPED NAME, TITLE, OFFICE SYMBOL, PHONE

SPECIAL INSTRUCTIONS

RELEASER

TYPED NAME, TITLE, OFFICE SYMBOL AND PHONE

SIGNATURE

SECURITY CLASSIFICATION

DATE TIME GROUP

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
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IMMEDIATE PRIORITY

030030Z DEC 89

FM NAVSTA CHARLESTON SC

TO COMDT COGARD WASHINGTON DC

INFO CNO WASHINGTON DC
COMNAVSEASYSCOM WASHINGTON DC
SOPA ADMIN CHARLESTON SC
EPA REGION FOUR ATLANTA GA
COMNAVBASE CHARLESTON SC

UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. CMD FOR OP-45 CHINFO

2. 02194RZ DEC 89 NAVAL STATION CHARLESTON SC VIC 61165

3. NAVSTA CHARLESTON SC, PIER LIMA/ZULU SLIP.

4. APPROX 35 GALLONS

5. OIL/WATER MIXTURE

POSSIBLE CRACK IN HULL ON WASTE OIL BARGE

7. CONTAINED
A.) 5 X 10
B.) BROWN, DARK
C.) WINDS NNW 10 KTS
D.) CALM
E.) NONE

8. SPILL OCCURED IN COOPER RIVER WITH NO APPARENT DAMAGE

9. NOT MADE

10. SAMPLES WERE TAKEN.

11. BOOM

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 21675/ 3/0123
01(1) 08(1) 11(1) 16(1) 18(1) 20(1) 00(1)

RTD 15-131 COPIES 0008
RCVD
RUN-OFF
TRFC CHKR
DISTRO NAVSTA CHARLES

834296/337 1 OF 2 MATA0028 337/00:54 030030Z DEC 89
N:VDTH00003

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U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

01 0919157 FEB 90 PP UUUU 0401915

OPS

USS RICHMOND K TURNER

COMDT COGARD WASHINGTON DC//JJJ//

COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//JJJ//

COMNAVFACENGCOM ALEXENDRIA VA//JJJ//

NEESA PORT HUENEME CA//JJJ//

NSC CHARLESTON SC//JJJ//

COMCRUDESGRU TWO

NAVSTA CHARLESTON SC//JJJ//

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DISPATCHER 1.
2.
3.

UNCLAS //N05090//

SUBJ: OIL SPILL (REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 AND CHINFO

2. 0921062 FEB 90 USS RICHMOND K TURNER (CG-20)

3. NAVSTA CHARLESTON SC PIER P-4A

4. APPROX 300 GALLONS

5. DIESEL FUEL MARINE (DFM)

6. OPERATION: INTERNAL TRANSFER OF FUEL

7. WHILE TRASFERING FUEL FROM FUEL STORAGE TANK•6-185-0-F TO FUEL SERVICE TANK 6-108-2-F TANK SOUNDING WATCH FELL ASLEEP ALLOWING FUEL

RELEASER: CAPT LASSITER
DRAFTER: LTJG HILTON
PROOF:

S.T. MORRIS, RM2, USN, 7277

TO OVERFLOW. THIS WAS A MONITORING ERROR.

8. SLICK DESCRIPTION:

(A) 500 FT LONG BY 100 FT WIDE

(B) DULL BROWN

(C) 270/12 KTS

(D) LIGHT CHOP

(E) SLICK MOVEMENT CONFUSED DUE TO TUG AND SHIP MOVEMENT IN VICINITY.

9. SPILL OCCURRED IN COOPER RIVER WITH NO APPARENT DAMAGE TO PROPPERTY OR WILDLIFE.

10. TELEPHONIC REPORT TO NATIONAL RESPONSE CENTER (NRC) WAS NOT MADE.

11. SAMPLES WERE NOT TAKEN|

13. SPILL REMOVED USING SORBENTS/DIP 3001.

14. RK TURNER/NAVSTA CHARLESTON PORT SERVICES

15. NO ASSISTANCE REQUIRED

16. POC: LT MCGINNIS, OPERATIONS OFFICER, USS RICHMOND K TURNER, AV 563-5545, COMM (803)743-5545.

01 01 0919202 FEB 90 PP UUUU 0401920

OPS

USS RICHMOND K TURNER

COMCRUDESGRU TWO

UNCLAS

MSGID/UNIT SITREP/USS RK TURNER/003/FEB//

FLAGWORD/-/UNIT SITREP//

TIMELOC/0921052/NAVSTA CHASN/INIT//

GENTEXT/FUEL OIL SPILL IN CHARLESTON NAVAL BASE HARBOR, PIER PAPA BERTH 4A. FUEL OIL SVCE TANK OVERFLOWED WHEN TRANSFERING FUEL FROM FUEL OIL STORAGE TANK. APPROX 300 GAL OVERFLOWED AND WAS DISCHARGED OVBD. SVCE TANK SOUNDING WATCH FELL ASLEEP. PUMPING SECURED AS SOON AS FUEL SPILL WAS DETECTED.

RMKS/CLEAN UP DELAYED DUE TO TUG AND SHIP MOVEMENT ON ADJACENT PIER. SPILL CONTAINMENT IN PROGRESS//

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DISP NCHFR 1.
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3.

RELEASER: CAPT LASSITER
DRAFTER: LTJG AKENS
PROOF:

CO XO OPS CSO ENG CICO
NAV ADM CIC SUPP
WRO/EMO/ERO MCPOC CHAP ISC GMF SIGS
CDO COMM 2 CMS RTR COPY#

S.T. MORRIS, RM2, USN, 7277

Sean Morris

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U UNCLASSIFIED U
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DISPATCHER 1.
2.
3.

RATIVE MESSAGE

RETAIN FILE COPY TO BOATHOUSE

TINE

11937Z MAR 90 ZYB PSN 582674J32

USS JOHN RODGERS

COMDT COGARD WASHINGTON DC

COMNAVBASE CHARLESTON SC

O CNO WASHINGTON DC
NAVSEASYSCOM WASHINGTON DC
STA CHARLESTON SC

COMNAVFACENGCOM ALEXANDRIA VA
NEESA PORT HUENEME CA

LAS //N03000//

J: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

CNO FOR OP-45 AND CHINFO

011457Z MAR 90

NAVSTA CHARLESTON S.C. BERTH Z4A

/ GAL

DFM (F-76)

FUELING

INACCURACY IN TANK LEVEL INDICATOR

(A) FIVE FEET BY SEVENTY FIVE FEET TRANSIENT SHEEN
(B) BARELY VISIBLE, LIGHT BROWN
(C) 070/12
(D) ZERO
(E) NONE

(A) COOPER RIVER
(B) NONE
(C) NONE

R:USS JOHN RODGERS(1)...ORIG

1)...INFO FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
01(1) 08(1) 11(1) 16(1) 18(1) 20(1) 00(1)

RTD:000-000/COPIES:0009

5 4/1514/061 1 OF 2 M1 0587 061/07:45Z 011937Z MAR 90
:RX .0590 USS JOHN RODGERS

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
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10. NOT MADE.

11. TAKEN

12. BOOM/CAMELS

13. SORBENTS

14. NAVY (NAVSTA CHARLESTON PORT SERVICES)

15. FIRST CLASS PETTY OFFICER STANDING OVERBOARD WATCH DURING REFUELING NOTICED OVERBOARD COMPENSATING WATER DISCHARGE CHANGED FROM A CLEAR STREAM TO A LIGHT BROWN DISCHARGE. HE NOTIFIED CCS AND SYSTEM WAS SECURED WITHIN 15 SECONDS. ESTIMATE 40 GALS OF FUEL/WATER MIX WAS SPILLED. WATER SURFACE HAS A LIGHT TRANSIENT SHEEN MIXED WITH BIOLOGICAL GROWTH FROM COMPENSATING TANK. FIRE HOSES WERE IMMEDIATELY BROKEN OUT AND SHIP'S COMPANY CONTAINED THE SHEEN TO THE SIDE OF THE SHIP AND THE EDGE OF THE PIER. PORT SERVICES WAS NOTIFIED AND SENT SMALL BOATS TO ASSIST IN CLEANUP.

16. LT J. BUZIAK, CHIEF ENGINEER, AV 563-3070, COMM (803) 743-3070.
BT

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U UNCLASSIFIED U
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CALL

IMMEDIATE

O 091400Z MAY 90 PSN 365334J24

FM USS JESSE L BROWN

TO COMDESRON FOUR

INFO COMCRUDESGRU TWO COMNAVBASE CHARLESTON SC//JJJ//
NAVSTA CHARLESTON SC//JJJ//

CONTROL COPY TO BOAT HOUSE

BT
UNCLAS

MSGID/UNITSITREP/USS JESSE L BROWN/003/MaY//
FLAGWORD/-/UNIT SITREP//
TIMELOC/091330ZMAY90/NAVSTA CHASN/INIT//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS: WHILE COMMENCING DEFUELING OPERATIONS AT PIER ZULU, 15GAL DFM SPILLED OVER THE SIDE FROM AFT PORT OVERFLOW. FUEL OIL CONTAINED BY SHIP'S FORCE BETWEEN SHIP AND PIER USING FIREMAIN. CLEAN UP IN PROGRESS BY SHIP'S FORCE. PORT SERVICES NOTIFIED AND STANDING BY TO ASSIST SHIPS FORCE AS REQUIRED.
BT

[redacted]
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134 AES
DISPATCHER 1.
2.
3.

TO GACS

LT MOXCEY
CHENC

DLVR:COMDESRON FOUR(9)...ACT
DLVR:USS JESSE L BROWN(1)...ORIG

EM1 GS 16302

002(1)...INFO FOR COMCRUDESGRU TWO(14) /18/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

13(1)...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
17(1) 14(1) 01(1) 00(1) 08/24

RTD:000-000/COPIES:0029

365334/7075/129 1 OF 1 M1 0938 129/16:02Z 091400Z MAY 90
CSN:RXBR0934

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U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

[redacted]ESSE L BROWN	
RUN-OFF	
TRFC CHKR	
DISTRO	

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

CALL

IMMEDIATE

O 091400Z MAY 90 PSN 365334J24

FM USS JESSE L BROWN

TO COMDESRON FOUR

INFO COMCRUDESGRU TWO COMNAVBASE CHARLESTON SC//JJJ//
NAVSTA CHARLESTON SC//JJJ//

BT
UNCLAS

MSGID/UNITSITREP/USS JESSE L BROWN/003/MAY//
FLAGWORD/-/UNIT SITREP//
TIMELOC/091330ZMAY90/NAVSTA CHASN/INIT//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS: WHILE COMMENCING DEFUELING OPERATIONS AT PIER ZULU, 15GAL DFM SPILLED OVER THE SIDE FROM AFT PORT OVERFLOW. FUEL OIL CONTAINED BY SHIP'S FORCE BETWEEN SHIP AND PIER USING FIREMAIN. CLEAN UP IN PROGRESS BY SHIP'S FORCE. PORT SERVICES NOTIFIED AND STANDING BY TO ASSIST SHIPS FORCE AS REQUIRED.
BT

BMCM RUSSELL 70 GALS

LT MOXCEY CHENG

FY FILES
V/R
QM2(SW) E

DLVR:COMDESRON FOUR(9)...ACT
DLVR:USS JESSE L BROWN(1)...ORIG

EM1 GS 16302

002(1)...INFO FOR COMCRUDESGRU TWO(14) /18/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

13(1)...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
17(1) 14(1) 01(1) 00(1)

09/24

RTD:000-000/COPIES:0029

365334/7075/129 1 OF 1 M1 0938 129/16:02Z 091600Z MAY 90
CSN:RXPR0934

USS JESSE L BROWN	
RUN-OFF	
TRFC CHKR	
DISTRO	

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ADMINISTRATIVE MESSAGE

ROUTINE

R 091900Z MAY 90 ZYB PSN 377683J34

FM USS JESSE L BROWN

TO COMDT COGARD WASHINGTON DC//JJJ//
NAVSTA CHARLESTON SC//JJJ// COMDESRON FOUR
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ// NEESA PORT HUENEME CA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
ENVIRONMENTAL PROTECTION AGENCY ATLANTA GA//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/USS JESSE L BROWN//
REF/A/DOC/COMNAVBASECHASN/SOPA (ADMIN) CHASNINST 5090.1 CH-I//
RMKS/1. CNO FOR OP-45 AND CHINFO.

2. 091330Z MAY 90/USS JESSE L BROWN/FF 1089/20067

3. NAVSTA CHASN - PIER Z, BERTH 3A

4. 70 GAL

5. DFM

6. DEFUELING

7. VALVE MISALIGNMENT. BT3 OPENED FIRE M1IN SUPPLY TO
DEBALLAST MANIFOLD INSTEAD OF STRIPPING VALVE: SALT WATER
FILLED TANK FORCING FUEL OUT THE OVERFLOW. ALERT TOPSIDE
WATCH LIMITED EXTENT OF SPILL.
8A. SIZE: 20 FT BY 10 FT , CONTAINED BETWEEN SHIP'S HULL AND
SOLID PIER WALL USING FIREHOSES.

CLVR:COMDESRON FOUR(9)...ACT
CLVR:USS JESSE L BROWN(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:027-000/COPIES:0018

377683/9265/130 1 OF 2 M1 1203 130/15:39Z 091900Z MAY 90
CSN:RX3R1254 USS JESSE L BROWN

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134
DISPATCHER 1.
2.
3.

RUN-OFF
TRFC CHKR
DISTRO

REDDISH BROWN
C. CALM
D. SLACK WATER/CALM
E. NO MOVEMENT
9A. COOPER RIVER
B. NONE
C. NONE

10. REPORT NOT MADE

11. SAMPLES NOT TAKEN

12. WATER SPRAY, HULL, PIER.

13. ABSORBENT PADS

14. NAVY-USS JESSE L. BROWN/PORT SVCS.

15. NONE

16. LT MOXCEY-AV 563-6265-COMM (803)743-6133.//
BT

JOINT MESSAGE FORM

SECURITY CLASSIFICATION: UNCLASSIFIED

PAGE	DTG/RELEASER TIME			PRECEDENCE		CLASS	SPECAT	LMF	CIC	ORIG/MSG IDENT
	DATE-TIME	MONTH	YR	ACT	INFO					
OF	04 1230	SEPT	90	PP	PP	UUUU				247 041835

BOOK

MESSAGE HANDLING INSTRUCTIONS

FROM: NAVSTA CHARLESTON SC

TO: COMDT COGARD WASHINGTON DC.

INFO: CNO WASHINGTON DC
COMNAVFACENGCOM ALEXANDRIA VA.
COMNAVSEASYSCOM WASHINGTON DC
NEESA PORT HUENEME CA
FEMA REGIONAL OFFICE ATLANTA GA.
SOPA ADMIN CHARLESTON

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 CHINFO
2. 04 0730 ~~SEPT 90~~ NAVAL STATION CHARLESTON, SC
3. NAVAL STATION CHARLESTON, SC FROM ATC TO PIER "Q"
4. APROX 75 GAL
5. UNKNOWN/DIESEL FUEL
6. UNKNOWN
7. UNKNOWN
8. 1.5 MILES X 300' SILVERY, BRIGHT COLOR BANDS, NORTH, 10-15 KTS, CHOPPY, SOUTH:
9. NONE
10. NOT MADE
11. WERE TAKEN
12. BOOM, SHIPS HULL CAMEL
13. DIP 3001, SORBENTS
14. NAVAL STATION CHARLESTON PORT SERVICES PERSONNEL
15. NONE
16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC
PHONE COMERCIAL (803) 743-6411 - AV 563 6411

DISTR:

TYPED NAME, TITLE, OFFICE SYMBOL AND PHONE

SIGNATURE

SECURITY CLASSIFICATION

Minimize Considered

OIL SPILL LOC/UNITS

DATE 90	LOCATION	UNIT	GL.	M/H	TYPE	REMARKS
11 JAN	P/N	USS ELRIO	5gl		WASTE OIL	GOOD CONTAINMENT
16 JAN	PIER	USS TURNER	250	235	1,083.58	
09 FEB	PIER P	USS TURNER	200	240		FUEL OIL SJC. TANK OVERFLOWED.
01 MAR	Z-M SLIP	USS JOHN ROGERS	60gl	129.5	DFM	INACCURACY IN TANK LEVER INDICATOR.
30 MAR	C-SOUTH	CNLY	9	25		SHIPYARD OIL SPILL.
17 APR	K-SOUTH	YTB 771	65	36		
01 MAY	C-SOUTH	SHOP 99	20	32		CAMEL SUB & DIP.
09 MAY	ZULU	USS J.L. BROWN	72	8		NO SAMPLE BROWN DID CLEAN UP.
15 MAY	PIER S	NTB 799	4			DEM WHILE REFUELING.
24 MAY	M-2	STURGEON	5	22		DIP/SORBANT
15 JUN	ST QU	SHIPYARD FUEL TRUCK	17	15		DIP/FUEL HOSE BROKER ON TRUCK.
15 JUN	WEP. STA.	DREDGE	40	4		WEP. STA. HANDLED.
17 JUN	PIER U.	MOHAWK	5	1		SF CLEANED NO SAMPLE.
17 JUN	M,N,O,U	UNK	5	15		BOOM BARGE NO SAMPLE.
18 JUN	D-SOUTH	USS MAHAN	2	7		PAINT SPILL
27 JUN	T-NIS	UNK	4	13		NO SAMPLE TAKEN.
27 JULY	Z-R	PRATT	100	24		NO SAMPLE TAKEN.

20 AUG	P,R SLIP	USS NIGGLSON	45	120	20min TO GET WALKIE-TALKIE
30 AUG	CNOY C	CNOY	7	15	NO SAMPLE SF WORKING.
04 SEP	ATC-PIER Q	UNK	75	47.5	FROM ATC-Q 300 WIDE.
06 SEP	Q 1-A	USS HEWES	2	17.5	NO SAMPLE
13 SEP	T-1 A	USS FEARLESS	2	12	
13 SEP	T/U QUAY WALL	SIMA DIVERS	2	248.1	
20 SEP	P 3	USS BROWN	5	7	OUTBOARD SHIP U/W DISPOSED OIL.
27 SEP	P,Q QUAY WALL	USS SIERRA	15	35	SAMPLE TAKEN.
28 SEP	P,Q QUAY WALL	UNK	10	25	
05 OCT	SHIPYARD	SHIPYARD	50	33	IN DECK DRAIN 1300 MED.
10 OCT	Z-1	USS ELROD	15	45.5	AROUND ELROD BUT DIDN'T SPILL.
18 OCT	Q/R SLIP	USS PRATT?	150	102	COAST GUARD INVOLVED, PRATT CHANGED STORY.
24 OCT	N-2A	USS HALLIBURTON	75	66	224 WAS PUMPING SAMPLE TAKEN.
29 OCT	X-A	MSB 29	5	19.5	OIL AROUND MSB-29 THEY CLAIM THEY DIDN'T DO IT.
02 NOV	ATC	USNS MARSHFIELD	2	03.	MOST OILCONTAINED ON DECK.

10 NOV	PIER M	USS RAY	25			OIL MIXTUERE.
15 NOV	Q-R	UNK	200	182		BILDGE OIL.
15 NOV	N-2A	USS RODGERS	105	55		ALL NIGHT WITH DEEP FAT FRYER.
19 NOV	K	SUPPLY	400	54		LAND SPILL/WE BOOMED AND SOUNDED.
29 NOV	C	USS BILLFISH	1	4		BILL FISH SAID THEY DID AND DIDN'T.
03 DEC	ARMY DOCK SC	USNS SEALIFT CHINA SEA	1.5		I-P5	
07 DEC	C	SHIPYARD	10	36		SHOP 7Z SPILLED OIL FROM HOSE WITH CRANE.
07 DEC	K-Z SLIP	UNK	50	52		
12 DEC	Z-M	MT BAKER	5	2		USED DIP ONLY.
14 DEC	K/Z	YTB 802 (15)	15	48		BOOM DIP.
14 DEC	S/T	USS CABLE 50' UT	2	2		WHILE PUMPING BILGE IN YOS 10.
15 DEC	C-F	HESS OIL	50	44		HESS OIL SPILL.
18 DEC	WEP.STA.	USS HOLLAND	300	24		
19 DEC	FROM KILO	FROM WEP.STA.	2	4		LEFT OVER FROM 18 DEC.

5090
Ser 462.2/970
4 JAN 1991

MEMORANDUM

From: Code 462.2
To: Code 460
Via: Code 462 ____

Subj: ILLEGAL DISCHARGES TO THE COOPER RIVER FROM YFN 1205

Ref: (a) PHONCON CNSY (Code 462.2) W. Neville/CNSY (Code 341) D. Hilzendager of 18 Dec 90
(b) PHONCON CNSY (Code 462.2) W. Neville/CNSY (Code 938) Mr. Grant of 01 Jan 91

1. It was brought to my attention that the YFN 1205 has a sink that discharges gray water directly into the river. During reference (a), the subject barge and discharge were discussed. Mr. Hilzendager stated that the barge belonged to Shop 38 and was undergoing an overhaul. The barge does not have a CHT system and to modify the barge would require a NAVSEA's approval to add the system. He stated that he requested Shop 38 to remove the sink. During reference (b), Mr. Grant stated that the sink had been removed.

2. If you have any questions, please contact me.

WAYNE H. NEVILLE

462.

Copy to:
460
460DF

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NISTRATIVE MESSAGE

ROUTINE

R 142111Z JAN 91 ZYB PSN 878895J37

FM USS SAMUEL ELIOT MORISON

TO COMOT COGARD WASHINGTON DC //JJJ//
NAVSTA CHARLESTON SC //13/00/01/11//

INFO CNO WASHINGTON DC //45//
COMNAVBASE CHARLESTON SC //N32//
EPA REGION FOUR ATLANTA GA //JJJ//
COMNAVFACENGCOM ALEXANDRIA VA //JJJ//
COMNAVSEASYSCOM WASHINGTON DC //JJJ//
COMNAVSURFLANTREP CHARLESTON SC //JJJ//
NAVENENVSA PORT HUENEME CA //JJJ//
COMDESRON SIX
NEESA PORT HUENEME CA //JJJ//

BT
UNCLAS

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/USS SAMUEL ELIOT MORISON//
REF/A/SOPA ADMIN CHASINST/5400.1F//
R[illegible]/1. IAW REF A FOL INFO PROVIDED:

[illegible]NO FOR OP-45 AND CHINFO

2. 141550Z
   A. USS SAMUEL ELIOT MORISON, FFG-13 20966

3. CHARLESTON NAVAL STATION, PIER Q3A.

4. 10 GALLONS

5. DFM

6. FUELING

7. ORIG WAS FILLING LAST TANK AT MINIMUM PRESSURE WITH SOUNDINGS

DLVR:USS SAMUEL ELIOT MORISON(1)...ORIG
DLVR:COMNAVSURFLANTREP CHARLESTON SC(5)...INFO
DLVR:COMDESRON SIX(5)...INFO

13(1)...ACT FOR NAVSTA CHARLESTON SC(4) /19/
00(1) 01(1) 11(1)

RTD:000-010/COPIES:0015

[illegible]878895/1680/014 1 OF 2 M1 0970 014/22:37Z 142111Z JAN 91
[illegible]RXBR0977 USS SAMUEL ELIOT MORISON

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DISPATCHER 1.
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[illegible]ATING 91 PERCENT FULL WHEN OVERFLOW WATCH REPORTED FUEL COMING [illegible]F PORT SIDE OVERFLOW. PUMPING WAS SECURED IMMEDIATELY. FULL INVESTIGATION CONDUCTED ON BOARD REVEALED SYSTEM ALIGNMENT CORRECT, PROCEDURES CORRECT AND FULLY ADHERED TO, ALL PERS QUALIFIED AND ON STATION. ONLY ABNORMALITY NOTED WAS THAT REFUELING WAS TEMPORARILY CEASED PRIOR TO THE SPILL TO ALLOW PASSAGE OF BARGE ALONGSIDE OILER. REFUELING RECOMMENCED FOLLOWING PASSAGE OF BARGE. MOST PROBABLE CAUSE OF SPILL: AIR SHOT INTO STORAGE TANK FOLLOWING RECOMMENCEMENT OF REFUELING.

8. A. 25FT/6FT
   B. BRIGHT COLOR BANDS
   C. NORTHEAST AT APPROXIMATELY 10K
   D. 1
   E. DOWN RIVER, EBB CURRENT

9. COOPER RIVER

10. TELEPHONE REPORT TO NATIONAL RESPONSE CENTER (NRC) WAS MADE. NRC 54852.

11. SAMPLES WERE NOT TAKEN

12. BOOM, WATERSPRAY

[illegible]SORBENTS

[illegible] NAVSTA CHARLESTON SC

15. NONE

16. NAVSTA CHARLESTON SC (803) 743-6411, (QM2 ENGER)/
USS SAMUEL ELIOT MORISON (803) 743-2196/2177 AV 563-2196/
2177 (LT GILBERT)//
BT

DEPARTMENT OF THE NAVY
CHARLESTON NAVAL SHIPYARD
NAVAL BASE
CHARLESTON, S.C. 29408-6100

5090
Ser 462.2/099
22 JAN 1991

MEMORANDUM

From: CNSY (Code 460)
To: ROICC (Neil Roberts)

Subj: ENVIRONMENTAL INCIDENT REPORT #91-15

1. Nature of incident: Washing water based paint brushes into the storm sewer system.

2. Location of incident: Storm sewer on the north west corner of Building 1199.

3. When notified: Date: 14 Jan 91 Time: 1500

4. Notified by: A. Shoultz, Code 461

5. Immediate action taken: I requested that the contractor stop washing the brushes into the storm sewer. I notified the ROICC representative of the problem and requested that he advise the contractor of the required corrective action. The contractor, Mescon, removed and collected all the wastewater in the storm catch basin and properly disposed of the wastewater into the sanitary sewer system.

6. Follow-up action taken or planned: No further action required at this time.

JOHN SNEED

Copy to:
NRRO
460
460 DF
PWD Circ

460
462
462.2

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ADMINISTRATIVE MESSAGE

PRIORITY

P 221342Z FEB 91 ZYB PSN 215907J24

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ// NEESA PORT HUENEME CA//JJJ//
FEMA RGN IV ATLANTA GA//JJJ// SOPA ADMIN CHARLESTON SC//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 211930Z FEB 91, MCALLISTER TOWING TUG SOUTHPORT, NAVAL STATION, CHARLESTON

3. NAVAL SHIPYARD, CHARLESTON, SC, PIER "D-F" SLIPS

4. APPROXIMATELY 30 GALLONS

5. OIL/WATER

6. UNKNOWN

7. VALVE MISALIGNMENT

8. 600 FT X 150 FT, DARK BROWN, WIND EAST 10 KTS, SEA CALMS, MOVEMENT SOUTH

9. NONE

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:027-000/COPIES:0008

215907/9271/054 1 OF 2 M1 0102 054/01:31Z 221342Z FEB 91
CSN:RXBR0097 NAVSTA CHARLESTON SC//13/00/01/11//

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U U N C L A S S I F I E D U
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INRTR
RUN-OFF
TRFC CHKR

TELEPHONIC REPORT WAS MADE NUMBER 60628

11. WERE NOT TAKEN

12. CAMELS, PIER, BOOM, SHIPS HULL

13. DIP 3001 AND SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.

17. RELEASED BY CDR W. T. BASSETT, PORT SERVICES OFFICER.//
BT

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U U N C L A S S I F I E D U
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ADMINISTRATIVE MESSAGE

PRIORITY

P 251350Z FEB 91 ZYB PSN 222747J24

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMOT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ// NEESA PORT HUENEME CA//JJJ//
FEMA RGN IV ATLANTA GA//JJJ// SOPA ADMIN CHARLESTON SC//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//

BT
UNCLAS //N03090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 241002R FEB 91, NAVSTA CHARLESTON SC

3. NAVAL STATION, CHARLESTON, SC FROM PIER MIKE TO PIER PAPA

4. APPROXIMATELY 10 GALLONS

5. DFM, F-76

6. UNKNOWN

7. UNKNOWN

8. 35 FT X 40 FT, BRIGHT COLOR BANDS, SOUTH 5 KTS

9. NONE

10. TELEPHONIC REPORT WAS MADE NUMBER 60941

13(1)..ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:027-000/COPIES:0005

222747/1247/056 1 OF 2 M1 6001 057/00:032 251350Z FEB 91
CSN:RXB0060 NAVSTA CHARLESTON SC//13/00/01/11//

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INRTR	
RUN-OFF	102
TRFC CHKR	
ASTRO	

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11. WERE NOT TAKEN

12. SHIPS HULL, CIVILIAN CRANE AND BARGE

13. DIP 3001 SKIMMER AND SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.

17. RELEASED BY COR W. T. BASSETT, PORT SERVICES OFFICER.//
BT

222747/1247/056 2 OF 2 M1 0001 057/00:03Z 251350Z FEB 91
CSN:RXBR0660 NAVSTA CHARLESTON SC//13/30/31/11//

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PTTUZDKW RHFJSGG0515 0751720-UUUU--RHFJBRB.
ZNR UUUUU ZUI RHFJBRB0552 0763628

RETRANSMISSION

PRIORITY

P 161615Z MAR 91 PSN 288760J31

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO RULSJGA/COMDT COGARD WASHINGTON DC//JJJ//
RUCKNSA/COMNAVBASE CHARLESTON SC//JJJ//

INFO RUENAAA/CNO WASHINGTON DC//JJJ//
RUCLRGD/FEMA RGN IV ATLANTA GA//JJJ//
RUEAHOF/COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
RULSSAA/COMNAVSEASYSCOM WASHINGTON DC//JJJ//
RUWFPAA/NEESA PORT HUENEME CA//JJJ//
RUCKNSA/SOPA ADMIN CHARLESTON SC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 CHINFO

2. 161242Z MAR 91, D. UNKNOWN, EXPECT FROM NAVY OPERATIONS

3. NAVAL STATION CHARLESTON SC, PIER "S"/"T" QUAYWALL.

4. APROX 5 GALLONS

5. UNKNOWN/ESTIMATE USED LUBE OIL

6. UNKNOWN

7. UNKNOWN

8. 4 FT X 5FT. DARK BROWN/BLACK, WIND ESE 7KTS

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0008

290047/0508/075 1 OF 2 M1 0173 076/38:28Z 161615Z MAR 91
CSN:RX3R0172 NAVSTA CHARLESTON SC//13/00/01/11//

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INRTR	164
RUN-OFF	150
TRFC CHKR	
DISTRO	

DISPATCHER 1. 2. 3.

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U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

TO 2 FT, NW ALONGSIDE QUAYWALL, DUE TO TIDE AND WIND.

9. COOPER RIVER, NONE

10. TELEPHONIC REPORT WAS MADE TO NRC, RPT NUMBER 63752

11. WERE NOT TAKEN

12. BOOM, QUAYWALL, CAMEL

13. DIP 3001, SORBANTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC PHONE
COMM (303) 743-6411/AV 563-6411.//

BT

290047/0508/075 2 OF 2 M1 0173 076/08:28Z 161615Z MAR 91
C RXBR0172 NAVSTA CHARLESTON SC//13/00/01/11//

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ADMINISTRATIVE MESSAGE

ROUTINE

R 252005Z MAR 91 ZYB PSN 324979J34

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CND WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 251430R MAR 91, UNKNOWN

3. NAVAL STATION, CHARLESTON, SC PIER QUEBEC/PAPA SLIP

4. APPROXIMATELY 15 GALLONS

5. UNKNOWN (BEST ESTIMATE DFM)

6. UNKNOWN

7. UNKNOWN

8. 150 FT X 50 FT, DULL BROWN, EAST 03 KTS, SEA CALM, MOVEMENT SOUTH

9. NONE.

10. TELEPHONIC REPORT WAS MADE NUMBER 65005

13(1)..ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:048-000/COPIES:0008

324979/9738/084 1 OF 2 M1 0671 084/23:26Z 252005Z MAR 91
CSN:RXBR0698 NAVSTA CHARLESTON SC//13/00/01/11//

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INRTR	157
RUN-OFF	003
TRFC CHKR	
DISTRO	

11. NOT TAKEN

12. CAMELS, PIER, BOOM, SHIPS HULL.

13. DIP 3001 AND SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

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ADMINISTRATIVE MESSAGE

PRIORITY ROUTINE

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134
DISPATCHER 1.

P R 041930Z APR 91 ZYB PSN 378528J33

FM SUPSHIP CHARLESTON SC//140//

TO NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//45// NEESA PORT HUENEME CA
NAVSHIPYD CHARLESTON SC//460//
COMNAVSEASYSCOM WASHINGTON DC//00C/071//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT
MSGID/GENADMIN/SUPSHIP CHARLESTON//
RMKS/1. RELEASE OCCURRED AT APPROXIMATELY 1045 4 APR 91.

2. COMMERCIAL CONTRACTOR: METAL TRADES, INC., OF YOUNGES ISLAND, SC, PERFORMING SHIP REPAIR ON USS SIERRA (AD 18) UNDER CONTRACT TO SUPSHIP CHARLESTON.

3. SPILL LOCATION: NAVAL STATION CHARLESTON SC, PIER PAPA, COOPER RIVER.

4. AMOUNT SPILLED IN GALLONS: ESTIMATED SPILL 55 U.S. GALLONS, 10 US GALLONS ENTERED COOPER RIVER ON OUTGOING TIDE.

5. TYPE OF OIL SPILLED. HYDRAULIC OIL.

6. OPERATION UNDER WAY WHEN SPILL OCCURRED: CONTRACTORS MOBILE CRANE WAS IN OPERATION PERFORMING LIFTS FOR MATERIAL/MACHINERY ON AND OFF USS SIERRA.

7. SPILL CAUSE: HYDRAULIC LINE ON CRANE VIBRATED LOOSE.

8. SLICK DESCRIPTION: SLICK MOSTLY CONTAINED BY PIER, ADJACENT NAVY SHIP ON SOUTHSIDE OF PIER. SLICK WAS SILVERY FAINT IN COLOR. INCIDENT OCCURRED ON OUTGOING TIDE.

9. AREA DAMAGED: NO DAMAGE OR THREAT TO LAND OR SEA CREATURES DUE

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:0001

378528/3800/094 1 OF 2 M1 1439 094/23:41Z 041930Z APR 91
:RXBR1429 SUPSHIP CHARLESTON SC//140//

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U U N C L A S S I F I E D U
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TO QUICK RESPONSE OF PORT SERVICES AND CHARLESTON NAVAL SHIPYARD SHOP 99 SPILL RECOVERY TEAM.

10. TELEPHONE REPORT NOT MADE TO NRC. (10 GAL OR LESS)

11. SAMPLE OF HYDRAULIC FLUID WAS OBTAINED BY CNSY ENVIRONMENTAL CODE 460. CONTRACTOR WAS REQUESTED TO PROVIDE MSDS.

12. CONTAINMENT METHOD: ABSORBENT MATERIAL (SPEEDY DRY), RAGS USED ON PIER, OIL BOOM ABSORBENT IN WATER.

13. SPILL REMOVAL METHOD: RESIDUE TO BE TURNED IN TO CNSY ENVIRONMENTAL CODE 460 FOR DISPOSAL AS NECESSARY.

14. PARTIES PERFORMING SPILL REMOVAL: SHOP 99 OF CNSY WITH FOUR PERSONNEL, PORT SERVICES WITH ONE BOAT, FIVE NAVY PERSONNEL CONTRIBUTED TO CLEANUP. NO NEGATIVE IMPACT ON ENVIRONMENT EXPECTED.

15. ASSISTANCE REQUIRED: NONE.

16. POINT OF CONTACT AT SUPSHIP CHARLESTON IS T. P. LAWSON, AUTOVON 563-4424 COMMERCIAL (803) 743-4424.//
BT

SECURITY CLASSIFICATION

JOINT MESSAGE FORM

PAGE	DTG/RELEASER TIME			PRECEDENCE		CLASS	SPECAT	LMF	CIC	ORIG/MSG IDENT
	DATE-TIME	MONTH	YR	ACT	INFO					
OF BOOK	091530	APR.	91	PP	PP	UUUU				

MESSAGE HANDLING INSTRUCTIONS

099
091720

FROM: NAVSTA. CHARLESTON,SC.

TO: COMOT COGARD WASHINGTON DC.

INFO: CNO WASHINGTON DC.
COMNAVFACENGCOM ALEXANDRIA VA.
COMNAVSEASYSCOM WASHINGTON DC
NEESA PORT HUENEME CA
FEMA REGIONAL OFFICE ALANTA GA.
SOPA ADMIN CHARLESTON SC.

UNCLAS SUBJ: OIL SPILL REPORT(REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 CHINFO
2. 091220 APR. 91, UNKNOWN.
3. COOPER RIVER NAVAL STATION CHARLESTON SC. FROM PIER "Q TO 1/2 MILE SOUTH.
4. APROX. 50 GALS
5. UNKNOWN (BEST ESTIMATE DFM)
6. UNKNOWN.
7. UNKNOWN.
8. 150 ft.x 2000, BRIGHT COLOR BANDS, NORTH WEST 05 kts, SEA CALM, MOVEMENT SOUTH
9. NONE
10. ~~WAS MADE REPORT #????~~ WAS MADE REPORT # 67192
11. WERE TAKEN
12. CAMELS, PIER,BOOM, SHIPS HULL.
13. DIP 3001 (FLYING "V"), SORBENTS
14. NAVAL STATION CHARLESTON SC. PORT SERVICES PERSONNEL
15. NONE
16. PORT SERVICES OFFICER, CODE 13 NAVSTA CHARLESTON SC. PHONE COMMERCIAL (803)743-6411-AV 563-6411

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DISTR:

DRAFTER TYPED NAME, TITLE, OFFICE SYMBOL, PHONE

SPECIAL INSTRUCTIONS

RELEASER

TYPED NAME, TITLE, OFFICE SYMBOL, AND PHONE

SIGNATURE

SECURITY CLASSIFICATION

DATE TIME GROUP

DD FORM 1 MAR 79 1732 (OCR) PREVIOUS EDITION IS OBSOLETE

S/N 0105-LF-000-1735

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DISPATCHER 1. 30
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3.

PRIORITY

P 211645Z APR 91 PSN 469062J27

FM USS OBANNON

TO COMDESRON FOUR

INFO COMNAVSURFLANT NORFOLK VA//JJJ//
COMNAVBASE CHARLESTON SC//JJJ// COMCRUDESGRU TWO
NAVSTA CHARLESTON SC//JJJ// NAVSHIPYD CHARLESTON SC//JJJ//
SUPSHIP CHARLESTON SC//JJJ//
NAVSURFLANT READSUPPGRU CHARLESTON SC//JJJ//

BT
UNCLAS

SUBJ: UNITSITREP
MSGID/USS OBANNON/004/APR//
FLAGWORD/-/UNITSITREP//
TIMELOC/211500ZAPR91/NAVSTA CHARLESTON SC/FINAL//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/
SPILL OF OIL/WATER MIXTURE OCCURRED AT BERTH P4A
WHILE DEWATERING FORWARD FUEL OIL STORAGE TANKS.
FUEL IN TANK HAD BEEN PREVIOUSLY REMOVED TO ALLOW
FOR REPAIRS TO TANK. APPROX 20 GALS OF OIL/WATER
MIX (10 PERCENT OIL) OVERFLOWED FROM FUEL SWOB. ENTIRE
SPILL WAS CONTAINED BETWEEN SWOB AND SHIP. CLEANUP
EFFORT BY SHIPS FORCE WITH PORT SERVICES ASSISTANCE
COMMENCED IMMEDIATELY AND WAS RAPIDLY COMPLETED.
NO RELEASE OF FUEL TO SURROUNDING ENVIRONMENT
(VERIFIED BY COAST GUARD AND PORT SERVICES REPS).
PORT SERVICES REP AT SCENE INDICATED OIL/WATER
MIXTURE WHICH OVERFLOWED HAD LITTLE OIL IN IT.
DEWATERING WAS BEING ACCOMPLISHED BY A CONTRACTOR
UNDER OBANNON SUPERVISION (CHENG/MPA WERE ABOARD).

DLVR:COMDESRON FOUR(10)...ACT
DLVR:NAVSURFLANT READSUPPGRU CHARLESTON SC(5)...INFO
DLVR:USS OBANNON(1)..ORIG

002(1)...INFO FOR COMCRUDESGRU TWO(~~14~~ 7) /18/0001
007(1) 006(1) 004(1) 003(1) D0(1) N5(1) N4(1) N33(1) N32(1)
13 N31(1) N3(1) N2(1) FILE(1)

~~11(1)~~...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
~~17(1)~~ ~~14(1)~~ 01(1) 00(1) 08

28

RTD:000-000/COPIES:0035

469062/7507/112 1 OF 2 M1 0035 112/01:39Z 211645Z APR 91
CSN:RXBR0034

NRTR USS	OBANNON 764
RUN-OFF	123
TRFC CHKR	
DISTRO	

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U U N C L A S S I F I E D U
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.MPS TOPSIDE WATCH ON SOUND POWERED PHONE AND RADIO
ATTEMPTED TO GET CONTRACTOR TO CHASE PUMPING AS TANK
FILLED, BUT CONTRACTOR TOOK SEVERAL MINUTES TO STOP
PUMP. TIGHTER SUPERVISION OF CONTRACTOR PERSONNEL HAS
BEEN IMPLEMENTED. LAST REPORT THIS INCIDENT.
RMKS/MISHAP REPORT NOT REQUIRED.//
BT

69062/7507/112 2 OF 2 M1 0035 112/01:39Z 211645Z APR 91
RXBR0034
USS OBANNON

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DISPATCHER 1.
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ADMINISTRATIVE MESSAGE

PRIORITY

P 241925Z APR 91 ZYB PSN 490421J20

FM USS ORTOLAN

TO COMDT COGARD WASHINGTON DC//JJJ//
NAVSTA CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
COMSUBGRU SIX
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
COMSUBLANT NORFOLK VA//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMSUBRON FOUR

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/ORTOLAN//
RMKS/1. CNO FOR OP-45 AND CHINFO

2. 241925Z APR 91
(A9 USS ORTOLAN (ASR-22) V20144

3. SPILL LOCATION
(A9 INPORT NAVSHIPYD CHARLESTON SC, PIER DELTA BERTH SIX.

4. AMOUNT SPILLED IN GALLONS; FIVE GALLONS

5. TYPE OF OIL SPILLED
(A) DIESEL FUEL MARINE (DFM)

6. NOT APPLICABLE

7. SPILL CAUSE.
(A) OTHER - OIL DONUT WAS NOT EQUIPPED WITH A FLANGED HOSE CONNECTION. WHEN FUEL OIL STRIPPING COMMENCED, HOSE DISLODGED FROM

They Did Not follow Instructions

13(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

N1(1)...INFO FOR COMSUBGRU SIX(6) 05090/ 1/0208
013(1) 01(1) 00A(1) N32(1) FILE(1)

RTD:000-000/COPIES:0014

490421/2930/115 1 OF 2 M1 0615 115/14:19Z 241925Z APR 91
CSN:RXBR0621 USS ORTOLAN

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RUN-OFF	141
TRFC CHKR	
DISTRO	

NAA port bow out

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OIL DONUT SPILLING FIVE (5) GALLONS OF FUEL OIL INTO THE COOPER RIVER. PUMPING IMMEDIATELY CEASED.

SLICK DESCRIPTION AND MOVEMENT:
(A) SIZE: LENGTH/WIDTH 150 FEET/10 FEET
(B) COLOR: FAINT COLOR
(C) ON-SCENE WIND: WEST FIVE KNOTS
(D) SEA STATE: ONE
(E) SLICK MOVEMENT - STATIONARY

9. AREAS DAMAGED OR THREATENED:
(A) NAME OF BODY OF WATER AFFECTED. COOPER RIVER
(B) NATURE AND EXTENT OF DAMAGE TO PROPERTY, WILDLIFE, OR OTHER RESOURCES: NONE
(C) AREAS OF RESOURCES THREATENED: NONE

10. TELEPHONIC REPORT TO NATIONAL RESPONSE CENTER (NRC) WAS NOT MADE.

11. SAMPLES WERE NOT TAKEN.

12. CONTAINMENT METHOD PLANNED/USED:
(A) OIL ABSORBENT BOOM
(B) SHIP'S HULL

13. SPILL REMOVAL METHOD PLANNED/USED:
(A) SORBENTS - OIL ABSORBING PADS
(B) OTHER - SMALL BOAT WITH OIL ABSORBENT PAD.

14. PARTIES PERFORMING SPILL REMOVAL:
(A9 NAVSTA CHARLESTON PORT SERVICES AND USS ORTOLAN SHIP'S FORCE.
(B) SPILL CLEANUP/REMOVAL COMPLETED 242130Z APR 91.

15. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS. NONE

16. ACTIVITY CONTACT FOR ADDITIONAL INFORMATION. LCDR D. L. JOHNSON, XO, A/V 563-3897, COMM (803)-743-3897.//
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DISPATCHER

PRIORITY

P 242230Z APR 91 PSN 488164J31

FM USS FAHRION

TO COMDESRON SIX

INFO CINCLANTFLT NORFOLK VA//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//
NAVSTA CHARLESTON SC//JJJ//
COMNAVSURFLANT NORFOLK VA//JJJ//
COMCRUDESGRU TWO
SOPA CHARLESTON SC//JJJ//

BT
UNCLAS

MSGID/UNIT SITREP/FAHRION/005/APR//
FLAGWORD/-/UNITSITREP//
REF/A/VMG/FAHRION/241915ZAPR91//
AMPN/REF A IS INITIAL VOICE REPORT TO CINCLANTFLT SDO//
TIMELOC/241800ZAPR91/CHARLESTON SC/FINAL//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/SPILL OF APPROXIMATELY THREE QUARTS OF OILY WASTE INTO COOPER RIVER//
RMKS/1. SHIP COMMENCED TRANSFERRING OILY WASTE FROM AMR2 BILGES TO OILY WASTE HOLDING TANK S-164-0-F USING NUMBER 1 AND 2 BILGE PUMPS TAKING INTERMITTENT SUCTION ON THE BILGES USING A SWEEP HOSE (MAXIMUM PUMP RATE OF 50 GPM). BILGE PUMPS WERE ON LINE FOR TEN MINUTES WHEN CENTRAL CONTROL STATION (CCS) RECEIVED WORD THERE WAS FUEL ON THE PORT SIDE MAIN DECK. BILGE PUMPS WERE IMMEDIATELY SECURED. FUEL WAS DETERMINED TO COME FROM S-164-0-F TANK VENT ON THE PORT SIDE MAIN DECK LOCATED AT FRAME 168. APPROXIMATELY TWO GALLONS OF OILY BILGE WATER SPILLED ON DECK. BILGE WATER RAN AFT AND DOWN THE MAIN DECK TO AMR2 ESCAPE TRUNK HATCH 2-212-2-T WHICH IS EQUIPPED WITH AN INSTALLED COAMING DRAIN WHICH IS PLUMBED DIRECTLY OVERBOARD. BMCM W. D. RUSSELL FROM NAVSTA CHARLESTON PORT SERVICES OIL SPILL RESPONSE TEAM DETERMINED LESS THAN ONE GALLON OF OILY WASTE WAS DISCHARGED OVER THE SIDE VIA THIS PLUMBING DRAIN. THERE ARE NO VALVES INSTALLED IN THIS

DLVR:SOPA CHARLESTON SC(5)...INFO
DLVR:COMDESRON SIX(5)...ACT
DLVR:USS FAHRION(1)...ORIG

002(1)...INFO FOR COMCRUDESGRU TWO(14) /18/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

13

~~11~~(1)...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
~~17(1) 14(1) 01(1) 00(1)~~

00/01/11/18/08 104

RTD:000-000/COPIES:0030 23

488164/2402/115 1 OF 2 M1 0203 115/03:142 242230Z APR 91
CSN:RXBR0199

USS FAHRION
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SCUTTLE DRAIN PLUMBING SYSTEM AND ITS ASSOCIATED OVERBOARD SCUPPER IS LOCATED APPROXIMATELY TEN FEET BELOW THE MAIN DECK.

2. THE OILY WASTE TANK (5-164-0-F) THAT THE BILGE WATER WAS BEING PUMPED INTO HAS A 2500 GALLON CAPACITY. LOCAL TANK LEVEL INDICATOR (TLI) ON TANK 5-164-0-F PRIOR TO PUMPING WAS 1500 GALLONS. AFTER SPILL WHEN PUMPS WERE SECURED, LOCAL INDICATOR FOR THIS TANK SHOWED 1600 GALLONS AND THE REMOTE LEVEL INDICATION IN CENTRAL CONTROL STATION (DEMAND DISPLAY INDICATOR (DDI)) SHOWED 2000 GALLONI IN TANK 5-164-0-F. HIGH LEVEL ALARM SET POINT FOR THIS TANK IS 2100 BY DDI. AT NO TIME WAS THERE A HIGH LEVEL ALARM.

3. CAUSE OF SPILL ON DECK WAS OVERFILLING 5-164-0-F. OVERFILLING APPEARS TO BE A DIRECT RESULT OF AN INACCURATE ELECTRONIC TANK LEVEL INDICATING SYSTEM. I HAVE VERIFIED THAT SHIP'S FORCE WAS CONDUCTING TRANSFER OF OILY WASTE IN ACCORDANCE WITH EOSS (SOWH/004/0881 PAGE 1 OF 2 USER NOTES 1A). CAUSE OF SPILL OVERBOARD, WAS FUEL ON DECK ENTERING ESCAPE TRUNK WEATHER DECK HATCH 2-212-2-T COAMING DRAIN.

4. WE WILL CONDUCT VERIFICATION OF ALL TLI'S ASSOCIATED WITH FUEL SYSTEMS TO DETERMINE ACCUARACY OF ALL TLI'S. MISHAP OR JAGMAN REPORT NOT REQUIRED. LAST SITREP THIS INCIDENT.//
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DISPATCHER 1.
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ADMINISTRATIVE MESSAGE

ROUTINE

R 261653Z APR 91 ZYB PSN 501157J19

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 241330Q APR 91, UNKNOWN

3. COOPER RIVER, NAVAL SHIPYARD CHARLESTON, SC FROM PIER JULIETTE (NORTH SIDE OF PIER)

4. APPROXIMATELY 10 GALLONS

5. DIESEL FUEL MARINE (DFM)

6. UNKNOWN

7. UNKNOWN.

8. 50 FT X 150 FT, BRIGHT COLOR BANDS, WINDS CALM, WATER MOVEMENT STATIONARY.

9. COOPER RIVER

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:026-000/COPIES:0008

501157/6133/117 1 OF 2 M1 0287 117/03:022 261653Z APR 91
CSN:RXBR0275 NAVSTA CHARLESTON SC//13/00/01/11//

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RUN-OFF	
TRFC CHKR	
DISTRO	

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TELEPHONIC REPORT WAS MADE NUMBER 69336.

11. WERE TAKEN

12. CAMELS, BOOM, BARGE HULL.

13. DIP 3001 (FLYING "V") SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

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DISPATCHER 1.
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3.

ADMINISTRATIVE MESSAGE

ROUTINE

R 262044Z APR 91 ZYB PSN 501459J24

FM USS BLAKELY

TO NAVSTA CHARLESTON SC//JJJ// COMDESRON FOUR

INFO CINCLANTFLT NORFOLK VA//JJJ// COMNAVSURFLANT NORFOLK VA//JJJ//
COMCRUDESGRU TWO CNO WASHINGTON DC//OP-45//
NEESA PORT HUENEME CA//112// COMNAVBASE CHARLESTON SC//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//02C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/BLAKELY//
REF/A/DOC/CNO/02OCT90//
AMPN/OPNAVINST 5090.1A, ENVIRONMENTAL AND NATURAL RESOURCES PROGRAM MANUAL//
RMKS/1. 251200ZAPR91

2. OIL IS FROM UNKNOWN SOURCE. OIL RISING TO THE SURFACE NEAR THE HULL OF USS BLAKELY INDICATED A POSSIBLE HULL PENETRATION INTO A FUEL TANK WITH FUEL SEEPING OUT.

3. NAVAL STATION CHARLESTON SC, PIER Q4A.

4. ESTIMATE BY NAVAL STATION PERSONNEL WAS APPROX. 50 GAL OF OIL RECOVERED.

5. BEST ESTIMATE OF TYPE OF OIL SPILLED IS NAVY DISTILLATE, F-76.

DLVR:COMDESRON FOUR(10)...ACT
DLVR:USS BLAKELY(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 16(1) 16(1) 11(1) 08(1) 01(1) 00(1)

202(1)...INFO FOR COMCRUDESGRU TWO 05090/ 1/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

26

RTD:000-000/COPIES:0000

501459/6214/117 1 OF 2 M1 0350 117/27:557 262044Z APR 91
CSN:RXBR0345

USS BLAKELY
ARTH
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REC CHKR
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SHIP WAS INPORT COLD IRON, CONDUCTING NO FUEL RELATED OPERATIONS.

7. CAUSE UNKNOWN. POSSIBLE STRUCTURAL FAILURE: HULL CORROSION, PENETRATION.

8. 1000FT BY 100 FT BRIGHT COLOR BANDS OUTBOARD SIDE OF SHIP, 100FT BY 10 FT DULL BROWN INBOARD SIDE AND UNDER PIER; WINDS SE AT 10-15 KTS; SEA STATE X-2; SLICK MOVEMENT VARIED WITH CURRENTS, MOSTLY DOWN RIVER AT 1-2 KTS.

9. COOPER RIVER, VIC NAVSTA PIER 4 AND SOUTH.

10. TELEPHONIC REPORT TO NRC WAS MADE.

11. SAMPLES WERE TAKEN.

12. OIL CONTAINED USING BOOMS AND SHIP'S HULL.

13. OIL REMOVED USING DIP 3301 AND SORBENT PADS. VERY SLIGHT RESIDUE REMAINS INSIDE BOOM.

14. NAVSTA CHASN PORT SERVICES.

15. AFTER EXTENSIVE INVESTIGATION, DIVERS WERE UNABLE TO DETERMINE SOURCE OF OIL. OIL FLOW SLOWED TO OCCASIONAL DROPLETS SURFACING OUTBOARD AFTER 4-5 HOURS. INTENTION IS TO KEEP CONTAINMENT BOOM AROUND SHIP UNTIL U/W AM TUES. INVESTIGATE Q4A PIER AREA AFTER DEPARTURE. REMOVE ALL F-76 FROM SUSPECT TANKS AS SPACE BECOMES AVAILABLE. MONITOR TANKS FOR WATER ENTRY. RETURN TO ALTERNATE BERTH 03 MAY. IF NO WATER ENTRY, RETURN FUEL TO TANKS AND CLOSELY MONITOR VICINITY OF SHIP. IF WATER DISCOVERED IN ANY TANK, TAKE CORRECTIVE ACTION.

16. BLAKELY POC: LCDR BARNHART, CHENG, AV 563-5304 COMM (803)743-3099.//
BT

UUUU

SAMPLES WERE TAKEN

12. QUAY WALL, SHIPS HULL

13. DIP 3001

14. NAVSTA CHARLESTON, SC PORT SVCS PERSONNEL

15. NONE

16. USS SAMUEL ELIOT MORISON, LTJG JOHNSON A/V 563-2196
BT

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U U N C L A S S I F I E D U
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ADMINISTRATIVE MESSAGE

ROUTINE

R 291505Z APR 91 ZYB PSN 515167J25

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//JJJ//

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134 TOMC
DISPATCHER 1.
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BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 291020Q APR 91, SOURCE UNKNOWN

3. NAVAL STATION CHARLESTON PIER MIKE

4. APPROXIMATELY 50 GALLONS

5. DIESEL FUEL MARINE (DFM) F-76

6. UNKNOWN

7. UNKNOWN

8. 1,100' X 600', BRIGHT COLOR BANDS, NW 5 KTS, CALM, MOVEMENT SOUTH

9. COOPER RIVER

10. TELEPHONIC REPORT WAS MADE NUMBER 69965.

13(1)..ORIG FOR NAVSTA CHARLESTON SC(8) 13241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:026-000/COPIES:0009

515167/9499/122 1 OF 2 M1 0535 120/09:16Z 2915052 APR 91
CSN:RXBR3565 NAVSTA CHARLESTON SC//13/00/01/11//

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U U N C L A S S I F I E D U
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OFF
CHKR
DISTRD

11. WERE TAKEN

12. BOOM, CAMEL

13. DIP 3001, SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

2

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C C O N F I D E N T I A L C
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DTTCZYUW RHFJSGG8523 1200627-CCCC--RHFJBRA.
ZNY CCCCC

IMMEDIATE

O 300134Z APR 91

FM USS BLAKELY

TO RHFJBRA/NAVSTA CHARLESTON SC//JJJ//
RHFJBRA/COMDESRON FOUR

INFO RUENAAA/CNO WASHINGTON DC//OP-45//
RHRRVTA/COMCRUDESGRU TWO
RUCBSAA/CINCLANTFLT NORFOLK VA//JJJ//
RUCBSAK/COMNAVSURFLANT NORFOLK VA//JJJ//
RUWFPAA/NEESA PORT HUENEME CA//112//
RULSSAA/COMNAVSEASYSCOM WASHINGTON DC//00C//
RULSJGA/COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
C O N F I D E N T I A L

MSGID/UNIT SITREP/BLAKELY/007/-//
REF/A/RMG/BLAKELY/300130ZAPR91//
AMPN/REF A IS OIL SPILL REPORT IAW OPNAVINST 5090.1A//
FLAGWORD/-/UNITSITREP//
TIMELOC/292100Z/315100N0795600W/INIT//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/WHILE PUMPING WATER
FROM WASTE WATER TANK IN MAIN CONTROL TO AUXILIARY MACHINERY ROOM
61 VIA STRIPPING SYSTEM TO CONTAMINATED OIL TANK, TANK FILLED AND
OVERFLOWED INTO HARBOR. ESTIMATED 200-300 GALS OF WASTE WATER
MIXED WITH OIL. NAVAL STATION CHARLESTON PORT SERVICES AND
SHIP'S FORCE CONDUCTED CLEAN UP USING OIL ABSORBENT PADS AND
SURFACE SKIMMER. CLEANUP COMPLETE, MINOR RESIDUE REMAINS.
WATCHES POSTED TO ASSIST PORT SERVICES IN DETECTING ANY FURTHER
OIL RESIDUE DISCOVERED UPON TIDE SHIFT. JAGMAN INITIATED//
DECL/16NOV91//
BT

Bartin

121111 COMCRUDESGRU TWO-10
11111 COMDESRON 4-10-Simon C. Kember/06 30 Apr 91
11111 NAVSTA CHARLESTON-4/EN2 French/30 Apr 91
CODE 11/00/01/13

Copies: 24

5912/120 1 M1 0015 120/06:30Z 300134Z APR 91
CSN:RXBR0013

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C C O N F I D E N T I A L C
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NRTR	USS BLAKELY
RUN-OFF	003
REF CHKR	Pg
DISTRO	

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U UNCLASSIFIED U
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SUSPECTED DUPLICATE

IMMEDIATE

O 202050Z MAY 91 PSN 634202J17

FM USS HOLLAND

TO COMSUBRON EIGHTEEN

INFO COMSUBLANT NORFOLK VA
SOPA CHARLESTON SC
NAVSTA CHARLESTON SC
COMSUBGRU SIX
COMNAVBASE CHARLESTON SC

BT
UNCLAS

MSGID/UNIT SITREP/HOLLAND/004/-//
FLAGWORD/-/UNIT SITREP//
TIMELOC/201820Z/NAVSTA CHSN/INIT//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/
TWENTY FIVE GALLONS OF FUEL OIL SPILLED INTO COOPER RIVER, PIER PAPA NAVSTA CHASN. VALVE LEAKAGE DURING FUEL SYSTEM OPERATION CAUSED OVER FILLING OF THE OFF LINE FUEL OIL SERVICE TANK AND SPILLAGE VIA OVERBOARD DISCHARGE. CAUSE CORRECTED. CLEANUP IN PROGRESS WITH ASSISTANCE FROM PORT SERVICES.//
RMKS/NO FURTHER OUTSIDE ASSISTANCE IS REQUIRED.//
BT

DLVR:SOPA CHARLESTON SC(5)...INFO

N3(1)...INFO FOR COMSUBGRU SIX(6) 17801/ 3/0008
01(1) QM(1) N32(1) N31(1) FILE(1)

11(1)...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
17(1) 14(1) 01(1) 00(1)

RTD:000-000/COPIES:0016

634202/3875/141 1 OF 1 M1 0358 141/03:55Z 2020502 MAY 91
CSN:RXBR0354

INRTR
RO USS HOLLAND
TRFO CARE

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DISPATCHER 1.
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ROUTINE

R 270005Z MAY 91 PSN 677484J36

FM USS HALYBURTON

TO COMDTCOGARD WASHINGTON DC NAVSTA CHARLESTON SC

INFO CNO WASHINGTON DC//OP-45// NEESA PORT HUENEME CA//112//
COMNAVBASE CHARLESTON SC COMCRUDESGRU TWO
CINCLANTFLT NORFOLK VA COMNAVSURFLANT NORFOLK VA
COMDESRON SIX
COMNAVSEASYSCOM WASHINGTON DC//00C//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2) (MIN: CONSIDERED)
MSGID/GENADMIN/HALYBURTN//
REF/A/DOC/OPNAVINST 5090.1A//
RMKS/1. 261925Z MAY 91

2. USS HALYBURTON/FFG-40/21107//

3. NAVSTA CHARLESTON, SC PIER QUEBEC, BERTH 1A//

4. 5 U.S. GALLONS OIL/WATER MIXTURE/80 PCT OIL//

5. OIL/WATER MIXTURE MILSPEC 9250 DSL LUBE OIL

6. INTERNAL TRANSFER IN AMR 3 OF WASTE LUBE OIL FROM BILGES TO OILY WASTE DRAIN TANK

7. USE OF PORTABLE PNUEMATIC PUMP TO TRANSFER OILY WASTE INTO NO.4 OILY WASTE DRAIN TANK PERMITTED OVERFILLING WITH SUFFICIENT HEAD TO EXPEL OIL THROUGH THE 02 LEVEL VENT. OIL SUBSEQUENTLY DRAINED INTO

DLVR:COMDESRON SIX(5)...INFO
DLVR:USS HALYBURTON(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

002(1)...INFO FOR COMCRUDESGRU TWO(10) 05090/ 1/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

24

RTD:000-000/COPIES:0028

677484/5343/147 1 OF 2 M1 3869 143/22:24Z 2[illegible]1257Z MAY 91
CSN:RX3R0885

UNITR
USS HALYBURTON
RUN-OFF
TRFC CHKR
DISTRO
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RIVER THROUGH A DECK DRAIN.

9. A. SLICK BARELY VISIBLE
B. WIND 090 DEGT/6KT
C. SEASTATE 0
D. N/A

10. COOPER RIVER. NO DAMAGE OR THREAT TO LAND OR SEA CREATURES DUE QUICK RESPONSE OF SHIP AND NAVSTA CHARLESTON PORT SERVICES.

11. TELEPHONE REPORT OT NRC WAS MADE; CASE NR. 73367 ASSIGNED.

12. CONTAINMENT BY SHIP HULL, QUAYWALL AND SHIP HULL AT PIER PAPA.

13. SPILL REMOVAL BY OIL ABSORBANT PADS.

14. SPILL REMOVAL PERFORMED BY: US NAVY; NAVSTA CHARLESTON PORT SERVICES.

15. NO ASSISTANCE REQUIRED.

16. POC IN USS HALYBURTON (LT A. COLLINS, ENG OFF, A/V 563-6464/2072; COMM 803-743-6464/2072)

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ADMINISTRATIVE MESSAGE

ROUTINE

R 281845Z MAY 91 ZYB PSN 676910J29

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//JJJ//

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DISPATCHER 1.
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BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 281500Z MAY 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION CHARLESTON SC FROM PIER MIKE TO 1/2 MILE SOUTH

4. APPROXIMATELY 20 GALLONS

5. UNKNOWN (BEST ESTIMATE HYDRAULIC)

6. UNKNOWN

7. UNKNOWN

8. 100' X 2000', BRIGHT COLOR BANDS, SOUTH 05 KTS, SEA CALM, MOVEMENT SOUTH

9. NONE

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:048-000/COPIES:0008

676910/4838/148 1 OF 2 M1 0691 148/20:31Z 281845Z MAY91
CSN:RXBR0707 NAVSTA CHARLESTON SC//13/00/01/11//

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. TELEPHONIC REPORT WAS MADE NUMBER 73517

11. WERE TAKEN

12. NONE

13. DIP 3001 (FLYING "V"), SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

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DISPATCHER 1.
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ADMINISTRATIVE MESSAGE

ROUTINE

R 071755Z JUN 91 ZYB PSN 743320J19

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//JJJ//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 062207Z JUN 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION CHARLESTON SC FROM PIER UNIFORM TO DAYMARKER 49

4. APPROXIMATELY 5 GALLONS

5. UNKNOWN (BEST ESTIMATE DIESEL FUEL)

6. UNKNOWN

7. UNKNOWN

8. (A) 10 FEET BY 10 FEET
. (B) BARELY VISIBLE
. (C) EASTERLY, 20-25 KNOTS
. (D) CHOPPY

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) ~~13(1)~~ 16(1) 11(1) 08(1) 01(1) 00(1)

RTO:000-000/COPIES:0008

743320/3362/159 1 OF 2 M1 0207 159/02:55Z 071755Z JUN 91
CSN:RXBR0206 NAVSTA CHARLESTON SC//13/00/01/11//

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INRTR	173
RUN-OFF	172
TRFC CHKR	
DISTRO	

(E) SOUTHERLY, APPROXIMATELY 3 KNOTS

9. (A) COOPER RIVER
. (B) NONE KNOWN
. (C) NONE

10. REPORT WAS MADE, NUMBER 74734

11. SAMPLES WERE NOT TAKEN

12. NONE DUE TO SPILL IN MIDDLE OF CHANNEL

13. OIP 3001 SKIMMER

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (303) 743-6411, A/V 563-6411.//
BT

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DISPATCHER 1.
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U[redacted]NISTRATIVE MESSAGE

OUTINE

141445Z JUN 91 ZYB PSN 786110J23

M NAVSHIPYD CHARLESTON SC//330//

O COMDT COGARD WASHINGTON DC//JJJ//
AVSTA CHARLESTON SC//JJJ//

NFO CNO WASHINGTON DC//JJJ// COMNAVBASE CHARLESTON SC//JJJ//
EESA PORT HUENEME CA//JJJ//
S EPA REGION FOUR
345 CORTLAND ST NE
ATLANTA GA 30365
OMNAVFACENGCOM ALEXANDRIA VA//JJJ//
OMNAVSEASYSCOM WASHINGTON DC//JJJ//

T
NCLAS //N05090//

UBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
SGID/GENADMIN/CNSY CHARLESTON SC//

[redacted]CNO FOR OP-45 AND CHINFO

. 130845ZJUN91
B. CHARLESTON NAVAL SHIPYARD UIC: N00191

. B. CHARLESTON NAVAL SHIPYARD, ADJACENT SE END OF PIER CHARLIE
ND ALONG THE CAISSON OF DRYDOCK NO. 1

. APPROX 15 TO 30 GAL, 50%

. K. OIL/WASTE BILGE WASTE

. C. BILGE DEWATERING FROM SSN

. C. OTHER TYPE EQUIPMENT FAILURE. A VACUUM CAN FAILED TO
PERATE PROPERLY. CAN WAS REPLACED.

W

3(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0008

[redacted].6110/3665/165 1 OF 2 M1 1458 165/22:21Z 14[redacted]57 JUN 91
[redacted]RXBR1473 NAVSHIPYD CHARLES[redacted]330//

RTD	133
TRFC CHKR	
DISTRO	

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10. REPORT WAS MADE, NUMBER 76597

11. SAMPLES WERE TAKEN

12. BOOM

13. SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC
PHONE (803) 743-6411 AV 563-6411//

BT

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DISPATCHER 1.
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833773/T941/174 2 OF 2 H1 8482 174/23:392 2321312 JUN 91
SN:RXBR8546 NAVSTA CHARLESTON SC//13/00/01/11//

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ADMINISTRATIVE MESSAGE

ROUTINE

R 031649Z JUL 91 ZYB PSN 898346J42

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//N32//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
NEESA PORT HUENEME CA//JJJ//
SOPA ADMIN CHARLESTON SC//N322//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 031215Z JUL 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION CHARLESTON SC FROM PIER LIMA

4. LESS THAN 5 GALLONS

5. UNKNOWN (BEST ESTIMATE-RESIDUE FROM FLOATING BAG)

6. UNKNOWN

7. UNKNOWN (NO OPS IN AREA)

8. 10 FT X 20, SHEEN OF BRIGHT COLOR BANDS, NORTH 07 KTS, SEA CALM, MOVEMENT SOUTH

9. NONE

13(1)..ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0008

898348/5193/185 1 OF 2 M1 0317 185/04:02Z 031649Z JUL 91
CSN:RX8R0304 NAVSTA CHARLESTON SC//13/00/01/11//

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INRTR	111
RUN-OFF	108
TRFC CHKR	
DISTRO	

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REPORT WAS MADE, NUMBER 77867

11. WERE TAKEN

12. NONE

13. SORBENTS

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

898348/5193/185 2 OF 2 M1 0317 185/04:02Z 031649Z JUL 91
:RXBR0334 NAVSTA CHARLESTON SC//13/00/01/11//

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DISPATCHER 1.
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ROUTINE

R 101930Z JUL 91 PSN 935870J32

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//N32//

INFO CNO WASHINGTON DC//OP-453//
FEMA RGN IV ATLANTA GA
COMNAVFACENCOM ALEXANDRIA VA//182C//
COMNAVSEASYSCOM WASHINGTON DC//SEA-07//
SOUTHNAVFACENCOM CHARLESTON SC//044//
NEESA PORT HUENEME CA//112F3//
SOPA ADMIN CHARLESTON SC//N322//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 101445Z JUL 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION, CHARLESTON, SC PIER ROMEO/
SLIP

4. APPROXIMATELY 02 GALLONS

5. UNKNOWN

6. UNKNOWN

7. UNKNOWN

8. 50 FT X 200, BRIGHT COLOR BANDS, WIND CALM, SEA CALM, MOVEMENT
SOUTH WITH EBB

9. NONE

10. REPORT WAS MADE, NUMBER 787786

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 12(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:030-030/COPIES:0008

935870/5642/192 1 OF 2 M1 0912 192/17:15Z 101930Z JUL 91
CSN:RXBR0969 NAVSTA CHARLESTON SC//13/00/01/11//

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INITR	
RUN-OFF	
TRFC CHKR	
DISTRO	

11. WERE NOT TAKEN

12. TRAPPED WITHIN SHIP HULLS, CAMELS AND USE OF OUT BOARD WASH

13. SORBENTS, DIP 3001

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

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ADMINISTRATIVE MESSAGE

ROUTINE

R 232150Z JUL 91 ZYB PSN 010033J07

FM USS SIERRA

TO COMNAVBASE CHARLESTON SC//N34// COMCRUDESGRU TWO
NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//45// COMNAVSURFLANT NORFOLK VA//N915E//
NEESA PORT HUENEME CA//112//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT \REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/SIERRA//
REF/A/DOC/CNO/02 OCT 90//
REF/B/DOC/COMNAVBASECHASN/20 FEB 87//
REF/C/TEL/SIERRA/231330ZJUL91//
NARR/REF A IS OPNAVINST 5090.1A, ENVIRONMENTAL AND NATURAL RESOURCES PROGRAM MANUAL. REF B IS COMNAVBASECHASNINST 5400.1F, SOPA MANUAL. REF C IS TELCON BTWN SIERRA (LT EPSTEIN) AND USCG NRC (MST3 YUSKA).//
RMKS/THE FOL IS SUBMITTED IAW REFS A AND B:

1. 231250Z JUL 91.

2. USS SIERRA AO 18. UIC: 04638.

3. PIER PAPA, NAVSTA, CHASN, SC.

4. APPROX ONE-HALF GAL.

DLVR:USS SIERRA(1)...ORIG

002(1)...ACT FOR COMCRUDESGRU TWO(14) 05090/ 1/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:0016

010033/6639/205 1 OF 2 M1 0800 205/14:49Z 232150Z JUL 91
CSN:RXBR0801

13
13A
131
132
133
134
DISPATCHER 1.
2.

INTRUSS SIERRA
RUN-OFF
TRFC CHKR
DISTRO

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. DFM.

6. DEWATERING MWB BILGE.

7. INDIVIDUAL ASSIGNED TO CLEAN MWB DID NOT PROPERLY CONNECT HOSE TO BILGE DRAIN. FUEL DRAINED ON DECK AND OVER THE SIDE.

8. SMALL SLICK (APPROX 130 FT LONG, 1 - 10 FT WIDE) WITH DARK PATCHES AND BRIGHT COLOR BANDS. WIND WAS 188 DEGS / 12 KTS. SPILL EUICKLY DISSIPATED IN VICINITY OF PIER.

9. COOPER RIVER, NO KNOWN DAMAGE TO PROPERTY AND WILDLIFE.

10. TELEPHONE REPORT WAS MADE. REF C, CASE NR 80540 APPLIES.

11. SAMPLES NOT TAKEN.

12. WATER SPRAY USED TO ASSIST CONTAINMENT.

13. NAVSTA UTILITY BOAT DISPATCHED 231257Z. REPORTED SHEEN, AND USED ABSORBENT MATERIAL TO REMOVE FUEL FROM SURFACE OF WATER.

14. NAVY LEAD ORGANIZATION: NAVSTA CHASN.

1[illegible] NO ADDITIONAL ASSISTANCE REQD.

. SIERRA POC: LT EPSTEIN, (803) 743-4072/2074 OR AUTOVON 3-4072/2074.//
BT

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U U N C L A S S I F I E D U
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ADMINISTRATIVE MESSAGE

ROUTINE

R 241756Z JUL 91 ZYB PSN 013073J14

FM FLEMINEWARTRACEN CHARLESTON SC//90//

TO COMDT COGARD WASHINGTON DC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
FEMA RGN IV ATLANTA GA//JJJ//
COMTRALANT NORFOLK VA//JJJ//
NAVSHIPYD CHARLESTON SC//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
NAVSTA CHARLESTON SC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

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13A
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DISPATCHER 1.
2.
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ET
UNCLAS //N04020//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)

1. CNO FOR OP-45 CHINFO

2. 231600 JULY 91, UNKNOWN

3. COOPER RIVER NAVAL STATION CHARLESTON SC "R" "S" SLIP

4. APPROX 30 GALS

5. DFM

6. NONE

7. EQUIPMENT FAILURE OF PUMP CONTROL AT SEWAGE LIFT STATION NO. 1 OFF-SITE ALLOWED OVERFLOW OF OIL WATER SEPARATOR. SEWAGE LIFT STATION MAINTAINED BY NAVAL SHIPYARD PUBLIC WORKS DEPARTMENT (PWD). FMWTC NOTIFIED PWD AT FIRST INDICATION OF MALFUNCTION, PRIOR TO OVERFLOW. PUMP RESTARTED AND SEPARATOR RETURNED TO NORMAL OPERATION IN AP 20 MIN. TO PREVENT REOCCURRENCE, PWD IS INSTALLING REMOTE DETECTION AND CONTROL SYSTEM FOR BOTH SEWAGE LIFT STATION AND OIL WATER SEPARATOR OVERFLOW BASIN. WILL PROVIDE FOR CONTINUOUS

DLVR:FLEMINEWARTRACEN CHARLESTON SC(1)...ORIG

13(1)...INFO FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0009

013073/7447/205 1 OF 2 M1 1472 205/23:14Z 241756Z JUL 91
CSN:RX8R1470 FLEMINEWARTRACEN CHARLESTON SC//90//

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INRTR
RUN-OFF
TREC CHKR

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U U N C L A S S I F I E D U
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MONITORING BY PWD WATCH. ECD SEPT 91.

8. 40 FT X 20 FT, BRIGHT COLOR BANDS, WIND CALM, SEA CALM, MOVEMENT SOUTH

9. COOPER RIVER - NONE

10. TELEPHONE REPORT WAS MADE NUMBER #80628

11. WERE NOT TAKEN

12. BOOM (MK7 SLICKBAR, SORBENT SAUSAGE)

13. SORBENTS, DIP 3001 SKIMMER

14. NAVAL STATION CHARLESTON SC PORT SERVICES PERSONNEL

15. NONE

16. CDR EARNEST FLEET MINE WARFARE TRAINING CENTER CHARLESTON SC, PHONE COMMERCIAL (803) 743-5066/AV 563-5066.//
BT

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34
DISPATCHER 1.
2.
3.

CALL

ADMINISTRATIVE MESSAGE

IMMEDIATE PRIORITY

O P 311545Z JUL 91 ZYB PSN 053421J15

FM USS SEMMES

TO COMDESRON FOUR

INFO COMNAVSURFLANT NORFOLK VA//N3//
COMNAVBASE CHARLESTON SC//N31// COMCRUDESGRU TWO
NAVSTA CHARLESTON SC//13/17// NAVSHIPYD CHARLESTON SC//460//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//
NAVSURFLANT READSUPPGRU CHARLESTON SC//JJJ//

BT
UNCLAS

MSGID/UNIT SITREP/USS SEMMES/011/JUL//
FLAGWORD/-/UNITSITREP//
TIMELOC/311400ZJUL91/CHARLESTON SC/INITI//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/1. WHILE PMP BILGE TO DONUT DISCHARGE HOSE SLIPPED OUT OF DONUT. DONUT WATCH IMMEDIATELY ORDERED PUMPING SECURED AND RETURNED HOSE TO DONUT. IN THE PROCESS, OILY WASTE SPRAYED INTO SVM EYES. SVM WAS TREATED BY HM AND RETURNED TO DUTY. APPROX 2 GAL OILY WASTE WAS DISCHARGED TO RIVER. NAVBASE PO SERVICES SKIMMER WAS CALLED TO SCENE TO CONTAIN AND CLEAR OILY WASTE.
//
RMKS/1. NRC WAS NOTIFIED. CASE NUMBER 1707 ASSIGNED. NO MISHAP REPORT REQUIRED. FINAL RPT THIS INCIDENT.//
BT

DLVR:COMDESRON FOUR(5)...ACT — RM RAY > 16:27Z 7/18
DLVR:NAVSURFLANT READSUPPGRU CHARLESTON SC(5)...INFO
DLVR:USS SEMMES(1)...ORIG

002(1)...INFO FOR COMCRUDESGRU TWO(14) /18/0001
007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

13(1)...INFO FOR NAVSTA CHARLESTON SC(2) /19/
17(1)

RTD:000-000/COPIES:0027

053421/7611/212 1 OF 1 M1 0897 212/16:26Z 311545Z JUL 91
CSN:RXBR0929 USS SEMMES

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INRTR	118
RUN-OFF	172
TRFC CHKR	
DISTRO	

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DISPATCHER 1.
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ADMINISTRATIVE MESSAGE

ROUTINE

R 071700Z AUG 91 ZYB PSN 100520J08

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//N32//

INFO CNO WASHINGTON DC//OP-453// NEESA PORT HUENEME CA//112F3//
FEMA RGN IV ATLANTA GA//JJJ// SOPA ADMIN CHARLESTON SC//N322//
COMNAVFACENGCOM ALEXANDRIA VA//182C// NAVFACENGCOM
COMNAVSEASYSCOM WASHINGTON DC//SEA-07//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 071345Z JUL 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION, CHARLESTON, SC. PIER ROMEO/SIERRA SLIP.

4. APPROXIMATELY 10 GALLONS OR LESS

5. UNKNOWN (BEST ESTIMATE DIESEL)

6. UNKNOWN

7. UNKNOWN

8. 40 FT X 40 FT, DULL BROWN, WIND CALM, SEA CALM, MOVEMENT SOUTH

9. NONE

10. REPORT WAS MADE, NUMBER 82714

13(1)..ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0008

INRTR	169
RUNOFF	
TRFC CHKR	
DISTRO	

100520/9965/220 1 OF 2 M1 0452 220/05:12Z RUNOFF 070Z AUG 91
CSN:RX8R0461 NAVSTA CHARLESTON SC//13/00/01/11//

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11. WERE TAKEN

12. BOOM, SHIPS HULL, CAMELS

13. SORBENTS, DIP 3031 SKIMMER

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (803) 743-6411, A/V 563-6411.//
BT

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131
132
133
134
DISPATCHER FRI
SAT
SUN
DUTY CHIEF FRI
SAT
SUN

ADMINISTRATIVE MESSAGE

PRIORITY

P 131135Z AUG 91 ZYB PSN 133545J21

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//N32//

INFO CNO WASHINGTON DC//OP-453//
FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//182C//
COMNAVSEASYSCOM WASHINGTON DC//SEA-07//
NEESA PORT HUENEME CA//112F3//
SOPA ADMIN CHARLESTON SC//N322//

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 121118Z AUG 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION, CHARLESTON, SC. IN MIDDLE OF RIVER FROM CLOUTER REACH, SOUTH EAST OF BUOY 50 TO DANIEL ISLAND BEND.

4. APPROXIMATELY 50 GALLONS

5. UNKNOWN (BEST ESTIMATE DIESEL)

6. UNKNOWN

7. UNKNOWN (A COMPLETE INSPECTION OF ALL AREA INPORT UNITS REVEALED NOTHING, POSSIBLE RIVER TRANSIENT AT FAULT).

8. 700 YDS X 150 YDS LIGHT BRIGHT COLOR BANDS, WIND SW 5 KNOTS, SEA CALM, MOVEMENT NORTH

9. NONE

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:000-000/COPIES:0006

133545/3317/226 1 OF 2 M1 8121 226/21:39Z 131135Z AUG 91
CSN:RXBR8127 NAVSTA CHARLESTON SC//13/00/01/11//

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INNTR	135
RUN-OFF	11
TRFC CHKR	
DISTRO	

10. REPORT WAS MADE, NUMBER 83379

11. WERE TAKEN

12. BOOM, BOAT HULLS

13. SORBENTS, DIP 3001 SKIMMER

14. NAVAL STATION CHARLESTON SC, PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, SC, PHONE (303) 743-6411, A/V 563-6411.//
BT

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CALL

IMMEDIATE

O 231420Z AUG 91 PSN 191452J22

FM USS JOSEPH HEWES

TO COMDESRON FOUR

INFO COMNAVSURFLANT NORFOLK VA COMCRUDESGRU TWO
COMNAVBASE CHARLESTON SC NAVSTA CHARLESTON SC

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L3A
131
132
133
134
DISPATCHER 1.
2.
3.

BT
UNCLAS //N06320//

MSGID/UNIT SITREP/USS JOSEPH HEWES/006/AUG//
FLAGWORD/-/UNITSITREP//
TIMELOC/231315ZAUG91/CHARLESTON SC/-//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/FUEL SPILL DURING REFUELING INPORT CHARLESTON.//
RMKS/AT 2915Q AUG 91, APPROXIMATELY 20 GALS OF DFM SPILLED OVERBOARD DURING REFUELING EVOLUTION AT PIER "N". SPILL THROUGH OVERFLOW PIPING FROM F.O. OVERFLOW TANK 5-41-2-F. OVERFLOW PIPED DIRECTLY OVER THE SIDE. REFUELING IN PROCESS OF SECURING AT TIME OF SPILL. SHIP'S PERS TOOK IMMEDIATE ACTIONS TO CONTAIN SPILL, PORT SVCS OIL SPILL CONTAINMENT TEAM ON STA. OIL SPILL DID NOT SPREAD BEYOND LOCAL AREA, CONTAINED BTWN SHIP AND PIER. ESTIMATE SPILL CLEAN-UP COMPLETE APPROX. 12300.//
BT

INRTR	
RUN-OFF	
TRFC CHKR	
DISTRO	

DLVR:COMDESRON FOUR(5)...ACT Rm' RAY 1503Z
DLVR:USS JOSEPH HEWES(1)...ORIG

006(1)...INFO FOR COMCRUDESGRU TWO(6) 06320/ 1/0016
004(1) 002(1) 00(1) N5(1) FILE(1)

13

~~11(1)~~...INFO FOR NAVSTA CHARLESTON SC(5) 17801/ 3/0002
~~17(1)~~ ~~14(1)~~ 01(1) 20(1)

RTD:000-000/COPIES:0017

191452/5136/235 1 OF 1 M1 0857 235/14:57Z 2314202 AUG 91
CSN:KXBRU572 USS JOSEPH HEWES

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ADMINISTRATIVE MESSAGE

ROUTINE

R 012330Z NOV 91 ZYB PSN 589447J37

FM USS BILLFISH

TO COMOT COGARD WASHINGTON DC//JJJ//
NAVSTA CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
COMSUBLANT NORFOLK VA//JJJ//
COMSUBRON FOUR
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//JJJ//
COMSUBGRU SIX//JJJ//
USS FRANK CABLE

13 ____
131 ____
132 ____
133 ____
134 ____

BT
UNCLAS //N04020//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2) (MIN: CONSIDERED)

DISPATCHER FRI ____
SAT ____
SUN ____

DUTY CHIEF FRI ____
SAT ____
SUN ____

1. CNO FOR OP-45 AND CHINFO

2. SPILL OCCURRED: 2030Z
   A. BILLFISH, SSN 676, 05724

3. SPILL LOCATION:
   A. CHARLESTON NAVAL BASE PIER MIKE

4. AMOUNT SPILLED:
   A. 2 GALLONS

5. TYPE OF OIL SPILLED:
   A. OIL/WATER MIXTURE (INCLUDING BILGE WASTE 50 OIL)

6. OPERATION UNDERWAY WHEN SPILL OCCURRED
   A. BILGE DEWATERING TO SHIP'S WASTE OIL COLLECTION TANK

7. SPILL CAUSE:

13(1)...ACT FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

N4(1)...INFO FOR COMSUBGRU SIX(4) 04020/ 1/0202
01(1) N32(1) FILE(1)

RTD:000-000/COPIES:0012

589447/2287/306 1 OF 2 M1 0215 306/21:31Z 012330Z NOV 91
CSN:RXBR1181 USS BILLFISH

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[illegible]	141
[illegible]	164
[illegible]	
[illegible]	

A. WASTE OIL COLLECTION TANK IS DESIGNED TO BE OPEN ON THE BOTTOM. INDICATED LEVEL WAS 100 GALLONS OF OIL. TANK LEVEL INDICATOR FAILED, AND THE TANK WAS OVER FILLED DURING ROUTINE OPERATIONS.

8. SLICK DESCRIPTION AND MOVEMENT:
   A. 6 FOOT DIAMETER (INITIALLY BEFORE BEING WASHED UNDER THE PIER.)
   B. DARK BROWN
   C. SLIGHT
   D. ONE
   E. WASHED UNDER PIER MIKE DUE TO INBOUND UNIT THAT MOORED ALONGSIDE JUST AFTER SPILL.

9. AREAS DAMAGED OR THREATENED:
   A. COOPER RIVER
   B. NONE

10. TELEPHONE REPORT TO NATIONAL RESPONSE CENTER (NRC) WAS NOT MADE.

11. SAMPLES WERE NOT TAKEN.
12. CONTAINMENT METHOD PLANNED/USED:
    A. NONE, BECAUSE SPILL DISPERSING QUICKLY
13. SPILL REMOVAL METHOD PLANNED/USED:
    A. NONE, BECAUSE SPILL DISPERSED QUICKLY
14. PARTIES PERFORMANCE SPILL REMOVAL:
    A. NAVY: PORT SERVICES, NAVSTA CHARLESTON
15. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS: NONE
16. ACTIVITY CONTACT FOR ADDITIONAL INFORMATION:
    A. LCDR EVANS, COMM 803-743-3265, AC 563-3265

BT

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ADMINISTRATIVE MESSAGE

DISPATCHER FRI ___ SAT ___ SUN ___

PRIORITY

P 112210Z NOV 91 ZYB PSN 628292J29

DUTY CHIEF FRI ___ SAT ___ SUN ___

FM NAVSTA CHARLESTON SC

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//N32//

INFO CNO WASHINGTON DC//OP 453// NEESA PORT HUENEME CA//112F3//
SOPA ADMIN CHARLESTON SC//N322// FEMA RGN IV ATLANTA GA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//182C//
COMNAVSEASYSCOM WASHINGTON DC//SEA-07//
SOUTHNAVFACENGCOM CHARLESTON SC//044//

13 ___
131 ___
132 ___
133 ___
134 ___

BT
UNCLAS //N05090//

SUBJ: OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
RMKS/

1. CNO FOR OP-45

2. 111240R NOV 91, UNKNOWN

3. COOPER RIVER, NAVAL STATION CHARLESTON, S.C. PIER QUEBEC AND ROMEO SLIP.

4. APPROX. 2 TO 3 GALLONS

5. UNKNOWN (SUSPECTED TO BE DIESEL FUEL MARINE)

6. UNKNOWN

7. UNKNOWN

8. APPROX. 40 FT. LENGTH, 10 FT WIDTH, BARELY VISIBLE, WINDS. FROM NORTH WEST A 9 KNOTS, SEA CALM, MOVEMENT SOUTH AT APPROX. 8 KNOTS.

9. NONE

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:014-000/COPIES:0008

628292/5520/315 1 OF 2 M1 0419 315/22:32Z 112210Z NOV 91
CSN:RXBR0416 NAVSTA CHARLESTON SC

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INRTR 144
RUN 110
TRC
DIST

10. REPORT WAS MADE, NUMBER 95824.

11. NOT TAKEN

12. CAMELS, SHIP'S HULLS.

13. SORBENTS

14. NAVAL STATION CHARLESTON, S.C. PORT SERVICES PERSONNEL.

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON, S.C. PHONE (803) 743-6411, A/V 563-6411.//
BT

13A2

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U UNCLASSIFIED U
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13
13A
131
132
133 HPC
134
DISPATCHER 1
2

ADMINISTRATIVE MESSAGE

ROUTINE

R 031945Z DEC 91 ZYB PSN 732187J28

FM NAVSHIPYD CHARLESTON SC//330//

TO COMNAVBASE CHARLESTON SC//00/01N3/N32//
NAVSTA CHARLESTON SC//13/00/01/11//

INFO CNO WASHINGTON DC//OP-45// SOPA CHARLESTON SC//JJJ//
NEESA PORT HUENEME CA//112//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COMNAVSEASYSCOM CHARLESTON SC//823//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

ST
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHAS//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 031300ZDEC91
   6. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. 8. CHARLESTON NAVAL SHIPYARD, ADJACENT DRYDOCK TWO CAISSON AND ALONG F PIER AND D/F SLIP

4. APPROX 5 TO 10 GAL, 50%

5. K. OIL/WASTE BILGE WASTE

6. C. BILGE DEWATERING FROM AE-28

7. C. OTHER TYPE EQUIPMENT FAILURE. VACUUM CAN M99-18-PV FAILED AND CARRY OVER WAS EXHAUSTED OVERBOARD. CAN SHUT DOWN FOR REPAIRS/TESTING.

DLVR:SOPA CHARLESTON SC(5)...INFO

13(1)...ACT FOR NAVSTA CHARLESTON SC(4) /19/
11(1) 01(1) 00(1)

RTD:000-000/COPIES:0009

732187/9430/338 1 OF 2 M1 0232 338/03:05Z 031945Z DEC 91
CSN:RXBR0238 NAVSHIPYD CHARLESTON SC//330//

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INTR	
RUN-OFF	
TRFC CHKR	
DISTRO	

A. 500 FT X 30 FT
B. BRIGHT COLORED BANDS AND BLACK SLUDGE
C. N/A
D. N/A
E. CONTAINED BY SORBENT BOOM AT DRYDOCK M2.

9. A. COOPER RIVER
B. NONE
C. NONE

10. NO

11. NO

12. A. BOOM

13. B. DIP 3001 SKIMMER
D. SORBENTS

14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC

15. NONE

16. CONTACT: ENCS(SW) SHANNON, USN, C340, AV 563-1794, COMM (803) 7[illegible]-1794//

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

ADMINISTRATIVE MESSAGE

PRIORITY

P 150504Z DEC 91 ZYB PSN 790748J35

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC COMNAVBASE CHARLESTON SC

INFO CNO WASHINGTON DC//OP/453// SOPA CHARLESTON SC
NEESA PORT HUENEME CA//12//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
RMKS/

1. 141755Z DEC 91

2. UNKNOWN SHOULD BE UNIT OR UNDER INVESTIGATION

3. NAVAL STATION, CHARLESTON, SC PIER TANGO

4. 50 GALLONS 12 gal

5. DIESEL FUEL MARINE (DFM)

6. UNKNOWN

7. UNKNOWN

8. 600" X 300", BRIGHT COLOR BANDS, WIND SW 15-20 KTS, CALM, MOVEMENT SOUTH

9. NONE

10. WAS MADE, 99724

DLVR:SOPA CHARLESTON SC(5)...INFO

13(1)...ORIG FOR NAVSTA CHARLESTON SC(8) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 01(1) 00(1)

RTD:069-000/COPIES:0013

790748/6642/349 1 OF 2 M1 0311 349/16:47Z 150504Z DEC 91
CSN:RXBR0408 NAVSTA CHARLESTON SC//13/00/01/11//

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

NWTR	
NON-OFF	
TREC CHKR	
DISTRO	

SAMPLES WERE TAKEN

12. BOOM, SHIP'S HULL AND CAMEL

13. DIP 3001 AND SORBENT

14. NAVSTA PORT SERVICES PERSONNEL

15. NONE

16. ACTIVITY CONTACT FOR ADDITIONAL INFORMATION, CDR K. P. WHITAKER, PORT SERVICES OFFICCR, COMM: 803-743-6413; AV: 563-6413.//
BT

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

13A2

ROUTINE

R 091500Z JAN 92 PSN 892121J23

FM USS SANTA BARBARA

TO COMNAVBASE CHARLESTON SC//N31// NAVSTA CHARLESTON SC//13//
COMCRUDESGRU TWO COMDESRON FOUR

INFO CNO WASHINGTON DC//OP-45// NEESA PORT HUENEME CA//112//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//

BT
UNCLAS //N05090//

MSGID/GENADMIN/SANTA BARBARA/041//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
REF/A/TEL/09JAN92/-//
AMPN/REF A IS PHONCON BETWEEN SANTA BARBARA (LT SISNEY)/ NATIONAL RESPONSE CENTER ON 09 JAN 92//
RMKS/1. PER REF A,

2. A. USS SANTA BARBARA, AE-28, 20111

3. B. CHARLESTON NAVAL SHIPYARD PIER FOXTROT

4. 75-125 GALLONS

5. A

6. A

7. G
WHILE TAKING ON FUEL FROM YO225 FROM PORT SERVICES CHARLESTON SC, SOUNDING ON TANK 5-154-0-F READ 12 FT 11 IN AT NEXT READING SOUNDING WAS 13 FT 7 IN. PUMPING TO TANK WAS IMMEDIATELY SECURED BUT NOT SOON ENOUGH TO PREVENT OVERFLOW. TANK SOUNDING CHART STATES 95 PERCENT LEVEL IS 13 FT 1 3/8 IN 100 PERCENT LEVEL IS 14 FT 1 7/8 IN.

8. LENGTH 800 FT WIDTH 600 FT

DLVR:COMDESRON FOUR(5)...ACT
DLVR:USS SANTA BARBARA(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:026-000/COPIES:0007

892121/7686/009 1 OF 2 M1 0105 010/01:13Z 091500Z JAN 92
CSN:RXBR0104 USS SANTA BARBARA

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

SILVERY
C. NORTHWEST 5 KNOTS
D. CALM
E. EAST AT 1 TO 2 KNOTS

9. A. COOPER RIVER
B. NONE
C. NONE

10. TELEPHONE REPORT TO NATIONAL RESPONSE CENTER WAS MADE AT 1407 LOCAL REPORT NO. 102223.

11. SAMPLES WERE NOT TAKEN.

12. A, B, C, D, F, (DIP 3001, OIL SKIMMER)

13. B, D.

14. A. SHIPS FORCE AND PORT SERVICES.

15. NOTIFIED NATIONAL RESPONSE CENTER, COMNAVBASE N31 OOD.

16. LCDR MOXCEY, CHIEF ENGINEER USS SANTA BARBARA COMM (803)743-5136.//
BT

ADMINISTRATIVE MESSAGE

PRIORITY ROUTINE

P R 030002Z MAR 92 ZYB PSN 176789J38

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N32//

INFO CINCLANTFLT NORFOLK VA//N4422//
NAVSHIPYD CHARLESTON SC//190/340//

BT
UNCLAS //N04490//

MSGID/UNIT SITREP/NAVSTA CHARLESTON SC/002//
FLAGWORD/UNIT SITREP//
TIMELOC/021915ZMAR92/NAVSTA CHARLESTON SC//
RMKS/

1. APPROXIMATELY 1415 LOCAL, YTB 802 WAS RETURNING FROM A HARBOR FAMILIARIZATION TOUR WITH TWELVE AFJROTC STUDENTS AND ONE AIR FORCE INSTRUCTOR FROM MECKLENBURG HIGH SCHOOL, CHARLOTTE, NC. CRAFT WAS MAKING APPROACH TO PIER WHEN CRAFTMASTER ENGAGED ASTERN CLUTCH WITH RESULT. CRAFT HIT YFN-311, 27 FT SECURITY BOAT, TWO EIGHTEEN FT. UTILITY BOATS, YC-794, AND AN OIL RECOVERY ENVIRONMENTAL OPERATIONS BOAT (OREO-1) AT 5-10 KNOTS.

2. DAMAGE ASSESSMENT AS FOLLOWS:
   (A) 27 FT. SECURITY BOAT: SUNK. RECOVERY IN PROGRESS.
   (B) TWO EIGHTEEN FT. UTILITY BOATS: SUSTAINED DAMAGE TO BOTH MOTORS. MAJOR FIBERGLASS DAMAGE.
   (C) OREO-1: SUSTAINED MINOR DAMAGE TO SIDES.
   (D) YFN-311: SUPERFICIAL DAMAGE. DIVERS WILL GIVE FURTHER ASSESSMENT 03 MARCH 92. WATER TIGHT INTEGRITY NOT BREACHED.
   (E) YC-794: SUPERFICIAL DAMAGE. DIVERS WILL GIVE FURTHER ASSESSMENT ON 03 MARCH 92. WATER TIGHT INTEGRITY NOT BREACHED.
   (F) YTB-802: SUSTAINED NO DAMAGE FROM COLLISION. INABILITY TO ENGAGE STERN CLUTCH. WAS DUE TO RUPTURED DIAPHRAM IN THE STERN THROTTLE QUICK DUMP VALVE.

13

11(1)...ORIG FOR NAVSTA CHARLESTON SC(4) 17801/ 3/0002
17(1) 14(1) 00(1)
00/11/14/1104/SITREP Folder

RTO:000-000/COPIES:0004

176789/9625/063 1 OF 2 M1 0362 063/04:11Z ~~030002Z MAR 92~~
CSN:RX3R0363 NAVSTA CHARLESTON SC//13/00/11//

NRTR
RUN-OFF
TRFC CHKR
DISTRO

3. PERSONNEL INJURIES: ONE CHARLESTON NAVAL HOSPITAL INDUSTRIAL HYGENIST ONBOARD YFN-311 RECEIVED MINOR SCRAPE TO LOWER RIGHT LEG IN AREA OF SHIN. TRANSPORTED TO A LOCAL MEDICAL FACILITY. NO FURTHER PERSONNEL INJURIES.

4. NAVOSH SAFETY INSPECTION IN PROGRESS ON BOARD YFN-311 AT TIME OF INCIDENT.

5. INTERNAL INVESTIGATION INITIATED. FITNESS FOR DUTY ANALYSIS OF CRAFTMASTER ORDERED AS A MATTER OF COURSE. NO DRUG/ALCOHOL INVOLVEMENT SUSPECTED.

6. LOCAL MEDIA INTEREST MODERATE. HAS BEEN RESPONDED TO BY COMNAVBASE PAO.

7. ANTICIPATE THIS IS LAST REPORT THIS INCIDENT.//
BT

5090
Ser 106.2 JEM/

From: Commander, Charleston Naval Shipyard
To: Commanding Officer, Naval Station, Charleston, S.C. 29408 (Code 18)

Subj: ENVIRONMENTAL INCIDENT REPORT #92-

1. Nature of incident: Shop 72 was attempting to clean a clogged discharge line on a sludge oil tanker when some oil spilled on the ground space, approximately 5-10 gallons. There was also oil in the river near the spill site.

2. Location of incident: North East side of dry dock #5

3. When notified: Date: 03 Mar 92 Time: 1130

4. Notified by: Master Chief Russel, Naval Station, Code 186(WR)

5. Immediate action taken: Shop 72 cleaned up the oil spill on the ground. Senior Chief Shannon and Master Chief Russel are investigating the oil spill in the river to identify its source and cause. The shipyard sent out an oil spill message for the oil in the river.

6. Follow up action taken or planned: It is requested when the investigation of the spill is complete, that a report be issued to Code 106.2.

RON DEWITT
by direction

Copy to:
NRRO CHARLESTON
972
340
106.2
106.2DF
FXD

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U UNCLASSIFIED U
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L3
L3A
L31
L32
L33
L34
DISPATCHER 1.
2.
3.

ADMINISTRATIVE MESSAGE

PRIORITY

P 031350Z MAR 92 ZYB PSN 183209J23

FM NAVSTA CHARLESTON SC//13/00/01/11//

TO COMDT COGARD WASHINGTON DC COMNAVBASE CHARLESTON SC

INFO CNO WASHINGTON DC//OP/453// COMNAVSEASYCOM CHARLESTON SC//823//
SOPA CHARLESTON SC NEESA PORT HUENEME CA//12//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
RMKS/

1. CNO FOR OP-45 CHINFO

2. 021915Z MAR 92, NAVAL STATION CHARLESTON SC, UIC:61165

3. COOPER RIVER, PIER SIERRA

4. 50 GALLONS

5. 40 GALLONS GASOLINE , 10 GALLONS LUBE OIL

6. DOCKING TUG

7. COLLISION NAVY YTB 802 SUFFERED MECHANICAL FAILURE STRIKING SEVERAL SMALL BOATS MOORED TO A BARGE SINKING ONE AND DAMAGING TWO. RUPTURING FUEL TANK.

8. 20 FEET X 20 FEET, NO MOVEMENT

9. NONE

DLVR:SOPA CHARLESTON SC(5)...INFO

13(1)...(ORIG) FOR NAVSTA CHARLESTON SC(7) 18241/ 3/0123
20(1) 18(1) 16(1) 11(1) 08(1) 00(1)

RTD:014-000/COPIES:0012

183209/1364/063 1 OF 2 M1 0166 064/01:47Z 031350Z MAR 92
CSN:RXBR0171 NAVSTA CHARLESTON SC//13/00/01/11//

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
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OFF
CHKR

10. WAS MADE, 108886

11. SAMPLES WERE TAKEN

12. CAMEL,WATER SPRAY,BOAT WASH,SORBENT BOOM

13. SORBENTS

14. NAVAL STATION PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13 NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803)743-6413-AV:563-6411//

BT

340

01 02 112020Z MAR 92 RR UUUU 0712020

ADMIN

NAVSHIPYD CHARLESTON SC//330//

COMNAVBASE CHARLESTON SC//00/01N3/N32//

NAVSTA CHARLESTON SC//13/00/01/11//

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

SOPA CHARLESTON SC//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHAS//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 111300ZMAR92

B. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. B. CHARLESTON NAVAL SHIPYARD, ADJACENT SE END OF DRYDOCK #5.

4. APPROX 20 TO 35 GAL, 50%

5. A. (DFM)

6. F. UNKNOWN

7. H. UNKNOWN

T. SHANNON,ENCS(SW),USN CODE 340

M R. BROWN CDR, USN, 330 4706

MRBrown

COPY TO: 100, 300, 330, 104, 107, 400, 460, FXD

02 02 RR UUUU 0712020

8. A. 05 FT X 200 FT

B. BRIGHT COLORED BANDS

C. N/A

D. N/A

E. TIDE NEAR SLACK, CONTAINED WITHIN F-G PIER SLIP.

9. A. COOPER RIVER

B. NONE

C. NONE

10. YES, REPORT # 11-0105

11. SAMPLES WERE TAKEN.

12. A. BOOM

13. B. DIP 3001 SKIMMER

D. SORBENTS

14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC

15. NONE

16. CONTACT: ENCS(SW) SHANNON, USN, C340, AV 563-3280, COMM (803) 743-3280//

5090
SER

MEMORANDUM

From: Code 106.2
To:

Subj: ENVIRONMENTAL INCIDENT REPORT #92-001

1. Nature of incident: A gasoline truck driver was lowering a hose to the bottom of dry dock #2 when the hose ruptured spilling 27 gallons of gasoline. The driver had the gas meter on when lowering the hose. This caused pressure to build up on the hose.

2. Location of incident: West end of Dry Dock #2

3. When notified: Date: 5 May 92 Time: 1330

4. Notified by: Lieutenant Elkin Ship Superintendent

5. Immediate action taken: Shop 99 Forman Mitchell and his crew were on the spill site when the spill accrued. Absorbent was placed on the spill and then cleaned up and put in 55 gallon drums.

6. Follow up action taken or planned: Request that hoses on fuel trucks be inspected for worn and damaged areas and that the meter not be turned on until hose is in place to distribute the fuel to the vehicle.

JOHN SNEED

Copy to:
NRRO
106.2

106.2DF
PWD CIRC

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

Spill #1

PRIORITY

P R 141405Z MAY 92

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//G-TGC-2//
COMDT COGARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC//N322//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC
NEESA PORT HUENEME CA//12//
USS RICHMOND K.TURNER

BT
UNCLAS //N05090//

D/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES
/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 CHINFO

2. 131350Z MAY 93, UNKNOWN

3. NAVAL STATION CHARLESTON SC "M-Z" SLIP

13 ____
131 ____
132 ____
133 ____
134 ____

DISPATCHER FRI ____
SAT ____
SUN SPB

DUTY CHIEF FRI ____
SAT ____
SUN ____

DLVR:COMDESRON FOUR(1)...ACT

13(1)...ORIG FOR NAVSTA CHARLESTON SC(3) /19/
11(1) 00(1)

002(1)...ACT FOR COMCRUDESGRU TWO(15) 05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

TD:000-000/COPIES:

029992/05434/ /231 1 SBA 0086 134/22:03Z 141405Z MAY 92
CSN:BSVH0110 134/22:04Z NAVSTA CHARLESTON SC
PSN-029992 /

IIII

4. APROX. 3 GALS

5. HYDRAULIC FLUID

6. UNDER INVESTIGATION

7. UNDER INVESTIGATION

8. (A) 50' X 50'
   (B) LIGHT BLUE RAINBOW
   (C) 1-2 KNOTS NORTH WEST
   (D) CALM
   (E) EBBING

9. (A) COOPER RIVER
   (B) NONE
   (C) NONE

10. WAS MADE, REPORT NUMBER 173471

11. WERE NOT TAKEN

12. SHIPS HULL

13. DIP 3001 OIL SKIMMER, OIL ABSORBING PADS

14. PORT SERVICES, NAVSTA CHARLESTON SC.

15. THIS SPILL HAS NO ADVERSE IMPACT TO THE ENVIRONMENT.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV. 563-6413.//

BT

ADMINISTRATIVE MESSAGE

ROUTINE

R 151942Z MAY 92 ZYB PSN 093429B27

FM NAVSHIPYD CHARLESTON SC//330//

TO COMNAVBASE CHARLESTON SC//00/C1N3/N32//
NAVSTA CHARLESTON SC//13/00/01/11//

INFO CNO WASHINGTON DC//OP45// SOPA CHARLESTON SC//JJJ//
NEESA PORT HUENEME CA//112//
COMNAVSEASYSCOM WASHINGTON DC//00C//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHAS//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. CNO FOR OP-45 AND CHINFO

2. 151500ZMAY92
B. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. B. CHARLESTON NAVAL SHIPYARD, ADJACENT DRYDOCK TWO CAISSON AND ALONG F PIER AND D/F SLIP

4. APPROX 25 TO 50 GAL, 52 PERCENT

5. K. OIL/WASTE BILGE WASTE/SOLVENTS

6. F. UNKNOWN

7. H. UNKNOWN. COAST GUARD MARINE INSPECTOR CALLED IN TO ANALYZE SAMPLES FROM VARIOUS PROBABLE SOURCES.

8. A. 500 FT X 100 FT
B. BRIGHT COLORED BANDS, BLACK SLUDGE, AND STRONG SOLVENT

DLVR:NAVSHIPYD CHARLESTON SC(1)...ORIG
DLVR:SOUTHNAVFACENGCOM CHARLESTON SC(1)...INFO

N34(1)...ACT FOR COMNAVBASE CHARLESTO(7) 19666/ 3/0083
01(1) 00(1) N3(1) N1(1) SND

RTD:142-000/COPIES:0016

093429/6160/130 1 OF 2 M1 0837 130/23:56Z 151942Z MAY 92
CSN:RXNS0964 NAVSHIPYD CHARLESTON SC//330//

C. N/A
D. N/A
E. CONTAINED BY SORBENT BOOM AT DRYDOCK NR 2

9. A. COOPER RIVR
B. NONE
C. NONE

10. NO

11. NO

12. A. BOOM

13. B. DIP 3001 SKIMMER
D. SORBENTS

14. PORT SERVICES, NAVAL STATIONS CHARLESTON, SC

15. NONE

16. CONTACT ENCS (SW) SHANNON, USN, C340, AV 563-5051, COMM 803-743-5051.//
BT

5090
Ser 106.21/3268
29 MAY 1992

MEMORANDUM

From: Code 106.21
To: Code 106.2

Subj: ENVIRONMENTAL INCIDENT REPORT #92-011

Encl: (1) NAVSHIPYD CHARLESTON SC 151942Z MAY 92

1. Nature of incident: Repair Office estimated 25 - 50 gallons of oil spilled into the Cooper River, enclosure (1).

2. Location of incident: N.E. End of DD # 2

3. When notified: Date: 15 May 92 Time: 1030 hrs

4. Notified by: Shop 56 Personnel

5. Immediate action taken: Port Services dispatcher was contacted and confirmed that Port Services was on scene to remove the oil from the river. A search of the area indicated that the source of the spill was a broken sewer line under the pier. The required oil spill message was sent, enclosure (1).

6. Follow up action taken or planned: Oily wastes are not to be discharged into the sanitary sewer system. While several operations involving oily wastes were being performed within the area of the spill, the specific source of the oil could not be determined. All activities involved in the management of oily wastes are requested to review shop practices and procedures to ensure that appropriate control measures are in place to prevent future occurrences.

S. F. Hensley
S. F. HENSLEY

Copy to:
COMNAVBASE (Code N34)
NAVSTA (Code 13)
106, 106.2, 106.24, 106.2DF,
330, 453, 971, 999

UNCLASSIFIED

RTTTUZYUW RUCKCHC0001 1541835-UUUU--RUCKSUU.
UUUUU
.. :1835Z JUN 92 ZYB
FM NAVSHIPYD CHARLESTON SC//330// N31
TO COMNAVBASE CHARLESTON SC/~~/00/01N3/N32~~//
NAVSTA CHARLESTON SC//13/00/01/11//
INFO CNO WASHINGTON DC//OP45//
COMNAVSEASYSCOM WASHINGTON DC//00C// COGARD MSO CHASN SC
SOUTHNAVFACENGCOM CHARLESTON SC//044//
SOPA CHARLESTON SC//JJJ// SOPA ADMIN //N322// COMDET COAST GUARD WASHINGTON DC
NEESA PORT HUENEME//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ// //G-TGC-2//
BT
UNCLAS //N00191//
MSGID/GENADMIN/NAVSHIPYD CHAS//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. CNO FOR OP-45 AND CHINFO
2. 162502ZJUN92
B. CHARLESTON NAVAL SHIPYARD UIC: N00191
3. B. CHARLESTON NAVAL SHIPYARD, PIER H AND J SLIP.
4. APPROX 03 TO 05 GAL, 50%
5. K.OIL/WATER MIXTURE
6. E. PUMPING OPERATION FROM YSR-45 TO YOS-21
7. A. DURING PUMPING OPERATION IT WAS DISCOVERED THAT YOS-21 HAD CRACK IN UPPER RUB RAIL.
8. A. 05 FT X 050 FT
B. BRIGHT COLORED BANDS
C. N/A
D. N/A
E. TIDE NEAR SLACK, CONTAINED WITHIN H-J PIER SLIP.
9. A. COOPER RIVER
B. NONE
C. NONE
10. YES, REPORT #120080
11. NO
12. B. SHIP'S HULL
C. CAMEL
13. D. SORBENTS
14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC
15. NONE
16. CONTACT: ENCS(SW) SHANNON, USN, C340, AV 563-3280, COMM (803) 743-3280.//
BT
NNNN

PTTUZYUW RUCKCHC0001 1751847-UUUU--

UUUUU

R 231847Z JUN 92 ZYB

FM NAVSHIPYD CHARLESTON SC//CODE 325//

TO COMDT COGARD WASHINGTON DC

NAVSTA CHARLESTON SC

INFO CNO WASHINGTON DC

COMNAVFACENGCOM ALEXANDRIA VA

COMNAVSEASYSCOM WASHINGTON DC

NAVENENVSA PORT HUENEME CA

EPA REGION IV ATLANTA GA

BT

UNCLAS //N05090//

TTD/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/OPNAV/-/-/5090-2//

AMPN/-//

NARR/-//

POC/-/-/-/-/-//

AKNLDG/-//

RMKS/1. CNO FOR OP-45 AND CHINFO

/2. 040023Z JUN 92

B. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. B. CHARLESTON NAVAL SHIPYARD, PIER H AND J SLIP

4. APPROX 03 TO 05 GAL, 50%

5. K. OIL/WATER MIXTURE

F. UNKNOWN

7. H. UNKNOWN - UNDER INVESTIGATION

A. 05 FT X 050 FT

B. BRIGHT COLORED BANDS

C. NORTH EASTERLY, 3-5 KNOTS

D. N/A

E. TIDE EBBING, CONTAINED WITHIN H-J PIER SLIP

9. A. COOPER RIVER

B. NONE

C. NONE

10. YES, REPORT #123171

11. WERE TAKEN

12. A. BOOM

B. SHIP'S HULL

C. CAMEL

13. D. SORBENTS

14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC

15. NONE

16. CONTACT: ENCS(SW) SHANNON, USN, C340, AV 563-3280, COMM (803) 743-3280//

BT

#0001

NNNN

5090
Ser 106.25/3585
07 AUG 1992

MEMORANDUM

From: Code 106.25
To: Code 452
Via: Code 106.2 fl 8/7

Subj: ENVIRONMENTAL INCIDENT REPORT #92-022

1. Nature of incident: Approximately 120 gallons of waste oil leaked from the YOS 266 (waste oil barge) into the Cooper River. The investigation indicated that the barge was completely full and that Shop 02 discharged into the barge at approximately 1530 hrs 5 Aug 92. The spill was reported to Port Services at approximately 1700 hrs. Port Services indicated that the spill occurred shortly after Shop 02 discharged the load waste oil into the barge.

2. Location of incident: Quay wall between Piers Q and R.

3. When notified: Date: 5 Aug 92 Time: 1730

4. Notified by: Chief of the Watch

5. Immediate action taken: Port Services boomed the spill area and collected the oil. Port Services will turn the waste into Code 106.25 for proper disposal.

6. Follow up action taken or planned: Shop 02 is requested to review their procedures and incorporate the following recommendations:

a. Contact Port Services Control Office for permission to discharge, phone number 36411.

b. Establish a log book with volume being pumped, date of discharge, barge number, Port Services personnel authorizing the discharge, and visual appearance of the cargo bays.

c. Visually inspect the cargo bays before discharge.

No further action required.

Wayne H. Neville
WAYNE H. NEVILLE

Copy to:
106, 106.2DF
NAVSTA (13)

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DISPATCHER 1. 2. 3.

PRIORITY ROUTINE

P R 060013Z AUG 92 PSN 195807J30

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMDT COAST GUARD WASHINGTON DC
COMNAVBASE CHARLESTON SC//N32/00FR//

INFO CNO WASHINGTON DC//OP/453// SOPA CHARLESTON SC
NEESA PORT HUENEME CA//12//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
RMKS/

1. CNO FOR OP-45 CHINFO

0620 50Z AUG 92, NAVAL STATION, CHARLESTON, SC, 61165

3. NAVAL STATION , QUEBEC ROMEO QUAYWALL AND SLIP

4. 120 GALLONS

5. OIL/OIL MIXTURE (SLOP AND WASTE OIL)

6. BARGE WAS APPARENTLY FILLED TO MAXIMUM CAPACITY AND SPILL WAS DISCOVERED PRIOR TO COMMENCEMENT OF TRANSFER OPERATIONS

7. OVERFILL BARGE

8. A. 1000 FT BY 400 FT
   B. BRIGHT COLOR BANDS AND DARK BROWN PATCHES
   C. SOUTHERLY 5-10 MPH
   D. LESS THAN 1 FOOT
   E. SOUTHERLY (DOWN RIVER) ABOUT 2.5 KNOTS

DLVR:SOPA CHARLESTON SC(5)...INFO

13(1)...ORIG FOR NAVSTA CHARLESTON SC(7) 18241/ 3/0123
85(1) 18(1) 16(1) 111(1) 08(1) 30(1)

RTD:027-000/COPIES:0012

195807/8956/219 1 OF 2 M1 0271 219/03:26Z 060013Z AUG 92
CSN:RX3R0332 NAVSTA CHARLESTON SC//13/00/11//

TRFC CHKR

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU DISTRO

A. COOPER RIVER
B AND C. NO APPARENT DAMAGE TO PROPERTY OR WILDLIFE.

10. WAS MADE, REPORT NUMBER 130527

11. WERE TAKEN

12. BOOM, SHIP'S HULL, QUAYWALL

13. DIP 3001, SORBANTS

14. NAVAL STATION PORT SERVICES

15. ADDITIONAL COMMENTS: YON 266 BARGE WAS APPARENTLY FILLED TO MAXIMUM CAPACITY AND ONE OF THE TANK LIDS WERE LEFT OPEN, CAUSING OIL TO SPILL ON THE DECK OF THE BARGE AND INTO THE WATER.

16. PORT SERVICES OFFICER, CODE 13, NAVAL STATION, CHARLESTON, SC TELEPHONE COMMERCIAL (803) 743-6413 - AUTOVON 563-6413.//

BT

P[illegible]JZYUW RUCKCHC0001 2621655-UUUU--RUCKSUU.

[illegible] UUUUU

R 181655Z SEP 92 ZYB

FM NAVSHIPYD CHARLESTON SC//CODE 304//

TO COMDT COGARD WASHINGTON DC

NAVSTA CHARLESTON SC

INFO CNO WASHINGTON DC

COMNAVFACENGCOM ALEXANDRIA VA

COMNAVSEASYSCOM WASHINGTON DC

NAVENENVSA PORT HUENEME CA

EPA REGION IV ATLANTA GA

BT

UNCLAS //N05090//

[illegible]D/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/OPNAV/-/-/5090-2//

AMPN/-//

NARR/-//

POC/-/-/-/-/-//

AKNLDG/-//

RMKS/ 1. CNO FOR OP-45 AND CHINFO

2. 171240Z SEP 92

B. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. B. CHARLESTON NAVAL STATION, PIER Z

4. LESS THAN ONE GALLON

5. M. UNKNOWN - BEST ESTIMATE IS OIL/OIL MIXTURE

E. CLEANING OPERATION OF TANKS

7 H. UNKNOWN - UNDER INVESTIGATION

A. 1 FT X 50 FT

B. BARELY VISIBLE

C. NONE

D. N/A

E. CONTAINED/NO MOVEMENT

9. A. COOPER RIVER

B. NONE

C. NONE

10. NO

11. WERE NOT TAKEN

12. A. BOOM

B. SHIPS HULL

D. WATER SPRAY

13. D. SORBENTS

14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC

15. NONE

16. CONTACT: MR. ANDREW CHAPMAN, C300, AV 563-0124, COMM (803) 743-0124//

BT

#0001

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7. OVERFILL TANK

(A) 600 FT BY 300 FT
(B) BRIGHT COLORED BANDS
(C) WESTERLY 5-10 KTS
(D) 1-2 FT
(E) WESTERLY 8 KTS (INLAND)

9. (A) COPPER RIVER
(B,C) NO APPARENT DAMAGE TO PROPERTY OR WILDLIFE.

10. WAS MADE, REPORT #139 458

11. SAMPLES WERE NOT TAKEN

12. SORBENT ROLLSHULL

13. DIP 3001, SORBENTS

14. NAVSTA PORT SERVICES PERSONNEL

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

R' "IZYUW RUCKCHC0001 3371432-UUUU--RUCKSUU.

ZK UUUUU

R 021432Z DEC 92 ZYB

FM NAVSHIPYD CHARLESTON SC//CODE 304//

TO COMNAVBASE CHARLESTON SC//N31//

NAVSTA CHARLESTON SC//13/00/01/11//

INFO CNO WASHINGTON DC//OP45//

COMNAVFACENGCOM ALEXANDRIA VA//044//

COMNAVSEASYSCOM WASHINGTON DC//00C//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//G-TGC-2//

SOPA ADMIN CHARLESTON SC//N322//

COGARD MSO CHARLESTON SC//JJJ//

C ET COAST GUARD WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/OPNAV/-/-/5090-2//

RMKS/1. CNO FOR OP-45 AND CHINFO

2. 011330Z DEC 92

B. CHARLESTON NAVAL SHIPYARD UIC: N00191

3. B. CHARLESTON NAVAL SHIPYARD, PIER DELTA

4. APPROXIMATELY ONE GALLON

5. K. OIL/WATER MIXTURE

6. E. OTHER - DRAINAGE OF OILY WASTE VACUUM CAN

B. CRACKED HOSE

8 A. 20 FT X 25 FT

B. DULL BROWN

C. OUT OF THE NORTH, 3-5 KTS

D. CALM

E. SOUTHERLY, 3-5 KTS

9. A. COOPER RIVER

B. NONE

C. NONE

10. NO

11. WERE NOT TAKEN

12. F. NONE-SMALL SLICK EASILY AND QUICKLY PICKED UP WITH SORBENT MATERIAL

13. D. SORBENTS

- PORT SERVICES, NAVAL STATION, CHARLESTON, SC

15. NONE

16. CONTACT: LT LES ELKIN, C304, AV 563-5051, COMM (803) 743-5051//

BT

#0001

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UNCLASSIFIED

01 02 0414322 DEC 92 FM [illegible] UUUU 1791432

DPS

NAVSTA CHARLESTON [illegible]

CMDT COGARD WASHINGTON DC

NAVSTA CHARLESTON SC

INFO CNO WASHINGTON DC//OP-45//

DIRNAVSEASYSCOM WASHINGTON DC//[illegible]//

FPA RETICA PULR AT ANTA GA.

COMNAVFACENGCOM ALEXANDRIA VA.

[illegible] WLENMF GA//10//

UNCLAS //[illegible]//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/010//

[illegible]

[illegible]

1. [illegible]

2. [illegible] INVESTIGATION

3. BY CHARLESTON [illegible]

4. 35 BALLONS

5. BILGE WASTE /CHT

6. P. [illegible]

7. [illegible]

[illegible]

02 02 041432Z DEC 92 PP RR UUUU 3391432

8. (A) SCATTERED POCKETS 10 FEET BY 20 FEET

(B) FAINT COLOR

(C) DUE WEST 5 KNOTS

(D) CALM

(E) FLOOD TIDE NORTH, 3 KNOTS

9. (A) COOPER RIVER

(B) NONE

(C) NONE

10. YES, 14746.

11. WERE TAKEN

12. A. LABEL

F. SLAYWA

13. B. DIR DOD

D. SORBENTS

14. PORT SERVICES, NAVAL STATION, CHARLESTON SC

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE

COMMERCIAL (803) 743-6415, AVN 563-[illegible]

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8. A. SIZE: 25 FEET BY 25 FEET
   B. COLOR: DULL BROWN
   C. ONSCENE WIND: ZERO
   D. SEA STATE: ZERO
   E. SLICK MOVEMENT: SLACK TIDE

9. A. NAME OF BODY OF WATER AFFECTED: COOPER RIVER
   B. NATURE AND EXTENT OF DAMAGE: NONE
   C. AREAS OR RESOURCES THREATENED: NONE

10. TELEPHONE REPORT TO NRC: 149678
    A. NAME OF PERSON AND COMMAND MAKING REPORT:
       LT KIERSTEAD, USS BILLFISH (SSN 676), SHIP'S DUTY OFFICER
    B. DATE AND TIME OF NOTIFICATION: 172030Z DEC 92

11. CONTAINMENT METHOD PLANNED: BOOM

12. SPILL REMOVAL METHOD PLANNED: SORBENTS I.E., OIL-ABSORBING PADS, CHIPS, OR OTHER MATERIALS

13. PARITES PERFORMING SPILL REMOVAL: NAVY, COMNAVSTA CHARLESTON

14. NONE

15. USS BILLFISH (SSN 676), AV 563-3265, COM 803-743-3265//
BT

ZYUW RUCKCHC0001 3531531-UUUU--RUCKSUU.

UUUUU

R 181531Z DEC 92 ZYB

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//OP-45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

ARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 172216Z DEC 92.

2. B. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. B. CHARLESTON NAVAL SHIPYARD, PIER CHARLIE 4.

4. APPROXIMATELY ONE GALLON IN THE WATER AND 50 GALLONS ON PIER.

5. I.A. 2110 HYDRAULIC OIL.

6. L. HYDRAULIC SYSTEM FLUSH ABOARD TENDER UNIT (MTS-2).

7. E. VALVE MISALIGNMENT.

8. A. SIZE: 1 FT BY 2 FT.

B. COLOR: SILVERY.

A. COOPER RIVER.

B. NO DAMAGE.

C. NO THREAT.

10. PHONE REPORT TO NRC WAS MADE Report Number 149807.

11. A. BOOM.

12. A. SORBENT PADS.

13. A. NAVY - NAVSTA PORT SERVICES, CNSY C-106.

14. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS: NONE.

15. POINT OF CONTACT: CNSY/LT JOHNSON/C-304/563-5051/803-743-5051.//

BT

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U U N C L A S S I F I E D U
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ADMINISTRATIVE MESSAGE

ROUTINE

R 212115Z DEC 92

FM USS DANIEL WEBSTER

TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//460//

INFO CNO WASHINGTON DC//OP-45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//
MSGID/GENADMIN/USS DANIEL WEBSTER//

SUBJ/OIL SPILL REPORT//
RMKS/1. 211500Z DEC 92

2. DANIEL WEBSTER, SSBN-626, 30091

3. CHARLESTON, SC PIER C BERTH 4

4. 50 GALLONS OIL WATER, 75%

5. WASTE OIL

6. VALVE MISALIGNMENT

7. VALVE MISALIGNMENT - NEWLY INSTALLED TOPSIDE DISCHARGE VALVE (3-WAY) INDICATION NOT PROPERLY LABELED TO SHOW PUMP DISCHARGE TO OVERBOARD OR ECOLOGY CONNECTION. DISCHARGE PATH TRACED BY OPERATOR

DLVR:NAVSHIPYD CHARLESTON SC(6)...ACT
DLVR:USS DANIEL WEBSTER(1)...ORIG
~~DLVR:SOUTHNAVFACENGCOM~~ CHARLESTON SC(5)...INFO

~~N34(1) ACT FOR COMNAVBASE~~ CHARLESTO(5) 19666/ 3/0083
~~01(1) 00(1) N5(1) N1(1)~~

RTD:000-000/COPIES:0~~017~~ 12

84343/15101/ /357 1 WSA 0036 358/04:04Z 212115Z DEC 92
CSN:PONS0142 358/04:05Z USS DANIEL WEBSTER
PSN-084343 /

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U U N C L A S S I F I E D U
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INFO
ROUTE

5090
Ser 106.25/3971

24 DEC 1992

MEMORANDUM

From: Code 106
To: Code 956
Via: Code 900

Subj: ENVIRONMENTAL INCIDENT REPORT #92-031

Ref: (a) PHONCON CNSY (Code 106.25)Mr. Neville/CNSY (Code 956) Mr. Poston of 11 Dec 92

1. Nature of incident: A hydraulic spill of approximately fifty gallons occurred on the north side of Pier C and about one gallon went into the Cooper River. The spill occurred while Shop 56 was flushing the hydraulic system of the USS DANIEL WEBSTER (MTS-626). Mr. Mims, Shop 56, was in charge of the operation. Mr. Mims had assigned one man to a 3000 psi valve that controlled the volume of hydraulic oil to the flushing unit that was located on Pier C. He had assigned another man to monitor the flow rate at the hydraulic oil flushing unit. Both men were assigned radios for communication purposes. When the flushing rig monitor realized that the volume of hydraulic oil was increasing, he made several attempts calling the valve monitor by radio before acknowledgment was received and the hydraulic valve was closed. Due to the time lapse in communication, the spill occurred.

2. Location of incident: North side of Pier C

3. When notified: Date: 17 Dec 92 Time: 1720

4. Notified by: Industrial Watch Officer

5. Immediate action taken: When 106.2 arrived, Shop 99 and Port Services were already on the scene. Shop 99 was in the process of spreading kitty litter on the hydraulic oil. Code 106.2 requested the Chief of the Watch to call Public Works to the scene to verify if any hydraulic oil had entered a concrete steel covered ditch, located directly beneath the hydraulic flushing unit. Two steel deck covers were removed but no oil was found.

Subj: ENVIRONMENTAL INCIDENT REPORT #92-031

6. To prevent future spills, the following recommendations are made:

a. An emergency shut-off valve should be installed at the hydraulic flushing unit.

b. A light should be installed at the flushing unit for better visibility in monitoring the hydraulic oil flow indicator.

c. Use sound powered telephones between the boat and the flushing unit.

d. Develop an operating and emergency shut-down procedure.

e. Train shop personnel to use above procedure.

6. Follow up action taken or planned: As discussed in reference (a), it is requested that a copy of the investigation be forwarded to Code 106.25 no later than 11 January 1992.

James Reiman for
JOHN SNEED

Copy to:
106
106.2
106.2DF
(NRRO)

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Post-it™ brand fax transmittal memo 7671	# of pages ▸ 2
To Lt Elkin	From ENS Dis4
Co.	Co. Pout Svcs
Dept.	Phone # 6411
Fax # 9384	Fax # 8554

IMMEDIATE

O 082238Z JAN 93 PSN 123226J16

FM NAVSHIPYD CHARLESTON SC//304/106//

TO COMNAVBASE CHARLESTON SC//N34// NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45// CHINFO WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//112//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. 081300ZJAN93

2. CHARLESTON NAVAL SHIPYARD, UIC:N00191

3. CHARLESTON, SC QUAYWALL BETWEEN DRYDOCK 4 AND PIER KILO

10-20 GALLONS

5. DIESEL FUEL

6. NONE

7. BOAT SINKING - A WORKBOAT SUNK PIERSIDE AFTER SHAFT PACKING GAVE WAY. OILY DISCHARGES APPEAR TO HAVE EMANATED FROM THE BOAT'S BILGES AND FUEL TANK. THE BOAT HAS BEEN RAISED.

8. A. 50' X 100'
B. BRIGHT COLOR BANDS AND SOME LIGHT BROWN
C. OUT OF WEST, 5 KTS
D. N/A
E. CONTAINED

9. A. COOPER RIVER
B. NONE
C. NONE

DISPATCHER FRI OB
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

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13(1)...ACT FOR NAVSTA CHARLESTON SC(1) — ~~EMJ~~ BOB RAY-00026 /19/

RTD:000-000/COPIES:0001

123226/2336/008 1 OF 2 M1 0939 008/23:17Z 082238Z JAN 93
CSN:RXBR1817 NAVSHIPYD CHARLESTON SC//326/106//214

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U U N C L A S S I F I E D U
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5. PHONE REPORT TO NRC WAS MADE; REPORT NO. 152438
   A. LT L.R. ELKIN
   B. 08JAN93, 1615

11. 600M

12. DIP 3001 SKIMMER AND SORBENTS

13. NAVY - PORT SERVICES

14. NONE

15. POC: LT LES ELKIN, NAVSHIPYD CHARLESTON SC, (AV/ 563-5351
    (COMM/ (803) 743-5351.//

BT

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Post-It™ brand fax transmittal memo 7671	# of pages ▸ 2
To Lt Elkin	From ENS Disy
Co.	Co. Port Svcs
Dept.	Phone # 6411
Fax # 9384	Fax # 2554

IMMEDIATE

G 082238Z JAN 93 PSN 123226J16

FM NAVSHIPYD CHARLESTON SC//304/106//

TO COMNAVBASE CHARLESTON SC//N34// NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45// CHINFO WASHINGTON DC//JJJ//
NEESA PORT HUENEME CA//112//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. 081300ZJAN93

2. CHARLESTON NAVAL SHIPYARD, UIC:N00191

3. CHARLESTON, SC QUAYWALL BETWEEN DRYDOCK 4 AND PIER KILO

4. 10-20 GALLONS

5. DIESEL FUEL

6. NONE

7. BOAT SINKING - A WORKBOAT SUNK PIERSIDE AFTER SHAFT PACKING GAVE WAY. OILY DISCHARGES APPEAR TO HAVE EMANATED FROM THE BOAT'S BILGES AND FUEL TANK. THE BOAT HAS BEEN RAISED.

8. A. 50' X 100'
B. BRIGHT COLOR BANDS AND SOME LIGHT BROWN
C. OUT OF WEST, 5 KTS
D. N/A
E. CONTAINED

9. A. COOPER RIVER
B. NONE
C. NONE

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DISPATCHER FRI OPB
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

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13(1)...ACT FOR NAVSTA CHARLESTON SC(1) — EMJ BOB KAY-00022 /191/

RTD:000-000/COPIES:0001

123226/2336/008 1 OF 2 M1 0939 003/23:17Z 082238Z JAN 93
CSN:RX3R1817 NAVSHIPYD CHARLESTON SC//304/106//

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10. PHONE REPORT TO NRC WAS MADE; REPORT NO. 152438
A. LT L.R. ELKIN
B. 08JAN93, 1615

11. 6004

12. DIP 3001 SKIMMER AND SORBENTS

13. NAVY - PORT SERVICES

14. NONE

15. POC: LT LES ELKIN, NAVSHIPYD CHARLESTON SC, (AV/ 563-5051
(COMM/ (803) 743-5051.//

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Bailey. COPY. TO [redacted] Please file copy in our 8P file

IMMEDIATE

O 121535Z JAN 93 PSN 142064J17

FM USS MOUNT BAKER

TO CNO WASHINGTON DC
COMLOGGRU TWO
NAVY JAG ALEXANDRIA VA

CINCLANTFLT NORFOLK VA//CDO//
COMLOGRON TWO

INFO USCINCLANT NORFOLK VA
SOPA CHARLESTON SC//CDO//
NAVSTA CHARLESTON SC//CDO//
SUPSHIP CHARLESTON SC//100/200/390//
COMNAVSEASYSCOM WASHINGTON DC//JJJ//

COMNAVMEDCOM WASHINGTON DC
COMNAVSURFGRU CHARLESTON SC//CDO//

BT
UNCLAS

MSGID/OPREP-3/MOUNT BAKER/002/JAN/-//
REF/A/VMG/USS MOUNT BAKER/121520ZJAN93/OPREP-3/-/-//
AMPN/VOICE MESSAGE TO CINCLANTFLT//
FLAGWORD/NAVYBLUE/-//
TIMELOC/121520ZJAN93/PIER ZULU NAVSTA CHASN/INIT//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/HYDRAULIC FLUID SPILL. APPROX 3-5 GALS OF FYRQUEL 220-MLT SPILLED ON HANGAR BAY WITH APPROX 2-3 GALS IN WATER. RUPTURED LINE IN HIGH PRESSURED UNIT CAUSE OF SPILL. TWO CREW MEMBERS SPRAYED WITH CHEMICAL, SHOWERED ONBOARD CONTINUOUSLY AND TRANSPORTED TO HOSPITAL. NO APPARENT INJURIES. SHIPS EMERGENCY PARTY RESPONDED AND IS CLEANING HYDRAULIC SPILL ONBOARD. APPROX 2 GALS WENT OVER BOARD THROUGH DECK DRAIN PRIOR TO HAZMAT RESPONSE TEAM GAINING ACCESS TO BLOCK DRAIN. PORT SERVICES ASSISTING IN CONTAINING AND RECOVERING SPILL. CAUSE OF RUPTURE UNKNOWN, SYSTEM INDICATED NO PRESSURE.//
RMKS/1. JAGMAN AND SAFTEY MISHAP REPORT TO BE INITIATED. MTB SAFTEY OFFICER ASSIGNED AS INVESTIGATING OFFICER. NO MEDIA INTEREST ANTICIPATED. VIOLENT CRIME REPORTING NOT APPLICABLE. AMPLIFYING REPORTS TO FOLLOW.//
BT

DISPATCHER 1.
2.
3.

DLVR:USS MOUNT BAKER(1)...ORIG
DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO
DLVR:SOPA CHARLESTON SC(5)...INFO

17(1)...INFO FOR NAVSTA CHARLESTON SC(5) 00139/ 3/0135
14(1) 111(1) 04(1) 00(1)

RTD:019-000/COPIES:0012

142064/7957/012 1 OF 2 M1 0575 012/16:44Z 121535Z JAN 93
CSN:RXBR1267

USS MOUNT BAKER
OFF
CHKR

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U —UNCLASSIFIED U
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Chief McDonald

PRIORITY ROUTINE

P R 301903Z JAN 93 PSN 263487J30

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31// COMDT COGAR WASHINGTON DC

INFO CNO WASHINGTON DC//OP-45// COMNAVFACENGCOM ALEXANDRIA VA.//
SOPA ADMIN CHARLESTON SC//N322// NEESA PORT HUENEME CA//12//
COMNAVSEASYSCOM WASHINGTON DC//00C//
FEMA REGIONAL FOUR OFFICE ATLANTA GA

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES
/SECPHN:803-743-6413/-//
RMKS/

1. CNO FOR OP-45 CHINFO

2. 301903Z JAN 93, NAVSTA CHARLESTON

3. COOPER RIVER, SIERRA-TANGO SLIP

4. 1-2 GALLONS

5. BILGE OIL

6. UNKNOWN

7. UNKNOWN

8. (A) 30 FT BY 20 FT
   (B) DULL BROWN
   (C) CALM
   (D) CALM
   (E) SLACK EBB-SOUTHERLY, 1-2 KNOTS

9. NONE

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13(1)...ORIG FOR NAVSTA CHARLESTON SC(7) 18241/ 3/0123
185(1) 18(1) 16(1) 111(1) 08(1) 00(1)

RTD:081/000/COPIES:007

263487/4371/030 1 OF 2 M1 3745 030/21:09Z 301903Z JAN 93
CSN:RX3R1786 NAVSTA CHARLESTON SC//13/00/11//

INFO
RUN-OFF
TRFC CHKS
DISTRO

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10. WAS MADE, REPORT NUMBER 155359

11. NO SAMPLES

12. NO CONTAINMENT, SLACK TIDE, USED SORBENT BOOM AND DIP 3001 OIL SKIMMER

13. SORBENT BOOM, DIP 3001

14. NAVSTA PORT SERVICES PERSONNEL

15. NONE.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

- UZYUW RUCKCHC0001 0341344-UUUU--RUCKSUU.

ZNR UUUUU

R 031344Z FEB 93 ZYB

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

NEESA PORT HUENEME CA//112//

\RD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 022000Z FEB 93.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. CHARLESTON, SC, PIER FOXTROT NORTH.

4. TEN GALLONS OIL/WATER, 50%.

5. DFM.

6. BILGE DEWATERING.

7. PROCEDURAL ERROR - OPERATOR DID NOT SOUND TANK FREQUENTLY ENOUGH FOR PUMP RATE.

A. SIZE: 30 FT BY 50 FT.

B. COLOR: BRIGHT COLOR BANDS.

C. WIND: NORTH, 10K.

D. N/A.

E. MOVEMENT: CONTAINED.

9. A. COOPER RIVER.

B. DAMAGE: NONE.

C. AREAS THREATENED: NONE.

10. PHONE REPORT TO NRC WAS MADE, REPORT NO. 156271.

A. NAME MAKING REPORT: LT L R ELKIN.

B. DATE/TIME NOTIFICATION: 02 FEB 93, 1635.

11. CONTAINMENT METHOD: BOOM.

12. SPILL REMOVAL METHOD: SORBENTS.

13. NAVY - NAVSTA PORT SERVICES.

ASSISTANCE REQUIRED/ADDITIONAL COMMENTS: NONE.

15. POINT OF CONTACT: CNSY/LT L R ELKIN/CODE 304/NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//

BT

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9. A. COOPER RIVER.
   B. DAMAGE: NONE.
   C. AREAS THREATENED: NONE.

10. PHONE REPORT TO NRC WAS MADE, REPORT NO. 156271.
    A. NAME MAKING REPORT: LT L R ELKIN.
    B. DATE/TIME NOTIFICATION: 02 FEB 93, 1635.

11. CONTAINMENT METHOD: BOOM.

12. SPILL REMOVAL METHOD: SORBENTS.

13. NAVY - NAVSTA PORT SERVICES.

14. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS: NONE.

15. POINT OF CONTACT: CNSY/LT L R ELKIN/CODE 304/NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//
BT

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1.5 TO 2 GALLONS

[redacted]

10. PORT SERVICES DISPATCHED A DIP 3001 TYPE OIL SKIMMER AND A UTILITY BOAT WITH ABSORBANT MATERIAL TO CLEAN UP THE SPILL.

11. PORT SERVICES, NAVAL STATION CHARLESTON

12. PART OF THE SPILL WAS CONTAINED ON BOARD THE DIVE BOAT WITH ABSORBANT MATERIAL.

13. PORT SERVICES DIP 3001 TYPE OIL SKIMMER AND ABSORBANT MATERIAL.

14. CW02 H.L. BRADEN, R-6 DIVISION OFFICER/DIVING OFFICER, (803) 743-4625.
BT

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PRIORITY

R 161643Z FEB 93

FM NAVSTA CHARLESTON-SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//00C//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//G-TGC-2//
COMDT COAST GUARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC//N322//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC
NEESA PORT HUENEME CA//12//
USS RICHMOND K TURNER

BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES
/SECPHN:803-743-6413/-//
MKS/

1. CNO FOR OP-45 CHINFO

2. 161600Z FEB 93

3. PIER NOVEMBER TWO ALFA

4. 2-5 GALLONS

Please make a copy for me

To ENS Disey

DISPATCHER 1.
2.
3.

DLVR:COMDESRON FOUR(5)...ACT
DLVR:USS RICHMOND K TURNER(1)...INFO

13(1)...ORIG FOR NAVSTA CHARLESTON SC(7) 18241/ 3/0123
185(1) 18(1) 16(1) 111(1) 08(1) 00(1)

002(1)...ACT FOR COMCRUDESGRU TWO(15) 05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

RTD:055-000/COPIES:~~0028~~ 7

8358 /04995/ /047 1 WSA 0008 048/00:47Z 161643Z FEB 93
CSN:BRAK0059 048/00:47Z NAVSTA CHARLESTON SC
RSN-8358 /

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165

5. DFM

6. PUMPING FUEL FROM BARGE TO SHIP

7. MONITORING ERROR, YARD OILER DIDN'T CLOSE VALVE

8. (A) 10 FT BY 20 FT

   (B) BRIGHT COLOR BANDS

   (C) NORTHERLY 10-15 KNOTS

   (D) CHOPPY

   (E) NO MOVEMENT-CURRENT COUNTERACTED WINDS

9. NONE

10. WAS MADE, REPORT NUMBER 158237

11. SAMPLES WERE NOT TAKEN

12. BOOM

13. DIP 3001, SORBENTS

14. PORT SERVICES OIL SPILL CLEAN UP TEAM

15. NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

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ADMINISTRATIVE MESSAGE

Berly
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a copy.

ROUTINE

R 162230Z FEB 93

FM USS SIERRA

TO COMNAVBASE CHARLESTON SC//N34//
COMLOGGRU TWO//JJJ//
NAVSHIPYD CHARLESTON SC//460//
NAS ATLANTA GA//70//
NAVSTA CHARLESTON SC//13//
WPNSTA CHARLESTON SC//044//

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//00C//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//

EPS DISP

BT
UNCLAS //N05090//
MSGID/GENADMIN/AD 18 SIERRA//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. 161755Z FEB 93

2. FUEL-OIL BARGE/YON-98/61165.

3. CHARLESTON, SC/PIER PAPA.

4. LESS THAN ONE GALLON.

5. DFM.

6. DEFUELING.

7. PACKING MATERIAL INSIDE CROSS OVER VALVE ON BARGE BLEW OUT CAUSING THREE GAL OF DFM TO SPILL ONTO BARGE BEFORE PUMP SECURED.

.U8
.U31
.31
.U32
.U33
.U34
DISPATCHER 1.
2.
3.

DLVR:USS SIERRA(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:0002

682 /05186/ /047 1 WSA 0020 048/02:17Z 162230Z FEB 93
CSN:BRAK0227 048/02:18Z
RSN-8582 /

USS SIERRA	
SIGN-OFF	214
UNEC CKED	10

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ESS THAN ONE GAL OF DFM WENT OVER THE SIDE.

8. TEN FEET BY ONE FOOT/BRIGHT COLOR BANDS/ON SCENE WIND: 25 KNOTS, NORTHEAST/NO SLICK MOVEMENT.

9. COOPER RIVER/NO DAMAGE TO PROPERTY, WILDLIFE OR OTHER RESOURCES.

10. LTJG WILLY/USS SIERRA AD 18 AT 1400,16FEB93. ASSIGNED REPORT NUMBER 158277.

11. SAMPLES WERE NOT TAKEN.

12. NONE/QUICK RESPONSE BY PORT SERVICES.

13. ABSORBENT PADS - SMALL BOAT (PORT SERVICES).

14. NAVY/NAVSTA CHARLESTON SC PORT SERVICES.

15. NO ASSISTANCE REQUIRED.

16. LTJG MURPHY, SAFETY OFFICER/05/(AV)563-6247, COM (803)743-6247
//
BT

PTTUZYUW RHFJSUU0001 0571406-UUUU--RHFJSUU.

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P R 2614062 FEB 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//G-TGC-2//

SOPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC

NEESA PORT HUENEME CA//12//

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES

/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 CHINFO

2. 261600Z FEB 93

3. PIER NOVEMBER THREE-ALFA

4. LESS THAN ONE GALLON

5. DFM WATER MIXTURE

6. A SHIP WAS MONITORING THE FUELING PROCESS WHEN OVERFLOW DISCHARGE

OF DFM SPILLED IN THE WATER, SHIP QUICKLY SECURED FROM FUELING OPERATIONS.

7. NOT APPLICABLE

8. (A) 10 FT BY 15 FT

(B) BRIGHT COLOR BANDS

(C) NORTH, 5 KNOTS

(D) CALM

(E) NO MOVEMENT

9. NONE

10. WAS MADE, REPORT NUMBER 159833

11. SAMPLES ~~WERE~~ NOT TAKEN

12. DUE TO LOCATION AND CURRENT AND SHIPS HULL, NO CONTAINMENT

13. SORBENTS

14. PORT SERVICES OIL SPILL CLEAN UP TEAM

NONE

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

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ɔMINISTRATIVE MESSAGE

ROUTINE

R 041511Z MAR 93

337

FM NAVSTA CHARLESTON SC//00//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//106/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//30//
CINCLANTFLT NORFOLK VA//N4422//

BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR FEBRUARY 93//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF FEBRUARY.

THERE WERE FIVE OIL SPILL INCIDENTS DURING THE MONTH OF FEBRUARY.

A. THE FIRST SPILL OCCURRED ON 2 FEBRUARY WHEN A SHIPYARD BARGE NEAR PIER FOXTROT NORTH WAS CONDUCTING BILGE DEWATERING AND SPILLED 10 GALLONS OF OIL/WATER MIXTURE INTO THE WATER. THE SPILL OCCURRED BECAUSE THE OPERATOR DID NOT SOUND THE TANK FREQUENTLY ENOUGH FOR THE PUMP RATE, AND OVERFLOW OCCURRED. THE SPILL WAS QUICKLY CONTAINED WITH OIL BOOM AND REMOVED WITH SORBENTS.

B. THE SECOND SPILL OCCURRED ON 9 FEBRUARY AT PIER MIKE WHEN A DIVE BOAT SPILLED 1.5 TO 2 GALLONS OF DIESEL FUEL INTO THE WATER PUMPING FROM TANK TO TANK. PART OF THE SPILL WAS CONTAINED ON THE DIVE BOAT WITH ABSORBENT, WHILE THE DIESEL FUEL IN THE WATER WAS CONTAINED WITH BOOM AND REMOVED WITH SORBENTS.

C. THE THIRD SPILL OCCURRED ON 16 FEBRUARY AT PIER NOVEMBER TWO ALPHA WHEN 2-5 GALLONS OF DFM WAS SPILLED INTO THE WATER WHEN A YARD

DLVR:NAVSHIPYD CHARLESTON SC(6) w.o. ...ACT
DLVR:USS DANIEL WEBSTER(1)...ACT
DLVR:COMDESRON TWO ZERO ~~(1)~~...ACT

N32(1)...ACT FOR COMNAVBASE CHARLESTO~~(1)~~ 17516/ 2/0194
01(1) 00(1) N35(1) N322(1) N3(1) N1(1)

RTD:000-000/COPIES:0~~015~~ 7

.7835/19137/ /063 1 WSA 0188 064/12:55Z 041~~511Z~~ MAR 93
JSN:PONS0516 064/12:55Z NAVSTA CHARLESTON SC
PSN-387835 /

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INFO
RUN-OFF
TRFC CHKR
DISTRO

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8. 3 FT BY 75 FT DIAMETER PATCHES, LIGHT BLUSISH SHEEN, RAINBOW.

9. (A) COOPER RIVER.
(B) NO APPARENT DAMAGE TO PROPERTY, WILF LIFE, OR RESOURCES.
(C) NONE.

10. WAS MADE, REPORT NUMBER 1o1-194.

11. NO SAMPLES WERE TAKEN.

12. SORBENT BOOM.

13. DIP 3001, SORBENT PADS, SORBENT SWEEP UNABLE TO PICK UP SUBSTANCE. DIP 3001 SKIMMED RESIDUE OFF WATER. HOWEVER SUBSTANCE DID NOT SEEM TO BE OF A OILY WASTE/WASTE OIL OR DFM PRODUCT.

14. NAVAL STATION CHARLESTON SC. PORT SERVICES PERSONNEL.

15. NONE.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

ZYUW RHFJBSV0001 0881512-UUUU--RHFJSUU.

ZNR UUUUU

P R 291512Z MAR 93

FM NAVSTA CHARLESTON SC//00/01/13//

TO COMNAVBASE CHARLESTON SC//N32//

COMCRUDESGRU TWO

COMDESRON FOUR

INFO CNO WASHINGTON DC//OP-453//

SOPA ADMIN CHARLESTON SC//105B//

NEESA PORT HUENEME CA//112F3//

COMNAVSEASYSCOM WASHINGTON DC//SEA-07//

SOUTHNAVENGFACENGCOM CHARLESTON SC//044//

COMDT COGARD WASHINGTON DC

RD MSO CHARLESTON SC

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILLREPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B. R./LCDR/61165/PORT SERVICES/TEL:803-743-6411

/TEL:563-6413//

RMKS/

1. CNO FOR OP-45 AND CHINFO.

2. 281600Z MAR 93.

3. NAVAL STATION, CHARLESTON, SC, PIER ZULU 1.

4. 7-10 GALLONS.

5. DIESEL FUEL MARINE.

UNDER INVESTIGATION.

NDER INVESTIGATION.

8. (A) 20 FT BY 20 FT.

(B) BRIGHT COLOR BANDS.

(C) NORTHERLY 1-2 KTS.

(D) CALM.

(E) EBBING.

9. NONE.

10. WAS MADE, REPORT NUMBER 164505.

11. WERE NOT TAKEN.

12. NO CONTAINMENT NECESSARY DUE TO CALM WATER AND SHIPS HULL.

13. SORBENT SWEEPS, SORBENTS.

14. PORT SERVICES, NAVAL STATION, CHARLESTON, SC.

15. NONE.

PORT SERVICES OFFICER, CODE 13, NAVAL STATION, CHARLESTON, SC, PHONE COMMERCIAL (803) 743-6413, AUTOVON 563-6413.//

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RTTUZYUW RUCKCHC0001 0911428-UUUU--RUCKSUU.
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,11428Z APR 93 ZYB
FM NAVSHIPYD CHARLESTON SC//304//
TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//
INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. DTG SPILL OCCURRED: 311530Z MAR 93.
2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.
3. SPILL LOCATION: CHARLESTON, SC; PIER GOLF NORTH.
4. AMOUNT SPILLED: 1 GALLON.
5. TYPE OF OIL SPILLED: HYDRAULIC OIL.
6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: OPERATION OF HATCH OP SYSTEM.
7. PRINCIPAL SPILL CAUSE: HOSE FAILURE - OLD HOSE FAILED DURING OP.
8 A. SIZE: 20 FT X 20 FT.
B. COLOR: SILVERY.
C. ON-SCENE WIND DIRECTION/SPEED: SW - 10K.
E. SLICK MOVEMENT: CONTAINED.
9. A. COOPER RIVER.
B. NONE.
C. NONE.
10. PHONE REPORT TO NRC WAS MADE REPORT NO. 165003.
A. LT R L JOHNSON, NAVSHIPYD CHARLESTON SC.
11. SHIPS HULL.
12. SPILL REMOVAL METHOD: SORBENTS.
14. ASSISTANCE REQUIRED: NONE.
15. POC: LT R L JOHNSON, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//
BT
#0001
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Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To Ens Disy	From LT Johnson
Co.	Co. C-304
Dept. Port Services	Phone # 5051
Fax # 9841	Fax # 9384

UNCLASSIFIED

RTTUZYUW RUCKCHC0001 0911428-UUUU--RUCKSUU.
ZNR UUUUU
R 011428Z APR 93 ZYB
FM NAVSHIPYD CHARLESTON SC//304//
TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//
INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. DTG SPILL OCCURRED: 311530Z MAR 93.
2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.
3. SPILL LOCATION: CHARLESTON, SC; PIER GOLF NORTH.
4. AMOUNT SPILLED: 1 GALLON.
5. TYPE OF OIL SPILLED: HYDRAULIC OIL.
6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: OPERATION OF HATCH OP SYSTEM.
7. PRINCIPAL SPILL CAUSE: HOSE FAILURE - OLD HOSE FAILED DURING OP.
8. A. SIZE: 20 FT X 20 FT.
B. COLOR: SILVERY.
C. ON-SCENE WIND DIRECTION/SPEED: SW - 10K.
E. SLICK MOVEMENT: CONTAINED.
9. A. COOPER RIVER.
B. NONE.
C. NONE.
10. PHONE REPORT TO NRC WAS MADE REPORT NO. 165003.
A. LT R L JOHNSON, NAVSHIPYD CHARLESTON SC.
11. SHIPS HULL.
12. SPILL REMOVAL METHOD: SORBENTS.
14. ASSISTANCE REQUIRED: NONE.
15. POC: LT R L JOHNSON, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//
BT
#0001
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U N C L A S S I F I E D U
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PRIORITY

R 091221Z APR 93

FM NAVSTA CHARLESTON SC//13/00/01//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//190/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//00/01/30//
CINCLANTFLT NORFOLK VA//N4422//

BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR MARCH 93//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF MARCH.

2. THERE WERE THREE OIL SPILL INCIDENTS DURING THE MONTH OF MARCH.
A. THE FIRST SPILL REPORTED OCCURRED ON 10 MARCH WHEN APPROXIMATELY FIVE GALLONS OF A SHEEN-LIKE RESIDUE WAS SPOTTED IN SEVERAL POCKETS AROUND PIERS ZULU, MIKE, NOVEMBER, AND PAPA. THIS AS CAUSED BY DREDGING OPERATIONS BRINGING UP BOTTOM PRODUCTS. THE SPILL WAS CONTAINED WITH SORBENT BOOM AND REMOVED WITH THE DIP 3001 OIL SKIMMER.
B. THE SECOND SPILL OCCURRED ON 28 MARCH AT PIER ZULU ONE WHEN 7-10 GALLONS OF DFM WERE DISCOVERED IN THE SLIP AREA. THE SPILL WAS QUICKLY REMOVED WITH SORBENT SWEEPS AND SORBENTS.
C. THE FINAL SPILL OF THE MONTH OCCURRED ON 31 MARCH AT PIER GOLF NORTH WHEN A BARGE SPILLED ONE GALLON OF HYDRAULIC OIL DUE TO HOSE FAILURE IN OPERATIONS OF THE HATCH OP SYSTEM. THE SPILL WAS CONTAINED BY A SHIP'S HULL AND WAS REMOVED WITH SORBENTS.

3. A TOTAL OF 11 GALLONS OF DFM AND OILY WASTE WERE SPILLED.

DLVR:NAVSHIPYD CHARLESTON SC(6)...ACT
DLVR:~~COMDESRON THREE SIX(1)...ACT~~
DLVR:~~EODMU SIX(2)...~~ACT

~~N32(1)...ACT FOR~~ COMNAVBASE CHARLESTO(6) 17516/ Z/0037
01(1) N35(1) N322(1) N3(1) N1(1)

RTD:000-000/COPIES:0015

554826/11444/ /099 1 WSA 001C 100/03:10Z 091221Z APR 93
`SN:FON50129 100/03:10Z NAVSTA CHARLESTON SC
PSN-554826 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

204

RECOVERY COST WAS 262 DOLLARS WITH 48 PORT SERVICE'S WORKHOURS EXPENDED. THIS WAS A LIGHT MONTH FOR SPILLS, LET'S KEEP IT UP.

4. DURING THE MONTH OF MARCH, PORT SERVICE'S OIL SPILL TEAM RECEIVED 2,000 FEET OF NEW CONTAINMENT BOOM. CURRENTLY PORT SERVICE'S OIL SPILL CONTAINMENT TEAM HAS 7,625 FEET OF DEPLOYABLE SLICK BAR. IN ADDITION, NAVAL STATION WILL RECEIVE 5,000 FEET OF BOOM IN JULY, BRINGING THE TOTAL NUMBER TO 12,620 FET. THE OIL SPILL RECOVERY TEAM IS TRAINING FOR QUICK AND EFFICIENT BOOM DEPLOYMENT TO INCIDENTS. BOOM IS STORED ON A BOOM BARGE AS WELL AS IN A "READY TO TOW" MARINA SLIP. THUS SPILL TEAM RESPONSE SHOULD RELATIVELY QUICK IN ALL OCCASIONS.

5. AS PER ALL RECENT REVIEWS, THE STATIONS RECOVERY TEAM REPRESENTS THE BEST TRAINED AND RESPONSIVE CLEANUP TEAM IN THE NAVY TODAY. CHARLESTON'S UNITS RARELY SPILL, AND THE ACTIONS OF THE RECOVERY TEAM ENSURE THAT THE COOPER RIVER SUFFERS NO DISCERNABLE EFFECTS FROM OIL.
//
BT

PTTUZYUW RUCKCHB0001 1031450-UUUU--RHFJSUU.

ZNR UUUUU

P R 131450 APR 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

COMDT COAST GUARD WASHINGTON DC

SOPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC

NEESA PORT HUENEME CA//12//

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES

/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 CHINFO

2. 121400Z APR 93 UNDER INVESTIGATION

3. NAVAL STATION, CHARLESTON, SC, PIERS G-H SLIP

4. 15 GALLONS

5. LUBE OIL

6. UNDER INVESTIGATION

7. UNDER INVESTIGATION, SEEMS TO HAVE BEEN COMING FROM UNDER PIER AREA AND QUAYWALL AREA

8. (A) 20 FT BY 20 FT

(B) YELLOW

(C) 5 KTS. NORTHWEST

(D) CALM

(E) EBBING

9. NONE

10. WAS MADE, REPORT NUMBER 167059

11. WERE NOT TAKEN

12. BOOM, ASORBENT BOOM

13. DIP 3001 OIL SKIMMER, SORBENTS AND SORBENT BOOM

14. PORT SERVICES, NAVSTA CHARLESTON SC

15. NONE.

PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

#0001

NNNN

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U UNCLASSIFIED U
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PRIORITY

P R 162330Z APR 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
COMDT COGARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC//N322//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC
NEESA PORT HUENEME CA//12//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
[illegible]OWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES
[illegible]HN:803-743-6413/-//

REMARKS/

1. CNO FOR OP-45 CHINFO

2. 161910Z APR 93, NAVSTA CHARLESTON

3. COOPER RIVER, SIERRA NORTH

4. 10 GALLONS

DELIVER:COMDESRON FOUR(5)...ACT

013(1)...ORIG FOR NAVSTA CHARLESTON SC(3) /13/
11(1) 00(1)

002(1)...ACT FOR COMCRUDESGRU TWO(15) 05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

RTD:000-000/COPIES:

26979/02521/ /106 1 SBA 0021 107/01:46Z 162330Z APR 93
RSN:BRAH0022 107/01:46Z NAVSTA CHARLESTON SC
PSN-026979 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

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U UNCLASSIFIED U
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. F

. NO OPERATIONS WERE OCCURRING AT TIME OF SPILL

. REACH ROD PACKING GLAND NUT WAS LOOSE AND WITH AFT TANK FULL AND FORWARD TANKS EMPTY THERE WAS A FORWARD TO AFT LIST WHICH ALLOWED SPILLAGE THROUGH PACKING GLAND.

. (A) 75 BY 75 FT
(B) LIGHT BROWN/BRIGHT COLORED BANDS
(C) NORTHWEST 15 KNOTS
(D) LESS THAN 1 FT.
(E) SLACK TIDE

. NONE

0. WAS MADE, REPORT NUMBER 167973

1. WERE NOT TAKEN

2. BOOM, ABSORBENT BOOM

3. DIP 3001 OIL SKIMMER, SORBENTS

. VSTA PORT SERVICES PERSONNEL

5. THE SOUNDING AND SECURITY WATCH REPORTED THE #7 FUEL/OIL TANK VALVE PACKING WAS LEAKING ON THE YO-225. IMMEDIATE ACTION WAS THEN TAKEN BY THE WATCH AND OIL SPILL CLEAN-UP TEAM. FUEL FROM THE AFT TANK WAS QUICKLY GRAVITY FED INTO FORWARD TANKS. ALL PACKING GLAND NUTS WERE THEN RE-TIGHTENED IN ACCORDANCE WITH PMS CHECK. 10 GALLONS OF DMF WAS LOCATED IN THE WATER, CONTAINED AND SAFELY REMOVED BY THE NAVSTA OIL SPILL CLEANUP TEAM. NO ENVIRONMENTAL IMPACT OCCURRED DUE TO THE QUICK THINKING OF BOTH THE SOUNDING AND SECURITY WATCH AND THE OIL SPILL CLEAN-UP TEAM.

6. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

T

269 /02521/ /106 2 SBA 0021 107/01:46Z 162330Z APR 93
SN:BRAH 0022 107/01:47Z NAVSTA CHARLESTON SC
PSN-026979 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

SAB

UNCLASSIFIED

PTTUZYUW RUCKCHB0001 1062330-UUUU--RHFJSUU.

UUUUU

P R 162330Z APR 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

COMDT COAST GUARD WASHINGTON DC

SOPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC

NEESA PORT HUENEME CA//12//

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES

/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 CHINFO

2. 161910Z APR 93, NAVSTA CHARLESTON

3. COOPER RIVER, SIERRA NORTH

4. 10 GALLONS

5. DMF

6. NO OPERATIONS WERE OCCURRING AT TIME OF SPILL

UNCLASSIFIED

7. REACH ROD PACKING GLAND NUT WAS LOOSE AND WITH AFT TANK FULL AND FORWARD TANKS EMPTY THERE WAS A FORWARD TO AFT LIST WHICH ALLOWED SPILLAGE THROUGH PACKING GLAND.

8. (A) 75 BY 75 FT

(B) LIGHT BROWN/BRIGHT COLORED BANDS

(C) NORTHWEST 15 KNOTS

(D) LESS THAN 1 FT.

(E) SLACK TIDE

9. NONE

10. WAS MADE, REPORT NUMBER 167973

11. WERE NOT TAKEN

12. BOOM, ABSORBENT BOOM

13. DIP 3001 OIL SKIMMER, SORBENTS

14. NAVSTA PORT SERVICES PERSONNEL

THE SOUNDING AND SECURITY WATCH REPORTED THE #7 FUEL/OIL TANK VALVE PACKING WAS LEAKING ON THE YO-225. IMMEDIATE ACTION WAS THEN TAKEN BY THE WATCH AND OIL SPILL CLEAN-UP TEAM. FUEL FROM THE AFT TANK WAS QUICKLY GRAVITY FED INTO FORWARD TANKS. ALL PACKING GLAND NUTS WERE THEN RE-TIGHTENED IN ACCORDANCE WITH PMS CHECK. 10 GALLONS OF DMF WAS LOCATED IN THE WATER, CONTAINED AND SAFELY REMOVED BY THE NAVSTA OIL SPILL CLEANUP TEAM. NO ENVIROMENTAL IMPACT OCCURRED DUE TO THE QUICK THINKING OF BOTH THE SOUNDING AND SECURITY WATCH AND THE OIL SPILL CLEAN-UP TEAM.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

#0001

PTTUZFDY RUCKSGG5091 1161600-UUUU--RHFJBSV.
ZNR UUUUU ZFD RUCKSGG
R 261635Z APR 93 ZYB PSN 850404121
FM COMNAVBASE CHARLESTON SC//N35//
INFO RHFJBSV/NAVSTA CHARLESTON SC//JJJ//
P 242002Z APR 93 PSN 611029B19
FM USCGC ESCAPE
TO COGARD MSO CHARLESTON SC
INFO CCGDSEVEN MIAMI FL//MEP//
COMCOGARDGRU CHARLESTON SC
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC
COMNAVBASE CHARLESTON SC//N34//
COMLANTAREA COGARD NEW YORK NY//AOF//
BT
UNCLAS //N16465//
SUBJ: POLREP 1 AND FINAL MDO APPROX 5 GALS, MINOR SPILL,
CGC ESCAPE, COOPER RIVER, NAVSTA CHARLESTON SC, UCN 169361
1. SITUATION:
A. 231733Q APR 93 DURING LIGHT OFFS OF MAIN DIESEL ENGINES THE RESERVE TANK RETURN VALVE WAS NOT SECURED RESULTING IN THE TANK OVER FLOWING ON TO THE STARBOARD BOAT DECK. APPROX 5 GALLONS OF DIESEL FUEL ENTERED THE WATER.
PAGE 02 RUCKSGG5091 UNCLAS
B. WX: SEAS CLAM, WIND SE 10KTS, TEMP 65 SKY CLR, TIDE FLOOD.
2. ACTION:
A. 1733Q SHIPS PERSONNEL COMMENCED CLEANUP.
B. 1735Q NOTIFIED NAVSTA CHARLESTON PORT SERVICES OF SPILL.
C. 1738Q SECURED RESERVE TANK RETURN VALVE.
D. 1743Q PORT SERVICE ON SCENE AND COMMENCED CLEANUP.
E. 1750Q PORT SERVICES INFORMED NRC OF SPILL.
F. 1752Q NOTIFIED MSO CHARLESTON OF SPILL.
1757Q DUTY CHIEF OF PORT SERVICES ARRIVED ON SCENE.
G. 1815Q PORT SERVICES COMPLETED CLEANUP, DEPARTED SCENE.
H. 1820Q SHIP'S PERSONNEL COMPLETED CLEANUP.
3. RECOMMENDATIONS:
A. BEFORE LIGHTING OFF MAINS, ENSURE ALL VALVES ARE PROPERLY ALIGNED.
BT
#5091
NNNN
13(1)...INFO FOR NAVSTA CHARLESTON SC(4)
18024/ 3/0291
17(1) 111(1) 00(1)
RID:000-000/COPIES:0004

EMS
DISY
Key

DISPATCHER 1.
2.
3.

*** MDU office codes that have received this message: ***

MDUOPR

4

293

339

RTTUZYUW RHFJSGG9792 1261700-UUUU--RUCKCHC.
ZNR UUUUU
R 061700Z MAY 93 ZYB PSN 668269B37
FM NAVSTA CHARLESTON SC//13/00/111//
TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
RUCKCHB/COMNAVBASE CHARLESTON SC//N32//
RHFJBTP/RHFJKGA/COMSUBGRU SIX//N32//
RUCKCHC/NAVSHIPYD CHARLESTON SC//190/340//
RUCLFOG/COMCOGARDGRU CHARLESTON SC//OPS//
RHFJBTM/COMNAVSURFGRU CHARLESTON SC//00/01/30//
RUCBSAA/CINCLANTFLT NORFOLK VA//N4422//
BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC//
SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR APRIL 93//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF APRIL.
2. THERE WERE FOUR OIL SPILL INCIDENTS DURING THE MONTH OF APRIL.
A. THE FIRST SPILL REPORTED OCCURRED ON 12 APRIL AT PIERS GOLF AND HOTEL WHEN 15 GALLONS OF LUBE OIL WAS SPILLED FROM A SOURCE THAT IS STILL UNDER INVESTIGATION. THE SPILL WAS CONTAINED WITH A
PAGE 02 RHFJSGG9792 UNCLAS
BOOM AND REMOVED WITH THE DIP 3001 OIL SKIMMER AND SORBENTS.
B. THE SECOND SPILL OF THE MONTH OCCURRED ON 16 APRIL AT PIER SIERRA NORTH, WHEN TEN GALLONS OF DFM FROM A YARD OILER WENT INTO THE WATER. THE REACH ROD PACKING GLAND NUT WAS LOOSE AND WITH THE AFT TANK FULL AND THE FORWARD TANK EMPTY, THERE WAS A FORWARD TO AFT LIST WHICH ALLOWED SPILLAGE THROUGH THE PACKING GLAND. THE SPILL WAS QUICKLY SECURED AND CONTAINED BY THE DUTY SECTION ON BOARD THE YO, AS WELL AS THE OIL SPILL CLEANUP TEAM. BOOM CONTAINMENT WAS USED, AND THE DIP 3001 OIL SKIMMER AND SORBENTS WERE USED TO REMOVE THE SPILL.
C. THE THIRD SPILL OF THE MONTH OCCURRED ON 23 APRIL AT PIER UNIFORM WHEN A SHIP SPILLED FIVE GALLONS OF DIESEL FUEL INTO THE WATER DURING LIGHT OFF OPERATIONS OF THE MAIN DIESEL ENGINES. A RESERVE TANK RETURN VALVE WAS NOT SECURED AND RESULTED IN TANK OVERFLOW. THE SPILL INCIDENT WAS QUICKLY ATTENDED TO AND REMOVED WITH ABSORBENT MATERIAL.
D. THE FINAL SPILL OF THE MONTH OCCURRED ON 27 APRIL AT PIER HOTEL NORTH WHEN ONE GALLON OF LUBE OIL WAS FOUND IN THE WATER. THE SOURCE IS UNKNOWN BUT PRESUMED RELATED TO PARA 2A. QUICK RESPONSE ALLOWED FOR A QUICK AND SAFE CLEANUP. THE SPILL WAS CONTAINED WITH SORBENT BOOM AND REMOVED WITH SORBENTS.
PAGE 03 RHFJSGG9792 UNCLAS
3. A TOTAL OF 31 GALLONS OF DFM AND OILY WASTE WERE SPILLED. RECOVERY COST WAS 3,412 DOLLARS WITH 65 PORT SERVICES' WORK HOURS EXPENDED. WITH THE BUSY SPRING AND SUMMER OPERATIONS APPROACHING, OIL SPILL INCIDENTS TEND TO INCREASE AS ACTIVITY INCREASES. THIS

MONTH BROUGHT FOUR SPILLS THAT WERE CAUSED, IN PART, BY EQUIPMENT PARTS THAT WEREN'T PROPERLY TIGHTENED OR SECURED. CARELESSNESS WILL GET YOU EVERY TIME AND CAN BE PREVENTED.
4. IN ADDITION TO THE SAFE CLEANUP AND REMOVAL OF OIL SPILLS, THE PORT SERVICES' OIL SPILL RECOVERY TEAM PRACTICES A PREVENTATIVE PROGRAM OF MONITORING THE BARGES AND PIER AREAS ON A DAILY BASIS. THE TEAM CHECKS FOR CLEANLINESS AND POSSIBLE OIL SPILL INCIDENTS IN WAITING. THIS HAS PAID OFF, AS THE WATERFRONT KEEPS PRESSING TO PRESERVE THE COOPER RIVER. NO ADVERSE RESULTS ARE SEEN TO DATE.//
BT
#9792
NNNN
DLVR:NAVSHIPYD CHARLESTON SC(6)...ACT
DLVR:COMDESRON THREE SIX(1)...ACT
DLVR:COMDESRON TWO ZERO(1)...ACT
DLVR:EODMU SIX(2)...ACT
N32(1)...ACT FOR COMNAVBASE CHARLESTO(6)
17516/ 2/0037
01(1) N35(1) N322(1) N3(1) N1(1)
RTD:000-000/COPIES:0016

*** MDU office codes that have received this message: ***

ADMIN

UNCLASSIFIED

"UZYUW RUCKCHC0001 1411743-UUUU--RUCKSUU.
.. UUUUU
R 211743Z MAY 93 ZYB
FM NAVSHIPYD CHARLESTON SC//304//
TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//
INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. 21/0900Z MAY 93.
2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.
3. SPILL LOCATION: CHARLESTON SC; DRYDOCK #2, PIER F N.
4. AMOUNT SPILLED: 1 QUART.
5. TYPE OF OIL SPILLED: DFM.
6. OPERATIONS UNDERWAY AT TIME OF SPILL: UNKNOWN.
7. PRINCIPAL SPILL CAUSE: UNKNOWN - SPILL DISCOVERED ON SHIFTING TIDE.
   A. SIZE: 25 FT X 25 FT.
   B. COLOR: BRIGHT COLOR BANDS.
   C. ON-SCENE WIND DIRECTION/SPEED: SOUTH, 5.
   E. SLICK MOVEMENT: CONTAINED.
9. A. COOPER RIVER.
   B. EXTENT OF DAMAGE: NONE.
   C. AREAS THREATENED: NONE.
10. PHONE REPORT TO NRC WAS: REPORT NO. 175294.
   A. PERSON MAKING REPORT: BT1(SW) R V HILL NAVSHIPYD CHARLESTON.
   B. DATE OF TIME: 210845Z MAY 93.
11. CONTAINMENT METHOD: SHIPS HULL AND PIER.
12. SPILL REMOVAL METHOD: SORBENTS.
13. NAVY - NAVSTA PORT SERVICES.
14. ASSISTANCE REQUIRED: NONE.
15. POC: BT1(SW) R V HILL, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//
//
BT
#0001
NNNN

UNCLASSIFIED

UZYUW RUCKCHC0001 1411743-UUUU--RUCKSUU.
UUUUU
R 1743Z MAY 93 ZYB
FM NAVSHIPYD CHARLESTON SC//304//
TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//
INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RMKS/1. 21/0900Z MAY 93.
2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.
3. SPILL LOCATION: CHARLESTON SC; DRYDOCK #2, PIER F N.
4. AMOUNT SPILLED: 1 QUART.
5. TYPE OF OIL SPILLED: DFM.
6. OPERATIONS UNDERWAY AT TIME OF SPILL: UNKNOWN.
7. PRINCIPAL SPILL CAUSE: UNKNOWN - SPILL DISCOVERED ON SHIFTING TIDE.
A. SIZE: 25 FT X 25 FT.
B. COLOR: BRIGHT COLOR BANDS.
C. ON-SCENE WIND DIRECTION/SPEED: SOUTH, 5.
E. SLICK MOVEMENT: CONTAINED.
9. A. COOPER RIVER.
B. EXTENT OF DAMAGE: NONE.
C. AREAS THREATENED: NONE.
10. PHONE REPORT TO NRC WAS: REPORT NO. 175294.
A. PERSON MAKING REPORT: BT1(SW) R V HILL NAVSHIPYD CHARLESTON.
B. DATE OF TIME: 210845Z MAY 93.
11. CONTAINMENT METHOD: SHIPS HULL AND PIER.
12. SPILL REMOVAL METHOD: SORBENTS.
13. NAVY - NAVSTA PORT SERVICES.
14. ASSISTANCE REQUIRED: NONE.
15. POC: BT1(SW) R V HILL, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//
//
BT
#0001
NNNN

UNCLASSIFIED

PLEASE NOTE: On the final message do not type information which is italic and not circled/selected form the listings given.

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34/N32//

Choose appropriate NOSCDR:

NAVSHIPYD CHARLESTON SC//106// *(land spill@South Complex)*

NAVSTA CHARLESTON SC//13// *(water spill@South Complex)*

~~NAVSTA CHARLESTON SC//011//~~ *(spill@North Complex)*

INFO CNO WASHINGTON DC//N45//

~~CHINFO WASHINGTON DC//JJJ//~~

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//DOC24//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRIA VA//JAG 81//

SOPA CHARLESTON SC

~~BOM TOM DAVISAW (1-800-424-8802)~~

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN//

RMKS/1. *DTG Spill occurred, note 'Z' is +5 fall, +4 spring:* 262045 JAN 94

2. CHARLESTON NAVAL SHIPYARD UIC: N00189

3. *Spill location: Spill in port list port name & berth, list ship, list bldg or area #:* Charleston Naval Shipyard Pier Charlie Berth 4/6

4. *Amount spilled: best est. Also if oil/water mix indicate % oil:* Approx 55 gallons

5. *Type of oil spilled, choose one - DFM, Navy distillate, NSFO, Jet fuel JP-4 or JP-5, Lube/Hydraulic oil, Oil/water mixture, Unknown, or other (specify):* Lube oil

6. *Operations underway when spill occurred, choose one - Fueling/ defueling, Internal transfer of fuel, Bilge dewatering, Salvage, Unknown, or other (specify):* Bilge dewatering

7. *Indicate principal spill cause, provide narrative - Structural failure, Hose failure, Equipment failure, Collision/grounding/sinking, Valve misalignment, Procedural/communications error, Unknown, or other (specify):* procedural error during bilge dewater

UNCLASSIFIED

8. *Slick description:*

A. *Size* 6 ft X 12 ft

B. ~~*Color choose one—barely visible, silvery, faint color, bright color bands, dull brown, or dark brown:*~~ yellowish brown

C. *On-scene wind direction/speed:* light and variable

D. N/A

E. *Slick movement direction/speed:* Contained between Pier & Ship

9. A. COOPER RIVER

B. *Extent of damage to property, wildlife:* None

C. *Areas or resources threatened:* None

10. PHONE REPORT TO NRC (1-800-424-8802) WAS ~~WAS NOT~~ MADE

A. *Name of person & Command making report:* LT Elkin, Charleston Naval Shipyard

B. *Date and time of notification:* 1900 local, report no. 218860

11. SAMPLES ~~WERE~~ WERE NOT TAKEN.

12. *Containment method used choose one Boom, Ship's hull, Camel, Water spray, Chemical agent, or other (specify):* Ship's hull & pier

13. *Spill removal method used choose one - DIP 1002 skimmer, DIP 3001 skimmer, SLURP skimmer, sorbents, dispersants, vacuum trucks/pumps, or other (specify):* Sorbents

14. NAVY - NAVSTA PORT SERVICES ~~*(or other specify):*~~

15. *Assistance required/additional comments:* N/A

16. POC, LT Elkin, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//

BT

PLEASE NOTE: On the final message do not type information which is italic and not circled/selected form the listings given.

RTTUZYUW RUCKCHC0001 0271200-UUUU--RUCKSUU.

NR UUUUU

R 271200Z JAN 94 ZYB

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34/N32//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/92MAY15//

AMPN/REF A IS COMNAVBASECHASNTNST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 262045Z JAN 94.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. CHARLESTON NAVAL SHIPYARD, PIER CHARLIE, BERTH 4/6.

APPROX 5 GALLONS

300A

DO

5. LUBE OIL.

BILGE DEWATERING.

7. PROCEDURAL ERROR DURING BILGE DEWATERING WITH VACUUM CAN.

8. A. 6 FT X 12 FT

B. YELLOWISH BROWN

C. LIGHT AND VARIABLE

D. N/A

E. CONTAINED BETWEEN PIER AND SHIP.

9. A. COOPER RIVER

B. NONE

C. NONE

10. PHONE REPORT TO NRC WAS MADE.

A. LT ELKIN, CHARLESTON NAVAL SHIPYARD

B. 1900 LOCAL, REPORT NO. 218860

11. SAMPLES WERE NOT TAKEN.

12. SHIP HULL AND PIER.

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. N/A

16. POC: LT ELKIN, NAVSHIPYD CHARLESTON SC, (AV)563-5051, (803) 743-5051.//

BT

#0001

NNNN

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RITY

P 290102Z JAN 94 PSN 459930J30

FM USS GUARDIAN

TO COMNAVBASE CHARLESTON SC//N34/N32//
NAVSTA CHARLESTON SC//13//
COMCMGRU INGLESIDE TX//JJJ//

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//181//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
COMINEWARCOM CORPUS CHRISTI TX//JJJ//
NAVY JAG ALEXANDRIA VA//JJJ//
SOPA CHARLESTON SC

BT
UNCLAS //N05090//

MSGID/GENADMIN/USS GUARDIAN MCM 5/-/-//

/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. SPILL OCCURRED AT 281555Z JAN 94.

2. USS GUARDIAN (MCM 5), UIC 21406.

3. SPILL LOCATION AT CHARLESTON NAVAL STATION, PIER QUEBEC.

4. AMOUNT SPILLED WAS APPROX 1 GALLON.

DISPATCHER FRI
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

LT KRAUSMAN

DLVR:SOPA CHARLESTON SC(1)...INFO
DLVR:USS GUARDIAN(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

13
131
132
133
134

54/16524/ /029 1 SBA 0039 029/03:46Z 290102Z JAN 94
BSVE0014 029/03:46Z USS GUARDIAN
PSN-021354 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
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TYPE OF OIL SPILLED WAS OIL/OIL MIXTURE.

6. OPERATION WHEN SPILL OCCURRED: BILGE DEWATERING TO OILY WASTE TRUCK.

7. CAUSE OF SPILL: VALVE PARTIALLY OPEN TO ONBD OILY WASTE TANK WHICH OVERFLOWED.

8. SLICK DESCRIPTION AND MOVEMENT: SLICK APPROX TEN FT BY ONE FT, DARK BROWN, WINDS ARE FROM THE SOUTH AT 7 KTS, SEA STATE IS 0 FT. SLICK WAS CONTAINED BETWEEN USS GUARDIAN AND CRANE BARGE ON STBD SIDE.

9. AREA AFFECTED IS THE COOPER RIVER. THERE ARE NO DAMAGED OR THREATENED AREAS DUE TO OIL SPILL. EXPECT NO DAMAGE TO WILDLIFE OR PROPERTY. SPILL IMMEDIATELY CONTAINED AND REMOVED WITH ONBD ABSORBENT PADS.

10. PHONCON REPORT WAS MADE TO THE NATIONAL RESPONSE CENTER BY LT B.G. WOODS, USS GUARDIAN, AT 281700Z JAN 94.

11. SAMPLES WERE NOT TAKEN DUE IMMEDIATE SPILL RECOVERY.

12. CONTAINMENT METHOD USED WAS OIL BOOM AND FIREHOSES TRAPPING OIL BETWEEN SHIP AND CRANE BARGE UNTIL REMOVAL WAS COMPLETED.

13. SPILL REMOVAL METHOD USED WAS ABSORBENT PADS.

14. PARTY PERFORMING SPILL REMOVAL WAS US NAVY (USS GUARDIAN).

15. NO ASSISTANCE REQUIRED.

16. POC FOR ADDITIONAL INFORMATION IS LT PASCHAL, AUTOVON 563-5356, COMM (803) 743-5356.//
BT

UNCLASSIFIED

01 03 021702Z FEB 94 RR RR UUUU 0331702

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/92MAY15//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 021405Z FEB 94.

MMCM(SS) M. J. DRENTLAW, X5051 306, 10L, NRRO CHASN

DOCKING OFFICE

CDR K. M. MCCOY, OPERATIONS OFCR

UNCLASSIFIED

02 03 021702Z FEB 94 RR RR UUUU 0331702

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. CHARLESTON NAVAL SHIPYARD, DRYDOCK 5 BASIN.

4. BEST ESTIMATE: 200 GALLONS.

5. DIESEL FUEL.

6. EMPTYING VACUUM CAN.

7. SPILL OCCURRED WHEN SHOP PERSONNEL ATTEMPTED TO EMPTY A FULL VACUUM CAN. WORKER BELIEVED THE CAN CONTAINED ONLY WATER AND PROCEEDED TO DRAIN THE CAN. DURING THE DRAINING PROCEDURE, THE HOSE END SEPARATED AND A PORTION OF THE CONTENTS DUMPED INTO THE BASIN OF DRYDOCK 5. AT THIS POINT IT WAS REALIZED THAT THE TANK CONTAINED FUEL OIL, THE DRAINING WAS STOPPED, DRYDOCK PUMPS WERE SECURED, AND AN OIL SPILL RESPONSE WAS INITIATED.

8. A. N/A.

   B. N/A

   C. N/A

   D. N/A

   E. N/A

9. A. N/A

   B. NONE

   C. NONE

03 03 021702Z FEB 94 RR RR UUUU 0331702

10. PHONE REPORT TO NRC WAS MADE.

A. MMCM(SS) MICHAEL DRENTLAW, CNSY DOCKING OFFICE.

B. 02FEB94 1000 HRS.

11. SAMPLES WERE TAKEN.

12. CONTAINED WITHIN CONFINES OF DRYDOCK 5.

13. VACUUM PUMPS AND SORBENTS.

14. CNSY

15. NONE. A FORMAL INVESTIGATION WAS CONDUCTED. STEPS ARE BEING TAKEN TO ENSURE CONTENTS OF TANKS ARE POSITIVELY KNOWN PRIOR TO DRAINAGE.

16. POC: MMCM(SS) M. J. DRENTLAW, NAVSHIPYD CHARLESTON SC, (AV) 563-5051, (803) 743-5051.//

RTTUZYUW RUCLEOC0001 0461740-UUUU--RULYSUU.
ZNR UUUUU
R 151740Z FEB 94 ZYB
FM USS FRANK CABLE
TO COMNAVBASE CHARLESTON SC//N34//
INFO CNO WASHINGTON DC//OP45//
CINCLANTFLT NORFOLK VA//JJJ//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//JJJ//
COMSUBLANT NORFOLK VA//JJJ//
COMSUBGRU SIX
ZEN/COMSUBRON FOUR
SOPA CHARLESTON SC
NAVSTA CHARLESTON SC//18/13//
BT
UNCLAS //N05090//
MSGID/GENADMIN/USS FRANK CABLE//
SUBJ/HAZARDOUS SUBSTANCE RELEASE REPORT (REPORT SYMBOL OPNAV 5090-3)//
RMKS/1. 151350ZFEB94//
2. USS FRANK CABLE (AS 40) UIC 20865
3. CHARLESTON NAVAL BASE/PIER MIKE
4. PHOTOGRAPHY LAB
5. COLOR PROCESSOR KCP-16
6. KODAK EKTA PRINT 2 BLEACH FIX PART A AND PART B MIXED WORKING SOLUTION. MIXTURE CONSISTED OF 85% WATER, 5-10% AMMONIUM THIOSULFATE, 1-5% AMMONIUM FERRIC ETHYLENEDIAMINETETRAACETIC ACID. SUBSTANCE RELEASED IS A LIGHT RED LIQUID WITH A SLIGHT AMMONIA AND SULFER DIOXIDE ODOR. IT HAS A PH OF 6.4-6.7 AND IS COMPLETELY SOLUBLE IN WATER. MSDS STATES TO FLUSH TO SEWER WITH LARGE AMOUNTS OF WATER IN CASE OF ACCIDENTAL RELEASE. WHEN DILUTED WITH A LARGE AMOUNT OF WATER, THIS MATERIAL RELEASED DIRECTLY OR INDIRECTLY INTO THE ENVIRONMENT IS NOT EXPECTED TO HAVE A SIGNIFICANT IMPACT, ACCORDING TO THE MSDS.
7. NONE DUE TO IMMEDIATE DISPERSAL BY TIDAL CURRENTS.
8. 10-12 GALLONS
9. AN UNKNOWN CHEMICAL RED IN COLOR WAS NOTICED BEING DISCHARGED FROM STARBOARD SIDE AFT. THE HAZARDOUS SPILL CLEAN UP TEAM CONTAINED
MOST OF THE SPILL IN A PUNT. THE SPILL TEAM WAS UNABLE TO CONTAIN ALL (APPROXIMATELY 50% CONTAINED) OF THE CHEMICAL. AN IMMEDIATE SEARCH WAS CONDUCTED FOR THE SOURCE WITH THE FOLLOWING RESULTS. KCP
16 COLOR PROCESSSOR WAS BEING REFILLED. INVESTIGATION SHOWED THAT THE CHEMICAL OVER FLOW HOSES WERE NOT PLACED IN COLLECTION BOTTLES. MACHINE WAS SECURED. THE CAUSE OF RELEASE WAS PERSONNEL ERROR, FAILURE TO FOLLOW PROCEDURE.
10. CHEMICAL DISCOLORATION/CONCENTRATION IN WATER WAS DISPERSED AND
DILUTED BY INCOMING TIDE.
11. NATIONAL RESPONSE CENTER SER # 221763 AND NAVAL STATION

CHARLESTON, PORT SERVICES.
12. CONTROLLING ACTIONS: SECURED MACHINE AND REPLENISHMENT TANK, MAJORITY OF SPILL WAS CONTAINED IN PAINT FLOAT.
13. SPILL RESPONSE TEAM CONTAINORIZED THE MATERIAL, TURNED IN AS HAZARDOUS WASTE.
14. POC ENS PEACOCK, R-0 DIVISION OFFICER 803-743-6027//
BT
#0001

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 10:30 DATE: 2-7-94 WHO RECEIVED CALL: MARY

PERSON REPORTING SPILL: _____ SHOP: _____ PHONE: _____

MATERIAL: OIL QUANTITY: UNK

SPILL LOCATION: Pier West End Quaywall

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES NO

WHAT SPILLED? OIL FROM UNKNOWN SOURCE

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	10:00
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	7
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE	CELLULAR PHONE
WAYNE NEVILLE		763-9371	729-2547
GENE RORIE			

A LIVE SEAGULL WAS FOUND IN THIS OIL SHEEN. HE WAS INSURED. I CALLED CUSY PEST CONTROL WAS NOTIFIED AND RESPONDED AT 15:00

COPIER

01 03 171808Z FEB 94 RR RR UUUU 0481808

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 171815Z FEB 94.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. PIERS C AND D QUAYWALL.

MMCM(SS) M. J. DRENTLAW, X5051 304, 106
NRRO CHASN

DOCKING OFFICE

CDR D. E. BIES, OPERATIONS OFCR

02 03 171808Z FEB 94 RR RR UUUU 0481808

4. APPROX ONE GALLON.

5. UNKNOWN.

6. NO OPERATIONS IN PROGRESS. DISCOVERED THROUGH LIGHT FILM ON WATER.

7. UNKNOWN.

8. A. 10 FT X 10 FT

   B. DARK BROWN

   C. NORTHEAST, 10 KTS

   D. N/A

   E. NO MOVEMENT

9. A. COOPER RIVER

   B. ONE SEAGULL

   C. NONE

10. PHONE REPORT TO NRC WAS MADE.

    A. MMCM(SS) DRENTLAW, CNSY CODE 307, REPORT NO. 222123.

    B. 17 FEB 94, 1405 LOCAL.

11. SAMPLES WERE NOT TAKEN.

12. SORBENTS, CAMEL, QUAYWALL AND BOOM.

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES.

03 03 171808Z FEB 94 RR RR UUUU 0481808

15. NONE

16. POC: MMCM(SS) DRENTLAW, NAVSHIPYD CHARLESTON SC, (AV)563-5342, (803)743-5051.//

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 10:15 DATE: 3/2/94 WHO RECEIVED CALL: Mary

PERSON REPORTING SPILL: Bob ADAMS SHOP: WORK CTR 49 PHONE: 5129

MATERIAL: Anti freeze QUANTITY: Unk / mix with water

SPILL LOCATION: Beginning of C Pier

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES ~~NO~~
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? ~~YES~~ NO

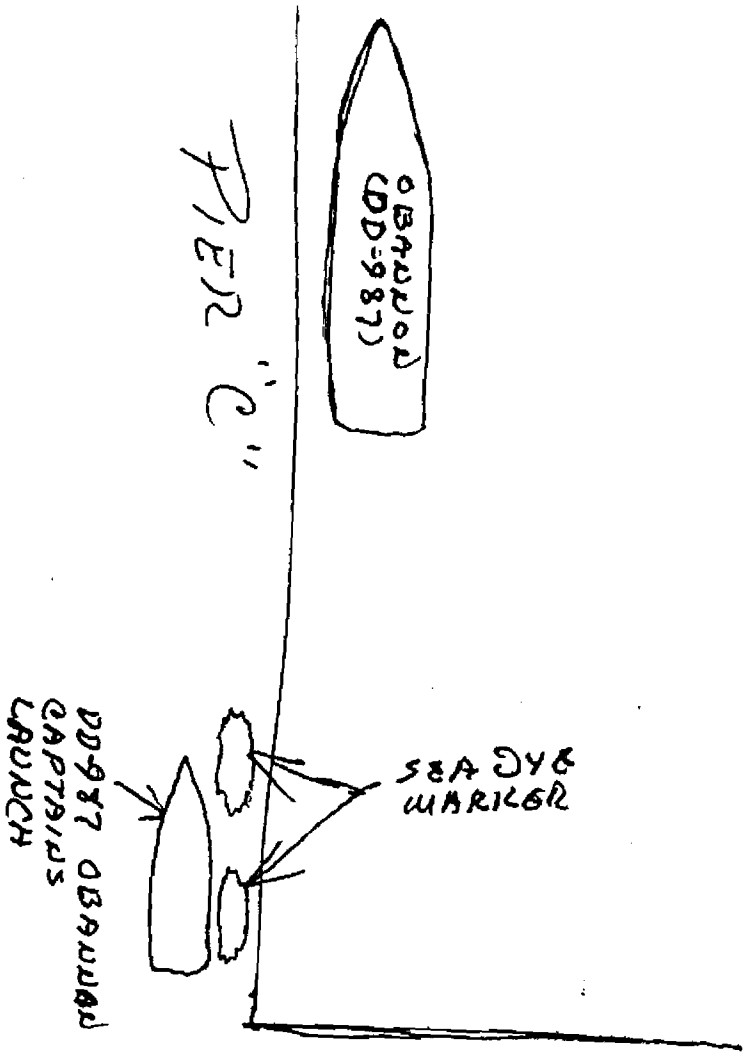
WHAT SPILLED? Pump Bilge - over pier Green like Antifreeze

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE	CELLULAR PHONE
WAYNE NEVILLE		763-9371	729-2547
GENE RORIE			



ON 3/2/94 AT 1015 HRS SEA-DYE MARKER WAS RELEASED FROM THE OBANNON (DD-987) "C" CAPTAINS LAUNCH ON THE HEAD OF PIER "C". AFTER TALKING WITH THE OBANNON DUTY OFFICER, HE IMPLIED SHIPS FORCE WOULD TAKE CARE OF THE CLEAN-UP

GEORGE BORIE

PTTUZYUW RUCKCHB0001 1521601-UUUU--RHFJSUU.

ZNR UUUUU

P R 011601Z JUN 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//G-TGC-2//

COMDT COAST GUARD WASHINGTON DC

SOPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC

NEESA PORT HUENEME CA//12//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES

/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 CHINFO

2. 011600Z JUN 93, NAVSTA CHARLESTON SC

3. COOPER RIVER, KILO SOUTH

4. 10 GALLONS

5. P M

B727 COPIER

6. TRANSFER OF FUEL FROM FUEL FARM TO YARD OILER

7. SURGE OF FUEL FROM FUEL FARM AND BURP IN FUEL LINE ON YARD OILER

8. (A) 50 FT BY 50 FT

   (B) BLUE RAINBOW

   (C) SOUTHWEST, LIGHT BREEZE

   (D) CALM

   (E) EBB TIDE 1-3 KTS

9. (A) COOPER RIVER

   (B) NONE

   (C) NONE

10. WAS MADE, REPORT NUMBER 177557

11. NONE

12. SLICK BAR BOOM

13. SORBENTS, DIP 3001, SKIMMER

14. NAVSTA PORT SERVICES PERSONNEL

15. YARD OILER CREW WAS TRANSFERRING FUEL FROM THE FUEL FARM TO #7 TANK WHEN A SURGE OF FUEL PLUS A BURP IN THE FUEL LINE CAUSED AN IMMEDIATE SPILLAGE, WHICH SPLASHED OVER THE GUNNEL INTO THE WATER. A SLICK BAR BOOM WAS IN PLACE. NO ADVERSE IMPACT TO THE ENVIRONMENT.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

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IMMEDIATE

O ..1410Z JUN 93

FM USS SEAHORSE

TO COMNAVBASE CHARLESTON SC//34//
NAVSHIPYD CHARLESTON SC//460//
NAS ATLANTA GA//70//
NAVSTA CHARLESTON SC//13//
WPNSTA CHARLESTON SC//044//
COMSUBLANT NORFOLK VA//44//
COMSUBGRU SIX//3//
ZEN/COMSUBRON FOUR//JJJ//

INFO CNO WASHINGTON DC//OP-45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

ENB DISY

BT
UNCLAS //N05090//

1. /GENADMIN/USS SEAHORSE/013/JUN//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. GMT DTG SPILL OCCURRED: 071245ZJUN93.

2. SHIP ORIGINATING SPILL:

A. USS SEAHORSE SSN 669 05151

3. SPILL LOCATION:
A. CHARLESTON NAVY BASE PIER M BERTH 2A

4. AMOUNT SPILLED: 10-20 GALLONS OIL/WATER MIXTURE 50 PERCENT.

13
134
131
132
133
134
DISPATCHER 1.
2.
3.

DLVR:USS SEAHORSE(1)...ORIG

N32(1)...ACT FOR COMSUBGRU SIX(9) 05090/ 1/0359
013(1) 01D(1) 01(1) 00A(1) N51(1) N5(1) N4(1) FILE(1)

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

0(/07742/ /158 1 SBA 0029 158/21:01Z 071410Z JUN 93
CS..SVH0069 158/21:01Z USS SEAHORSE
PSN-000175 /

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5. TYPE OF OIL SPILLED: OIL/WATER MIXTURE, INCLUDING BILGE WASTE.

6. OPERATION UNDERWAY WHEN SPILL OCCURRED:
A. BILGE DEWATERING.

7. SPILL CAUSE: AIR POCKET IN BILGE COLLECTING TANK CAUSED RELEASE OF OIL THROUGH TANK BOTTOM.

8. SLICK DESCRIPTION AND MOVEMENT:
A. SIZE-LENGTH AND WIDTH: 7FT X 50FT.
B. COLOR: DULL BROWN.
C. ON SCENE WIND-DIRECTION/SPEED: 5KTS WESTERLY
D. SEASTATE: 0
E. SLICK MOVEMENT-DIRECTION/SPEED: SLICK CONTAINED BETWEEN INBOARD AND OUTBOARD UNITS.

9. AREAS AFFECTED:
A. NAME OF BODY OF WATER AFFECTED: COOPER RIVER.
B. NATURE AND EXTENT OF DAMAGE TO PROPERTY, WILDLIFE, OR OTHER RESOURCES, IF ANY: NONE.
C. AREAS OR RESOURCES THREATENED:NONE.

10. TELEPHONIC REPORT TO NRC WAS MADE.
A. NAME OF PERSON AND COMMAND MAKING REPORT: LCDR K. ZUMBAR, USS SEAHORSE (SSN 669).
B. DATE AND TIME OF NOTIFICATION: 071357ZJUN93.
C. NRC REPORT NO: 1788468.

11. CONTAINMENT METHOD USED:
A. SHIP'S HULL AND ADJOINING SHIP.

12. SPILL REMOVAL METHOD USED:
A. SORBENTS, OIL ABSORBING PADS.

13. PARTIES PERFORMING SPILL REMOVAL:
A. NAVY-COMNAVBASE CHARLESTON SC

14. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS:NONE.

15. ACTIVITY CONTACT FOR ADDITIONAL INFORMATION:
LCDR K. ZUMBAR, USN
USS SEAHORSE SSN 669, FPO AA 34093
DSN 563-4759/COMM 803-743-4759.//
BT

0 5/07742/ /158 2 SBA 0029 158/21:01Z 071410Z JUN 93
CSN..BSVH0069 158/21:01Z USS SEAHORSE
PSN-000175 /
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ADMINISTRATIVE MESSAGE

PRIORITY

P 201830Z JUN 93

FM USS ROBERT G BRADLEY

TO COMNAVBASE CHARLESTON SC//N31//
NAVSHIPYD CHARLESTON SC//460//
COMCRUDESGRU EIGHT
COMDESRON FOUR

INFO CNO WASHINGTON DC//OP-45//
COMNAVSURFLANT NORFOLK VA//N434//
COMNAVSEASYSCOM WASHINGTON DC//00C//
NAVY JAG ALEXANDRIA VA//31//
NEESA PORT HUENEME CA//112//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
USS SIERRA

BT
[illegible]AS //05090//

MSGID/GENADMIN/RG BRADLEY//

SUBJ/OIL SPILL REPORT//

RMKS/1. 201245Z JUN 93.

2. ROBERT G. BRADLEY FFG-49, UIC 21201.

3. SPILL LOCATION: CHARLESTON NAVAL BASE, PIER PAPA, 1A.

4. AMOUNT SPILLED IN GALLONS: ESTIMATE FOUR (4) GALLONS BASED ON THICKNESS AND DISPERSION.

5. TYPE OF OIL SPILLED: OILY WASTE.

DISPATCHER FRI ____
SAT ____
SUN ____

DUTY CHIEF FRI ____
SAT ____
SUN ____

DLVR:NAVSHIPYD CHARLESTON SC(6)...ACT
DLVR:SOUTHNAVFACENGCOM CHARLESTON SC(5)...INFO

N34(1)...ACT FOR COMNAVBASE CHARLESTO(6) 19666/ 3/0083
N1(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:

13 ____
131 ____
132 ____
133 ____
134 ____

028484/09109/ /171 1 SBA 0058 171/23:22Z 201830Z JUN 93
CSN:CHBH0028 171/23:22Z USS ROBERT G BRADLEY
PSN-028484 /

OPERATION UNDER WAY WHEN SPILL OCCURRED: NONE.

7. SPILL CAUSE: OIL OBSERVED COMING UNDER THE PIER MOVING IN A NORTHERLY DIRECTION. RGB MOORED PAPA 1A, A NORTH SIDE BERTH. OILY WASTE SETTLED AGAINST THE SHIP. IT'S ORIGIN UNKNOWN.

8. SLICK DESCRIPTION AND MOVEMENT: FOUR (4) FEET BY TWENTY-FIVE (25) FEET, BLACK AND GREEN, WIND 121 DEGREES TRUE AT FOUR (4) KNOTS, SEA STATE OF 0. THE SLICK SETTLED AGAINST THE SHIP WHILE AT FLOOD TIDE.

9. AREAS DAMAGED OR THREATENED: THE IMMEDIATE FOUR (4) FEET X TWENTY-FIVE (25) FEET AREA OF THE SPILL.

10. TELEPHONIC REPORT TO NRC WAS MADE. OIL SPILL ASSIGNED 181456 IDENTIFICATION NBR.

11. SAMPLES WERE TAKEN.

12. CONTAINMENT METHOD PLANNED OR USED: SHIP'S FORCE SURROUNDED SPILL WITH FIREHOSES TO PREVENT IT FROM SPREADING.

13. SPILL REMOVAL METHOD PLANNED OR USED: ABSORBENT SWEEPS WERE USED TO ABSORB OILY WASTE.

14. PARTIES PERFORMING SPILL REMOVAL: RGB OIL SPILL CONTAINMENT KIT WAS USED. SHIP'S FORCE AND NAVAL BASE CHARLESTON SC PORT SERVICES REMOVED OILY WASTE.

15. ASSISTANCE REQUIRED OR ADDITIONAL COMMENTS: BASED ON DIRECTION OF OIL MOVEMENT, OIL APPEARED TO HAVE ORIGINATED DOWN RIVER AND SETTLED AGAINST RGB SHIP DURING FLOOD TIDE.

16. ACTIVITY CONTACT FOR ADDITIONAL INFORMATION: NAVAL BASE CHARLESTON PORT SERVICES.//

BT

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U UNCLASSIFIED U
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IMMEDIATE

O 061740Z JUL 93

FM USS FAHRION

TO COMDESRON SIX

INFO CINCLANTFLT NORFOLK VA
COMNAVSURFLANT NORFOLK VA
COMNAVSURFGRU CHARLESTON SC
NAVSTA CHARLESTON SC
COMNAVBASE CHARLESTON SC

BT
UNCLAS

MSGID/UNITSITREP/FAHRION/005/JUL//
FLAGWORD/-/UNITSITREP//
TIMELOC/061350ZJUL93/CHARLESTON SC/FINAL//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/

1. GMT DTG SPILL DISCOVERED: 061348Z JUL 93

2. SHIP ORIGINATING SPILL: USS FAHRION

3. SPILL LOCATION: VICINITY PIER NOVEMBER CHARLESTON SC

4. AMOUNT SPILLED: TWO-THREE GALLONS

5. TYPE OF OIL SPILLED: WASTE WATER WITH OILY RESIDUE

6. OPERATION: NOT U/W WHEN SPILL OCCURRED

7. SPILL CAUSE: WHILE PUMPING OILY WASTE FM AMR 3 BILGES TO AUX 3 OILY WASTE TANK UTILIZING PORTABLE PNEUMATIC PUMP, MIXTURE OF WASTE WATER WITH OILY RESIDUE DISCHARGED THROUGH A HOLE IN SIDE OF OILY WASTE TANK AIR ESCAPE ON 02 LVL. APPROX 2-3 GALLONS WASTE WATER WITH OILY RESIDUE SPRAYED OVER SIDE PRODUCING A LIGHT SHEEN WHICH QUICKLY DISPERSED. WHEN USING PORTABLE PNEUMATIC PUMP TANK LEVEL CAN NOT BE

DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO
DLVR:USS FAHRION(1)...ORIG

111(1)...INFO FOR NAVSTA CHARLESTON SC(4) 17801/ 3/0002
17(1) 14(1) 00(1)

RTD:000-000/COPIES:

008681/10592/ /187 1 SBA 0035 187/22:10Z 061740Z JUL 93
CSN:BSVH0028 187/22:10Z USS FAHRION
PSN-008681 /

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DISPATCHER 1.
2.
3.

ACCURATELY MONITORED BY TLI. WASTE WATER OVERFLOW WOULD HAVE BEEN CONTAINED ON 02 LVL EXCEPT FOR HOLE IN AIR ESCAPE PIPING. ALERT WATCHSTANDING AND RAPID ACTION BY GSM2 ON 02 LVL PREVENTED FURTHER DISCHARGE OVER SIDE. QUICK RESPONSE BY NAVSTA CHASN PORTSVCS SMALL BOATS AND SHIP'S FORCE IN PUNT QUICKLY PICKED UP OILY RESIDUE/SHEEN WITH ABSORBENT MATS.

8. SLICK DESCRIPTION AND MOVEMENT: SLICK PICKED UP USING OIL SPILL CONTAINMENT EQUIP PROVIDED BY PORT SERVICES NAVSTA CHASN AND SHIPS FORCE.

9. TELEPHONIC REPORT TO NATIONAL RESPONSE CENTER: NOT MADE

10. SPILL REMOVAL METHOD USED: OIL ABSORPTION SHEETS.

11. POC: LT STAPLETON DSN: 563-2176 COMM: (803) 743-2181//

RMKS/LAST REPORT THIS INCIDENT//
BT

SM1
PRIEBE

PTTUZYUW RUCKSGG5033 1871605-UUUU--RHFJBWW.
ZNR UUUUU
P 061605Z JUL 93 PSN 331903J19
FM USS TAYLOR
TO RHFJBTM/COMDESRON FOUR
INFO RUCBTFA/COMNAVSURFLANT NORFOLK VA//JJJ//
RUCBSAA/CINCLANTFLT NORFOLK VA//CDO//
RUCKCHB/COMNAVBASE CHARLESTON SC//N32//
RUCKCHB/COMNAVBASE CHARLESTON SC//N13//
BT
UNCLAS //N03120//
MSGID/UNIT SITREP/TAYLOR/008//
FLAGWORD/-/UNITSITREP//
TIMELOC/061420Z/INPT CHASN/FINAL//
GENTEXT/INCIDENT IDENTIFICATION AND DETAILS/ WHILE INPORT CHARLESTON NAVAL BASE BERTH Z4A, CREWMEMBER REPORTED OILY WASTE BEING EMITTED FROM OILY WASTE TANK VENT 5-164-0-F. APPROXIMATELY 3 GALLONS OF OILY WASTE OVERFLOWED ONTO THE PORT SIDE MAINDECK. SPILL WAS CONTAINED BY SF TO MAIN DECK. SIMULTANEOUSLY, S/F NOTED OIL SHEEN LIMITED TO 10FT BY 10FT TOTAL AND APPROX 1PT IN SLIP BETWEEN PIERS ZULU AND MIKE. SOURCE COULD NOT BE DETERMINED. PORT SERVICES NOTIFIED AND HAS CONDUCTED CLEAN UP.//
PAGE 02 RUCKSGG5033 UNCLAS
RMKS/NO PRESS INTEREST LIKELY. ABLE TO CONTINUE PRESENT MISSION. MISHAP REPORT NOT REQUIRED.//
BT
#5033
NNNN
DLVR:COMDESRON FOUR(1)...ACT
DLVR:USS TAYLOR(1)...ORIG
RTD:000-000/COPIES:

*** MDU office codes that have received this message: ***

ADMIN	CICO	CO	COMMO	CSC
CSO	ENG	LPO	MDUOPR	NAV
OPS	SUPPO	XO		

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MINE

R 072200Z JUL 93

FM USS SANTA BARBARA

TO COMNAVBASE CHARLESTON SC//N31//
NAVSTA CHARLESTON SC//13//
COMNAVSURFGRU CHARLESTON SC//N02L//
SOPA CHARLESTON SC//JJJ//
COMLOGRON TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//00C//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//
NAVY JAG ALEXANDRIA VA//JAG31//
COMCRUDESGRU TWO

ENS Riley

BT
UNCLAS //N05090//

MSGID/GENADMIN/SANTA BARBARA/025/JUL//

/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
RICHARDSON/LT/USS SANTA BARBARA/NAVSTA CHARLESTON/TEL:AV 564-4383
//

RMKS/1. 071818ZJUL93

2. USS SANTA BARBARA, AE-28, 20111

3. NAVSTA CHARLESTON SC, PIER ZULU

4. 5 GALS

5. DIESEL FUEL MARINE

DISPATCHER FRI
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

PROTECT FOR RHFJBSV
PROTECT FOR RHFJBTI
PROTECT FOR RHFJBTM
DLVR:SOUTHNAVFACENGCOM CHARLESTON SC(5)...INFO

N34(1)...ACT FOR COMNAVBASE CHARLESTO(6) 19666/ 3/0088 13/18
01(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:
13
131
132
133
134

46/10838/ /188 1 SBA 0109 189/21:57Z 072200Z JUL 93
CSN:CHBH0146 189/21:57Z USS SANTA BARBARA
PSN-007246 /

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DEFUELING

7. VALVE MISALIGNMENT - F/O TANK RECENTLY EMPTIED WAS MISTAKENLY ALIGNED FOR FILL. TANK OVERFLOWED TO FLIGHT DECK. SHIP SCUPPERS WERE BLOCKED. DAMAGED SCUPPER ALLOWED FUEL TO SPILL OVER ONTO BARGE. FUEL SPILLED FROM BARGE TO WATER.

8. A. LENGTH - 60 FT, WIDTH - 60 FT.
   B. SILVERY.
   C. SOUTHEAST 1 KNOT
   D. SEA STATE - 1.

9. A. COOPER RIVER
   B. NONE
   C. NONE

10. TELEPHONE REPORT TO NATIONAL RESPONSE CENTER WAS MADE NRC REPORT NR 184865 (RCVD BY PO LLOYD).

11. SAMPLES WERE NOT TAKEN. AMOUNT OF FUEL SPILLED WAS INSUFFICIENT TO ALLOW FOR SAMPLES.

12. WATER SPRAY.

13. USE OF SORBENTS ATTEMPTED, INSUFFICIENT AMOUNT OF FUEL FOR SORBENTS TO BE COMPLETELY EFFECTIVE.

14. USS SANTA BARBARA/NAVSTA CHASN PORT SERVICES

15. SPILL OF NOT MORE THAN 5 GALS VERIFIED BY MR RICE OF NAVSTA CHASN FUEL FARM. NOTIFIED NAVSTA CHASN PORT SERVICES, COMNAVSURFGRU CHASN, COMLOGRON TWO, AND NATIONAL RESPONSE CENTER. INTERNAL INVESTIGATION/CORRECTIVE ACTIONS IN PROGRESS.//
BT

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U U N C L A S S I F I E D U
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TUZYUW RUCKSGG2163 1901245-UUUU--RHFJBSF RHFJBSY RHFJBTH RHFJBTF
RHFJBTQ.
ZNR UUUUU
RHFJBTM T COMDESRON FOUR
RHFJBTP T COMSUBGRU SIX
RHFJBTQ T COOPMINERON TWO TWO
RHFJBWU T USS SANTA BARBARA
RHFJVTA T COMCRUDESGRU TWO
R 091245Z JUL 93 ZYB PSN 975591836
FM NAVSTA CHARLESTON SC//13/00/111//
TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
RUCKCHB/COMNAVBASE CHARLESTON SC//N32//
RHFJBTP/RHFJKGA/COMSUBGRU SIX//N32//
RUCKCHC/NAVSHIPYD CHARLESTON SC//190/340//
RUCLFOG/COMCOGARDGRU CHARLESTON SC//OPS//
RHFJBTM/COMNAVSURFGRU CHARLESTON SC//00/01/30//
RUCBSAA/CINCLANTFLT NORFOLK VA//N4422//
RUENJAG/NAVY JAG ALEXANDRIA VA//JAG31//
BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS
AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//
SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR JUNE 93//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS
PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF
JUNE.
THERE WERE FOUR OIL SPILL INCIDENTS DURING THE MONTH OF JUNE.
A. THE FIRST SPILL OCCURRED ON 01 JUNE AT PIER KILO SOUTH WHEN
PAGE 02 RUCKSGG2163 UNCLAS
TEN GALLONS OF DFM SPILLED INTO THE WATER DURING THE TRANSFER OF FUEL
FROM THE FUEL FARM TO A YARD OILER. THE INCIDENT OCCURRED WHEN A BURP
IN THE FUEL LINE CAUSED IMMEDIATE SPILLAGE. DUE TO SLICK BAR ALREADY
IN POSITION, THERE WAS NO ADVERSE EFFECTS TO THE ENVIRONMENT. THE
SPILL WAS QUICKLY CONTAINED AND REMOVED WITH SORBENTS AND THE DIP
3001 OIL SKIMMER.
B. THE SECOND SPILL OCCURRED ON 07 JUNE AT PIER MIKE WHEN A SHIP
SPILLED APPROXIMATELY 10-20 GALLONS OF OILY/WATER MIXTURE FROM A
BILGE COLLECTING TANK WHILE CONDUCTING BILGE DEWATERING OPERATIONS.
AN AIR POCKET HAD FORMED IN THE BILGE COLLECTING TANK CAUSING A
RELEASE OF OIL THROUGH THE TANK'S BOTTOM. SPILL WAS CONTAINED BY THE
SHIP'S HULL AND AN ADJOINING SHIP. SPILL REMOVAL WAS BY SORBENT
PADS.
C. THE THIRD SPILL OCCURRED ON 20 JUNE AT PIER PAPA ONE ALFA
WHEN AN ESTIMATED FOUR GALLONS OF OILY WASTE SPILLED DURING AN
UNDERWAY OPERATION. EXACT ORIGIN IS UNKNOWN, BUT SPILL WAS OBSERVED
TRAVELING OUT FROM UNDERNEATH THE PIER MOVING IN A NORTHERLY
DIRECTION AND COLLECTING ON THE SIDE OF A MOORED SHIP. SPILL WAS
CONTAINED BY THE SHIP'S HULL AND WATER PRESSURE FROM HOSES. SPILL
WAS REMOVED BY SORBENTS.
PAGE 03 RUCKSGG2163 UNCLAS

591/10704/ /190 1 WSA 1143 190/21:50Z
ON:PDCH1500 190/22:29Z
UNMATCHED RI /

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304/306 Johnston

23 Copies
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"TUZYUW RUCKCHC0001 1931356-UUUU--RUCKSUU.

ZNR UUUUU

R 121356Z JUL 93 ZYB

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 101510Z JUL 93.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. SPILL LOCATION: CHARLESTON SC; PIER GOLF SOUTH; MARAD SHIP CAPE ALAVA.

4. AMOUNT SPILLED: 2 GALLONS.

5. TYPE OF OIL SPILLED: BLACK FUEL OIL FOR MERCHANT SHIP.

6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: INTERNAL TRANSFER OF FUEL DURING DOCK TRIALS.

7. PRINCIPLE SPILL CAUSE: EQUIPMENT FAILURE - A RISER CAP ON FWD

"BD SIDE WAS LOOSE AND LEAKED DURING OIL TRANSFER.

8. A. SIZE: 150 FT X 100 FT.

B. COLOR: DULL BROWN.

C. ON-SCENE WIND DIRECTION/SPEED: ZERO.

D. N/A

E. SLICK MOVEMENT: CONTAINED.

9. A. COOPER RIVER

B. EXTENT OF DAMAGE: NONE.

C. AREAS THREATENED: CONTAINED.

10. PHONE REPORT TO NRC WAS ~~X~~ MADE; REPORT NO. 185450.

A. PERSON MAKING REPORT: LCDR C. D. HANSON, NAVSHIPYD CHARLESTON.

B. DATE AND TIME: 1255, 10 JUL 93.

11. CONTAINMENT METHOD: BOOM AND SHIP'S HULL.

12. SPILL REMOVAL METHOD: SORBENTS AND DIP 3001 SKIMMER.

13. NAVY - NAVSTA PORT SERVICES.

14. ~~ASSISTANCE REQUIRED.~~ ADDITIONAL COMMENTS: CLEANUP COMPLETED 1255, 10 JUL 93.

15. POC: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON SC, (AV) 563-5051, (803) 743-5051.//

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ADMINISTRATIVE MESSAGE

ROUTINE

R 121356Z JUL 93

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 101510Z JUL 93.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. SPILL LOCATION: CHARLESTON SC; PIER GOLF SOUTH; MARAD SHIP CAPE ALAVA.

4. AMOUNT SPILLED: 2 GALLONS.

5. TYPE OF OIL SPILLED: BLACK FUEL OIL FOR MERCHANT SHIP.

6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: INTERNAL TRANSFER OF FUEL DURING DOCK TRIALS.

7. PRINCIPLE SPILL CAUSE: EQUIPMENT FAILURE - A RISER CAP ON FWD STBD SIDE WAS LOOSE AND LEAKED DURING OIL TRANSFER.

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13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

002 /11280/ /193 1 SBA 0043 193/21:00Z 121356Z JUL 93
CSN:BSVH0075 193/21:00Z NAVSHIPYD CHARLESTON SC
PSN-002807 /

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A. SIZE: 150 FT X 100 FT.
B. COLOR: DULL BROWN.
C. ON-SCENE WIND DIRECTION/SPEED: ZERO.
D. N/A
E. SLICK MOVEMENT: CONTAINED.

9. A. COOPER RIVER
B. EXTENT OF DAMAGE: NONE.
C. AREAS THREATENED: CONTAINED.

10. PHONE REPORT TO NRC WAS MADE: REPORT NO. 185450.
A. PERSON MAKING REPORT: LCDR C. D. HANSON, NAVSHIPYD CHARLESTON.
B. DATE AND TIME: 1255, 10 JUL 93.

11. CONTAINMENT METHOD: BOOM AND SHIP'S HULL.

12. SPILL REMOVAL METHOD: SORBENTS AND DIP 3001 SKIMMER.

13. NAVY - NAVSTA PORT SERVICES.

14. ADDITIONAL COMMENTS: CLEANUP COMPLETED 1255, 10 JUL 93.

15. POC: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON SC, (AV) 563-5051, (803) 743-5051.//

'TUZYUW RUCKCHC0001 1961635-UUUU--RUCKSUU.

ZNR UUUUU

R 151635Z JUL 93 ZYB

FM NAVSHIPYD CHARLESTON SC//304//

[redacted]

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

)GARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 151315Z JUL 93.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. SPILL LOCATION: CHARLESTON SC; PIER GOLF SOUTH; MARAD SHIP CAPE ALAVA.

4. AMOUNT SPILLED: 15-20 GALLONS.

5. TYPE OF OIL SPILLED: OIL/WATER MIXTURE 60% OIL.

6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: BILGE DEWATERING DURING DOCK TRIALS.

. PRINCIPLE SPILL CAUSE: STRUCTURAL FAILURE - YSR-32 HULL WELD

M SPLIT. BILGE DEWATERING WAS IN PROGRESS.

8. A. SIZE: 50 FT X 150 FT.

B. COLOR: BRIGHT COLOR BANDS.

C. ON-SCENE WIND DIRECTION/SPEED: SOUTH 5-10.

D. N/A

E. SLICK MOVEMENT: CONTAINED.

9. A. COOPER RIVER

B. EXTENT OF DAMAGE: NONE.

C. AREAS THREATENED: CONTAINED.

10. PHONE REPORT TO NRC WAS MADE: REPORT NO. 186480.

A. PERSON MAKING REPORT: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON.

B. DATE AND TIME: 1201, 15 JUL 93.

. CONTAINMENT METHOD: BOOM, DC WEDGES IN WELD SEAM.

12. SPILL REMOVAL METHOD: SORBENTS AND OIL BOOM.

13. NAVY - NAVSTA PORT SERVICES.

14. ADDITIONAL COMMENTS: YSR PUMPED OFF AT 1040, SPILL STOPPED. YSR WILL BE WELD REPAIRED.

15. POC: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON SC, (AV) 563-5051, (803) 743-5051.//

BT

#0001

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[redacted]

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

NEESA PORT HUENEME CA//112//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON/SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

RMKS/1. 151315Z JUL 93.

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. SPILL LOCATION: CHARLESTON SC; PIER GOLF SOUTH; MARAD SHIP CAPE ALAVA.

4. AMOUNT SPILLED: 15-20 GALLONS.

5. TYPE OF OIL SPILLED: OIL/WATER MIXTURE 60% OIL.

6. OPERATIONS UNDERWAY WHEN SPILL OCCURRED: BILGE DEWATERING DURING DOCK TRIALS.

7. PRINCIPLE SPILL CAUSE: STRUCTURAL FAILURE - YSR-32 HULL WELD

SEAM SPLIT. BILGE DEWATERING WAS IN PROGRESS.

8. A. SIZE: 50 FT X 150 FT.

B. COLOR: BRIGHT COLOR BANDS.

C. ON-SCENE WIND DIRECTION/SPEED: SOUTH 5-10.

D. N/A

E. SLICK MOVEMENT: CONTAINED.

9. A. COOPER RIVER

B. EXTENT OF DAMAGE: NONE.

C. AREAS THREATENED: CONTAINED.

10. PHONE REPORT TO NRC WAS MADE: REPORT NO. 186480.

A. PERSON MAKING REPORT: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON.

B. DATE AND TIME: 1201, 15 JUL 93.

11. CONTAINMENT METHOD: BOOM, DC WEDGES IN WELD SEAM.

12. SPILL REMOVAL METHOD: SORBENTS AND OIL BOOM.

13. NAVY - NAVSTA PORT SERVICES.

14. ADDITIONAL COMMENTS: YSR PUMPED OFF AT 1040, SPILL STOPPED. YSR WILL BE WELD REPAIRED.

15. POC: LT R. L. JOHNSON, NAVSHIPYD CHARLESTON SC, (AV) 563-5051, (803) 743-5051.//

BT

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ADMINISTRATIVE MESSAGE

PRIORITY

P 301930Z JUL 93 ZYB PSN 493112J20

FM USS TAYLOR

TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//460//
NAS ATLANTA GA//70//
NAVSTA CHARLESTON SC//13//
WPNSTA CHARLESTON SC//044//
COMDESRON FOUR

INFO CNO WASHINGTON DC//OP-45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
UNCLAS //N05090//

MSGID/GENADMIN/TAYLOR/-/JUL//

SUBJ/OIL SPILL REPORT//

REF/A/DOC/COMNAVBASECHASN/15MAY92//

AMPN/COMNAVBASECHASNINST 5090.6//

RMKS/1. 301420ZJUL93

2. USS TAYLOR, FFG-50, V21231

3. PIER ZULU, BERTH 4A, CHARLESTON NAVAL STATION

4. 50 GAL

DISPATCHER FRI
SAT
SUN

DUTY CHIEF FRI
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DLVR:COMDESRON FOUR(1)...ACT
DLVR:USS TAYLOR(1)...ORIG

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

13
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133
134

60/01580/ /211 1 SBA 0009 212/00:33Z 301930Z JUL 93
USN:BSVH0009 212/00:33Z USS TAYLOR
PSN-031760 /

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DFM

6. FUELING

7. SPILL CAUSED BY FAULTY TLI. WHEN TLI INDICATED 85 PERCENT FULL, PRESSURE WAS REDUCED TO MINIMUM TO PREVENT OVERFILLING. REPORT WAS RECEIVED OF FUEL COMING OUT OF OVERBOARD OVERFLOW AND PUMPING WAS SECURED IMMEDIATELY. SOUNDINGS SHOWED THE TANK TO BE AT 100 PERCENT WHEN THE TLI SHOWED 85 PERCENT. TLI HAS BEEN CALIBRATED WITHIN LAST TWO WEEKS. TLI NOW LISTED AS OOC.

8. SLICK WAS APPROX 100 SQ YDS, FAINT IN COLOR, AND MOVING DOWNSTREAM WITH THE CURRENT.

9. SPILL OCCURED ON COOPER RIVER.

10. TELEPHONIC REPORT WAS MADE TO NATIONAL RESPONSE CENTER. REPORT MADE BY LTJG JOHN STEPHERSON OF USS TAYLOR AT 301445ZJUL93.

11. CONTAINMENT PROCEDURES INCLUDED WATER SPRAY FROM FORE AND AFT AND THE EMPLOYMENT OF AN ABSORPTIVE BOOM ATTACHED TO THE SHIP'S HULL.

12. SPILL WAS REMOVED BY OIL ABSORBING PADS.

13. SPILL REMOVAL CONDUCTED BY NAVAL BASE PORT SERVICES.

NO ASSISTANCE REQUIRED.

15. LT BLACK, CHIEF ENGINEER, (AV) 563-5454, (COMMERCIAL) (803) 743-5454.//
BT

5090
Ser 106.25/1070

MEMORANDUM

From: Code 106.25
To: Code 106.2

Subj: ENVIRONMENTAL INCIDENT REPORT #93-006

1. Nature of incident: Sewage overflow at manhole, resulting from a cloged line.

2. Location of incident: 13th Street and River Road

3. When notified: Date: 31 Jul 93 Time: 0810

4. Notified by: Chief of the watch

5. Immediate action taken: The Battery Shop and other surrounding buildings connected to that particular sewer line were requested to discontinue sewer release until the problem could be resolved. Environmental was requested to come in, due to the uncertainty of the amount of sewage released on the ground and into the river. After Code 106 surveyed the area and talking with Public Works, it was determined that mostly water had been released on the ground and that very little of that, if any, actually went into the river.

6. Follow up action taken or planned: No follow-up action planned, due to the inability to determine what caused the problem.

GENE RORIE

Copy to:
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106.2
999
106.2DF
SUBRON FOUR

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AKW

TUZYUW RUCKCHB0003 2151002-UUUU--RHFJSUU.

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R 031002Z AUG 93

NAVSTA CHARLESTON SC//13/00/11//

COMNAVBASE CHARLESTON SC//N31//

MDESRON FOUR

MCRUDESGRU TWO

NFO CNO WASHINGTON DC//OP-45//

MNAVSEASYSCOM WASHINGTON DC//00C//

VY JAG ALEXANDRIA VA//JAG 31//

MNAVSURFLANT CHARLESTON SC//N02L//

MNAVSURFGRU CHARLESTON SC//N02S/N02L//

MDT COAST GUARD WASHINGTON DC

ADMIN CHARLESTON SC//N322//

NAVFACENGCOM CHARLESTON SC//044//

GARD MSO CHARLESTON SC

ESA PORT HUENEME CA//12//

.

ICLAS //N05090//

GID/GENADMIN/NAVSTA CHARLESTON SC/013//

BJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

C/DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES

ECPHN:803-743-6413/-//

KS/

CNO FOR OP-45 AND CHINFO

010600Z AUG 93, NAVSTA CHARLESTON SC

COOPER RIVER, NOVEMBER SOUTH

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P R 041033Z AUG 93

FM NAVSTA CHARLESTON SC//13/00/11//

TO COMNAVBASE CHARLESTON SC//N31//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
NAVY JAG ALEXANDRIA VA//JAG 31//
COMNAVSURFLANT CHARLESTON SC//N02L//
COMNAVSURFGRU CHARLESTON SC//N02S/N02L//
COMDT COAST GUARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC//N322//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC
NEESA PORT HUENEME CA//12//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
PO DOWNS, B. R. /LCDR/PRIPHN:563-6413/-/PORT SERVICES
/SECPHN:803-743-6413/-//

RMKS/

1. CNO FOR OP-45 AND CHINFO

ENS Disy

2. 031000Z AUG 93, NAVSTA CHARLESTON SC

3. COOPER RIVER, SIERRA/TANGO QUAYWALL

4. 15 GALLONS

5. WASTE OIL

6. PUMPING FROM BARGE TO BARGE

7. TANK SUCTION VALVE PACKING GLAND FAILED, CAUSING WASTE OIL TO LEAK INTO THE WATER.

8. (A) 75 FT BY 100 FT
(B) BRIGHT COLOR BANDS
(C) SOUTHERLY, 2 KTS

/01964/ /216 1 SBA 0096 217/22:09Z 041033Z AUG 93
041033ZA 217/22:10Z NAVSTA CHARLESTON SC
V0013611652 /

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DISPATCHER I.

(D) CALM
(E) SLACK TIDE, LESS THAN ONE KNOT

9. (A) COOPER RIVER
(B) NONE
(C) NONE

10. WAS MADE, REPORT NUMBER 190363

11. SAMPLES WERE NOT TAKEN

12. NO CONTAINMENT DUE TO SLACK TIDE

13. DIP 3001 SKIMMER, SORBENTS

14. NAVAL STATION PORT SERVICES PERSONNEL

15. A LOOSE PACKING GLAND ON WASTE OIL BARGE FAILED ALLOWING FLUID TO LEAK THROUGH SUCTION VALVE. ALL OILY WASTE REMOVED FROM RIVER CAUSING NO ENVIRONMENTAL DAMAGE.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

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INE

R 060215Z AUG 93 PSN 530248J22

FM USS SAND LANCE

TO COMNAVBASE CHARLESTON SC//N31//
NAVSTA CHARLESTON SC//13/00/11//
COMSUBRON FOUR//00//30//

INFO CNO WASHINGTON DC//OP-45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
NEESA PORT HUENEME CA//112//
COGARD MSO CHARLESTON SC//JJJ//
SOPA ADMIN CHARLESTON SC//N322//
NAVY JAG ALEXANDRIA VA//JAG 31//
COMNAVSURFLANT NORFOLK VA//N022//
COMNAVSURFGRU CHARLESTON SC//N025/N021//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

BT
LAS //N05090//

ENS DISY

MSGID/GENADMIN/SAND LANCE//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

RMKS/

1. 032130Z AUG 93

2. USS SAND LANCE (SSN-660)

3. NAVAL STATION CHARLESTON SC, PIER NOVEMBER SOUTH

4. 30 GALLONS

5. BILGE WASTE

DISPATCHER FRI
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DUTY CHIEF FRI
SAT
SUN

DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO

13(1)...ACT FOR NAVSTA CHARLESTON SC(3) /19/
11(1) 00(1)

RTD:000-000/COPIES:

241/02072/ /218 1 SBA 0071 218/20:30Z 060215Z AUG 93
CSN:BSVH0076 218/20:30Z USS SAND LANCE
PSN-008241 /

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U U N C L A S S I F I E D U
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BILGE DEWATERING TO WASTE OIL COLLECTION TANK

7. MALFUNCTION OF WASTE OIL COLLECTION TANK LEVEL GAGE RESULTED IN OVERFILLING TANK.

8. A. 15FT BY 15FT
   B. DARK BROWN/BLACK
   C. NORTHERLY/5-6 KTS
   D. CALM
   E. FLOOD CURRENT, LESS THAN 0.5 KTS.

9. A. COOPER RIVER
   B. NONE
   C. NONE

10. WAS MADE, REPORT NUMBER 190502
   A. LT J.D. GORDON, SDO, USS SAND LANCE
   B. 032100Z AUG 93

11. SHIP'S HULL, BOOM

12. DIP 3001 SKIMMER, SORBENTS

13. NAVAL STATION PORT SERVICES PERSONNEL

14. NO ASSISTANCE REQUIRED. CLEAN-UP COMPLETE.

15. OPERATIONS OFFICER, LT GORDON, DSN 563-3268, COMM (803)743-3268//
BT

UZYUW RUCLEOO0860 2361600-UUUU--RULYSUU.
ZNR UUUUU
R 241600Z AUG 93
FM USS ORTOLAN
TO COMNAVBASE CHARLESTON SC//N34//
NAVSHIPYD CHARLESTON SC//460//
INFO CNO WASHINGTON DC//N45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//1823//
COMSUBRON FOUR
BT
UNCLAS //N05090//
MSGID/GENADMIN/ORTOLAN//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
POC/B.G.CLARK/CDR/-/-/TEL:DSN 563-3897/TEL:COMM 803-743-3897//
RMKS/1. DTG SPILL OCCURED: 241420Z AUG 93
2. ACTIVITY ORIGINATING RELEASE: USS ORTOLAN (ASR-22), UIC 20144.
3. SPILL LOCATION: CHARLESTON NAVAL STATION PIER "ROMEO"
4. AMOUNT SPILLED: 03 GALLONS
5. TYPE OF OIL SPILLED: HYDRAULIC
6. OPERATIONS WHEN SPILL OCCURRED: BRIDGE CRANE OPERATIONS
7. SPILL CAUSE: RUPTURE OF A HYDRAULIC CROSS CONNECT FITTING.
8. SLICK DESCRIPTION AND MOVEMENT: SIZE 15 FT BY 20 FT, COLOR BARELY VISIBLE, ON SCENE WIND 3 MPH, SLICK MOVEMENT WAS CONTAINED BETWEEN HULLS OF SHIP.
9. AREA AFFECTED: COOPER RIVER BETWEEN SHIPS HULLS
10. PHONE REPORT TO NRC WAS MADE: REPORT NO. 194-308
11. SAMPLES WERE NOT TAKEN BY SHIPS FORCE.
12. SPILL REMOVAL METHOD USED: SORBENTS
13. PARTIES PERFORMING SPILL REMOVAL: SHIPS FORCE
14. ASSISTANCE REQUIRED/ADDITIONAL COMMENTS: NO ASSISTANCE WAS REQUIRED.//
BT
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ADMINISTRATIVE MESSAGE

PRIORITY

P R 272300Z SEP 93 ZYB PSN 824821J25

FM FISC CHARLESTON SC //700//

TO COMDT COGARD WASHINGTON DC//JJJ//
COMNAVBASE CHARLESTON SC//JJJ//

INFO CNO WASHINGTON DC//JJJ//
COMNAVSUPSYSCOM WASHINGTON DC//JJJ//
NAVPETOFF ALEXANDRIA VA//JJJ//
COMNAVFACENGCOM ALEXANDRIA VA//JJJ//
NEESA PORT HUENEME CA//JJJ//
EPA REGION IV ATLANTA GA//JJJ//
NAVSTA CHARLESTON SC//JJJ//
USS SANTA BARBARA

BT
UNCLAS //N03100//

MSGID/GENADMIN/FISC CHARLESTON/700//

SUBJ/OIL SPILL REPORT//

RMKS/1. SPILL TIME/LOC: 272015Z SEP 93
FISC CHARLESTON SC N00612

2. SPILL IDENTIFICATION

A. N/A
B. N/A
C. SPILL LOCATION: PIER ZULU NAVSTA CHARLESTON SC
D. AMOUNT SPILLED: 20 PLUS GALLONS
E. TYPE OF SPILL: DIESEL FUEL MARINE (DFM)
F. OPERATION UNDERWAY WHEN SPILL OCCURRED: FUELING USS SANTA BARBARA
G. SPILL CAUSE: STRUCTURAL FAILURE
H. SLICK DESCRIPTION AND MOVEMENT: LIGHT SHEEN OF FUEL TRAPPED UNDERNEATH PIER. SOME MOVEMENT OUT FROM UNDER PIER WHEN AT LOW TIDE

DISPATCHER 1. 2. 9-2

DLVR:USS SANTA BARBARA(1)...INFO

13(1)...INFO FOR NAVSTA CHARLESTON SC(7) 18241/ 3/0123
185(1) 18(1) 16(1) 111(1) 08(1) 00(1)

RTD:000-000/COPIES:

004078/07058/ /270 1 SBA 0023 271/10:59Z 272300Z SEP 93
CSN:BSVH0023 271/10:59Z FISC CHARLESTON SC
PSN-004078 /

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AND LOWER PART OF PIER CLEARS WATER. PIER IS SHELTERED AND WATER IS CALM.
I. AREAS THREATENED OR DAMAGED: NONE
J. TELEPHONIC REPORT TO NRC WAS MADE TO PETTY OFFICER MAUDLIN. CASE FILE NUMBER 199788 WAS ASSIGNED.
K. SAMPLES WERE NOT TAKEN.
L. CONTAINMENT METHOD PLANNED/USED: CONTAINMENT BOOM HAS BEEN PLACED AROUND ACCESSIBLE AREAS SOUTH OF PIER ZULU. THE HULL OF THE USS SANTA BARBARA PROVIDES CONTAINMENT TO THE NORTH OF PIER ZULU.
M. SPILL REMOVAL METHOD PLANNED/USED: SORBENT PADS ARE BEING UTILIZED WITHIN THE PIER STRUCTURE.
N. PARTIES PERFORMING SPILL REMOVAL: FISC CHARLESTON FUEL DEPARTMENT AND NAVSTA CHARLESTON PORT SERVICES PERSONNEL

3. REMARKS: SPILL OCCURRED DUE TO THE RUPTURE OF AN EXPANSION JOINT WITHIN THE EIGHT INCH DFM ISSUE LINE ON PIER ZULU. EVOLUTION IN PROGRESS WAS IN THE FINAL STAGES AND THE PIPELINE WAS AT LOW PRESSURE (30 PSI). THE PIPELINE RUNS UNDERNEATH THE PIER WITHIN A CONTAINMENT TROUGH AND THE RUPTURED JOINT WAS LOCATED APPROXIMATELY 70 FEET DOWNSTREAM FROM THE PIER RISER. THE EXPANSION JOINT RUPTURED AND THE LAST SECTION OF PIPELINE DROPPED IN SUCH A WAY AS TO PINCH OFF THE LINE AND MINIMIZE THE AMOUNT SPILLED. THE MAJORITY OF THE FUEL REMAINED WITHIN THE CONTAINMENT TROUGH, ALTHOUGH A SMALL AMOUNT OF THE FUEL REACHED THE WATER THROUGH A RUBBER EXPANSION JOINT BETWEEN THE CONCRETE SECTIONS OF THE PIER. CLEAN-UP IS HAMPERED BY THE PIER DESIGN AND WILL TAKE SEVERAL DAYS TO CONDUCT. HOWEVER, SPILL SHOULD REMAIN CONTAINED THROUGHOUT THE CLEAN-UP PERIOD. NO PRESS INTEREST IS ANTICIPATED. MISHAP REPORT NOT REQUIRED. POC: LT A.W. SNODGRASS, FUEL DEPARTMENT DIRECTOR, COMM 803-743-6086, DSN 563-6086.//
BT

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R 102146Z OCT 93 PSN 896404J31

M NAVSTA CHARLESTON SC//13/00/11//

O COMNAVBASE CHARLESTON SC//N32//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
NAVY JAG ALEXANDRIA VA//JAG31//
NAVSURFLANT READSUPPGRU CHARLESTON SC//NO2L//
COMNAVSURFGRU CHARLESTON SC//NO2S/NO2L//
COMDT COGARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC//RSM//
NEESA PORT HUENEME CA//12//

BT
UNCLAS //N05090//

MSG/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
POC/DOWNS, B. R./LCDR/-/PORT SERVICES/TEL:803-743-6413/TEL:563-6413//

RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 101130Z OCT 93, NAVSTA CHARLESTON SC

DISPATCHER FRI
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DUTY CHIEF FRI
SAT
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DLVR:COMDESRON FOUR(1)...ACT
DLVR:NAVSURFLANT READSUPPGRU CHARLESTON SC(1)...INFO
DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO

13(1)...ORIG FOR NAVSTA CHARLESTON SC(3) /19/
11(1) 00(1)

002(1)...ACT FOR COMCRUDESGRU TWO(15) 05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

RTD:000-000/COPIES:

13
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132
133
134

0[illegible]5/08142/ /283 1 SBA 0022 284/00:28Z 102146Z OCT 93
CSN:BSVH0002 284/00:29Z NAVSTA CHARLESTON SC
PSN-020425 /

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COOPER RIVER, PIER PAPA

4. 10 GALLONS

5. DFM

6. UNDER INVESTIGATION

7. UNDER INVESTIGATION

8. A. 100FT. X 50FT.
   B. BRIGHT COLOR BANDS/DULL
   C. SOUTHERLY, 3 KTS
   D. CALM
   E. FLOOD/SLACK/EBB CHANGE

9. A. COOPER RIVER
   B. NONE
   C. NONE

10. WAS MADE, #202171

11. SAMPLES WERE TAKEN

12. CAMELS, NO OTHER CONTAINMENT NECESSARY DUE TO SHIFT IN TIDE

13. DIP 3001 OIL SKIMMER, SORBENTS

14. NAVSTA PORT SERVICES PERSONNEL

15. THERE WERE APPROXIMATELY 4 UNITS AND 1 BARGE IN THE IMMEDIATE VICINITY OF THE SPILL. DUE TO QUICK RESPONSE BY THE OIL SPILL RECOVERY TEAM, NO ENVIRONMENTAL IMPACT OCCURED FROM THIS SPILL.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC., PHONE COMMERCIAL: (803) 743-6413, AV: 563-6413.//

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PRIORITY

P R 281920Z OCT 93 PSN 992347J34

FM NAVSTA CHARLESTON SC//13//

TO COMNAVBASE CHARLESTON SC//N32//
COMDESRON FOUR
COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//
COMNAVSEASYSCOM WASHINGTON DC//OOC//
NAVY JAG ALEXANDRIA VA//JAG 31//
COMNAVSURFGRU CHARLESTON SC//N02S/N02L//
NAVSURFLANT READSUPPGRU CHARLESTON SC//N02L//
COMDT COGARD WASHINGTON DC
SOPA ADMIN CHARLESTON SC//N322//
SOUTHNAVFACENGCOM CHARLESTON SC//044//
COGARD MSO CHARLESTON SC//RSM//
NEESA PORT HUENEME CA//12//

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
ADMIN/DOWNS, B.R./LCDR/PRIPHN:563-6413/PORT SERVICES//
SECPHN:803-743-6413//

RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 271430Z OCT 93, 1100, NAVSTA CHARLESTON SC

DLVR:COMDESRON FOUR(1)...ACT
DLVR:NAVSURFLANT READSUPPGRU CHARLESTON SC(1)...INFO
DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO

13(1)...ORIG FOR NAVSTA CHARLESTON SC(1) /19/

002(1)...ACT FOR COMCRUDESGRU TWO(15) 05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)

RTD:000-000/COPIES:

363/09480/ /301 1 SBA 0036 301/20:09Z 281920Z OCT 93
:BSVH0062 301/20:09Z NAVSTA CHARLESTON SC
PSN-009363 /

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DISPATCHER

3. COOPER RIVER, PIERS ROMEO AND SIERRA, NORTH AND SOUTH

4. 30-35 GALLONS

5. BILGE WASTE

6. UNDER INVESTIGATION

7. UNDER INVESTIGATION

8. A. PATCHES COVERING 350 FT X 75 FT
   B. SILVERY AND DULL BROWN
   C. SOUTHERLY, LESS THAN ONE KNOT
   D. CALM
   E. EBBING, ONE KNOT

9. A. COOPER RIVER
   B. SMALL AMOUNT ON SHORE LINE WAS CLEANED AND REMOVED
   C. NONE

10. WAS MADE, REPORT #205018

11. SAMPLES WERE TAKEN

12. SORBENT BOOM, MARINA JET FLOATS, AND SHIP'S HULL

13. SORBENTS

14. NAVSTA PORT SERVICES PERSONNEL

15. NUMEROUS POCKETS OF BILGE WASTE WERE DISCOVERED AT THIS SPILL. NO SPECIFIC SOURCE HAS BEEN IDENTIFIED, HOWEVER SEVERAL ARE BEING INVESTIGATED. NO ENVIORNMENTAL IMPACT OCCURRED AS A RESULT OF THIS SPILL.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

PTTUZYUW RHFJSGG0182 3201131-UUUU--RHFJBSV.
ZNR UUUUU
P R 161131Z NOV 93 PSN 112923J18
FM NAVSTA CHARLESTON SC//13//
TO RUCKCHB/COMNAVBASE CHARLESTON SC//N32//
RHFJBTM/COMDESRON FOUR
RHFJVTA/COMCRUDESGRU TWO
INFO RUENAAA/CNO WASHINGTON DC//OP-45//
RULSSEA/COMNAVSEASYSCOM WASHINGTON DC//OOC//
RULSSBN/NAVY JAG ALEXANDRIA VA//JAG 31//
RHFJBTM/COMNAVSURFGRU CHARLESTON SC//N02S/N02L//
RHFJBSH/NAVSURFLANT READSUPPGRU CHARLESTON SC//N02L//
RULSJGA/COMDT COGARD WASHINGTON DC
RUCKCHB/SOPA ADMIN CHARLESTON SC//N322//
RUCKCIF/SOUTHNAVFACENGCOM CHARLESTON SC//044//
RUCLFOA/COGARD MSO CHARLESTON SC//RSM//
RUWFPCN/NEESA PORT HUENEME CA//12//
BT
UNCLAS //N05090//
MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//
SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//
POC/DOWNS, B.R./CDR/PRIPHN:563-6413/PORT SERVICES//
SECPHN:803-743-6413//
PAGE 02 RHFJSGG0182 UNCLAS
RMKS/
1. CNO FOR OP-45 AND CHINFO
2. 15NOV93, 1000, NAVSTA CHARLESTON SC
3. SHORT STAY RECREATION PARK
4. LESS THAN ONE GALLON
5. GASOLINE
6. UNDERGROUND FUEL LINE TRANSPORT
7. UNDERGROUND FUEL LINE HAD WEAK COUPLING CAUSING SLOW LEAKAGE INTO GROUND AND WATER.
8. A. 5 FT. X 10 FT.
   B. BRIGHT COLOR BANDS
   C. NO ON-SCENE WIND
   D. CALM
   E. NO SLICK MOVEMENT
9. A. LAKE MOULTRIE
   B. SHORT STAY RECREATION AREA
   C. NONE
10. WAS MADE, REPORT #208117
11. SAMPLES WERE NOT TAKEN
12. SORBENT BOOM
PAGE 03 RHFJSGG0182 UNCLAS
13. SORBENTS PADS
14. NAVSTA PORT SERVICES PERSONNEL
15. ALTHOUGH LESS THAN ONE GALLON OF GASOLINE ESCAPED INTO LAKE MOULTRIE, THERE WAS APPROXIMATELY 100-150 GALLONS OF GASOLINE

Copy to Schuch

DISPATCHER FRI
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

13
131
132
133
134

LEAKED TO THE WATER TABLE. THE LEAK IN THE FUEL LINE HAS BEEN SECURED AND GROUND EXCAVATION WILL BE NEEDED TO FURTHER CLEAN UP THE SPILL. DUE TO EXCELLENT INVESTIGATIVE EFFORTS BY THE SHORT STAY RECREATION PARK PERSONNEL AND THE CLEANUP EFFORTS OF THE PORT SERVICES OIL SPILL TEAM, ENVIRONMENTAL IMPACT TO THE PARK WAS MINIMAL. CHARLESTON NAVAL BASE ENVIRONMENTAL DIVISION AND NAVAL SHIPYARD ENVIROMENTAL PROTECTION CODE HAS BEEN NOTIFIED AND WILL REQUIRE REMOVAL AND DISPOSAL OF THE HAZARDOUS LAND MATERIAL. SC DHEC AND SANTEE COOPER POWER COMPANY (LAKE OWNERS) NOTIFIED.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT
#0182
NNNN
DLVR:COMDESRON FOUR(1)...ACT
DLVR:NAVSURFLANT READSUPPGRU CHARLESTON SC(1)...INFO
DLVR:COMNAVSURFGRU CHARLESTON SC(1)...INFO
13(1)...ORIG FOR NAVSTA CHARLESTON SC(1)
/19/
002(1)...ACT FOR COMCRUDESGRU TWO(15)
05090/ 1/0001
01(1) 007(1) 006(1) 004(1) 003(1) 00(1) N5(1) N4(1) N33(1) N32(1)
N31(1) N3(1) N2(1) FILE(1)
RTD:000-000/COPIES:

*** MDU office codes that have received this message: ***

MDUOPR

PTTUZYUW RHFJBSV0003 0131002-UUUU--RHFJSUU.

NR UUUUU

P R 131002Z JAN 94

FM NAVSTA CHARLESTON SC//13//

TO COMNAVBASE CHARLESTON SC//N32//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

NAVY JAG ALEXANDRIA VA//JAG 31//

COMNAVSURFGRU CHARLESTON SC//N02S/N02L//

NAVSURFLANT READSUPPGRU CHARLESTON SC//N02L//

COMDT COGARD WASHINGTON DC

SOPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC//RSM//

NEESA PORT HUENEME CA//12//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B.R./CDR/PRIPHN:563-6413/PORT SERVICES//

SECPHN:803-743-6413//

RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 120800R JAN 94, NAVSTA CHARLESTON SC

3. COOPER RIVER SIERRA NORTH

4. 05-10 GALLONS

5. DFM

6. (B) INTERNAL TRANSFER OF FUEL

7. (H) OVER FILLED DAY TANK

8. A. 30' X 50'

   B. DARK NOT CLEARLY VISIBLE

   C. 6 KTS NORTH WEST

   D. FLOOD TIDE

   E. FLOOD TIDE 1 KT

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. YES

11. SAMPLES WERE NOT TAKEN

12. A. SORBENT BOOM

    B. YO-224 HULL

13. D. SORBENT PADS

14. NAVSTA PORT SERVICES PERSONNEL

15. YARD OILER CREW WAS TRANSFERRING FUEL FROM STORAGE TANK TO THE DAY TANK AND OVER FLOWED APPROXIMATELY 5-10 GALLONS. NO ADVERSE IMPACT TO THE ENVIRONMENT.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

#0003

NNNN

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

54/119477/ /018 2 HCA 0059 019/23:14Z 181230Z JAN 94
[illegible] FOCH0473 019/23:16Z
PSN-155754 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

330 mw
304/306

RATIVE MESSAGE

PRIORITY

P 181230Z JAN 94 PSN 155754827%

FM NAVSTA CHARLESTON SC//13/00/111//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N02//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//190/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//00/01/30//
CINCLANTFLT NORFOLK VA//N4422//
NAVY JAG ALEXANDRIA VA//JAG31//

BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS
AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR DECEMBER 93//
RMKS/1. THERE WILL BE NO SUMMARY OF OIL SPILL CLEANUP
REQIUREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING
MONTH OF DECEMBER. THE REASON IS GOOD NEWS!

2. THERE WERE NO, REPEAT NO OIL SPILL INCIDENTS DURING THE MONTH OF DECEMBER. IT WAS A SUPERB WAY TO END THE YEAR. IN 1993, THE NAVSTA OILSPILL CLEANUP TEAM RESPONDED TO A TOTAL OF 41 SEPARATE SPILL INCIDENTS REMOVING 346 GALLONS OF HAZARDOUS OILY WASTE. ALL CLEANUP EFFORTS WERE SUCCESSFUL, LEAVING NO KNOWN ENVIRONMENTAL IMPACT. IN 1993, SPILL INCIDENTS WERE REDUCED 36% AND QUANTITY OF MATERIAL REMOVED WAS REDUCED BY 80%. THESE IMPRESSIVE STATISTICS CLEARLY POINT OUT THAT THE NAVY IN CHARLESTON HAS BECOME MORE AWARE, CAREFUL, AND PRECISE IN ALL MATTERS CONCERNING HAZARDOUS OILY WASTE ALONG THE WATERFRONT. WE DEFINITELY HAVE REASON TO BE PROUD! LET'S KEEP UP THE OUTSTANDING WORK AND AIM FOR A CLEAN 1994.//

DLVR:NAVSHIPYD CHARLESTON SC(1)...ACT WD 1
DLVR:COMDESRON THREE SIX(1)...ACT
DLVR:COMDESRON TWO ZERO(1)...ACT

N34(1)...ACT FOR COMNAVBASE CHARLESTON 196667 310083
01(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:0014 137

'54/11947/ /018 1 HEA 0059 015/23:147 181230Z JAN 94
OS.:POCH0473 -19/23:14/ NAVSTA CHARLESTON SC
PSN-155754 10

01 03 041539Z MAR 94 RR RR UUUU 0631539

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/920515//

AMPN/REF A IS COMNAVBASECHASINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 041540Z MAR 94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. C-D SLIP

MMCM(SS) M. J. DRENTLAW, X5051 304, 106
NRRO CHASN

DOCKING OFFICE

CDR J. WATSON OPERATIONS OFC

02 03 041539Z MAR 94 RR RR UUUU 0631539

4. APPROX 4 GALS.

5. LUBE OIL

6. REMOVAL OF OIL HOSE FROM SLUDGE REMOVAL BARGE.

7. PROCEDURAL AND PERSONNEL ERROR IN NOT HAVING LINE DRAINED.

8. A. 30 FT X 30 FT

   B. SILVERY

   C. SOUTHWEST 5 KNOTS

   D. N/A

   E. NO MOVEMENT

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. PHONE REPORT TO NRC WAS MADE.

    A. MMCM(SS) M.J. DRENTLAW, CNSY CODE 307, REPORT NO. 224355.

    B. 04 MAR 94, 1115 LOCAL

11. SAMPLES WERE NOT TAKEN.

12. SHIP HULL, SORBENTS

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES.

15. NONE

03 03 041539Z MAR 94 RR RR UUUU 0631539

16. POC: MMCM(SS) M. J. DRENTLAW, NAVSHIPYD CHARLESTON SC, (AV)563-5245, (803)743-5051.//

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U UNCLASSIFIED U
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ADMINISTRATIVE MESSAGE

ROUTINE

R 041539Z MAR 94 ZYB PSN 648703J28

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34/N32//
NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
NAVY JAG ALEXANDRIA VA//JAG 31//
SOPA CHARLESTON SC

BT
UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/920515//

AMPN/REF A IS COMNAVBASECHASINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 041540Z MAR 94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. C-D SLIP

4. APPROX 4 GALS.

5. LUBE OIL

6. REMOVAL OF OIL HOSE FROM SLUDGE REMOVAL BARGE.

DISPATCHER

DUTY CHIEF

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

006043/19187/ /063 1 SBA 0063 063/20:54Z 041539Z MAR 94
CSN:BSVE0058 063/20:54Z NAVSHIPYD CHARLESTON SC
PSN-006043 /

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
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7. PROCEDURAL AND PERSONNEL ERROR IN NOT HAVING LINE DRAINED.

8. A. 30 FT X 30 FT
   B. SILVERY
   C. SOUTHWEST 5 KNOTS
   D. N/A
   E. NO MOVEMENT

9. A. COOPER RIVER
   B. NONE
   C. NONE

10. PHONE REPORT TO NRC WAS MADE.
    A. MMCM(SS) M.J. DRENTLAW, CNSY CODE 307, REPORT NO. 224355.
    B. 04 MAR 94, 1115 LOCAL

11. SAMPLES WERE NOT TAKEN.

12. SHIP HULL, SORBENTS

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES.

15. NONE

16. POC: MMCM(SS) M. J. DRENTLAW, NAVSHIPYD CHARLESTON SC, (AV)563-5245, (803)743-5051.//
BT

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 3:15 DATE: 3/9/94 WHO RECEIVED CALL: Mary
1. Title office near water front
PERSON REPORTING SPILL: Steve Dexter SHOP: 17 PHONE: 3709
MATERIAL: Heavy Glob of Oil Silver Dollar size QUANTITY: UNKNOWN
SPILL LOCATION: North E Pier / D/O #1

HAS SPILL STOPPED?	YES	NO
IS SPILL CONTAINED	YES	NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS?	YES	NO

WHAT SPILLED? Oil in Water

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE	CELLULAR PHONE
WAYNE NEVILLE		763-9371	729-2547
GENE RORIE			

PORT SERVICES CONTACTED AT 1520

GENG

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 2:00 Chet DATE: 3/11/94 WHO RECEIVED CALL: Mary

PERSON REPORTING SPILL: John Smith SHOP: C-Pier PHONE: 3514

MATERIAL: Barge of Shipyard Oil QUANTITY: _____

SPILL LOCATION: Barge near USS O'Bannon (Oil)

HAS SPILL STOPPED? YES ~~NO~~
IS SPILL CONTAINED YES ~~NO~~
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? ~~YES~~ NO

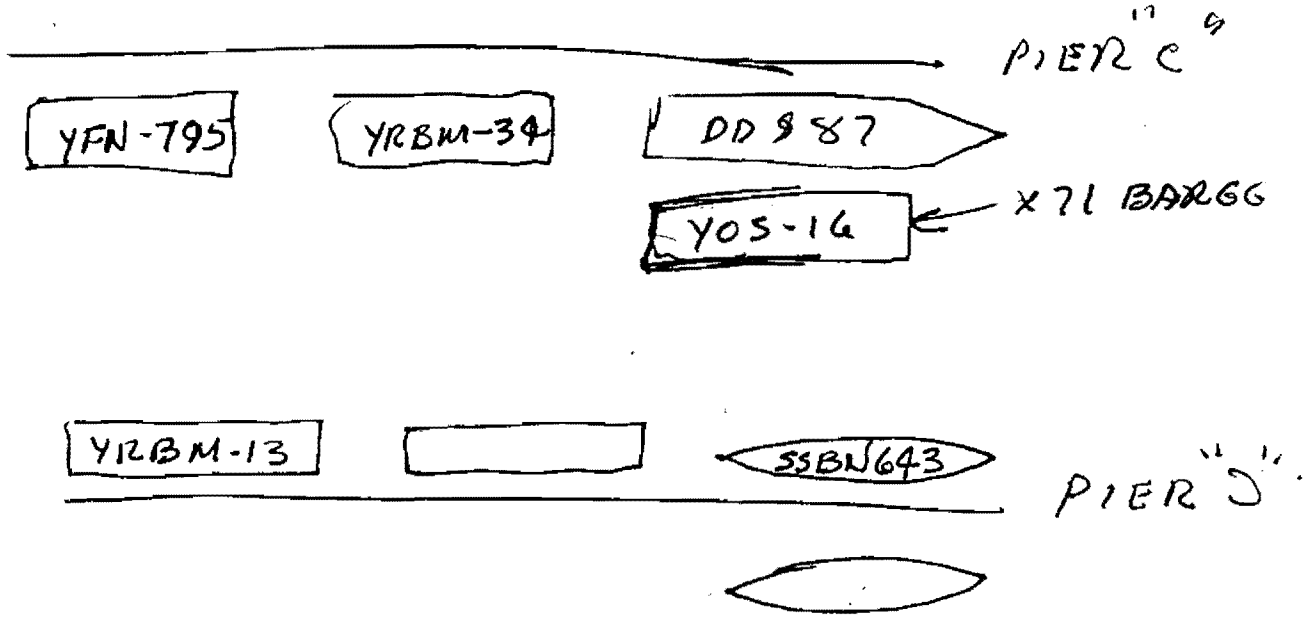
WHAT SPILLED? Leaking into River (Oil)

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE	CELLULAR PHONE
WAYNE NEVILLE		763-9371	729-2547
GENE RORIE			



1. PORT SERVICES AND C/106 RESPONDED NEATHER COULD CONFIRM SPILL.

2. UNABLE TO CONFIRM SPILL.

3. ADDITIONAL INFO WAS RECEIVED BY C/106 AT 1500 HRS ISOLATING THE OIL SPILL TO TOP OF YOS-16 OUT BOARD OF THE DD-987. MR WARNER EXT 9337 X 71 WAS CALLED AND HE CONFIRMED THAT X 71 WOULD TAKE CARE OF CLEAN-UP AS SOON AS THEY COULD GET ON BOARD YOS-16.

4. I CALLED PORT SERVICES AND ASK FOR ASSISTANCE FOR BOARDING THE BARGE FROM [illegible] SIDE TO CONTAIN SPILL BY BOOMS

01 03 181451Z MAR 94 RR UUUU 0771451

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 181410ZMAR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. DRYDOCK #5 SOUTH QUAYWALL

M J DRENTLAW, MMCM,USN, C/307,5051

771451Z NSY MPM

D. E. RIES, CDR,USN, C/300, 3715

02 03 181451Z MAR 94 RR UUUU 0771451

4. 10 GALS

5. UNKNOWN - PROBABLE LUBE OIL

6. NO EVOUITIONS IN PROGRESS, THE DRYDOCK DRAINAGE PUMPS HAD DISCHARGED APPROX 10 MIN BEFORE SPILL NOTICED

7. UNKNOWN - PROBABLE CAUSE DRYDOCK 5 DRAINAGE PUMP DISCHARGE

8. A. 50FT X 50FT

B. BRIGHT COLOR BANDS & DULL BROWN

C. EAST/5KTS

D. N/A

E. NO MOVEMENT

9. A. COOPER RIVER

B. NONE

C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #230584

B. 1010 LOCAL 18MAR94

11. SAMPLES WERE NOT TAKEN

12. BOOM AND SORBENTS

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. CONTRIBUTING FACTOR TO SPILL WAS IMPROPERLY ATTACHED AND

03 03 181451Z MAR 94 RR UUUU 0771451

FAULTY BOOM

16. POC, MMCM(SS) J.J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

01 03 181451Z MAR 94 RR UUUU 0771451

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 181410ZMAR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. DRYDOCK #5 SOUTH QUAYWALL

M J DRENTLAW, MMCM,USN, C/307,5051

771451Z,NSY MPM

D. E. RIES, CDR,USN, C/300, 3715

02 03 181451Z MAR 94 RR UUUU 0771451

4. 10 GALS

5. UNKNOWN - PROBABLE LUBE OIL

6. NO EVOUITIONS IN PROGRESS, THE DRYDOCK DRAINAGE PUMPS HAD DISCHARGED APPROX 10 MIN BEFORE SPILL NOTICED

7. UNKNOWN - PROBABLE CAUSE DRYDOCK 5 DRAINAGE PUMP DISCHARGE

8. A. 50FT X 50FT

   B. BRIGHT COLOR BANDS & DULL BROWN

   C. EAST/5KTS

   D. N/A

   E. NO MOVEMENT

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #230584

    B. 1010 LOCAL 18MAR94

11. SAMPLES WERE NOT TAKEN

12. BOOM AND SORBENTS

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. CONTRIBUTING FACTOR TO SPILL WAS IMPROPERLY ATTACHED AND

03 03 181451Z MAR 94 RR UUUU 0771451

FAULTY BOOM

16. POC, MMCM(SS) J.J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

RTTUZYUW RHFJBSV0001 0871445-UUUU--RHFJSUU.

ZNR UUUUU

P R 281445Z MAR 94

FM NAVSTA CHARLESTON SC//13//

TO COMNAVBASE CHARLESTON SC//N32//

COMDESRON FOUR

COMCRUDESGRU TWO

INFO CNO WASHINGTON DC//OP-45//

COMNAVSEASYSCOM WASHINGTON DC//00C//

NAVY JAG ALEXANDRIA VA//JAG 31//

COMNAVSURFGRU CHARLESTON SC//N02S/N02L//

NAVSURFLANT READSUPPGRU CHARLESTON SC//N02L//

COMDT COGARD WASHINGTON DC

EPA ADMIN CHARLESTON SC//N322//

SOUTHNAVFACENGCOM CHARLESTON SC//044//

COGARD MSO CHARLESTON SC//RSM//

NEESA PORT HUENEME CA//12//

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/013//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090)//

POC/DOWNS, B.R./CDR/PRIPHN:563-6413/PORT SERVICES//

SECPHN:803-743-6413//

RMKS/

1. CNO FOR OP-45 AND CHINFO

2. 27MAR94, 0740, NAVSTA CHARLESTON SC

MIKE TWO ALFA

15 GALLONS

DIESEL (DFM)

6. UNDER INVESTIGATION

7. UNDER INVESTIGATION

8. A. 25 FT. X 25 FT.

   B. DULL BROWN

   C. SOUTH SOUTHWEST 15 TO 20 KNOTS, GUSTS UP TO 26 KNOTS

   D. WAVES INNER TO MIDDLE 1 TO 3 FEET AND OUTER 3 TO 5 FEET

   E. EBB TIDE

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. WAS MADE, REPORT #231686

SAMPLES WERE TAKEN

12. CONTAINMENT

   A. NONE

   B. OTHER PIER

13. SORBENT MATERIAL

14. NAVSTA PORT SERVICES PERSONNEL

15. POSSIBLE SOURCE TO SPILL IS SUBMARINE ON MIKE TWO ALFA. OILY WASTE SUBSTANCE WAS ALL AROUND STERN AREA WHERE SUBMARINE WAS DISCHARGING SALT WATER.

16. PORT SERVICES OFFICER, CODE 13, NAVSTA CHARLESTON SC, PHONE COMMERCIAL (803) 743-6413, AV: 563-6413.//

BT

#0001

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U U N C L A S S I F I E D U
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NARRATIVE MESSAGE

PRIORITY

P 302000Z MAR 94 PSN 578804B32

FM USS OBANNON

TO COMNAVBASE CHARLESTON SC//N34/N32//
NAVSHIPYD CHARLESTON SC//106//
NAVSTA CHARLESTON SC//13//
COMDESRON FOUR

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//01//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//00C24//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//01//
NAVY JAG ALEXANDRIA VA//JAG 31//
SOPA CHARLESTON SC

BT
UNCLAS //N05090//
MSGID/GENADMIN/USS OBANNON//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//
REF/A/DOC/COMNAVBASE/15MAY92//
AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS
SUBSTANCE CONTINGENTY PLAN)//
RMKS/1. TIME OF SPILL: 301930Z MAR 94

2. UNIT: USS OBANNON (DD-987) UIC: 20834

3. LOCATION: CHARLESTON NAVAL SHIPYARD PIER CHARLIE

4. AMOUNT: APPROXIMATELY 30 GALLONS

5. TYPE: F-76

DLVR:NAVSHIPYD CHARLESTON SC(~~6~~ 1)...ACT
DLVR:SOUTHNAVFACENGCOM CHARLESTON SC(~~5~~)...INFO

N34(1)...ACT FOR COMNAVBASE CHARLESTO(~~6~~) 19666/ 3/0083
01(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:~~0017~~ 6

578804/26323/ /089 1 HCA 0034 090/04:23Z 302000Z MAR 94
CSN:FOCH0173 090/04:23Z USS OBANNON
PSN-578804 /

306
DD987

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U U N C L A S S I F I E D U
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6. N/A

7. SPILL CAUSE: EQUIPMENT FAILURE. FILL VALVE FOR #1 GAS TURBINE GENERATOR HEAD TANK AUTO SHUT-OFF SOLENOID FAILED. FILL VALVE DID NOT SHUT, HIGH LEVEL ALARM SOUNDED, WATCH PERSONNEL RESPONDED AND SECURED FUEL OIL FILL VALVE MANUALLY. HEAD TANK VENTS OVERBOARD.

8. SLICK DESCRIPTION AND MOVEMENT:
   A. SIZE: 50 FT BY 20FT
   B. COLOR: BRIGHT COLOR BANDS AND SOME DULL BROWN SPOTS
   C. WIND SPEED/DIRECTION: 10KTS/035T
   D. SEA STATE: CALM
   E. SLICK MOVEMENT: MINIMAL

9. N/A

10. TELEPHONIC REPORT TO NRC NOT MADE

11. SAMPLES NOT TAKEN

12. CONTAINMENT METHOD USED: APPROXIMATELY 95 PERCENT OF SPILL CONTAINED BETWEEN SHIP, OUTBOARD CRANE AND CAMELS. CAMELS WERE PULLED IN CLOSER TO SHIP AND OUTBOARD CRANE TO FORM A CONTAINMENT BOX. OPEN AREAS WERE FILLED WITH OIL-ABSORBING PADS.

13. SPILL REMOVAL METHOD USED: OIL-ABSORBING PADS

14. PARTIES PERFORMING SPILL REMOVAL: SHIPS FORCE AND NAVSTA PORT SERVICES.

15. ADDITIONAL ASSISTANCE NOT REQUIRED, CLEAN-UP COMPLETE.

16. POC: USS OBANNON (DD987), LT BROWN, OPERATIONS OFFICER
    TEL:(803)743-3071 DSN: 563-3071//
BT

01 03 311230Z MAR 94 RR UUUU 0771451

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 301950ZMAR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. C-D SLIP, SOURCE FROM DD-987

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

02 03 311230Z MAR 94 RR UUUU 0771451

4. 30 GALS

5. JP-5

6. INTERNAL TRANSFER OF FUEL ONBOARD DD-987

7. EQUIPMENT FAILURE, AUTOMATIC SHUT-OFF VALVE FAILED

8. A. 200FT X 2FT

   B. BRIGHT COLOR BANDS

   C. NW/5KTS

   D. N/A

   E. NW/MOVEMENT IS INTO SLIP

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #232528

    B. 1520 LOCAL 30MAR94

11. SAMPLES WERE NOT TAKEN

12. SHIPS HULL, CAMELS, FLOATING CRANE

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. NONE

16. POC, MMCM(SS) J.J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC,

03 03 311230Z MAR 94 RR UUUU 0771451

(AV) 563-5245, (803) 743-5051.//

01 03 311230Z MAR 94 RR UUUU 0771451

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 301950ZMAR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. C-D SLIP, SOURCE FROM DD-987

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. BIES, CDR, USN, C300 33715

02 03 311230Z MAR 94 RR UUUU 0771451

4. 30 GALS

5. JP-5

6. INTERNAL TRANSFER OF FUEL ONBOARD DD-987

7. EQUIPMENT FAILURE, AUTOMATIC SHUT-OFF VALVE FAILED

8. A. 200FT X 2FT

   B. BRIGHT COLOR BANDS

   C. NW/5KTS

   D. N/A

   E. NW/MOVEMENT IS INTO SLIP

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #232528

    B. 1520 LOCAL 30MAR94

11. SAMPLES WERE NOT TAKEN

12. SHIPS HULL, CAMELS, FLOATING CRANE

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. NONE

16. POC, MMCM(SS) J.J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC,

03 03 311230Z MAR 94 RR UUUU 0771451

(AV) 563-5245, (803) 743-5051.//

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ADMINISTRATIVE MESSAGE

ROUTINE

R 022235Z APR 94 ZYB PSN 822733J25

FM USS DEYO

TO COMNAVBASE CHARLESTON SC//N34//N32//
COMSUBGRU SIX//
NAVSTA CHARLESTON SC//13//
COMDESRON FOUR//JJJ//

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
NEESA PORT HUENEME CA//112//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
NAVY JAG ALEXANDRIA VA//JAG31//
SOPA CHARLESTON SC

BT
UNCLAS //N05090//

MSGID/GENADMIN/DEYO//

SUBJ/OIL SPILL REPORT (OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 021900Z APR 94.

DISPATCHER FRI
SAT
SUN

DUTY CHIEF FRI
SAT
SUN

DLVR:COMDESRON FOUR(1)...ACT
DLVR:USS DEYO(1)...ORIG
DLVR:COMCRUDESGRU TWO(001)...HOST (0)
DLVR:SOPA CHARLESTON SC(0)...TENANT/INFO (1)

N32(1)...ACT FOR COMSUBGRU SIX(9) 05090/ 1/0359
013(1) 01D(1) 01(1) 00A(1) N51(1) N5(1) N4(1) FILE(1)

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

0895/21483/ /092 1 SBA 0074 092/23:55Z 022235Z APR 94
:BSVE0039 092/23:55Z USS DEYO
PSN-020895 /

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USS DEYO (DD-989), 20836.

3. PIER ZULU 1A, NAVAL STATION CHARLESTON SC.

4. 50 GAL.

5. COSMOLINE.

6. IPT CHARLESTON SC.

7. UNDERWATER REPAIRS TO SHIPS HULL REQUIRED DIVERS TO CONDUCT NITROGEN PURGE OF SHIPS KEEL. LEAK OCCURED WHEN DIVING CONTRACTOR (OCEANEERING) REMOVED KEEL PLUG. SPILL DID NOT OCCURE UPON REMOVAL OF PLUG, ONLY AFTER SHORT DELAY APPROXIMATLY FIFTY GAL. OF COSMOLINE DRAINED TO RIVER. SOURCE SECURED UPON REPLACEMENT OF PLUG. NO PRESS INTEREST.

8. SLICK DESCRIPTION AND MOVEMENT.
   A. 400FT X 30FT.
   B. DK BROWN.
   C. 145DEG. AT 15KTS.
   D. NONE
   E. CONTAINED AROUND SHIPS HULL.

9. AREAS DAMAGED OR THREATENED.
   A. COOPER RIVER
   B. NO APPARENT DAMAGE TO PROPERTY, WILDLIFE OR OTHER RESOURCES.
   C. NONE

10. TELEPHONIC REPORT WAS MADE TO NRC.
    A. LANGFORD, GLEN LT. USN, COMMAND DUTY OFFICER.
    B. 02APR94, 1430R.

11. SAMPLES WERE NOT TAKEN.

12. CONTAINMENT METHOD: BOOM, SHIPS HULL, AND WATER SPRAY. THICK, NON-VISCOUS COSMOLINE WAS EASILY CONTAINED AND CLEANED UP.

13. REMOVAL METHOD: OIL-ABSORBING PADS.

14. SPILL REMOVED BY SHIPS FORCE, PORT SERVICES CHARLESTON, AND DIVING CONTRACTOR (OCEANEERING).

15. NO ASSISTANCE REQUIRED.

16. USS DEYO (DD 989), DSN 563-4526.

BT
PROTECT FOR RUCKCHB
PROTECT FOR RUCKCIF

0895/21483/ /092 2 SBA 0074 092/23:55Z 022235Z APR 94
:BSVE0039 092/23:55Z USS DEYO
PSN-020895 /

01 03 051137Z APR 94 RR UUUU 0951137

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 041640ZAPR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. C-NORTH BERTH 1

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. BIES, CDR, USN, C300 33715

02 03 051137Z APR 94 RR UUUU 0951137

4. 7.5 GALS

5. UNKNOWN

6. SPILL NOTICED DURING TOUR OF PIERS

7. UNKNOWN

8. A. 50FT X 50FT

B. BRIGHT COLOR BANDS & DULL BROWN

C. WINDSTILL

D. N/A

E. NONE

9. A. COOPER RIVER

B. NONE

C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #233197

B. 1325 LOCAL 4APR94

11. SAMPLES WERE NOT TAKEN

12. SHIP'S HULL AND CAMEL

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. COMPLETE CHECK OF PIER AND SHIP CONDUCTED, NO INDICATION OF PROBABLE SOURCE

03 03 051137Z APR 94 RR UUUU 0951137

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

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TRANSMISSION RECALLED MESSAGE
ADMINISTRATIVE MESSAGE

ROUTINE

R 051137Z APR 94 ZYB PSN 838690J34

FM NAVSHIPYD CHARLESTON SC//304//

TO COMNAVBASE CHARLESTON SC//N34/N32//
NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//
CHINFO WASHINGTON DC//JJJ//
SOUTHNAVFACENGCOM CHARLESTON SC//181//
COMNAVFACENGCOM ALEXANDRIA VA//181//
COMNAVSEASYSCOM WASHINGTON DC//OOC24//
COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//
NAVY JAG ALEXANDRIA VA//JAG 31//
SOPA CHARLESTON SC

BT
UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 041640ZAPR94
2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.
3. C-NORTH BERTH 1
4. 7.5 GALS
5. UNKNOWN
6. SPILL NOTICED DURING TOUR OF PIERS
7. UNKNOWN
8. A. 50FT X 50FT
B. BRIGHT COLOR BANDS & DULL BROWN
C. WINDSTILL
D. N/A

13(1)...ACT FOR NAVSTA CHARLESTON SC(1) /19/

RTD:000-000/COPIES:

024989/00274/ /096 1 SBA 0002 096/12:15Z 051137Z APR 94
CSN:BSVE0015 096/12:15Z NAVSHIPYD CHARLESTON SC
PSN-024989 /

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4-6-94
REC'D
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DISPATCHER 1.
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E. NONE
9. A. COOPER RIVER
B. NONE
C. NONE
10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #233197
B. 1325 LOCAL 4APR94
11. SAMPLES WERE NOT TAKEN
12. SHIP'S HULL AND CAMEL
13. SORBENTS
14. NAVY - NAVSTA PORT SERVICES
15. COMPLETE CHECK OF PIER AND SHIP CONDUCTED, NO INDICATION OF PROBABLE SOURCE
16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC (AV) 563-5245, (803) 743-5051.//
BT

024989/00274/ /096 2 SBA 0002 096/12:15Z 051137Z APR 94
:SN:BSVE0015 096/12:15Z NAVSHIPYD CHARLESTON SC
PSN-024989 /

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NARRATIVE MESSAGE

PRIORITY

P R 071530Z APR 94 PSN 626159B29&

FM NAVSTA CHARLESTON SC//13/00/111//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//190/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//00/01/30//
CINCLANTFLT NORFOLK VA//N4422//
NAVY JAG ALEXANDRIA VA//JAG31//

BT
UNCLAS//N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR MARCH 94//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF MARCH.

2. THERE WERE A TOTAL OF FOUR SPILL INCIDENTS DURING THE MONTH OF MARCH.

A. THE FIRST SPILL OCCURRED ON 4 MARCH AT PIER CHARLIE, WHEN FOUR GALLONS OF FUEL OIL WERE SPILLED INTO THE WATER DURING A TRANSFER EVOLUTION. ALERT WATCH STANDING AND QUICK RESPONSE PREVENTED MORE OIL FROM BEING SPILLED. ABSORBENT ROLLS WERE UTILIZED FOR CLEANUP OF THE SPILL. DUE TO SLACK TIDE, CONTAINMENT BOOM WAS NOT UTILIZED.
B. THE SECOND SPILL OCCURRED ON 18 MARCH AT DRY DOCK #5, WHEN APPROXIMATELY TEN GALLONS OF LUBE OIL WERE SPILLED DUE TO DRAIN PUMP DISCHARGE VALVE FAILURE. SPILL WAS CONTAINED WITH ABSORBENT BOOM AND PIER WALL. ABSORBENT PADS AND ROLLS WERE UTILIZED FOR CLEANUP OF THE SPILL.
C. THE THIRD SPILL OCCURRED ON 27 MARCH AT PIER MIKE, WHEN

DLVR:NAVSHIPYD CHARLESTON SC(~~0~~ 1)...ACT—WO

N34(1)...ACT FOR COMNAVBASE CHARLESTO(~~0~~) 19666/ 3/0083
01(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:00~~2~~ 1

626159/31796/ /097 1 HCA 0010 098/01:06Z 071530Z APR 94
CSN:POCH0073 098/01:07Z NAVSTA CHARLESTON SC
PSN-626159 /

214

APPROXIMATELY FIFTEEN GALLONS OF FUEL OIL WERE RELEASED INTO THE WATER; CAUSE UNKNOWN BUT INVESTIGATION ONGOING. DUE TO SLACK TIDE, CONTAINMENT BOOM NOT UTILIZED; ABSORBENT ROLLS USED AS RECOVERY MATERIAL.

D. THE FOURTH SPILL OCCURRED ON 30 MARCH AT PIER CHARLIE, WHEN APPROXIMATELY 30 GALLONS OF FUEL OIL WERE SPILLED INTO THE WATER DUE TO A FAULTY FUEL VALVE. DUE TO FLOOD TIDE AND LOCATION, THE QUAY WALL AND CAMELS WERE UTILIZED TO CONTAIN THE SPILL FOR RECOVERY.

3. EVEN THOUGH NO KNOWN ENVIRONMENTAL IMPACT OCCURRED AS A RESULT OF THESE SPILLS, THE POTENTIAL EXISTS IF THIS TREND IS CONTINUED. A TOTAL OF 59 GALLONS OF OIL WERE RELEASED INTO THE RIVER WITH A RECOVERY COST OF $3245, AND 100 PORT SERVICES' WORK HOURS USED DURING THE RECOVERY EFFORTS.

4. EACH AND EVERY PERSON ON THE WATERFRONT NEEDS TO BE MADE AWARE OF THEIR RESPONSIBILITY FOR ENSURING SPILLS DO NOT OCCUR.//
BT

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 11:56 DATE: ~~11:56~~ 4/18/94 WHO RECEIVED CALL: MARY

PERSON REPORTING SPILL: Small SHOP: Frgt ~~Sub~~ Sur PHONE: 8344

SPILL LOCATION: Southside D/D #5

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES NO

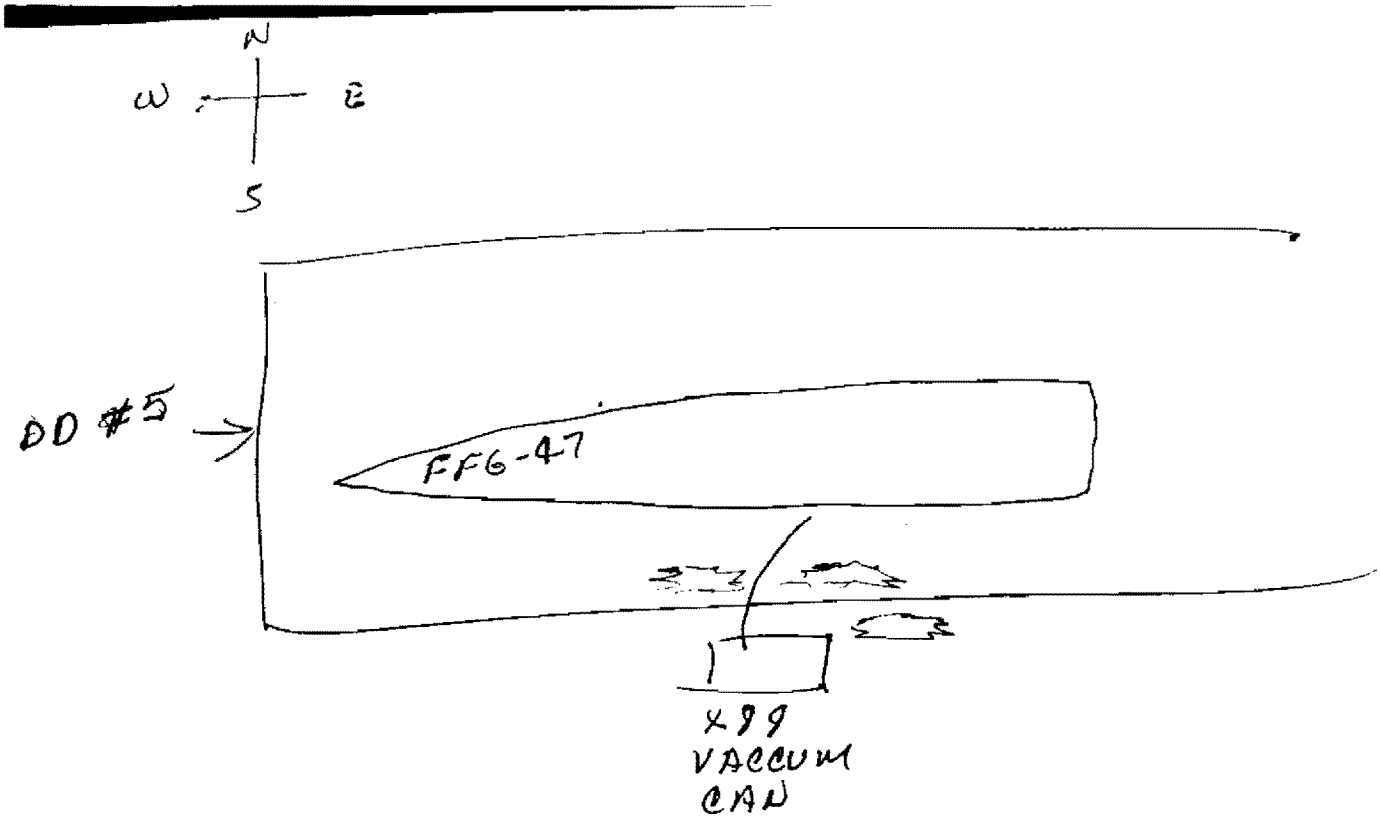
WHAT SPILLED? Oil overflowing (Major Spill)

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		744-7000
GENE RORIE		744-0986



1, APROX 1½ TO 3 GALLONS of 9250 OIL WAS SPRAYED ON THE PORT SID OF FFG-47 AND INTO DD #5, DUE TO AN OVER FILLED CAN OF A SHOP 99 VACCUM CAN LOCATED ON THE SOUTH SIDE of DD #5.

GENE ROBIE

01 02 191209Z APR 94 RR UUUU 1091209

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//106//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 181540ZAPR94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. CHARLESTON NAVAL SHIPYARD DRYDOCK 5

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

02 03 191209Z APR 94 RR UUUU 1091209

4. 4 GALS

5. OIL/WATER MIXTURE

6. PUMPING OUT LUBE OIL STOWAGE TANK

7. UNKNOWN PERSON OR PERSONS PLACED VACUUM CAN AIR EJECTOR IN SERVICE. SUBSEQUENTLY SHIPS FORCE USED ATTACHED HOSE TO DEWATER DIESEL GEN ROOM BILGE BUT DID NOT MONITOR LEVEL IN VACUUM CAN AND VACUUM CAN OVERFLOWED THROUGH VENT. CAN WAS SECURED IMMEDIATELY AND A CRITIQUE CONDUCTED.

8. NONE

9. A. COOPER RIVER

B. NONE

C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #235514

B. 1410 LOCAL 18APR94

11. SAMPLES WERE NOT TAKEN

12. FULLY CONTAINED WITHIN DRYDOCK 5

13. SORBENTS

14. CNSY

15. NONE

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC,

03 03 191209Z APR 94 RR UUUU 1091209

(AV) 563-5245, (803) 743-5051.//

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 11:12 DATE: 4/19 WHO RECEIVED CALL: Mary

PERSON REPORTING SPILL: Grady Blake SHOP: 31 PHONE: 4438

SPILL LOCATION: H-Pier YR6 Barge Rainbow Right of the
in Water Gas or Oil - Leak Diesel in water

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES NO

WHAT SPILLED? Gas or Oil in Water

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	11:15
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	11:25
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	11:25
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD	11:10	744-7000
GENE RORIE		744-0986

(OVER)

Enclosure (1)

MASTER CHIEF DRENTLAW
RESPONDED 11:30

PORT SERVICES - 11:25

NO MAJOR ACCUM. OF OIL
ONLY A FINE SHEEN.

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 0815 DATE: 5-4-94 WHO RECEIVED CALL: ~~D. MURDA~~ R. Nierson

PERSON REPORTING SPILL: D. MURDA SHOP: 106 PHONE: _____

SPILL LOCATION: F - PIER

YSR-45 / YOS-16 X-71 - I.D. SMOAK

BARGES

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES NO

WHAT SPILLED? FUEL OIL APPROX. 20 GALS.

POLT SERVICES CLEAN UP

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	0820
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		~~744-7800~~ 744-6061
GENE RORIE		744-0986

01 03 041520Z MAY 94 RR UUUU 1241520

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 041230ZMAY94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. PIER "F" NORTH BERTH 1

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

4. 20 GALS

5. SUSPECT DIESEL FUEL

6. BILGE DEWATERING

7. PRINCIPAL CAUSE WAS OPERATOR ERROR, OPERATOR FAILED TO CHECK EQUIPMENT PRIOR TO OPERATION, SIGHT GLASS FOR VACUUM CANISTER WAS ISOLATED, VACUUM CAN OVERFILLED CAUSING PUMP TO TAKE SUCTION ON FLUID INSTEAD OF AIR. PUMP DISCHARGE IS NORMALLY JUST EXHAUST BUT WHEN PUMP FILLED WITH SLUDGE IT WAS DISCHARGED OVERBOARD

8. A. 100FT X 100FT

   B. DULL BROWN

   C. NORTH/10KTS

   D. N/A

   E. NO MOVEMENT

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #237900

    B. 0930 LOCAL 04MAY94

11. SAMPLES WERE TAKEN

12. BOOM, PIER, QUAYWALL & CRAFT HULL

03 03 041520Z MAY 94 RR UUUU 1241520

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. U. S. COAST GUARD REPRESENTATIVE WAS PRESENT DURING SOME OF CLEAN-UP ACTIONS

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

01 03 041520Z MAY 94 RR UUUU 1241520

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

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RMKS/1. 041230ZMAY94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. PIER "F" NORTH BERTH 1

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

02 03 041520Z MAY 94 RR UUUU 1241520

4. 20 GALS

5. SUSPECT DIESEL FUEL

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7. PRINCIPAL CAUSE WAS OPERATOR ERROR, OPERATOR FAILED TO CHECK EQUIPMENT PRIOR TO OPERATION, SIGHT GLASS FOR VACUUM CANISTER WAS ISOLATED, VACUUM CAN OVERFILLED CAUSING PUMP TO TAKE SUCTION ON FLUID INSTEAD OF AIR. PUMP DISCHARGE IS NORMALLY JUST EXHAUST BUT WHEN PUMP FILLED WITH SLUDGE IT WAS DISCHARGED OVERBOARD

8. A. 100FT X 100FT

   B. DULL BROWN

   C. NORTH/10KTS

   D. N/A

   E. NO MOVEMENT

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #237900

    B. 0930 LOCAL 04MAY94

11. SAMPLES WERE TAKEN

12. BOOM, PIER, QUAYWALL & CRAFT HULL

03 03 041520Z MAY 94 RR UUUU 1241520

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. U. S. COAST GUARD REPRESENTATIVE WAS PRESENT DURING SOME OF CLEAN-UP ACTIONS

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

01 02 041641Z MAY 94 RR UUUU 1241641

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 031750ZMAY94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. PIER "F" NORTH

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

4. 1/2 GAL

5. FUEL OIL

6. PUMPING YSR TO YOS

7. CAPPED HOSE NOT SECURED PROPERLY

8. A. 100FT X 100FT

B. SILVERY & BRIGHT COLOR BANDS

C. NORTH/10KTS

D. N/A

E. NONE

9. A. COOPER RIVER

B. NONE

C. NONE

10. PHONE REPORT TO NRC WAS NOT MADE

11. SAMPLES WERE NOT TAKEN

12. PIER, QUAYWALL, SHIP'S HULL

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. NONE

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

01 02 041641Z MAY 94 RR UUUU 1241641

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSTA CHARLESTON SC//13//

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COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

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SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

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RMKS/1. 031750ZMAY94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. PIER "F" NORTH

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

4. 1/2 GAL

5. FUEL OIL

6. PUMPING YSR TO YOS

7. CAPPED HOSE NOT SECURED PROPERLY

8. A. 100FT X 100FT

   B. SILVERY & BRIGHT COLOR BANDS

   C. NORTH/10KTS

   D. N/A

   E. NONE

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. PHONE REPORT TO NRC WAS NOT MADE

11. SAMPLES WERE NOT TAKEN

12. PIER, QUAYWALL, SHIP'S HULL

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. NONE

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 8:48 DATE: 5/23/94 WHO RECEIVED CALL: Mary

PERSON REPORTING SPILL: Cathin SHOP: Public Work PHONE: 6444

SPILL LOCATION: Pier Mike Frank Cable

HAS SPILL STOPPED? (YES) NO
IS SPILL CONTAINED (YES) NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? (YES) NO

WHAT SPILLED? CNT Spill (waste)

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

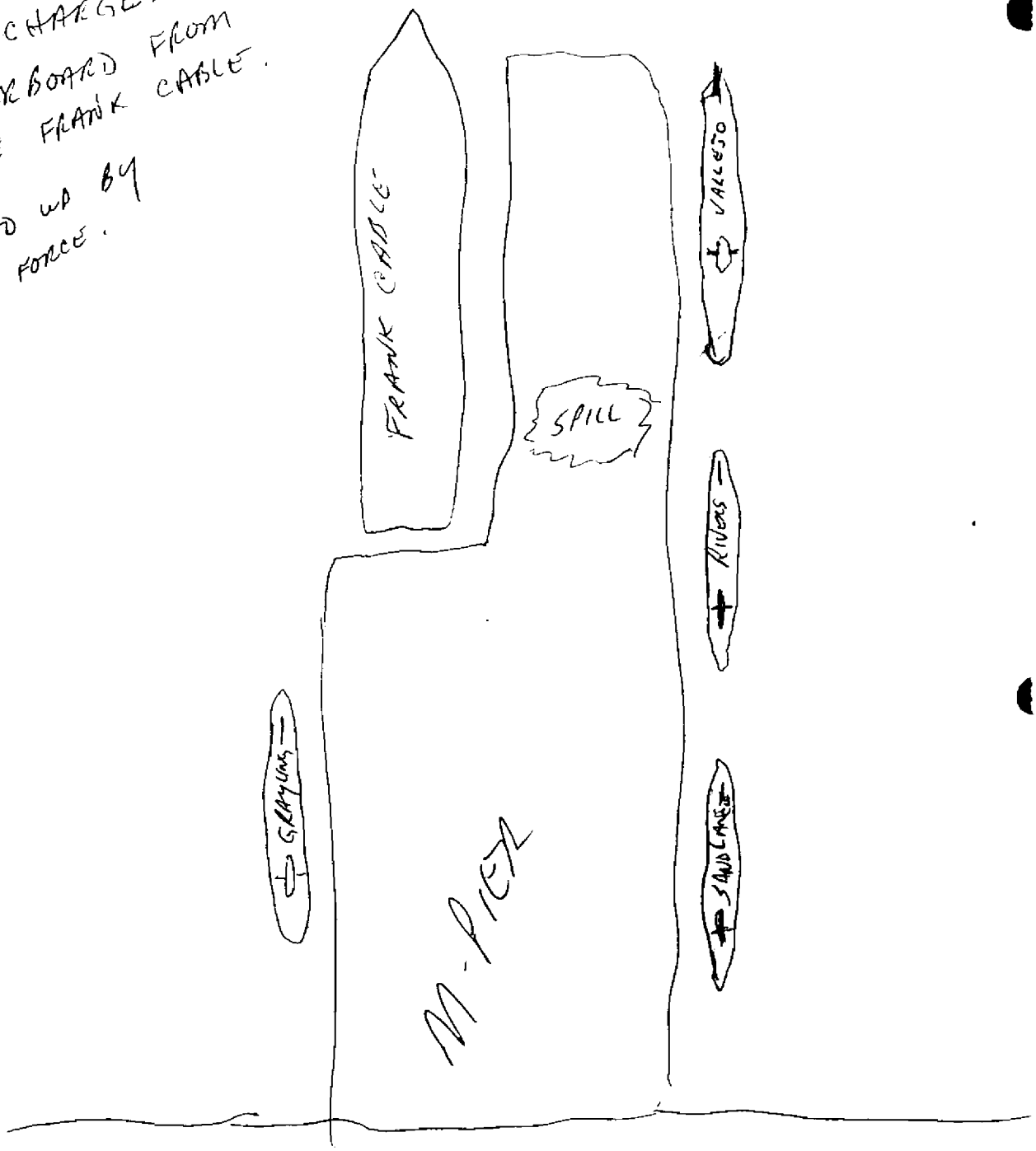
C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		~~744-7000~~ 744-6061
GENE RORIE		744-0986

EAST

CHT DISCHARGED OVERBOARD FROM THE FRANK CABLE.

CLEANED UP BY SHIPS FORCE.



NORTH

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 12.58 DATE: 5/26/94 WHO RECEIVED CALL: MARY

PERSON REPORTING SPILL: COLLON SHOP: _____ PHONE: 6411

SPILL LOCATION: PAPA 2. AISA - USS TURNER

HAS SPILL STOPPED? YES ~~NO~~
IS SPILL CONTAINED ~~YES~~ NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? (YES) NO

WHAT SPILLED? Diesel Fuel 75 to 80 gal

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	(Y)N	(Y)N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C\106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		~~744-7000~~ 744-6061
GENE RORIE		744-0986

1 C 6 RLF
106.2 WJS

UUUUUU [illegible]
U [illegible]
UUUUU

UUUU

1 C 6 RLL
106.2 WBS

UUUU

[illegible]

[illegible]

[illegible]

75-60 [illegible]

5. F-[illegible]

6. REFUELING IMPACT

7. ERROR READING [illegible] CHART

8. SLICK DESCRIPTION AND MOVEMENT
A. SIZE 10X20 FEET
B. COLOR DULL BROWN
C. WIND SOUTH 7 KTS
D. SEA STATE ONE
E. SLICK MOVEMENT CONTAINED

9. AREA THREATENED
A. COOPER RIVER
B. UNDETERMINED

10. TELEPHONE REPORT TO NRC WAS MADE. REPORT NUMBER ASSIGNED [illegible]
A. LCDR HENRY COMMAND DUTY OFFICER
B. 261655Z MAY 94

11. SAMPLES NOT TAKEN

12. CONTAINMENT METHOD [illegible] BAR BOOM AND ABSORBENT PADS ROLLS

13. REMOVAL METHOD ABSORPTION

14. SPILL REMOVAL BY NAVAL STATION OIL TEAM

15. ADDITIONAL COMMENTS: NO SUSPECTED ENVIRONMENTAL IMPACT. RAPID RESPONSE BY NAVAL STATION OIL TEAM AND USCG.

16. ADDITIONAL INFORMATION CONTACT LCDR HENRY
USS RICHMOND K TURNER (CG-20)
AV: 563-4746 COMM: 803-743-4746
BT

159/20743/ /146 2 HCA 0030 147/13:31Z 261915Z MAY 94
N:9HAG0022 147/13:31Z [illegible] RICHMOND K TURNER
[illegible]PSN-000159 /

[illegible]

01 02 031627Z JUN 94 RR UUUU 1541627

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVSHIPYD CHARLESTON SC//106//

NAVSTA CHARLESTON SC//13//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/NAVSHIPYD CHASN SC//

SUBJ/HAZARDOUS SUBSTANCE RELEASE REPORT (REPORT SYMBOL OPNAV 5090-2) //

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 021430Z JUN 94//

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. B. RIES, CDR, USN, C300 33715

02 02 031627Z JUN 94 RR UUUU 1541627

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191

3. PIER FOXTROT NORTH BETWEEN BERTHS 1 AND 3

4. NORMAL USAGE OF SEWAGE GRAVITY DRAIN LINE

5. 4" SEWAGE PIPE

6. SEWAGE

7. NONE

8. UNKNOWN - SEE EXPLANATION #9

9. PIPE WAS BROKEN BETWEEN 5/20/94 AND 6/2/94. A SHALLOW DRAFT PAINT CAMEL BECAME WEDGED BETWEEN YSR-32 AND PIER PILING IN A MANNER THAT AS TIDE CHANGED IT COULD NOT SHIFT. THE CAMEL LODGED UNDER THE 4" SEWAGE LINE AT LOW TIDE, WHEN THE TIDE STARTED TO RISE IT BENT AND THEN SEVERED THE PIPE. UNABLE TO DETERMINE AMOUNT OF SEWAGE DISCHARGE INTO THE RIVER.

10. DISCHARGE WAS TO RIVER FOR UNKNOWN PERIOD OF TIME DURING CHANGING TIDAL AND WEATHER CONDITIONS.

11. CNSY C/106, PORT SERVICES, PUBLIC WORKS, STATE AUTHORITIES

12. WHEN LEAK WAS DISCOVERED ALL SOURCES TO THE LINE WERE ISOLATED

13. ISOLATED SOURCES, REPAIRS TO PIPE ARE IN PROGRESS

14. POC, MMCM(SS) M. J. DRENTLAW, NAVSHIPYD CHARLESTON SC, (AV)563-5245, (803) 743-5051.//

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

330 Jun
304
307

NARRATIVE MESSAGE

PRIORITY

P R 061510Z JUN 94 PSN 974222B26%

FM NAVSTA CHARLESTON SC//13/00/111//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//190/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//00/01/30//
CINCLANTFLT NORFOLK VA//N4422//
NAVY JAG ALEXANDRIA VA//JAG31//

BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS AND/
OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR MAY 94//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS
.CED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF MAY.

2. THERE WERE FIVE, YES FIVE, SPILL INCIDENTS DURING THE MONTH OF MAY
1994.

A. THE FIRST SPILL OCCURRED ON 04 MAY AT PIER FOXTROT. 150 GALLONS OF
DIESEL FUEL WAS SPILLED INTO THE WATER FROM MISALIGNED VALVES ON A
SHIPYARD BARGE. ABSORBENT BOOMS AND ABSORBENT ROLLS WERE USED TO
RECOVER THE SPILL. RECOVERY COST EXCEEDED $6500!
B. THE SECOND SPILL OCCURRED ON 19 MAY AT THE NAVAL WEAPONS STATION,
PIER ALFA. 5 TO 10 GALLONS OF OILY WASTE SPILLED INTO THE WATER DUE
TO A STRUCTURAL CRACK IN WASTE OIL TANK. NAVAL STATION RESPONDED TO
WEAPONS STATION REQUEST TO RENDER ASSISTANCE, BUT THANKS TO RAPID
ACTION BY SHIP, SPILL WAS QUICKLY CONTAINED AND RECOVERED.
C. THE THIRD SPILL OCCURRED ON 26 MAY AT PIER SIERRA NORTH. 10
GALLONS OF OILY BILGE WASTE WAS RELEASED INTO THE WATER DUE TO VALVE
MISALIGNMENT AND AGAIN PERSONNEL ERROR. ABSORBENT BOOM, PADS, AND

B5

DLVR:NAVSHIPYD CHARLESTON SC(~~61~~...ACT 1-WD

N34(1)...ACT FOR COMNAVBASE CHARLESTO(~~6~~) 19666/ 2/0083
N1(1) 00(1) N35(1) N3(1) N1(1)

RTD:000-000/COPIES:0012

7 .222/01535/ /157 1 HCA 0038 157/20:13Z 061510Z JUN 94
CSN:POCH0352 157/20:14Z NAVSTA CHARLES TON SC
PSN-974222 /

. _LS WERE UTILIZED TO RECOVER THIS SPILL. RECOVERY COST $417.
D. THE FOURTH SPILL OCCURRED ON 26 MAY AT PIER PAPA. 75 TO 80 GALLONS OF DFM SPILLED INTO THE WATER DUE TO IMPROPER VALVE LINEUP WHEN COMMENCING FUELING EVOLUTION. SPILL OCCURRED DURING AN UNUSUALLY STRONG TIDE, BUT CONTAINMENT BOOM WAS IN PLACE, KEEPING THIS SPILL FROM BEING A DISASTER. RECOVERY COST EXCEEDED $2700.
E. FINALLY, THE LAST SPILL OF THE MONTH OCCURRED ON 27 MAY. 10 GALLONS OF LUBE OIL SPILLED ONTO A BARGE FROM A COMBATANT DUE TO PERSONNEL CARELESSNESS. 2 TO 3 GALLONSOF OIL ENTERED THE WATER. SPILL WAS EASILY RECOVERED WITH ABSORBENTS. COST APPROXIMATELY $100.

3. LUCKILY, NO KNOWN ENVIRONMENTAL IMPACT OCCURRED AS A RESULT OF THESE INCIDENTS. A TOTAL OF $9717 OF YOUR FUNDS WERE SPENT FOR RECOERY. A TOTAL OF 119 NAVSTA WORK HOURS WERE EXPENDED FOR RECOVERY OF 250 GALLONS OF VARIOUS OILS AND OILY WASTES. THE OVERALL NUMBERS HAVE DRAMATICALLY INCREASED SINCE THE MONTH OF APRIL. TOTAL GALLONS OF OIL RECOVERED HAVE INCREASED ALMOST FIVE HUNDRED PERCENT. PERSONNEL ERROR, LACK OF ATTENTION TO DETAIL, AND IMPROPER ENGINEERING PRACTICES ARE RESPONSIBLE FOR EACH OF THESE EVENTS. NOT ONCE WAS THE CAUSE DIRECTLY DUE TO AN EQUIPMENT FAILURE, AND WE SIMPLY CANNOT ALLOW THIS TREND TO CONTINUE.//
BT

01 03 131328Z JUN 94 RR UUUU 1641328

ADMIN

NAVSHIPYD CHARLESTON SC//304//

COMNAVBASE CHARLESTON SC//N34/N32//

NAVSHIPYD CHARLESTON SC//106//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//OOC24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRA VA//JAG 31//

SOPA CHARLESTON SC

UNCLAS //N05090//

MSGID/GENADMIN/CNSY CHARLESTON SC//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDOUS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 131045ZJUN94

2. CHARLESTON NAVAL SHIPYARD, UIC: N00191.

3. DRYDOCK #5

TAMMY B. GROOMS, C330, 34706

SECRETARY

D. E. RIES, CDR, USN, C300 33715

02 03 131328Z JUN 94 RR UUUU 1641328

4. 10 GALS

5. 2190 TEP LUBE OIL

6. NO OPERATIONS IN PROGRESS

7. MATERIAL FAILURE - THE SEALS ON THE CONTROL REVERSIBLE PITCH PROPELLER HUB FAILED ON DD-980 WHILE IN THE DRYDOCK

8. A. NONE

B. NONE

C. NONE

D. N/A

E. NONE

9. A. COOPER RIVER

B. NONE

C. NONE

10. A. MMCM(SS) M.J. DRENTLAW, CNSY C/307, REPORT #243647

B. 0900 LOCAL 13JUN94

11. SAMPLES WERE NOT TAKEN

12. FULLY CONTAINED WITHIN DRYDOCK

13. SORBENTS

14. NAVY - NAVSTA PORT SERVICES

15. NO ASSISTANCE REQUIRED. THE FAILURE WAS NOTICED DURING THE

03 03 131328Z JUN 94 RR UUUU 1641328

BASIN WALK-THRU FOR UNDOCKING, THE UNDOCKING HAS BEEN CANCELLED

16. POC, MMCM(SS) M. J. DRENTLAW, C/307, NAVSHIPYD CHARLESTON SC, (AV) 563-5245, (803) 743-5051.//

UZYUW RHFJBSV0002 1681331-UUUU--RHFJSUU.

ZNR UUUUU

P R 171331Z JUN 94

FM NAVSTA CHARLESTON SC//13//

TO COMNAVBASE CHARLESTON SC//N34/N32//

NAVSHIPYD CHARLESTON SC//N460//

INFO CNO WASHINGTON DC//N45//

CHINFO WASHINGTON DC//JJJ//

SOUTHNAVFACENGCOM CHARLESTON SC//181//

COMNAVFACENGCOM ALEXANDRIA VA//181//

COMNAVSEASYSCOM WASHINGTON DC//00C24//

COGARD NATIONAL RESPONSE CENTER WASHINGTON DC//JJJ//

NAVY JAG ALEXANDRIA VA//JAG 31//

A CHARLESTON SC

BT

UNCLAS //N05090//

MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL REPORT (REPORT SYMBOL OPNAV 5090-2)//

REF/A/DOC/COMNAVBASE/15MAY92//

AMPN/REF A IS COMNAVBASECHASNINST 5090.6 (OIL AND HAZARDS SUBSTANCE CONTINGENCY PLAN)//

RMKS/1. 161800Z JUN 94

2. UNKNOWN NON-NAVY SOURCE

3. PIER "R" NORTH

4. 20 GALLONS

5. UNKNOWN FUEL OIL

6. UNKNOWN

7. UNKNOWN UNDER INVESTIGATION

8. A. QUARTER MILE BY EIGHTH MILE

   B. FAINT COLOR TO BRIGHT COLOR BANDS

   C. EAST/NORTHEAST 5 TO 8 KTS

   D. CALM (SLACK WATER)

   E. STATIONARY

9. A. COOPER RIVER

   B. NONE

   C. NONE

10. A. LT M. KRAUSMANN, NAVSTA CHARLESTON SC

    B. 16 JUN 94 1420 LOCAL, REPORT #244341

11. SAMPLES TAKEN, SLACK WATER

12. A. DIP 3001 SKIMMER

    B. SORBENT ROLL AND PADS

13. NAVY-NAVSTA OSOT

14. NO ASSISTANCE REQUIRED

15. POC: LT MATT KRAUSMANN, PORT SVCS, NAVSTA CHARLESTON SC, (AV) 563-6414, (803) 743-6414.//

BT

#0002

NNNN

UUUUUUUUU UUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

:RATIVE MESSAGE

PRIORITY

P R 081102Z JUL 94 PSN 162222815

FM NAVSTA CHARLESTON SC/ 13//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX
NAVSHIPYD CHARLESTON SC/ 193.1//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//N3//
CINCLANTFLT NORFOLK VA//CDO/N3//
NAVY JAG ALEXANDRIA VA//JAG31//

304
307

BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS
AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR JUNE 94//
RMKS/1. THE FOLLOWING IS A SUMMARY OF OIL SPILL CLEANUP REQUIREMENTS
PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF
JUNE.

A. THERE WERE TWO SPILL INCIDENTS DURING THE MONTH OF JUNE 1994.
A. THE FIRST SPILL OCCURRED ON 16 JUNE AT PIER ROMEO. 20 GALLONS
OF OIL WAS FOUND ON THE WATER FROM A YET UNDETERMINED SOURCE. TWO
POSSIBLE SOURCES WERE IDENTIFIED, SAMPLES WERE TAKEN, BUT RESULTS ARE
NOT BACK. ABSORBENT BOOMS, ABSORBENT ROLLS, AND OIL RECOVERY CRAFT
WERE USED TO RECOVER THE SPILL. RECOVERY MATERIAL COST WAS MINIMAL
($88.00), BUT THIS SPILL UTILIZED 22 WORK HOURS.
B. THE SECOND SPILL OCCURRED ON 21 JUNE AT PIER NOVEMBER SOUTH.
15 GALLONS OF DFM LEAKED INTO A STORM DRAIN FROM AN UNDETERMINED
SOURCE, THEN FOUND ITS WAY INTO THE RIVER DURING HIGH TIDE WHEN THE
DRAIN WAS SUBMERGED. SAMPLES WERE TAKEN, BUT FINDINGS WERE
INCONCLUSIVE TO POSITIVELY IDENTIFY THE SOURCE. NAVAL STATION
RESPONDED WITH ABSORBENT BOOM, ABSORBENT BOOM, ABSORBENT ROLLS AND
OIL RECOVERY CRAFT. AGAIN, RECOVERY MATERIAL COST WAS MINIMAL (LESS

WD

DLVR:NAVSHIPYD CHARLESTON SC(6)...ACT

N32(1)...ACT FOR COMNAVBASE CHARLESTO(6) 19666/ 3/0008
01(1) 00(1) N35(1) N3 1) N1(1)

RTF:000-000/COPIES:0012

272/09609/ /189 1 LLJ 0057 189/20:14Z 081102Z JUL 94
:POCH0402 189/20:15Z NAVSTA CHARLESTON SC
PSN-162222

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U U N C L A S S I F I E D U

NATO

N $100), BUT 50 PLUS WORK HOURS WERE SPENT CONTAINING AND RECTING THIS INCIDENT.

3. TWO SPILLS... TWO UNKNOWN OR UNIDENTIFIABLE SOURCES... THIS. HOPEFULLY IS NOT A TREND. EXTRA ATTENTION TO DETAIL IS ALWAYS CALLED FOR, EVEN THE SLIGHTEST LOSS OF OIL INTO THE WATER CONSTITUTES AN INCIDENT. PLEASE, IF SEE OR CAUSE A SPILL DO NOT HESITATE TO CALL NAVSTA PORT SERVICES AT EXT: 3-6411. A QUICK RESPONSE WILL KEEP SPILLS AT A MINIMUM AND AS WITH THESE THIS MONTH NO KNOWN ENVIRONMENTAL DAMAGE.//
BT

UUUU UUUUUUUUUUUUUUUU UUUUU UUUU UUUUU
U U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

NARRATIVE MESSAGE

PRIORITY

P R 041045Z AUG 94 PSN 325157B23

FM NAVSTA CHARLESTON SC//13/00/111//

TO ALL SHIPS AND AFLOAT CMDS PRESENT CHARLESTON AREA
COMNAVBASE CHARLESTON SC//N32//
COMSUBGRU SIX//N32//
NAVSHIPYD CHARLESTON SC//190/340//
COMCOGARDGRU CHARLESTON SC//OPS//
COMNAVSURFGRU CHARLESTON SC//00/01/30//
CINCLANTFLT NORFOLK VA//N4422//
NAVY JAG ALEXANDRIA VA//JAG31//

304
307

BT
UNCLAS //N05090//GROUP/SQUADRON CDRS PROTECT FOR UNDERWAY UNITS AND/OR INPORT UNITS RETAINING THEIR COMM GUARD AS APPROPRIATE
MSGID/GENADMIN/NAVSTA CHARLESTON SC/13//

SUBJ/OIL SPILL HARBOR INCIDENT TOTALS FOR JULY 94//
RMKS/1. THERE WERE NO OIL SPILL CLEAN UP REQUIREMENTS PLACED ON THE NAVSTA OIL SPILL RECOVERY TEAM DURING THE MONTH OF JULY. ALL HANDS, STAND UP AND PAT YOURSELVES ON THE BACK!

2. YES THAT IS CORRECT. THERE WERE NO, REPEAT NO OIL SPILL INCIDENTS DURING THE MONTH OF JULY. IT CLEARLY POINTS OUT THAT NAVY CHARLESTON HAS BECOME MORE AWARE, CAREFUL, AND PRECISE IN ALL MATTERS CONCERNING HAZARDOUS OILY WASTE ALONG THE WATERFRONT. WE HAVE REASON TO BE PROUD BUT WE MUST KEEP UP THE GOOD WORK AND CONTINUE TO STRIVE FOR ZERO INCIDENTS FROM HERE ON.

3. CAPT FROMAN SENDS.//
BT

INRTR	134
RUN-OFF	
TRFC CHKS	
DISTRD	12

DLVR:NAVSHIPYD CHARLESTON SC(6 NO.)...ACT

N32(1)...ACT FOR COMNAVBASE CHARLESTON SC
O1(1) OO(1) N35(1) N3(1) N1(1)

19666/ 3/0008

RTD:000-000/COPIES:0012

325157Z4259/ /2.6 J LEJ 0647 216/21:52Z 041045Z AUG 94
CSN:P06H0577 216/21:52Z NAVSTA CHARLESTON SC
[illegible] 325157 [illegible]
[illegible]

DEPARTMENT OF THE NAVY

CHARLESTON NAVAL SHIPYARD

CHARLESTON, S.C. 29408-6100

5090
Ser 106/0251
09 AUG 1994

From: Commander, Charleston Naval Shipyard
To: Commanding Officer, Naval Station

Subj: IMPROPER DISPOSAL OF DEBRIS FROM THE FLOATING DRYDOCK USS ALAMOGORDO.

1. When the floating drydock USS Alamogordo was decommissioned recently, the debris that was removed from the drydock floor was improperly disposed of in the spoils area in the south end of the Naval Station. Although the debris was determined not to be hazardous waste, it is a RCRA regulated solid waste (SC Hazardous Waste Management Regulations R.61-79.260, Appendix I, Figure 1), and should be disposed of in a properly permitted landfill.

2. Per a site visual inspection by Code 106 personnel, the debris was observed to be sufficiently cleaned up to warrant no further action.

R L Laney
R. L. Laney
by direction

Copy to:

100
106DF
186 (Robertson)

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 13:34 DATE: 8/12/94 WHO RECEIVED CALL: MARY

PERSON REPORTING SPILL: Port Service SM2 Colon SHOP: S/F PHONE: 6411

SPILL LOCATION: Pier Nov 3 Alfa

HAS SPILL STOPPED? ~~YES~~ NO
IS SPILL CONTAINED ~~YES~~ NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES ~~NO~~ APPROX 2 GALS

WHAT SPILLED? Oily Waste Spill 10 Gal Pier 2 Gal Water ~~Clean~~ Clean up

RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	1400
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

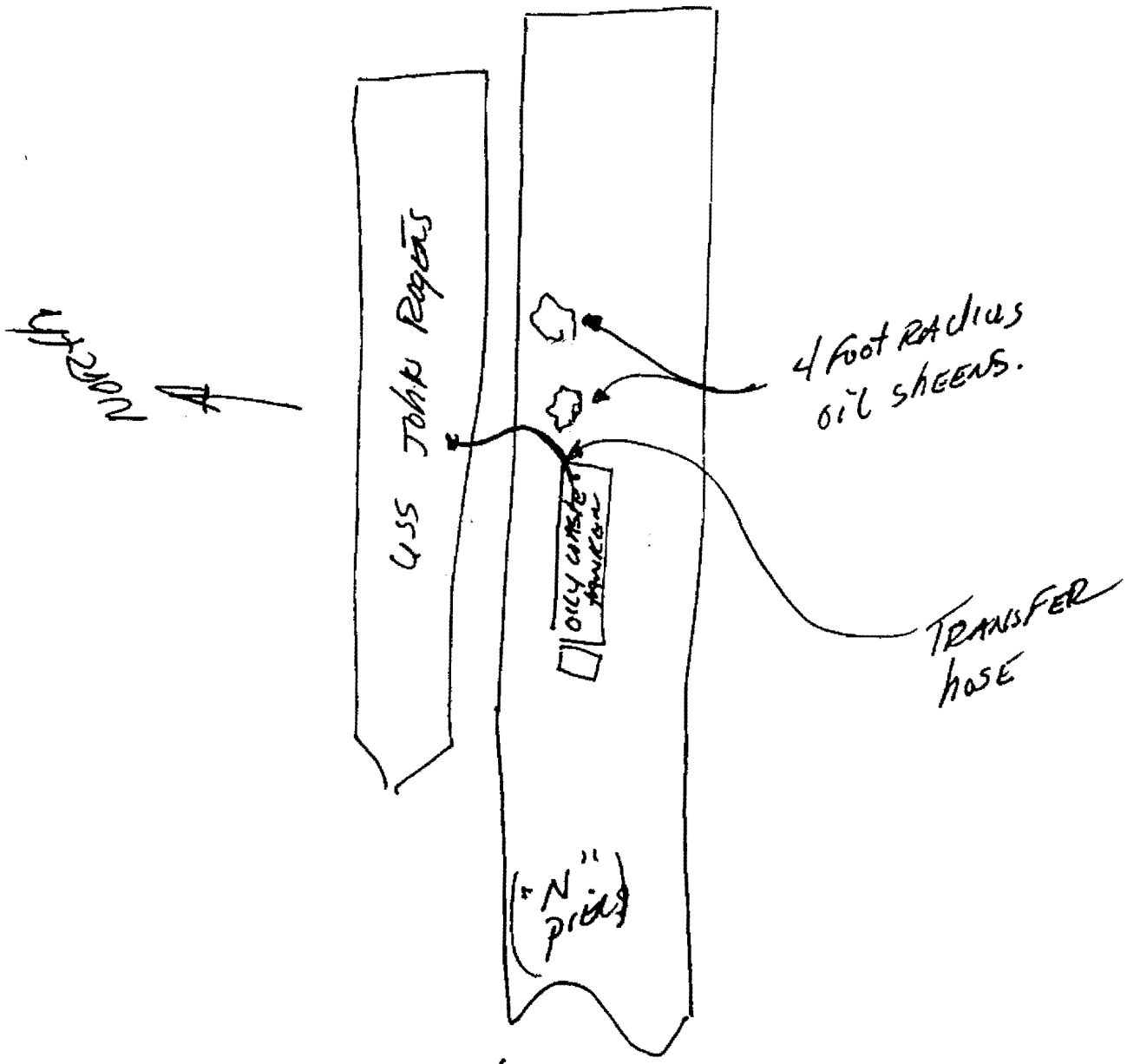
NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		~~744-7600~~ 749-6061
GENE RORIE		744-0986

Enclosure

Ashley River



USS JOHN ROGERS transferring oily waste had a small leak at a coupling. Approx 1/2 gal of oil waste that mixed with water on the pier, small amount went in River. Approx (2 gals) Port Services cleaned up water/oil. Shop 99 cleaned up the pier

[signature]
[illegible]-94

UUUU

UUUU

HAZARDOUS MATERIAL SPILL
PHONE DATA SHEET

TIME: 0950 DATE: 8/26/94 WHO RECEIVED CALL: GARY CRAWFORD

PERSON REPORTING SPILL: _____ SHOP: _____ PHONE: _____

SPILL LOCATION C-PIER NEAR EAST/SOUTH ENTRANCE TO BLDG-62 MANHOLE / ALSO HOSE CONNECTION ON C-PIER AT PWD & SONOR STATION.

HAS SPILL STOPPED? YES NO
IS SPILL CONTAINED YES NO
IS ANY MATERIAL GOING INTO RIVER OR DRAINS? YES NO

WHAT SPILLED? CHT @ 20 GALLONS

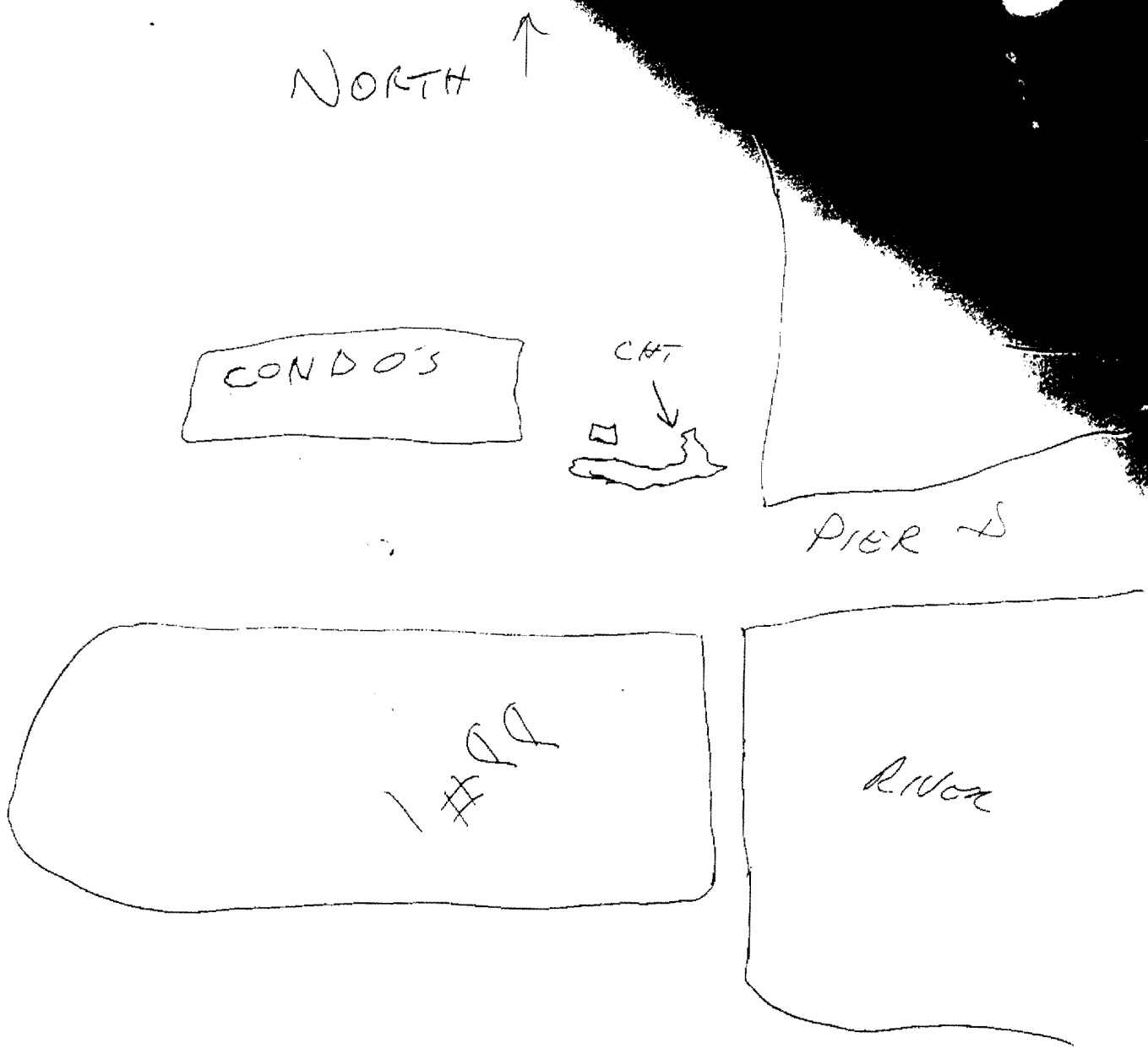
RESOURCES	NEEDED	CALLED	PHONE	TIME
X99 HAZ. MAT. SPILL TEAM	Y/N	Y/N	36115 (D) 35413 (B)	1000
POLICE	Y/N	Y/N	33555	
X07 (PCB OR PESTICIDE SPILL TEAM	Y/N	Y/N	36606 (D) 36104 (D)	
PORT SERVICES (WATER BORNE)	Y/N	Y/N	36411	
SHIPYARD WATCH OFFICER	Y/N	Y/N	34642 (B)	
INDUSTRIAL WATCH OFFICER (NIGHT)	Y/N	Y/N	36390 (B)	
X72 LABOR SUPPORT AND HANDLING EQUIPMENT	Y/N	Y/N	32817 (D) 36791 (B)	
EMS	Y/N	Y/N	35444	
FIRE DEPARTMENT	Y/N	Y/N	35333	
INDUSTRIAL HYGIENE	Y/N	Y/N	36100 (D) 36600 (D)	
NAVSTA DUTY OFFICER	Y/N	Y/N	35430 (B) 35096 (B)	
NSC DUTY OFFICER	Y/N	Y/N	32660 (B) 32661 (B)	
QUALITY ASSURANCE LAB	Y/N	Y/N	32955	
REPAIR OFFICER	Y/N	Y/N	33280	
RESIDENT OFFICER IN CHARGE OF CONSTRUCTION	Y/N	Y/N	33630	
SAFETY (NAVAL STATION)	Y/N	Y/N	35878	
SAFETY (SHIPYARD)	Y/N	Y/N	36298 35957	

NOTES: (D) DAY SHIFT, (B) BACKSHIFT

C106 NOTIFICATION:

NAME	TIME NOTIFIED	HOME PHONE
GARY CRAWFORD		~~744-7000~~ 749-6061
GENE RORIE		744-0986

Enclosure (1)


NORTH
CONDO'S
CHT
PIER
RIVER

NSY Charleston — Zone J
Spill Reports Summary Table

Year 1991

Spill Date	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume[a]	How Spill Occurred	Resulting Impact	Corrective Action Taken
5/24/91	241141	Pier Q	F-76	70-80 gal	70-80 gal	Error reading sounding chart	Cooper River	Containment Absorbent Pads/Rolls
6/11/91		Pier R	Oil	20 gal	20 gal	Undetermined →	None Known	Recovered with Boom/Absorbent/Craft
6/21/91		Pier N-South	DFM	15 gal	15 gal	Undetermined →	" "	" "
10/13/91	243647	Drydock 5	JET Lube Oil	10 gal	10 gal	Prop. seals failed	Potential Cooper River	Contained w/in Drydock/Sorbents
7/[illegible]/91		Pier E	Diesel Fuel	150 gal	150 gal	Misaligned Valves	Cooper River	Absorbent Rolls/Boom
5/19/91		N/W Pier A	Oily waste	5-10 gal	5-10 gal	Crack in tank		Contained and recovered
5/21/91		Pier S-North	Oily bilge waste	10 gal	10 gal	Valve misalignment Personnel error		" "
5/21/91		Pier P	DFM	75-80 gal	75-80 gal	Valve misalignment Personnel error	Cooper	Boom/Absorbent
5/21/91		?	Lube Oil	10 gal	2-3 gal	Personnel carelessness	?	Absorbent
6/21/91		Pier E North	Sewage	Unknown	Unknown	Sewage pipe broke for 12 days	Cooper	Sources & line were isolated/Repairs

Notes:

a — Critical Volume is the estimated amount of spilled substance that entered a surface water body or a storm sewer system.

NSY Charleston — Zone J
Spill Reports Summary Table

Year 1994

Spill Date	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume[a]	How Spill Occurred	Resulting Impact	Corrective Action Taken
5/4/94		Pier F	Diesel fuel	20 gal	20 gal	Operator error Bilge pump	Cooper River slick 100 x 10'	Boom, pier, quickwall, [illegible]/sorbents
5/3/94		Pier F	Fuel oil	.5 gal	.5 gal	Pump hose not secured	100 x 100' Cooper	Boom, quickwall sorbents
4/12/94		Dry dock 5	oil/H2O mixture	4 gal	4 gal	Bilge pump operator error	Dry dock	Sorbents
3/4/94		Pier C	Fuel oil	4 gal.	4 gal	Fuel transfer	Cooper no tide	Sorbents
3/10/94		Dry dock 5	Lube oil	10 gal.	10 gal.	Valve failure	Dry dock	Boom/sorbents
3/17/94		Pier M	Fuel oil	15 gal.	15 gal	Unknown	Cooper	Boom/sorbents
3/30/94		Pier C	Fuel oil	30 gal.	30 gal.	Faulty fuel valve	Cooper	Quickwalls/cones removing
4/4/94		Pier C	Unknown	7.5 gal.	7.5 gal	Unknown	Cooper 50x50'	Contained recovered
3/30/94		C-D SLIP	JP-5	30 gal	30 gal.	Equip failure valve failed	Cooper 200' x 2' slick	Boom/ Sorbents 95% recovered
5/[illegible]/94		Pier C						

Notes:

a — Critical Volume is the estimated amount of spilled substance that entered a surface water body or a storm sewer system.

NSY Charleston — Zone J
Spill Reports Summary Table

Year

Spill Date	Incident Report Number	Location	Substance Spilled	Volume Spilled	Critical Volume[a]	How Spill Occurred	Resulting Impact	Corrective Action Taken
5/18/91		Dry dock #5 S. annex	Probably [illegible] oil	10 gals	10 gals	Dry dock discharge impeded by attached boom	Contamination [illegible]	Sorbents

Notes:

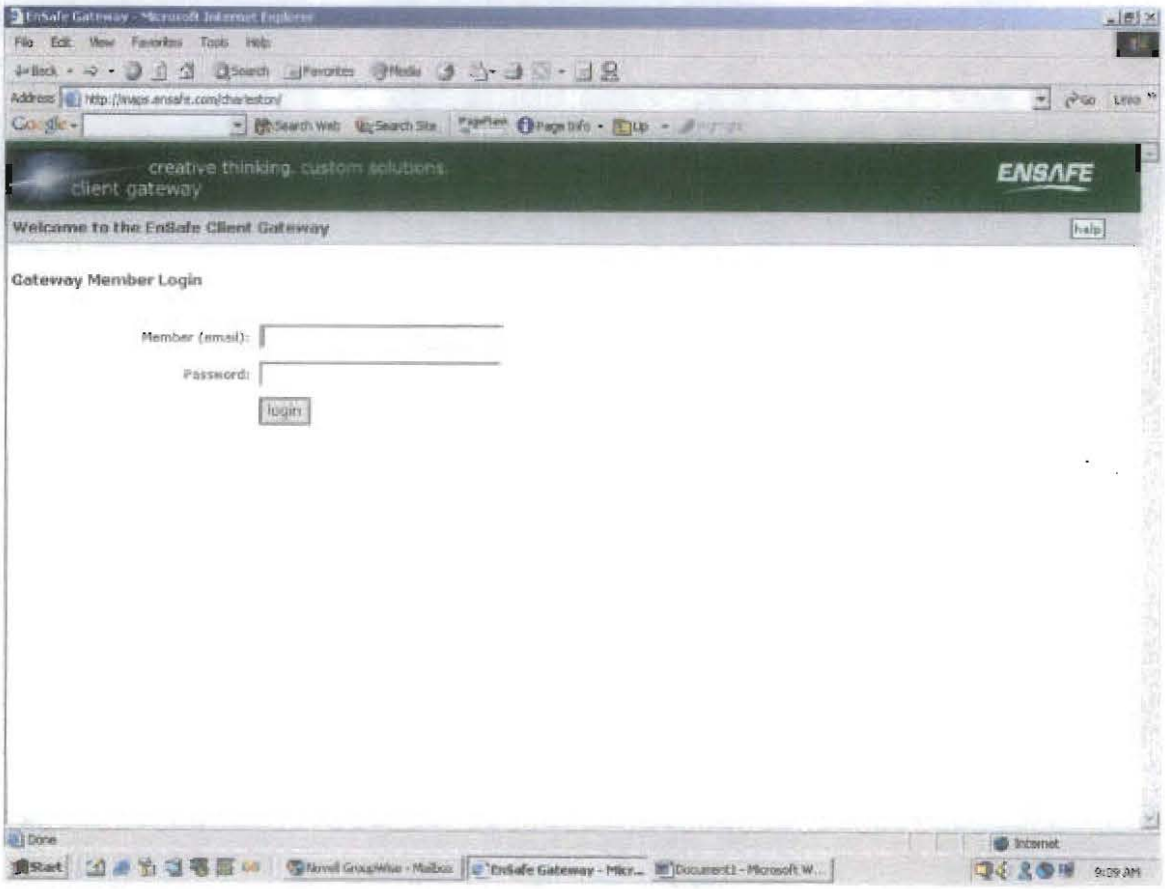
a — Critical Volume is the estimated amount of spilled substance that entered a surface water body or a storm sewer system.

CHARLESTON NAVAL COMPLEX ZONE J WEB DATA VIEWER

The Charleston Web Data Viewer has been developed to aid in the distribution and presentation of Charleston Naval Complex Zone J reports and data. There are seven major sections (Login, Home Page, Schedule, Documents, I-Map Viewer, Query Tool, and Members) to the website. The features of each section will be discussed below.

LOGIN

The website address is http://maps.ensafe.com/charleston/. Logging into the website will consist of entering the member ID (user's email address) and password. Each person who has authorized access to the gateway will be added to the member list. An individual username (consisting of the user's e-mail address) and password will be assigned to each member. This will help in determining/verifying the identity of individuals accessing the site. Also, it is possible to see which sections an individual is able to access or has accessed in the past.

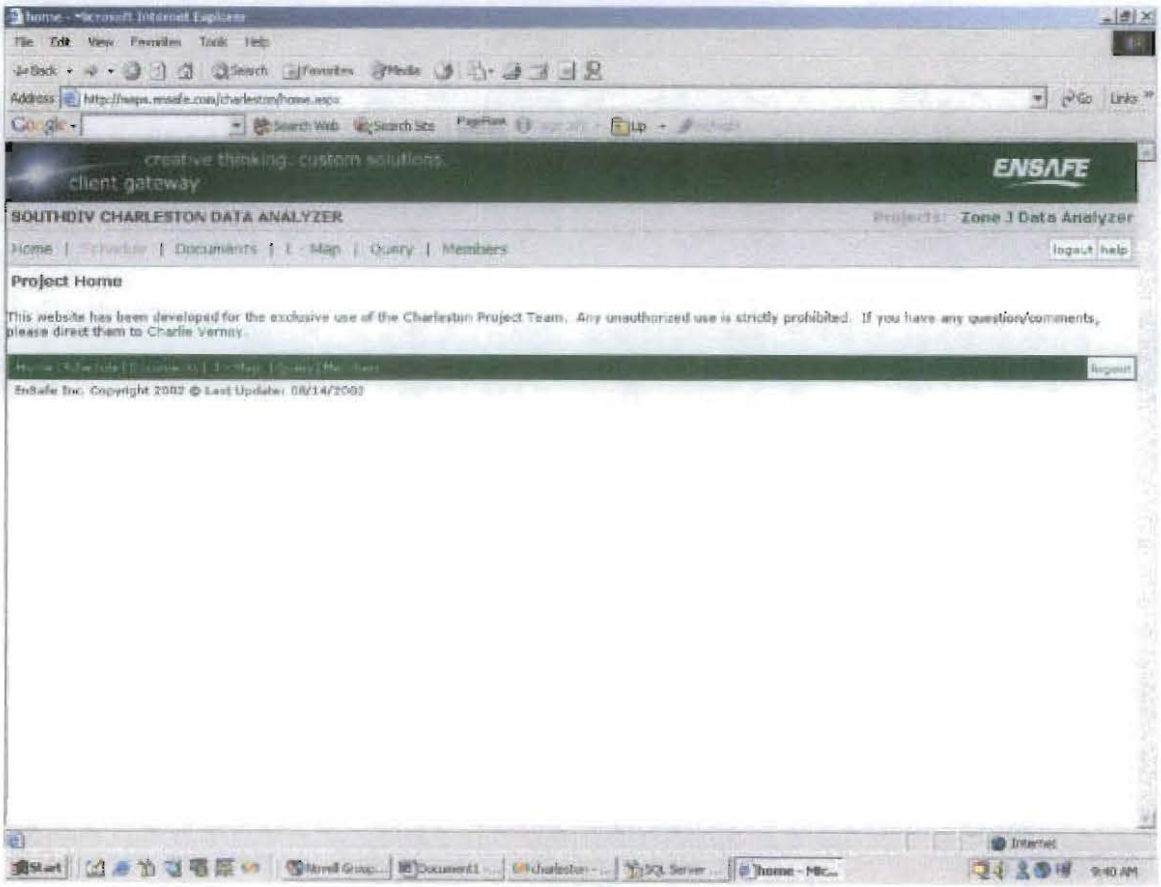


HOME PAGE

This section of the website contains a general introduction, the project main page, and provides a location for news about the project, updates, links, etc.

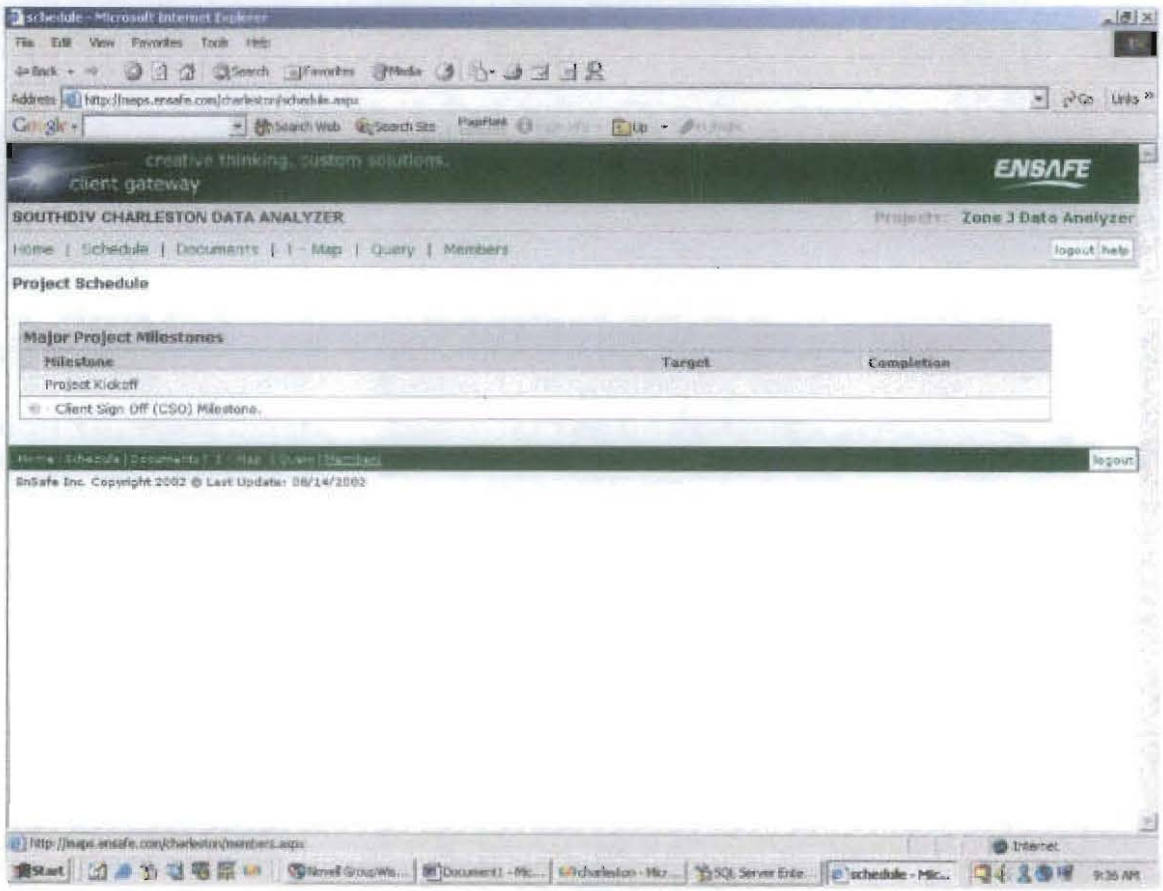
Tabs for the Schedule, Documents, I-Map, Query, and Members sections that may be viewed are also presented on this page as website navigation tools. Clicking on any of the tabs will open that particular section of the website to viewing by authorized members.

Members may log out of the website from this page by clicking on the logout button. Help regarding the website may be obtained by clicking on the help button which will bring up an e-mail to Frank McInturff.



SCHEDULE

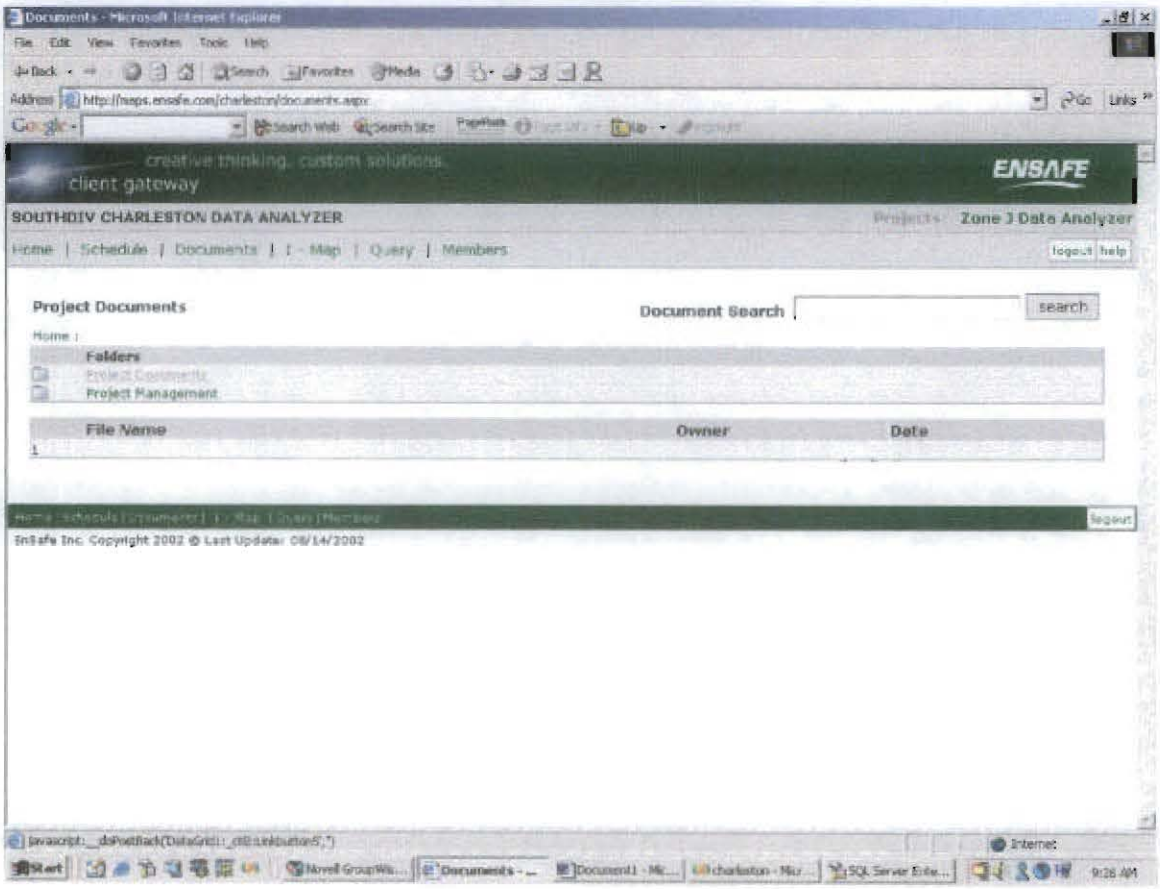
This section of the website contains project schedule information and will be updated to reflect changes in status and completion of tasks. Project schedules, milestones, meeting dates, deadlines, etc will be presented on this page.



DOCUMENTS

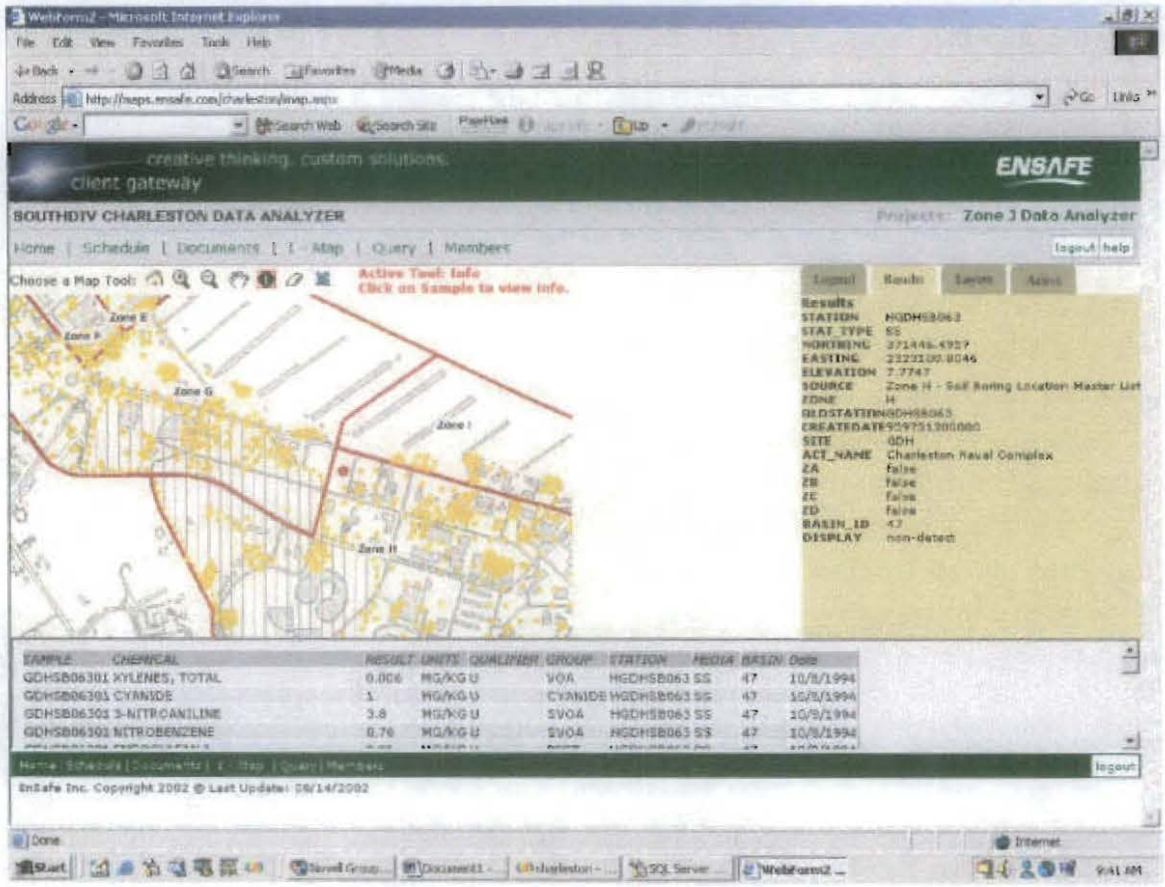
This section of the website lets website users navigate to documents based on a logical folder structure. The documents feature is used by clicking on a folder at the top. The subfolders contained within that folder will be displayed in the upper table while the documents contained within that folder will be contained in the bottom table. The document collection can also be searched by typing keywords into the document search box and clicking on the search button. The search will return any document that contains the search term requested.

Authorized members will be able to upload documents through the upload utility built into this page. Clicking on "add" will open the file upload page. A window for entering the name of the new folder will appear. Enter the name of the new folder and click on the green check to bring up the file upload utility. Name the file and file owner, and browse for the file that will be uploaded. The system will upload any file format. Suggested file formats are PDF and MS Word DOC.



I-MAP VIEWER

The I-Map viewer allows users to perform several functions on a live, queryable map of the project site. There are seven map tools (Home, Zoom In, Zoom Out, Re-center, Select, Clear Selection, and Export to Excel) available to the viewer. A user can choose any of the map tools by clicking the appropriate icon in the map tool bar which is located along the top of the map view.



I-Map tools are described below:

- Home – This will reset the map to its original extent.
- Zoom In – Select this tool by clicking on it and then click the map to zoom in.
- Zoom Out – Click on this tool to Zoom Out.
- Re-Center – Click on this tool to select it and then click the map to re-center at that point.
- Information/ Select – Click on this tool to select it and then click on any of the points from the active layer to display their results.
- Clear Selection – Click this tool to clear any selected points on the Map.
- Export to Excel – Click this tool to export data contained in the results pane to Microsoft Excel for further processing.

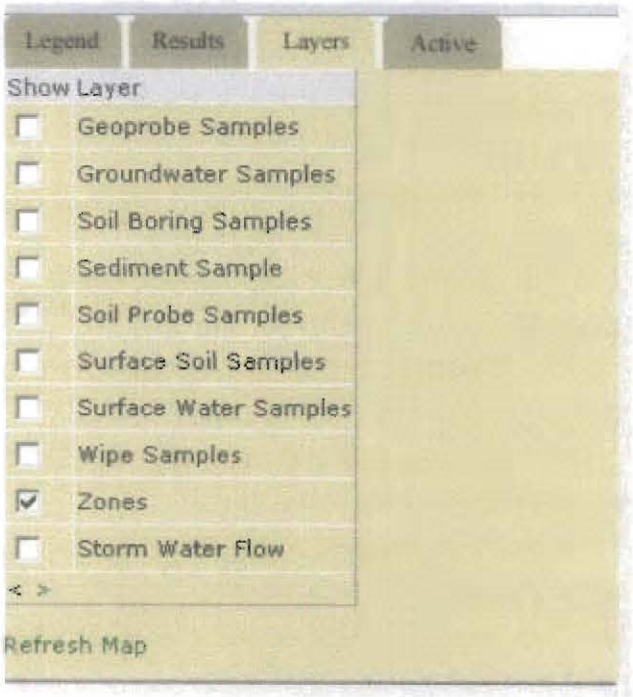
There are four display functions (Legend, Layers, Active, and Results) associated with the I-Map viewer. Each of the display functions can be selected using one of the four tabs presented to the right of the map. I-Map viewer tab display functions are described below.

Legend

The map legend is shown when the legend tab is selected. The items displayed in the legend are those items that have been selected in the Layer tab.

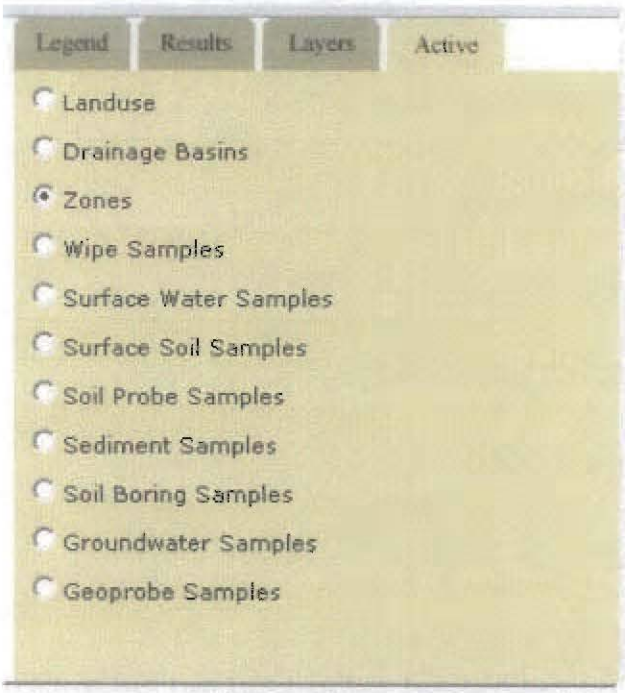
Layers

The layers tab provides a list of available layers which will open to the right of the map. The user is able to select which layers may be seen or remain hidden. A layer may be selected for viewing by clicking the check box next to the desired layer name and then clicking the "Refresh Map" link at the bottom of the table. Layers selected for viewing will be simultaneously represented on the Legend tab. The layers tab has several pages which may be viewed by clicking on the "<" and ">" links located beneath the list of layers. A layer which is visible may be hidden by clicking on the check of a visible layer and then clicking on the "Refresh Map" link. This will simultaneously hide the layer and remove the layer symbol from the legend.



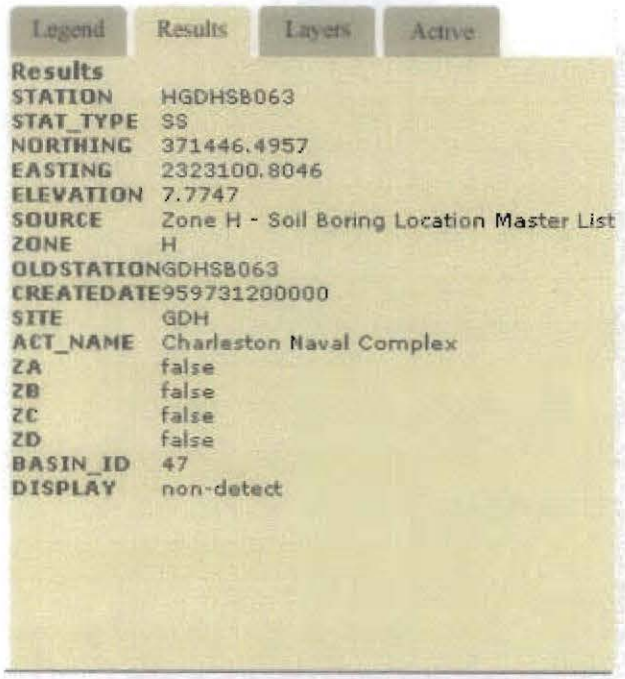
Active

The active display feature tab allows the viewer to select a single layer to which the information tool may be applied in determining attribute information about features within the layer such as location name, area, and coordinates from the GIS database. Choose the Active Tab to choose the layer to be queried with the information/select map tool. When a layer is chosen to be active, it is automatically visible on the map. Only one layer may be active at any time.



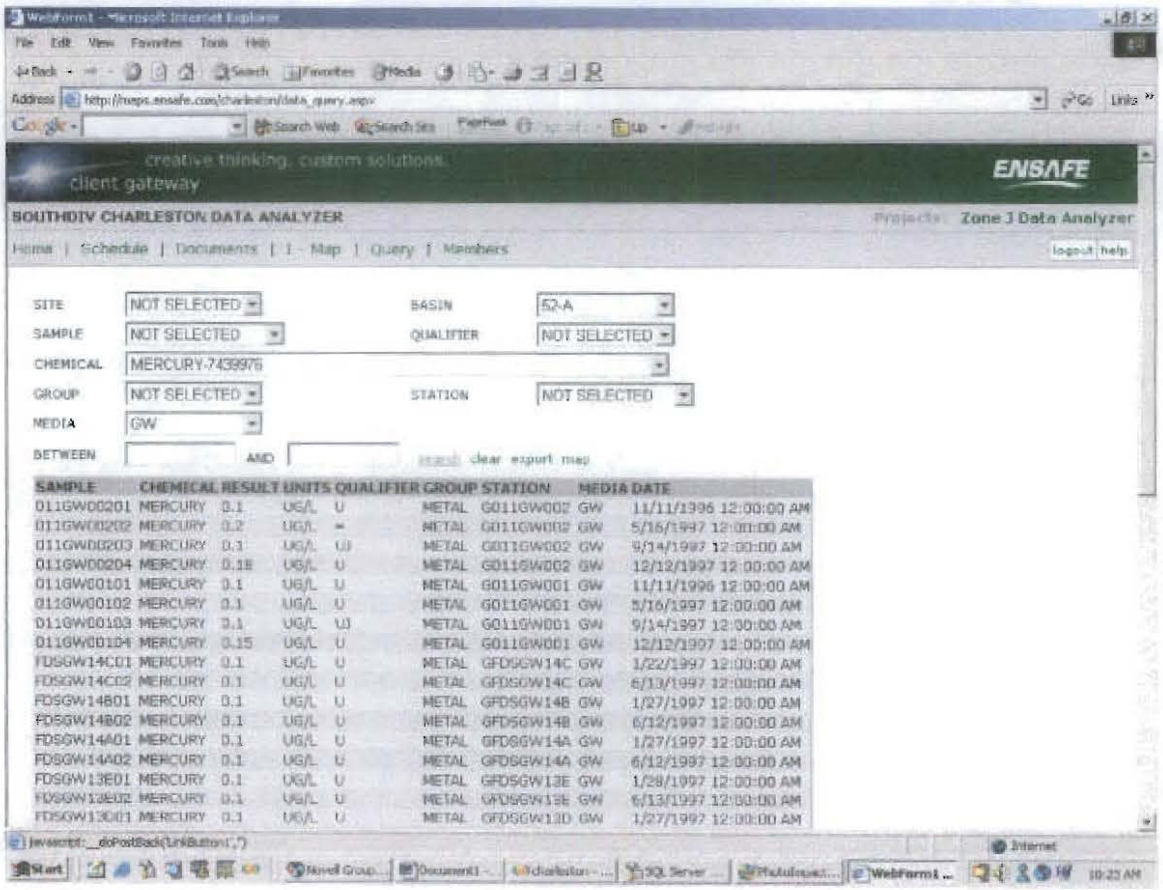
Results

Selecting the results tab allows the viewer to identify and display information about a feature using the information/selection map tool from the map tool bar. The feature to be selected must be part of a layer activated in the Active display feature before this option may be used. Click on the select map tool and then click on the object within the map portion of the view. Information regarding the selected object will be displayed in the Results tab portion of the view. A list of analytical results from the SQL Server database tables will be presented at the bottom of the screen if the selected feature is a sampling location.



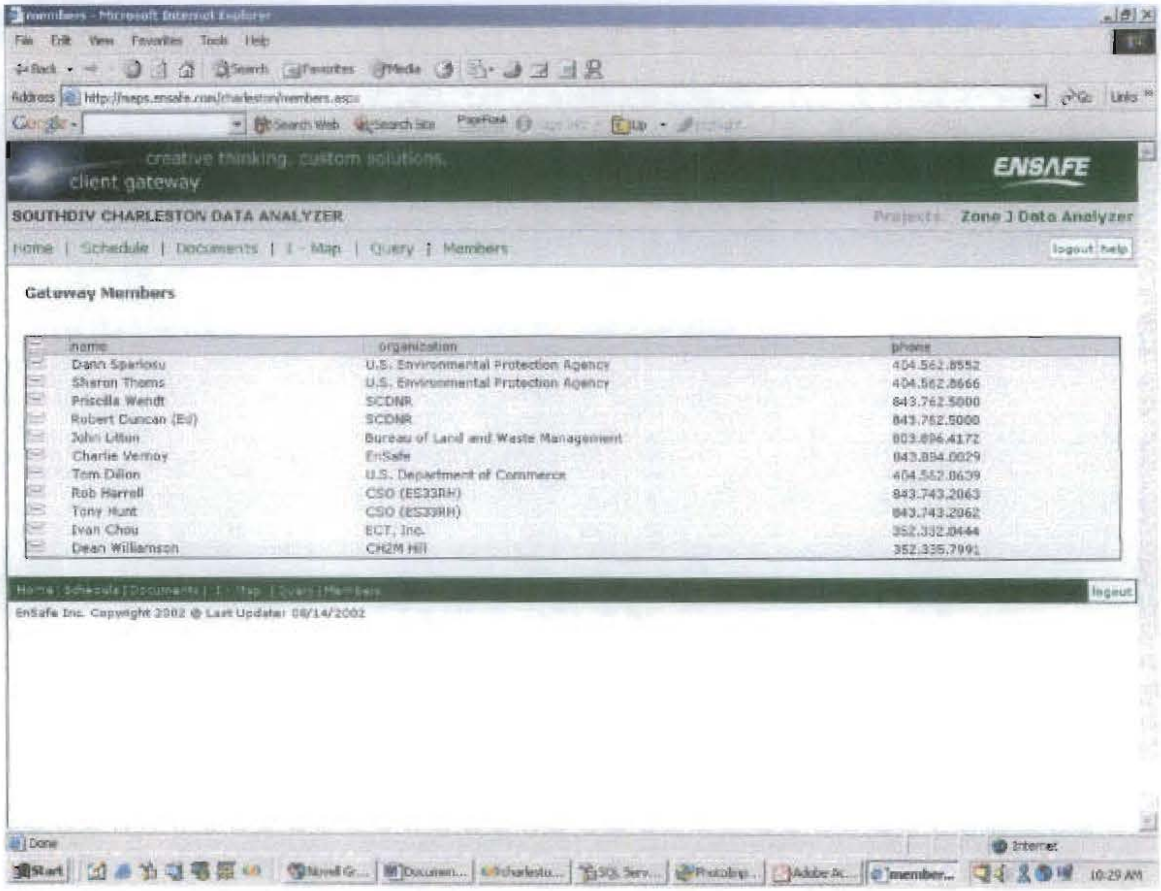
QUERY TOOL

The query tool allows users to do tabular queries on the data. These queries are limited by choosing criteria from the dropdown lists and then clicking the search link. Picking a site will populate the SAMPLE and STATION fields with samples taken at that site. The BETWEEN fields will add a date range to the selection criteria. Using NOT SELECTED in a field makes the criteria all inclusive for that field. Once query parameters are selected, click on search to perform the query. The results are then displayed in a table below the search criteria. Users can then export the results to Microsoft Excel for further analysis by clicking the export button and map the results in the I-Map Viewer by clicking on the map link. The map link will only be visible if a specific chemical, media, and date range are entered into the query tool. Dates should be entered as mm/dd/year.



MEMBERS

The members section presents contact information for the project team. All individuals listed on this page have access to the website and can be e-mailed by clicking on the envelope next to the member's name.



APPENDIX D

POTENTIAL STORM WATER COPCs

APPENDIX D
POTENTIAL STORM WATER COPCs[1]
ZONE J RFI
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

Water Body	Drainage Basin (DB)	Potential Storm Water COPCs	Upland Linkage
Cooper River	DB 3	Lead Mercury Vanadium	Soil Soil and Groundwater Soil
	DB 20	Aluminum Bis(2-ethylhexyl)phthalate Iron Lead Zinc	Groundwater Soil Soil and Groundwater Soil Soil
	DB 23	Antimony	Soil
	DB 30	Copper Nickel	Soil and Groundwater Soil and Groundwater
	DB 37	Benzo(g,h,i)perylene	Soil
	DB 41	Aluminum Iron	Soil Soil
	DB 45	Arsenic Barium Lead Nickel Vanadium	Soil Soil Soil Soil Soil
	DB 47	Bis(2-ethylhexyl)phthalate	Soil
	DB 51	Bis(2-ethylhexyl)phthalate Copper	Release and Soil Soil
Noisette Creek	DB 10B	Arsenic Barium Beryllium Chromium Cobalt Copper Iron Zinc	Soil and Groundwater Groundwater Soil Soil Soil Soil Soil and Groundwater Soil
Shipyard Creek	-	None	-

(1) This table is a summary of Table 8.1 from Ensafe (2003a) and Table 6.1 from Ensafe (2003b).

APPENDIX E

HYDRODYNAMICS AND CONTAMINANT TRANSPORT IN CHARLESTON HARBOR ESTUARY

Hydrodynamics and Contaminant Transport in Charleston Harbor Estuary

by: Ivan B. Chou, P.E.

ECT
Environmental Consulting & Technology, Inc.

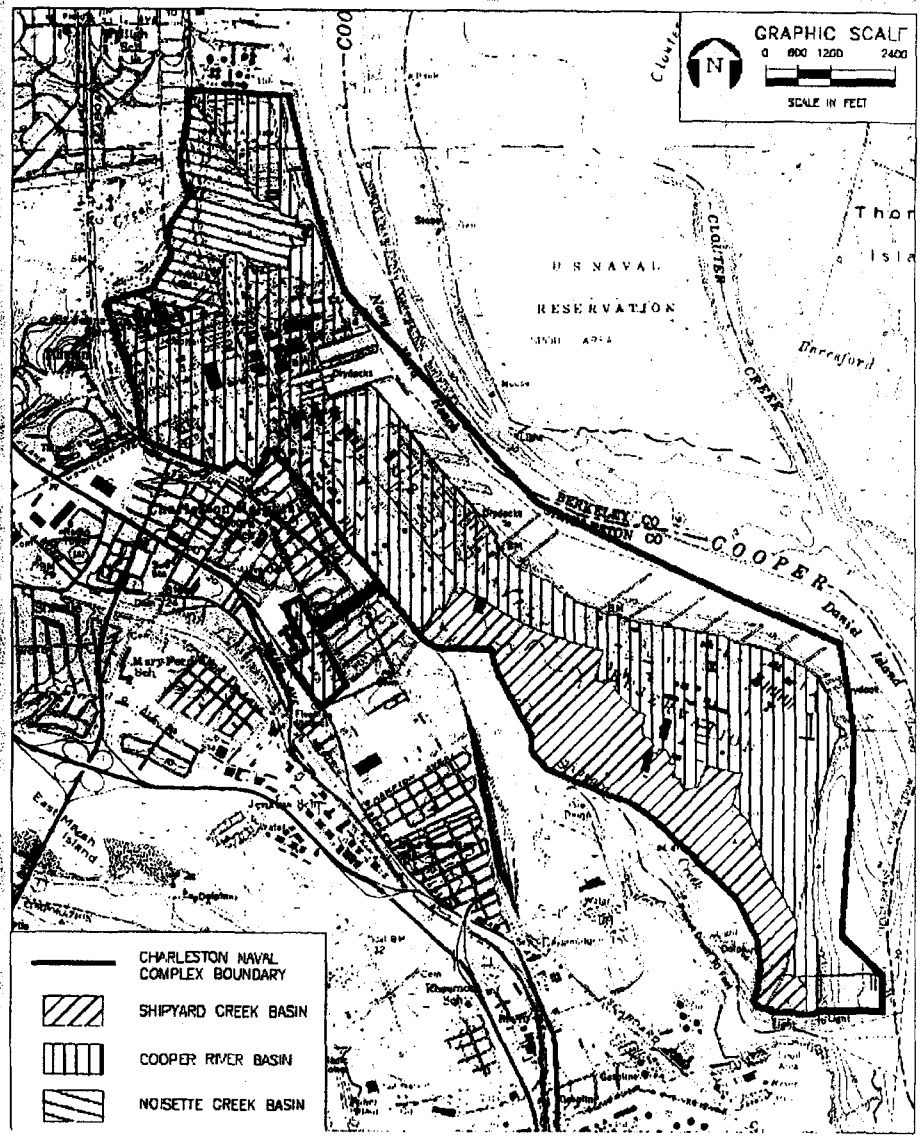
Naval Facilities Engineering Command • Southern Division •

ENSAFE
ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

Purpose

To evaluate potential contaminant migration pathway in the surface water around Charleston Naval Complex and Charleston Harbor Estuary

Charleston Naval Complex



Factors Affecting Estuarine Hydrodynamics

- Tide
- Freshwater inflow
- Bathymetry and boundary geometry
- Wind
- Density stratification

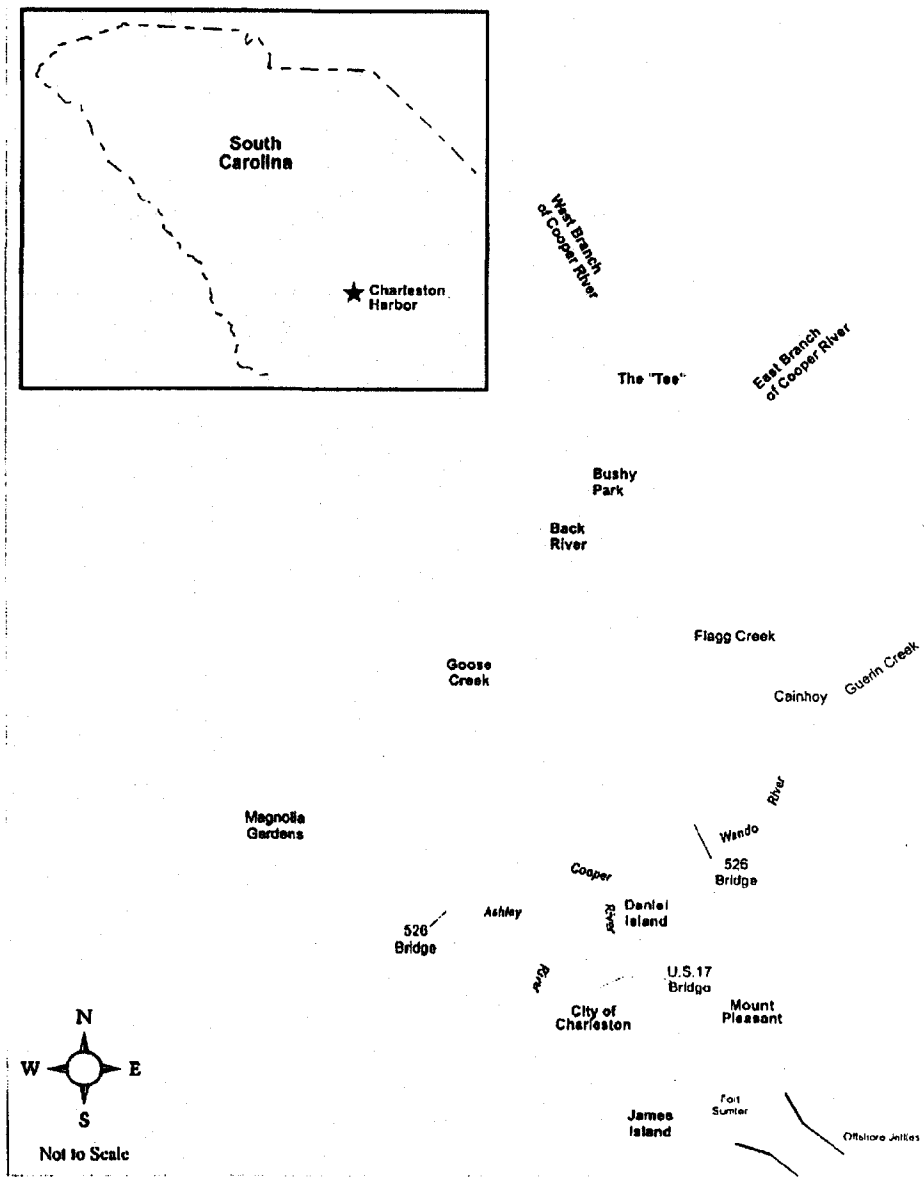
Factors Affecting Pollutant Transport

- Tidal current
- Pollutant source location
- Effluent quantity
- Effluent quality
- Sedimentation/resuspension
- Biochemical processes

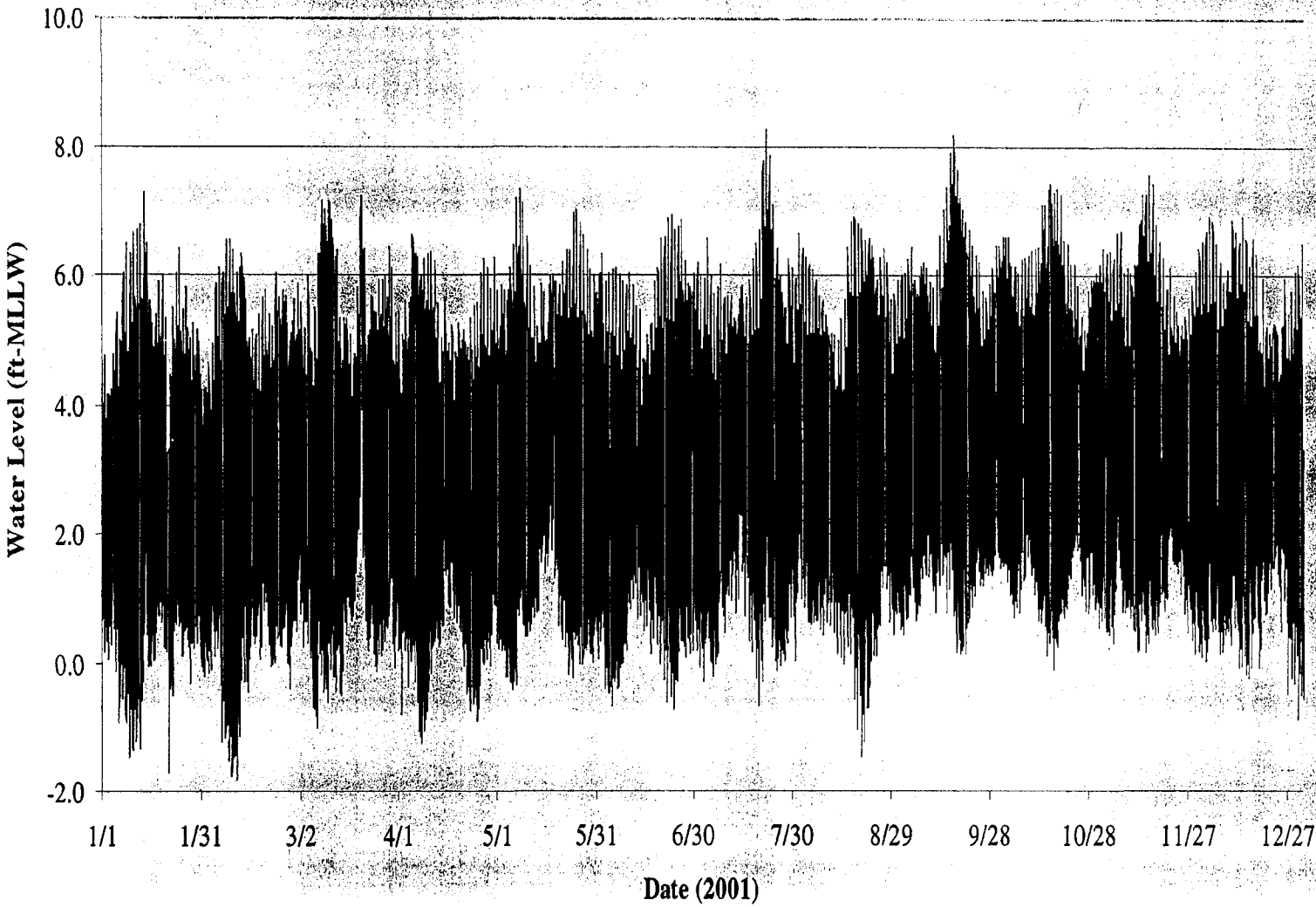
Pollutant Transport Process

- Nearfield processes:
  - Turbulent jet entrainment
  - Turbulent diffusion
  - Buoyant spreading
- Farfield processes:
  - Dispersion
  - Advection

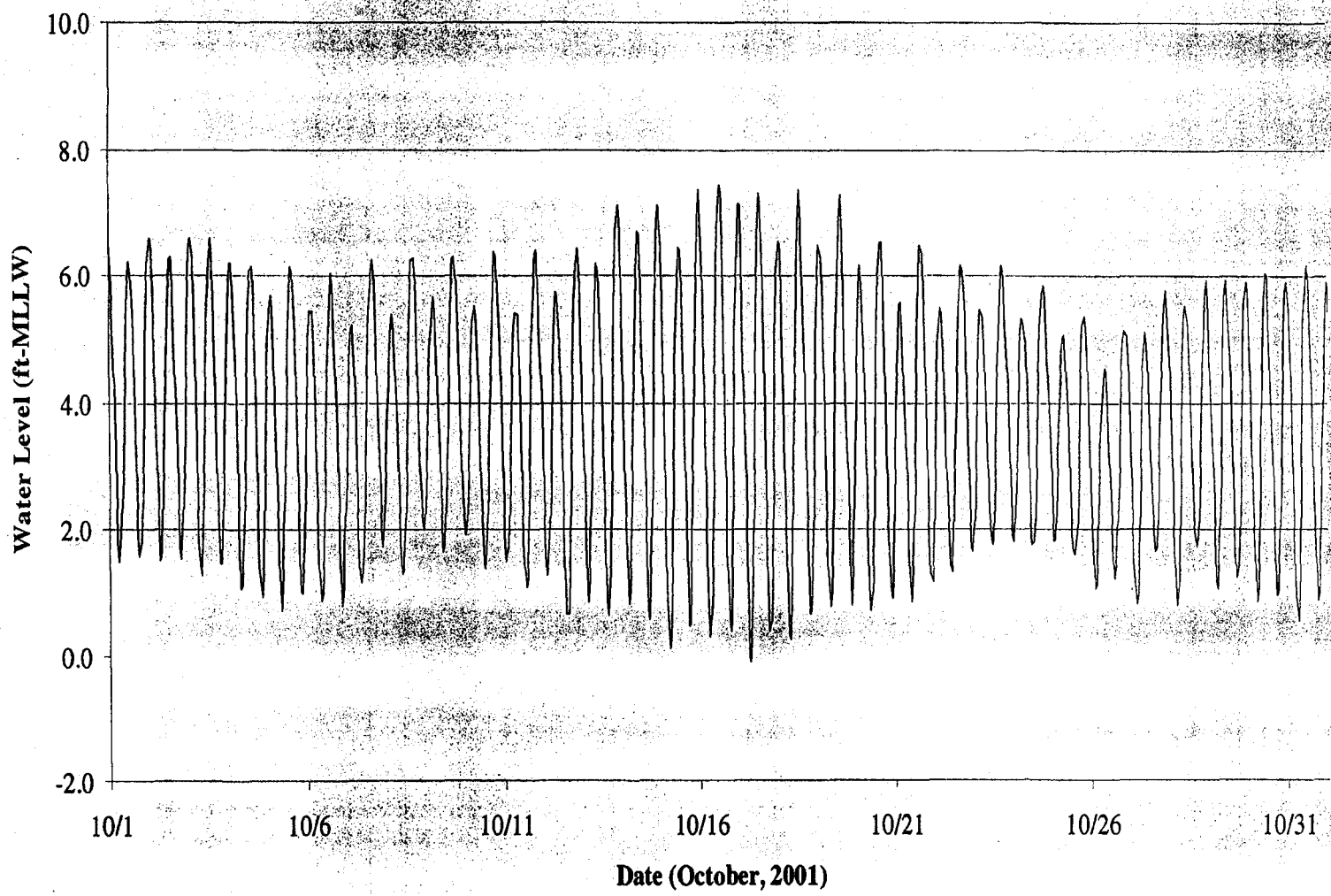
Charleston Harbor Estuary



Tidal Level at Cooper River Entrance (2001)



Tidal Level at Cooper River Entrance (October 2001)



Tidal Ranges and Phases in Charleston Harbor/Cooper River

Station	Mean Tide Range (ft)	Spring Tide Range (ft)	Phase Lag (hours)
Fort Sumter	5.09	5.90	-0.02
Charleston (Customhouse Wharf)	5.27	6.11	0.00
Shipyard Creek	5.30	6.10	0.33
Cooper River at Clouter Creek, south entrance	5.40	6.26	0.32
Cooper River at Clouter Creek, north entrance	5.48	6.36	0.55
Cooper River at Snow Point	5.36	6.22	0.75
Cooper River at General Dynamics Pier	4.37	5.07	1.42
Cooper River at Dupon, Dean Hall	3.43	3.98	2.12
Cooper River at Old Rice Mill, West Branch	2.60	3.02	2.93
Cooper River at Pimlico, West Branch	1.70	1.97	3.90

Note: Phase lag is relative to the tide phase at Customhouse.

Source: NOAA, 2002a.

Tidal Ranges and Phases in Ashley River

Station	Mean Tide Range (ft)	Spring Tide Range (ft)	Phase Lag (hours)
Fort Sumter	5.09	5.90	-0.02
Ashley River at South Ashley Bridge	5.34	6.19	0.12
Ashley River at Duck Island	5.60	6.50	0.28
Ashley River at Cosgrove Bridge	5.62	6.52	0.30
Ashley River at Drayton, Bee's Ferry	5.76	6.68	0.65
Ashley River at Magnolia Gardens	5.79	6.72	0.90
Ashley River at Greggs Landing, Matceba Gardens	6.06	7.03	1.70

Note: The phase lag is relative to the tide phase at Customhouse.

Source: NOAA, 2002a.

Tidal Ranges and Phases in Wando River

Station	Mean Tide Range (ft)	Spring Tide Range (ft)	Phase Lag (hours)
Fort Sumter	5.09	5.90	-0.02
Wando River at Hobcaw Point	5.76	6.68	0.18
Wando River at Parker Island	5.76	6.68	0.47
Wando River at Cainhoy	6.15	7.13	0.50
Wando River at Big Paradise Island	6.54	7.59	0.87
Wando River at Woodville	6.30	7.30	1.37

Note: The phase lag is relative to the tide phase at Customhouse.

Source: NOAA, 2002a

Tidal Current Velocities and Phases in Charleston Harbor/Cooper River

Station	Average Peak Flood Velocity (knots)	Average Peak Ebb Velocity (knots)	Phase Lag at Low Slack (hours)
Charleston Harbor Entrance, between jetties	1.8	1.8	-0.02
Charleston Harbor off Ft. Sumter	1.7	2.0	0.00
South Channel at Buoy "32"	0.8	1.0	-0.02
South Channel, 0.8 mile ENE of Fort Johnson	0.8	2.6	0.72
South Channel, 0.4 mile NW of Fort Johnson	0.7	1.9	1.17
The Cove, entrance on the Cove Range	1.2	0.9	0.47
Shutes Reach, Buoy "8"	1.3	1.5	0.30
Hog Island Channel	0.8	0.8	-0.65
Folly Reach at Buoy "5"	1.2	1.6	0.03
Folly Reach north of Fort Johnson	1.2	1.1	-0.85
0.6 miles SW of Castle Pinckney	0.7	1.3	-0.35
0.4 miles west of Shutes Folly Island	0.8	2.2	0.88
Customhouse Reach off Customhouse	1.0	1.3	0.82
Customhouse Reach	1.0	1.8	0.77
Horse Reach	1.4	1.9	0.60
Hog Island Reach, Buoy "12"	1.2	1.3	0.22
Drum Island, east of bridge	1.2	2.0	0.50
Town Creek Lower Reach	1.1	2.2	0.57
Town Creek, 0.2 mile above bridge	0.8	2.5	1.10
Drum Island Reach at Buoy "45"	0.6	1.0	0.43
Cooper River, 0.2 mile above Drum Island	1.1	2.4	1.20
Cooper River at Daniel Island Reach, Buoy "48"	1.2	1.3	1.02
Cooper River at Shipyard Creek entrance	0.5	1.5	0.68
Cooper River at Daniel Island Reach	1.3	2.3	1.48
Cooper River at Daniel Island Bend	1.2	2.1	0.92
Cooper River at North Charleston	1.1	1.7	1.43
Cooper River at Filbin Creek Reach	1.2	1.8	1.52
Cooper River at Filbin Creek Reach, Buoy "58"	1.1	1.3	1.30

Tidal Current Velocities and Phases in Charleston Harbor/Cooper River

(Continued, Page 2 of 2)

Station	Average Peak Flood Velocity (knots)	Average Peak Ebb Velocity (knots)	Phase Lag at Low Slack (hours)
Cooper River at Ordnance Reach	1.0	1.2	1.58
Cooper River at Yellow House Creek	0.7	1.4	2.10
Cooper River at 1 mile NW of Yellow House Landing	0.7	1.8	2.43
Cooper River at SE of Woods Point	0.8	1.0	1.80
Copper River at Woods Point	0.9	1.4	2.68
Cooper River at 0.5 mile North of Snow Point	1.1	1.4	2.25
Cooper River off Amoco Pier	0.7	0.9	2.15
Cooper River at 0.5 mile below Moreland	1.9	2.0	3.54
Cooper River at 1 mile below Hagan Island	1.3	1.4	3.54
Cooper River at 0.4 mile SW of The "Tee"	1.0	1.7	4.37
Cooper River at The "Tee"	0.9	1.0	3.00
Cooper River at Childsbury, S.A.L. RR Bridge	0.7	1.7	4.72

Note: Phase lag is relative to the phase at Charleston Harbor off Fort Sumter.

Source: NOAA, 2002b.

Tidal Current Velocities and Phases in Ashley River

Station	Average Peak Flood Velocity (knots)	Average Peak Ebb Velocity (knots)	Phase Lag at Low Slack (hours)
Ashley River SW of Battery	1.2	1.8	0.27
Ashley River off Wappoo Creek	1.1	1.2	0.12
Ashley River at highway bridge	1.2	1.1	-0.15
Ashley River at 0.1 mile below SCL railroad bridge	1.0	1.1	-0.10
Ashley River at 1.5 mile above SCL railroad bridge	1.2	1.5	0.37
Ashley River at State Highway 7 bridge	1.0	1.0	0.10
Ashley River at 0.1 mile east of West Marsh Island	0.7	1.0	0.38
Ashley River at Bees Ferry Bridge	1.9	2.3	1.22

Note: Phase lag is relative to the phase at Charleston Harbor off Fort Sumter

Source: NOAA, 2002b.

Tidal Current Velocities and Phases in Wando River

Station	Average Peak Flood Velocity (knots)	Average Peak Ebb Velocity (knots)	Phase Lag at Low Slack (hours)
Wando River at 0.2 mile NW of Ramley Point	1.3	1.8	-0.23
Wando River at Upper Reach, Turning Basin	1.0	1.2	-0.23
Wando River at Rathall Creek Entrance	1.3	1.7	0.42
Wando River off Nowell Creek, Buoy "19"	0.8	1.0	-0.13
Wando River at 0.2 mile above Horbeck Creek entrance	1.0	0.9	0.47
Wando River at 2.5 miles north of Horbeck Creek	0.8	1.3	0.50

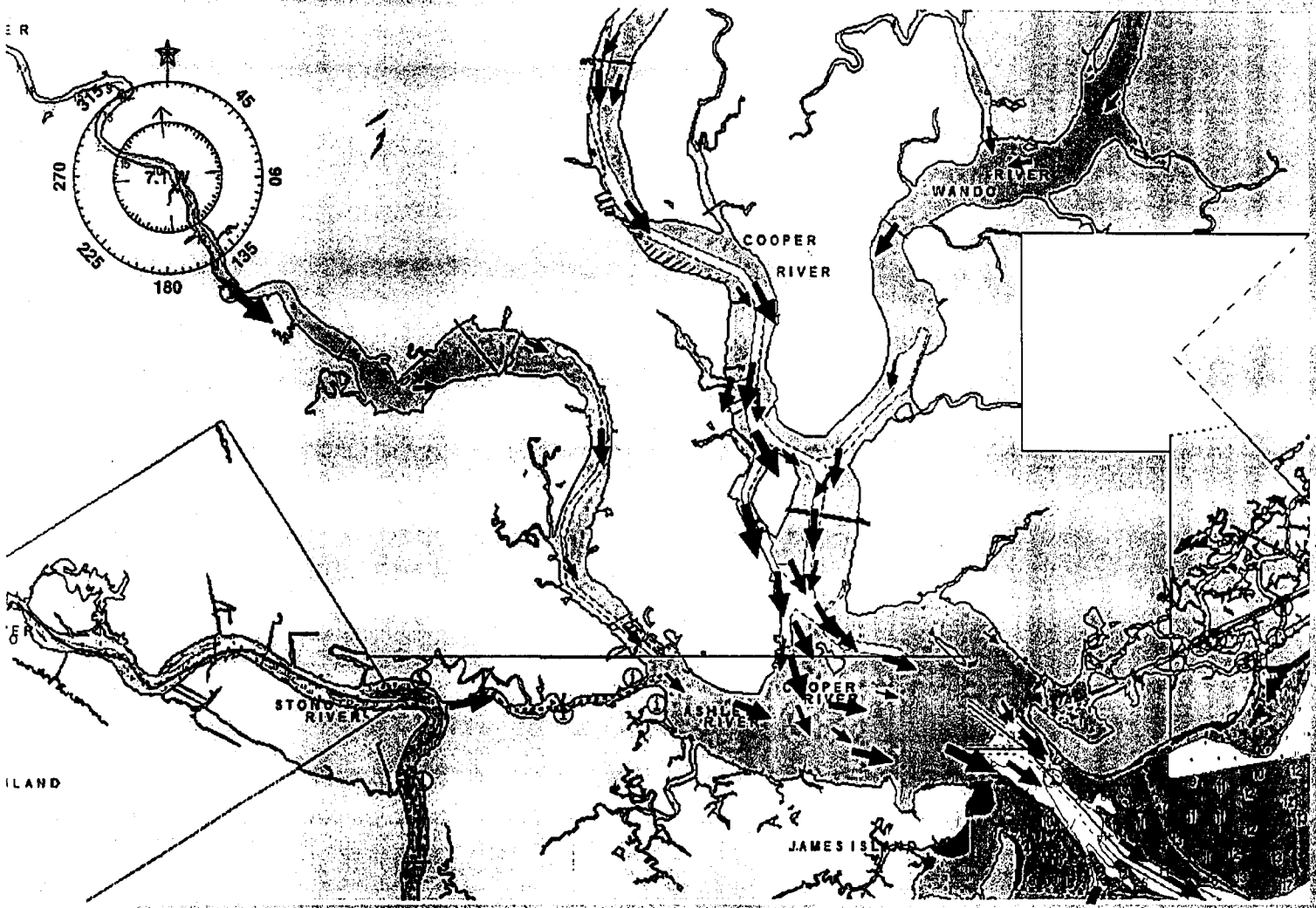
Note: Phase lag is relative to the phase at Charleston Harbor off Fort Sumter.

Source: NOAA, 2002b.

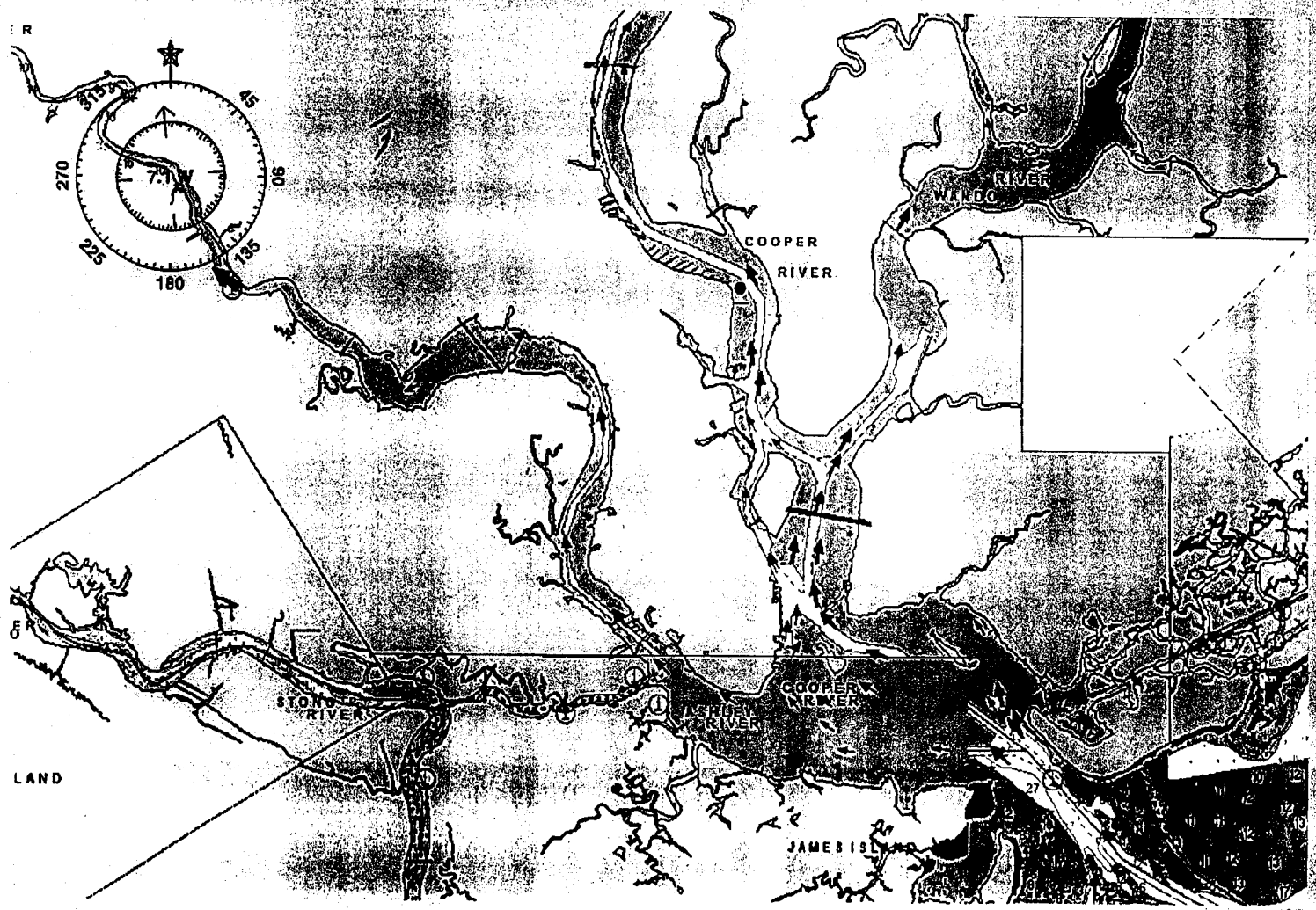
Cooper River Flows

- Average freshwater flow of Cooper River = 4,500 cfs
- Tidal flows (measured in September 1996):
  - Cooper River at Daniel Island = -150,000 to +160,000 cfs
  - Cooper River at Drum Island = -320,000 to +360,000 cfs

Ebb Currents



Flood Currents



Excursion Analysis

- Tidal excursion: the average travel distance of a water particle on the flood tide
- Methodology: Particle tracking by Lagrangian integration
- Results:
  - Cooper River = 4.3 miles north of CNC northern boundary
  - Ashley River = 3.5 miles upstream of river entrance
  - Wando River = 5.6 miles upstream of river entrance

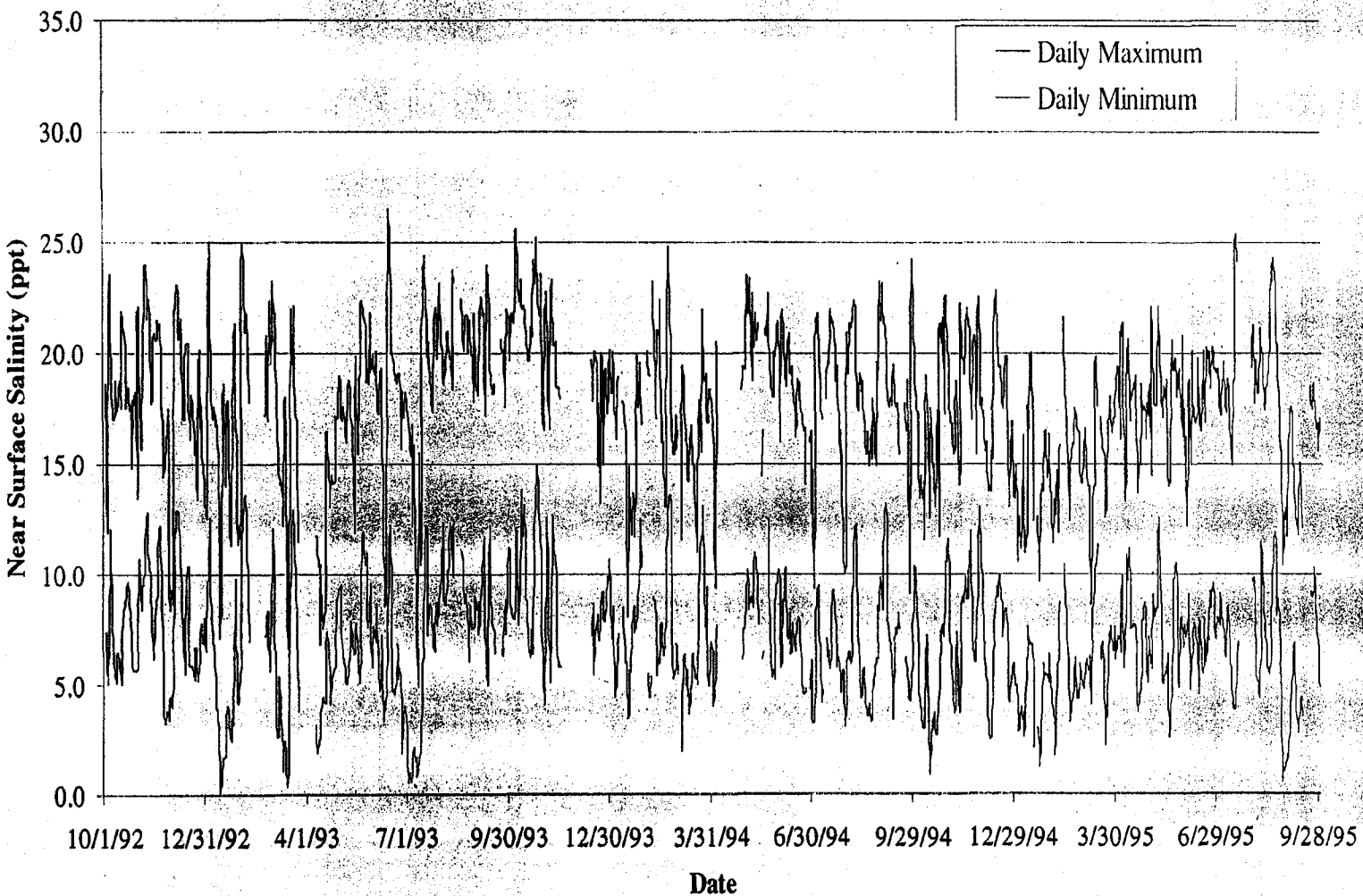
Tidal Excursion Limits

3 0 3 Miles

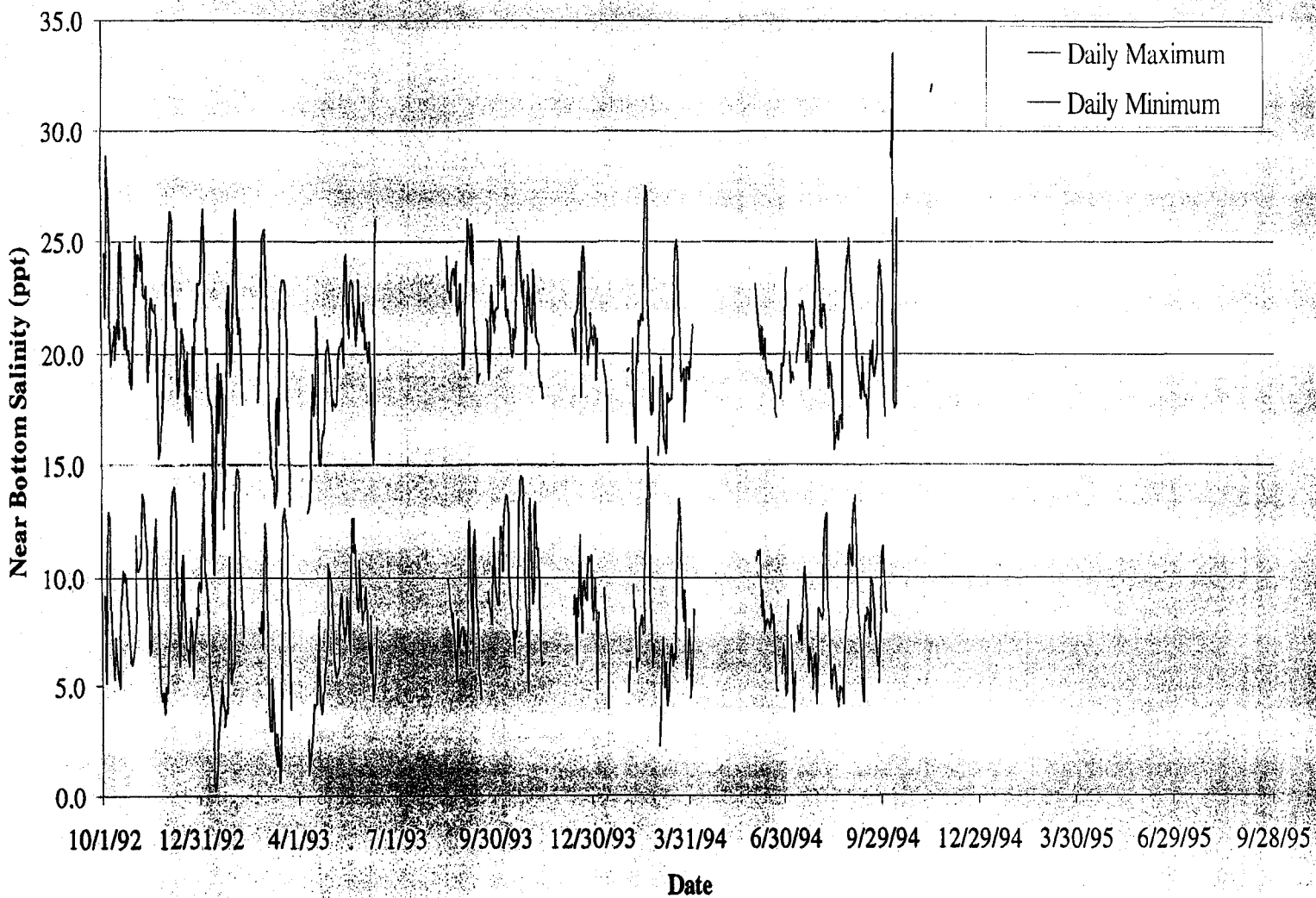
ZONE J
POINT OF ENTRY
EFFLUENT SAMPLING WORK PLAN
CHARLESTON NAVAL COMPLEX
CHARLESTON, SC

The data used to create this map was collected and created by SC DHEC. This information is contained in the Watershed Water Quality Management Strategy Report.

Cooper River Surface Salinity Near Army Depot



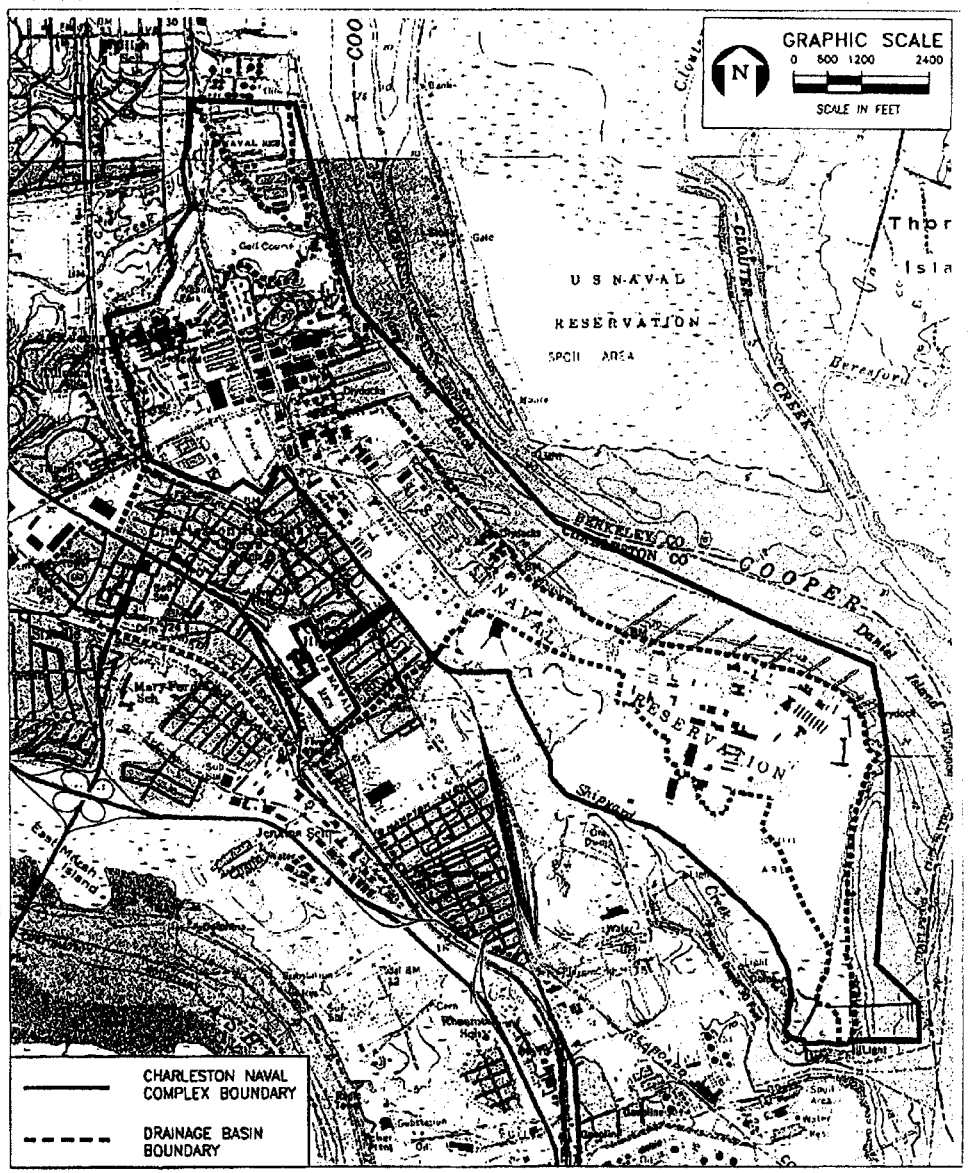
Cooper River Bottom Salinity Near Army Depot



Cooper River Salinity Near CNC

	Surface (ppt)	Bottom (ppt)
Average daily mean	11.3	14.3
Average daily minimum	7.1	8.5
Average daily maximum	17.8	20.6
Minimum	0.1	0.3
Maximum	26.4	33.9

Cooper River Watershed



Areas Draining to Cooper River

	Onsite (acres)	Offsite (acres)	Total (acres)
Total drainage area	886	440	1,326
Upland	849	433	1,282
Tidal marsh and wetland	37	7	44

Summary of Surface Runoff to Cooper River Along the CNC Shoreline

	Mean Event	Return Period (Years) 2	5	10	25	50	100
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak Runoff Rate (cfs)	—	1,939	2,607	3,065	3,568	4,077	4,685
Total Runoff Volume (acre-ft)	53.0	385.8	524.7	621.8	730.3	839.1	970.2
Runoff from CNC (acre-ft)	34.9	265.4	358.8	424.0	496.7	589.6	657.4

Source: ECT, 2002.

Sediment Loads from Cooper River Basin

- Annual average: 700,000 lb/yr (288 cubic yards per year)
- Wet season = 280,000 lb/yr (115 cubic yards per year)

Percentage of Particle Mass in Stormwater as Related to Average Settling Velocity

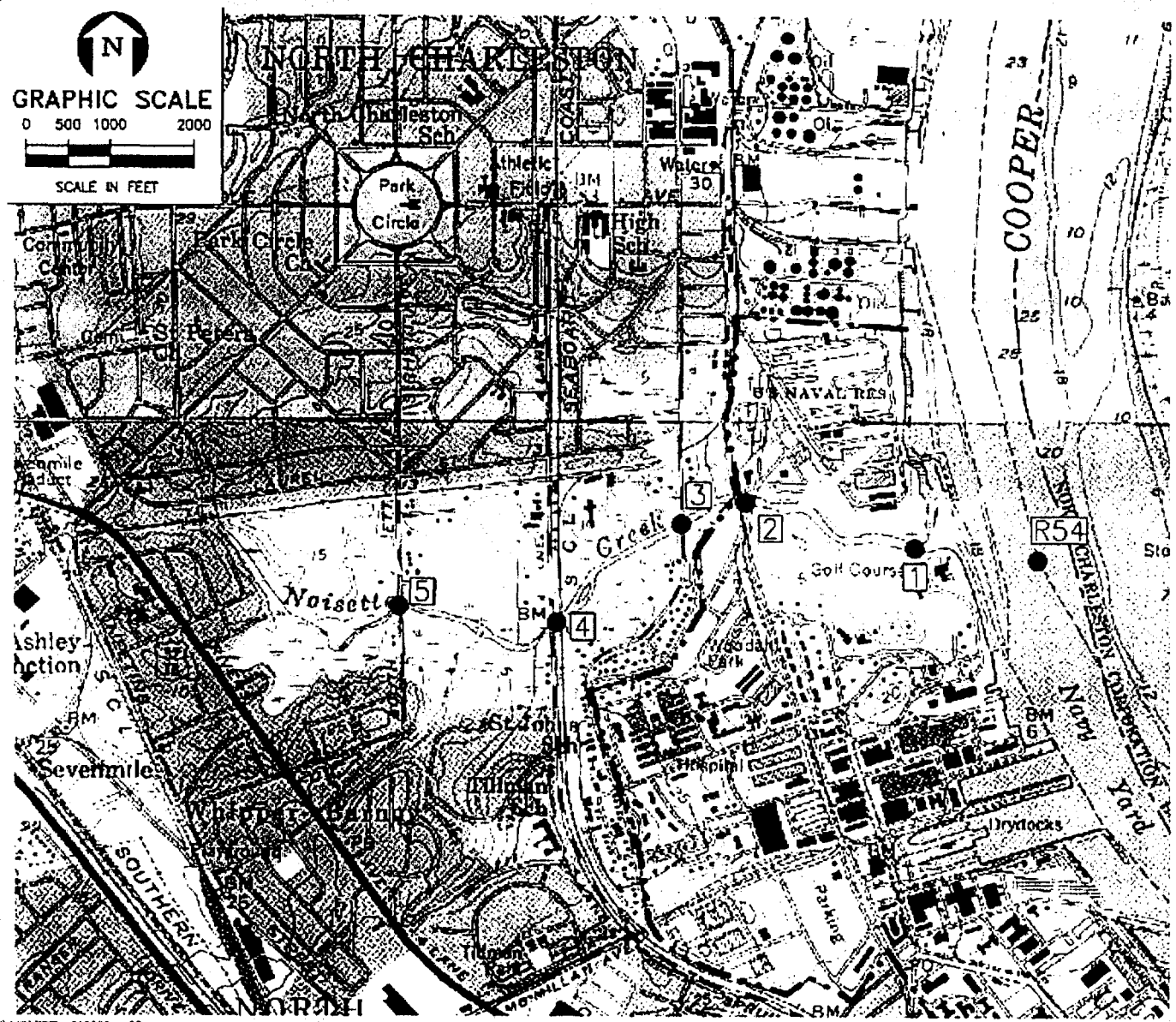
Cumulative Percent of Mass in Urban Runoff	Average Settling Velocity (ft/hour)	Settling Time in 40 ft of Water (hour)
0 to 20	0.03	1,670
20 to 40	0.33	152
40 to 60	1.5	27
60 to 80	7	5.7
80 to 100	70	0.6

Sources: Wanielista and Yousef, 1993.
EPA, 1983.
ECT, 2002.

Potential Depositional Areas

- Dry dock area in Zone E
- Shipyard Creek
- Nearshore shallow area in Zone I
- Middle ground
- Shallow area near Crab Bank
- South of Hog Island and Mount Pleasant
- Near Morris Island

Monitoring Station Locations



Noisette Creek Bathymetry

Station	Width (ft)	Depth at Low Tide (ft)
1	—	4
2	108	5
3	112	2.5
4	92	<1
5	51	<1

Source: ECT, 2003.

Noisette Creek Salinity Data (December 6 & 7, 2000)

Station	Low Tide* (ppt)	High Tide* (ppt)
1	14.3	15.9
2	12.7	15.2
3	11.9	13.8
4	11.1	13.5
5	9.8	13.6
Cooper River	17.7	22.4

*Vertical average salinity.

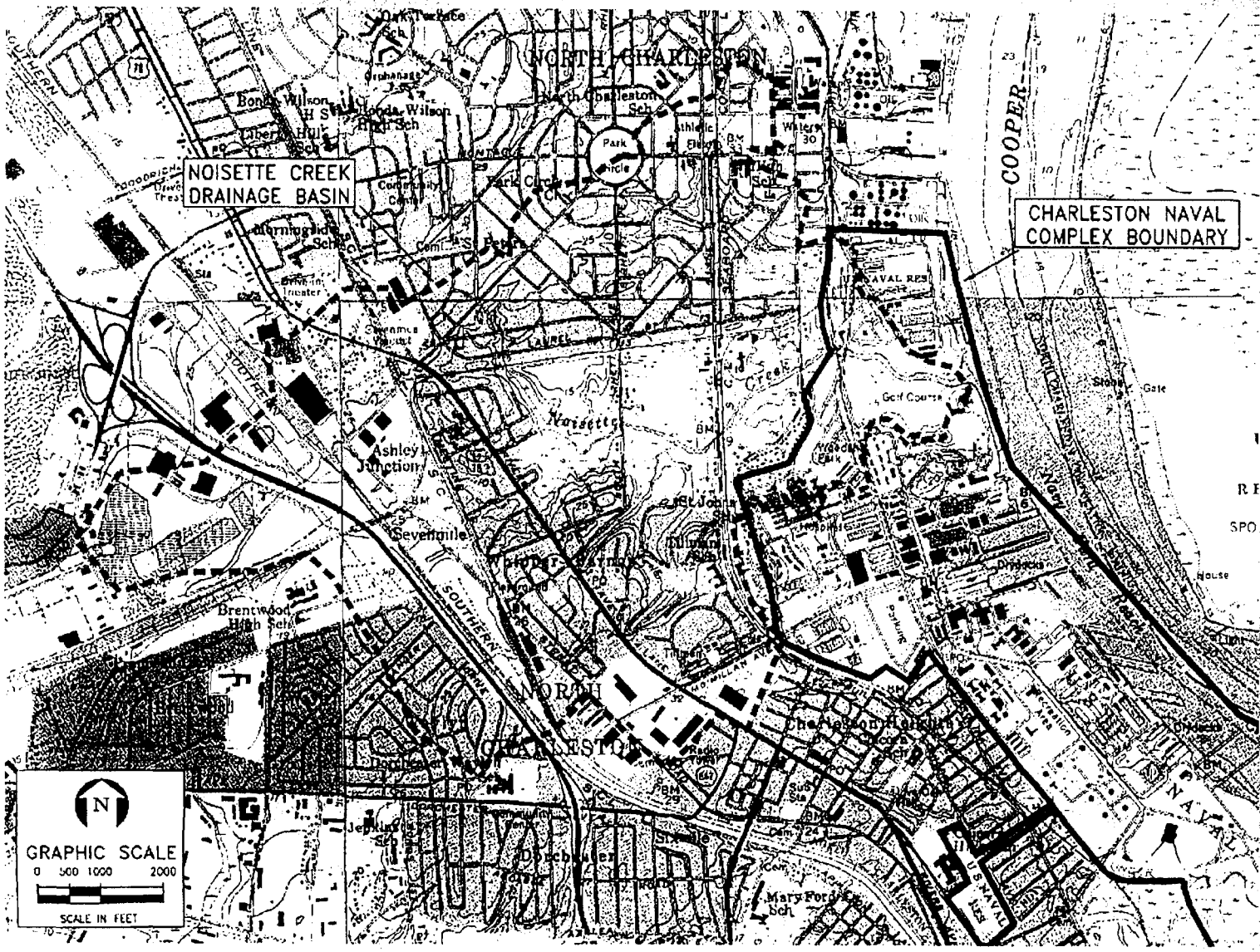
Source: ECT, 2003.

Noisette Creek Current Velocity

Station	Peak Current Speed Flood (fps)	Peak Current Speed Ebb (fps)
1	0.83	0.82
2	0.49	0.98
3	0.48	0.65
4	0.72	1.12
5	0.59	0.30

Source: ECT, 2003.

Noisette Creek Drainage Map



Noisette Creek Drainage Basin

	Onsite (acres)	Offsite (acres)	Total (acres)
Total drainage area	123	1,624	1,747
Upland	118	1,481	1,599
Open water at low tide	5	9	14
Tidal marsh	0	134	134

Source: ECT, 2003.

Noisette Creek Runoff Summary

	Mean Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak runoff (cfs)	—	2,380	3,179	3,720	4,333	4,936	5,659
Runoff volume (acre-ft)	92.8	523.2	707.3	835.7	979.1	1,123.0	1,296.0
Runoff from CNC (acre-ft)	6.3	35.3	47.7	56.4	66.1	75.8	87.5

Source: ECT, 2002.

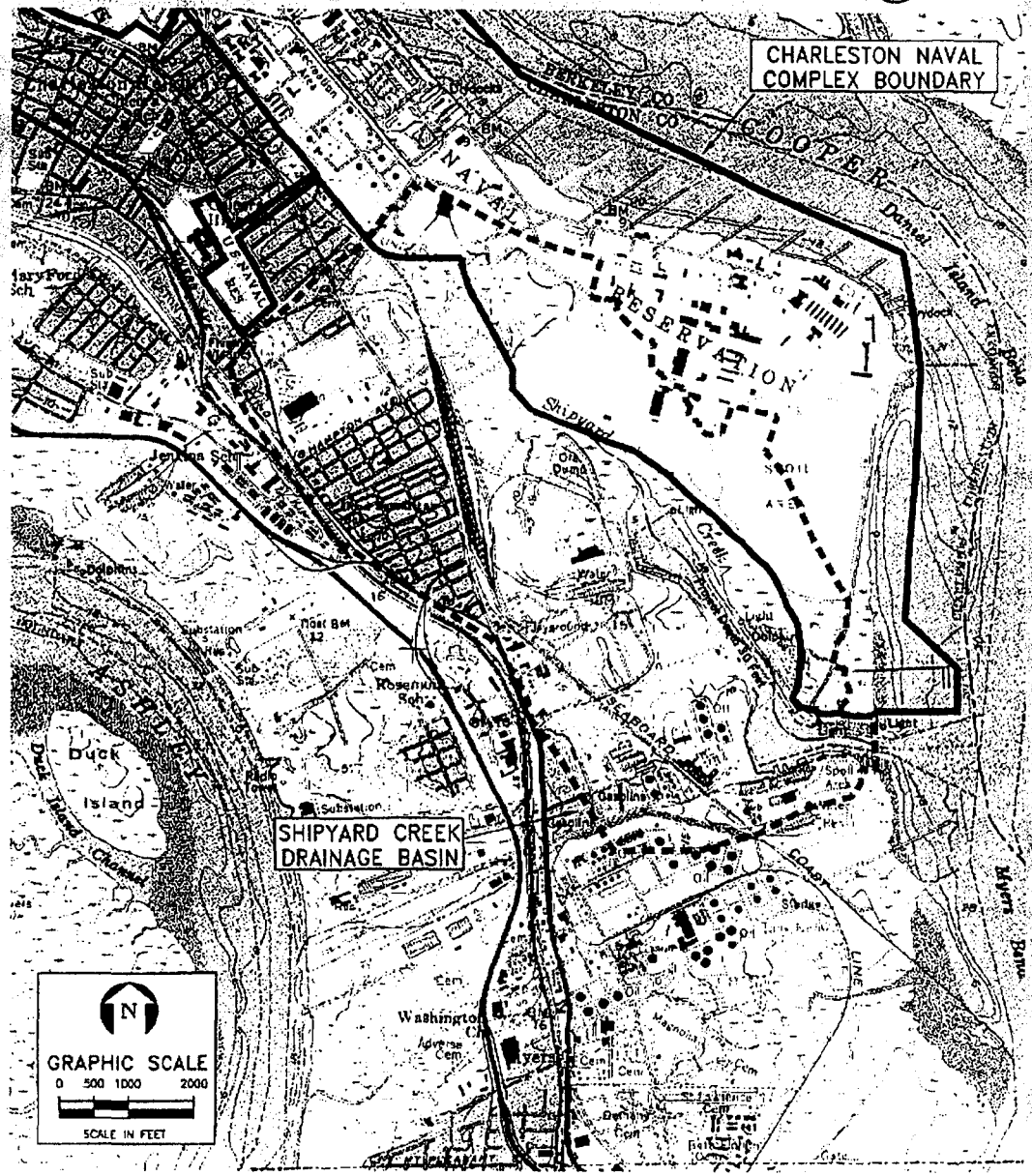
Tidal Flushing and Dilution in Noisette Creek

- Low tide volume = 46 acre-ft
- Tidal prism = 344 acre-ft
- Average tidal flow = 670 cfs
- Peak tidal flow = 1,053 cfs
- 88 percent of creek water can be flushed out in one tidal cycle
- Tidal dilution to CNC runoff is 55 to 1 during an average storm
- Tidal dilution to Noisette Creek runoff is 3.7 to 1 during an average storm
- Noisette Creek runoff/CNC runoff = 14.7
- Noisette Creek hydraulics are dominated by stormwater during severe storms

Shipyard Creek

- Outer turning basin depth = 50 ft @ MLW
- Ship channel and inner turning basin depth = 44 ft @ MLW
- Dredged area = 46 acres
- Open water = 91 acres
- Tidal marsh = 105 acres
- Entrance channel width = 600 ft
- Average tide range = 5.3 ft
- Spring tide range = 6.1 ft
- Average peak current speed at entrance channel = 0.05 ft/sec

Shipyard Creek Drainage Map



Shipyard Creek Drainage Area

	Onsite (acres)	Offsite (acres)	Total (acres)
Total drainage area	279	878	1,157
Upland	279	682	961
Marsh	0	105	105
Open water	0	91	91

Source: ECT, 2003.

Shipyard Creek Runoff Summary

	Mean Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak runoff (cfs)	—	1,427	1,959	2,328	2,736	3,142	3,627
Runoff volume (acre-ft)	49.3	308.9	427.8	511.3	605.0	699.3	813.0
Runoff from CNC (acre-ft)	5.9	66.5	95.7	116.6	140.2	164.1	193.0

Source: ECT, 2002.

Sediment Loads

- Noisette Creek Basin = 890,000 lb/yr (366 cy/yr)
- Shipyard Creek Basin = 580,000 lb/yr (239 cy/yr)

Tidal Flushing and Dilution in Shipyard Creek

- Tidal prism = 692 acre-ft
- Low tide volume = 2,620 acre-ft
- Average tidal flow = 1,348 cfs
- Peak tidal flow = 2,118 cfs
- Average storm runoff volume = 49.3 acre-ft
- Tidal prism/average storm runoff = 14
- Tidal flushing time (dilute to 10 percent) = 5.2 days
- Shipyard Creek is a low energy area

Conclusion

- Potential contaminants from CNC can travel to a large area in the estuary
- Contaminants found in Cooper River near CNC may come from remote areas
- Large tidal dilution at Cooper River
- Noisette Creek has efficient flushing
- Shipyard Creek is near stagnant and has inefficient flushing

APPENDIX F

ZONE J NOISETTE CREEK SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0164

ZONE J NOISETTE CREEK SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT TECHNICAL MEMORANDUM PROGRESS REPORT

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DEPARTMENT OF THE NAVY
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Release of this document requires the prior notification of the Commanding Officer of the Southern Division, Naval Facilities Engineering Command, Naval Base Charleston, South Carolina.

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1.0 INTRODUCTION

Background

The screening level ecological risk assessment (SLERA) for Noisette Creek is one part of the Zone J investigation of three water bodies that surround the Charleston Naval Complex (CNC).[1] Each Zone J water body, although part of one dynamic watershed, differs in size, flow, and level of near-shore industrialization. Therefore, it was necessary to segregate the data collected from each water body and assess the Cooper River, Noisette Creek, and Shipyard Creek separately.

For detailed descriptions of each Zone J water body, surrounding land uses, and known locations of near-shore AOC/SWMUs, see Section 1 of the *Zone J Storm Water Effluent Evaluation Report* (EnSafe October 2003), which details storm water discharge points to Noisette Creek and the other water bodies. It also summarizes findings of previous independent studies conducted in the Charleston Harbor and surrounding tidal creeks, including information on the system's hydrography, physical dynamics, biological communities, contaminants, and toxicity.

Purpose of SLERA and Progress Report

This SLERA evaluates all potential exposure pathways and contaminant migration pathways in Noisette Creek. It will document the constituents present in the creek's environmental media at concentrations that may pose unacceptable ecological risk. This evaluation will include screening constituents in the following migration pathways: (1) effluent via the storm water drainage system, (2) surface water overland flow, and (3) groundwater discharge into Noisette Creek. These migration pathways will be evaluated by screening the constituents in storm water drainage system effluent water samples, surface soil samples at SWMUs and AOCs[2] adjacent to (and draining directly into) Noisette Creek, and groundwater from wells closest to Noisette Creek. These contaminant migration pathways will be used not only to evaluate the potential for unacceptable risk, but also to identify potential upgradient sources for any unacceptable exposure within Noisette Creek habitats.

This progress report documents Steps 1 and 2 of EPA's 8-step ecological risk assessment process[3] as well as its contaminant of potential concern (COPC) refinement. Its [redacted]o provide risk managers with data they need to determine the final list of COPCs and [redacted]te whether any additional site-specific investigations or remedial alternatives are needed to deal with ecological risk in Noisette Creek. The Navy will provide screening constituents for the surface water overland flow and groundwater discharge migration pathways; as soon as data are incorporated, this report will need to be revised.

[1] Zone J consists of the Cooper River, Shipyard Creek, and Noisette Creek, which adjoin CNC properties.
[2] Solid waste management units and areas of concern
[3] Screening level problem formulation and exposure estimate and risk calculation

2.0 STEP – 1 SCREENING LEVEL PROBLEM FORMULATION

2.1 Zone J and Noisette Creek Description

Charleston Naval Complex (CNC) flanks the western shore of the Cooper River, approximately 6.75 miles upriver from Fort Sumter (Figure 2-1). The shipyard's 3.75-mile waterfront is lined by 25 piers and five dry docks; most of its length is protected by a wooden or concrete seawall. Large ships are repaired and maintained all along the industrial areas of CNC's shoreline. Less industrial areas border Noisette Creek, but offsite point-source discharges (i.e., National Pollution Discharge Elimination System [NPDES] outfalls) are also present in this tributary.

Noisette Creek, a small, tidally influenced tributary, flows east for approximately half a mile through CNC's abandoned golf course to the Cooper River. A small pond and several acres of wetlands are associated with the creek. According to base drainage maps, Noisette Creek receives surface and storm water runoff from the golf course as well as off-base properties and roadways upstream in North Charleston.

Several anthropogenic features dot the half mile that the tidal creek travels across CNC property. Eight outfalls line the bank and the reinforced portion of the southern shoreline near the creek's mouth, which has been protected from erosion by riprap, concrete debris, and a seawall. Two bridges span the creek upstream at the western property line: one for railcars, another for motor vehicles. A smaller footbridge near the center of the creek's run accommodates human traffic.

Southern hackberry trees and wax myrtle dominate the riparian zone along both banks, supplemented by fewer specimens of live oak (*Quercus virginiana*), privet (*Ligustrum sp.*), eastern red cedar (*Juniperus silicicola*), yaupon (*Ilex vomitoria*), saw palmetto (*Serenoa repens*), mulberry (*Morus sp.*), chokecherry (*Prunus virginiana*), french tamarisk (*Tamarix gallica*), and black willow trees. The wetland vegetation is typical of estuarine emergent habitats with smooth cord grass, black needle rush, and cattail. The following bird species were observed: barn swallow, white egret, red-wing blackbird, osprey, and pied-billed grebe (*Podilymbus podiceps*). Raccoon tracks were also observed along the muddy shoreline. Pilings beneath the bridges accommodated numerous clusters of remnant oyster shells.

According to the National Wetland Inventory and the Final Environmental Impact Statement (FEIS, 1995), several wetland types are associated with Noisette Creek: estuarine subtidal, estuarine intertidal, and palustrine forested. The subtidal wetlands consist of the open-water, nonvegetated portion of Noisette Creek that remains submerged at low tide. This wetland type has been classified as having unconsolidated bottom substrate (FEIS 1995). The intertidal wetland consists of the frequently flooded marshes and mud flats bordering Noisette Creek. The near-shore areas within these wetlands support dense stands of halophytic vegetation

(plants that grow in salty soil) such as smooth cord grass (*Spartina alterniflora*) with patches of salt meadow cord grass (*Spartina patens*) and black needle rush (*Juncus roemerianus*).

An area at the mouth of Noisette Creek, identified as a palustrine forested wetland, abuts frequently flooded Spartina marsh and is dominated by willow and oak. Estuarine influence in this tidal drainage is indicated by the high number of periwinkle and snail shells on the ground. Little herbaceous vegetation is present, indicating extended inundation. A defined drainage channel is also present. Information regarding physical attributes such as mean depth was not determined during the preliminary base-wide habitat and biota survey.

2.2 Noisette Creek Hydrodynamics

Noisette Creek is heavily influenced by tides, with several undercut areas along the bank where tidal flow has eroded the shore. The banks rise an average 3 to 6 feet above the water. High tides occasionally cause the tidal creek to spill over banks and flood portions of the surrounding areas. The brackish, often turbid, creek water and the creek bottom are visible only at Noisette Creek's confluence with the Cooper River, and then only at low tide. Visible substrate within the creek consists of marl, gravel, and muck, with some detritus and debris.

According to the NOAA tidal table, the average tide range in the Cooper River near the south entrance of Clouter Creek[4] is 5.4 feet; the average tide range in the Cooper River near the north entrance of Clouter Creek[5] is 5.48 feet. By linear interpolation, the average tide range at the Noisette Creek entrance is estimated to be 5.43 feet.

EnSafe and Environmental Consulting & Technology, Inc. (ECT) conducted a hydrographical study in Noisette Creek on December 6 and 7, 2000, during a neap tide[6] when the tide range was close to its minimum within a lunar cycle. Specific conductivity, salinity, dissolved oxygen (DO), pH, water temperature, and current data were collected at five locations in Noisette Creek.

Noisette Creek Sampling Locations	
Station 1	Mouth of Noisette Creek
Station 2	Hobson Avenue
Station 3	O'Hear Road
Station 4	Spruill Avenue
Station 5	South Rhett Avenue

Data were also collected in the Cooper River at Marker R54 near Noisette Creek as a reference. A YSI multiparameter water quality sampling unit and a Marsh McBirney current meter were used to collect water quality and current velocity data. Sediments samples were collected by a Petite Ponar for visual examination.

[4] approximately 2 miles south of the Noisette Creek entrance
[5] approximately 3.4 miles north of the Noisette Creek entrance
[6] a tide of minimum range occurring at the first and third quarters of the moon

2.2.1 Bathymetry

Noisette Creek's widths and depths were measured at low tide at five stations discussed in Section 2.2 are shown as follows:

Station	Width (ft)	Depth at Low Tide (ft)
1	—	4
2	108	5
3	112	2.5
4	92	<1
5	51	<1

Near Noisette Creek's entrance, the Cooper River is approximately 2,300 feet wide; the navigational channel is 40 feet deep at mean low water (MLW).

Water quality data were collected during morning low tide and afternoon high tide on December 6, 2000, and during morning low tide on December 7, 2000. No evidence of vertical stratification in Noisette Creek was observed. The difference in surface and bottom salinity was mostly less than 0.5 parts per thousand (ppt), except at Station 1, where a salinity difference of 1.7 ppt was observed. The average values of temperature, conductivity, salinity, DO, and pH at each station at low tide and at high tide are summarized in Table 2.1.

At low tide, the average salinity ranged from 9.8 ppt at Station 5 to 14.3 ppt at Station 1. At high tide, the average salinity ranged from 13.5 ppt at Station 4 to 15.9 ppt at Station 1. DO concentrations were generally lower at low tide than high tide. This is possibly caused by sediment oxygen demand consuming a portion of the DO during low tide when water stayed in the creek for about half of a tidal cycle. By contrast, high DO water at Cooper River flows into Noisette Creek during flood tide, replenishing DO in the creek. The lowest observed DO was 4.93 milligrams per liter (mg/L) at Station 5 during morning low tide on December 7, 2000, with a 43.8 percent DO saturation level. Higher DO concentrations, ranging from 8.84 to 9.34 mg/L (89.7 to 93.4 percent saturation) were observed throughout the creek during afternoon high tide. The afternoon DO in the creek was higher than DO in the Cooper River, probably due to the effects of photosynthesis in the marsh.

Low pH values were observed during morning low tide at upstream stations. The lowest value of 5.39 was measured at Station 5 in the morning of December 6, 2000. There were not sufficient data to determine whether the low pH values were caused by upland sources or the bioactivity in the marsh.

Table 2.1
Noisette Creek Water Quality Data Summary (Dec. 6 to 7, 2000)

Station	Temperature (°C)	Conductivity	Salinity (ppt)	DO (mg/L)	DO Saturation (%)	pH
Low Tide Average						
1	11.06	23,578	14.29	8.66	86.42	7.33
2	8.66	21,224	12.69	6.27	58.24	6.49
3	8.04	20,023	11.88	5.97	56.90	6.19
4	8.09	18,810	11.11	5.70	51.50	5.94
5	7.44	16,715	9.77	5.60	43.80	5.58
R54	11.92	28,795	17.71	8.62	89.25	7.79
High Tide Average						
1	11.94	25,960	15.86	8.86	90.73	7.92
2	11.94	24,987	15.23	8.95	91.30	7.89
3	12.06	22,845	13.81	9.16	92.95	7.86
4	11.77	22,335	13.48	9.28	93.55	7.78
5	11.54	22,520	13.59	8.98	89.85	7.81
R54	11.86	35,612	22.44	8.05	85.32	7.90

2.2.2 Currents

Tidal current velocities were measured on December 6 from noon to 1:30 p.m. at five monitoring stations in Noisette Creek during peak flood current. The current velocities were also measured during peak ebb current in the afternoon on December 6, 2000, and during peak flood current in the afternoon on December 7, 2000. The following table shows the peak profile-averaged current speeds at each station during flood tide and ebb tide.

	Peak Current Speed (fps)	
Station	Flood	Ebb
1	0.83	0.82
2	0.49	0.98
3	0.48	0.65
4	0.72	1.12
5	0.59	0.30

The maximum profile-averaged ebb current of 1.12 feet per second (fps) was recorded at Station 4, and the maximum profile-averaged flood current of 0.83 fps was recorded at Station 1. The maximum surface current speed of 0.95 fps during flood tide was recorded at Station 1, and the maximum surface current speed of 1.1 fps was recorded at Station 4 during ebb tide.

According to the NOAA's tidal current table, the average peak flood current in the Cooper River at North Charleston (about 0.7 mile south of Noisette Creek) is 1.8 fps and the average peak ebb current speed is 2.8 fps.

As previously described, the current data were measured close to the neap tide. The tide ranges varied from 4.1 to 4.7 ft during the hydrographical study; therefore, the long-term average peak current in the creek could be 15 to 32 percent higher than the values measured during the study. This calculation was based on the ratio of the neap and average tide ranges.

2.2.3 Sediments

A Petite Ponar was used to collect bottom sediment samples from Noisette Creek for visual examination and soil classification.

- **Station 1**—Very dark gray clayey sand, saturated. Approximately 30 to 40 percent clay, fine to very fine-grained sand; approximately 10 percent decaying organic matter (leaves, etc); decaying vegetation odor.

- **Station 2**—Dark gray clayey sand, saturated. Approximately 20 percent clay, fine to very fine-grained sand; approximately 10 to 20 percent decaying organic matter (leaves, etc.) and shells up to approximately half an inch in diameter; decaying vegetation odor.

- **Station 3**—Decaying organic matter (leaves, twigs, etc.) and shells (up to three quarters of an inch in diameter) in dark olive gray clayey matrix. Mostly organic matter and shells; decaying vegetation odor.

- **Station 4**—Very dark clayey sand. Approximately 30 to 40 percent clay, approximately 10 to 20 percent decaying organic matter, minor shells, fine to very fine sand, saturated; strong decaying vegetation odor.

- **Station 5**—Very dark gray clayey sand, saturated, very fine-grained sand. Approximately 45 percent clay, very minor organic debris (<5 percent), very strong sulfur, decaying vegetation odor.

The sediment matrix is mostly fine to very fine sand throughout the Noisette Creek bottom, except for Station 3, where abundant inactive oyster shells were found. These shell materials might be the remnants of the deployed oysters and clams for a previous bioaccumulation study. The finest grain-sized materials were observed in Station 5, the upstream location. Decaying organic material increased from Station 1 (the creek mouth) to Station 5. The spatial trend of organic material distribution supports the hypothesis that low DO concentrations in the upstream reach of the creek during low tides may be caused by high sediment oxygen demand in the marsh area.

Stations 1 and 5 had the highest clay contents, suggesting dual sources for the clay. One source is the upland runoff, mostly from the urban area outside of the CNC; another source is the Cooper River, which brings suspended fine materials or clays into Noisette Creek during flood tides. The tidal velocity in Noisette Creek is much smaller than that in the Cooper River; therefore suspended materials may settle in the creek when entering the creek.

2.2.4 Drainage

The Noisette Creek basin drains approximately 1,747 acres, including the open water and tidal marsh areas. The tidal marsh area covers approximately 134 acres and the open water in the creek at low tide covers about 14 acres, resulting in approximately 1,599 acres in the total upland drainage area. About 118 acres of the drainage area (approximately 7.4 percent of the total upland drainage area) is within the CNC property. The remainder is in the urban area of the City of North Charleston. The drainage basin delineation is based on the CNC drainage evaluation (Davis and Floyd, 1998), North Charleston drainage inventory (Davis and Floyd, 1980), and U.S. Geological Survey (USGS) quadrangles.

Fifteen storm water outfalls in the Noisette Creek basin are within the CNC boundary as listed below.

Outfall ID	Diameter (inches)	Drainage Basin Area (acres)	Sample ID
1A	15	7.51	EFF002
1B	24	3.80	EFF003
1C	8	3.73	EFF004
10	18	7.85	EFF007
9A	—		none*
9	24	3.07	none
10A	ditch	29.27	EFF008, EFF009, EFF010
10B	6	3.28	EFF011

10C	16	13.44	EFF012
10D	2 @ 15"	9.92	none
10E	18	14.24	none
11	8	5.64	none
12	6	0.38	none
13	12	1.58	none
14	—	0.47	none

Note: * = included in Drainage Basin 9

A major factor in determining the diluting and flushing capacity of a tidal creek is the quantity (volume and rate) of storm water runoff that enters the creek versus the magnitude of the tidal water exchange in the creek. Storm water runoff was estimated for comparison with creek tidal flows. Estimates of runoff volume and peak flow rates were prepared for annual average, storm-event average, and larger, more infrequent storm events.

Estimating the runoff required evaluating the area's topography and drainage infrastructure to determine drainage basins, rainfall statistics, and land cover, including impervious surface. Details and results are presented in the following sections.

2.2.4.1 Land Cover

Using the available GIS coverage for the CNC, the area of impervious cover and open space was computed. Land cover outside the CNC was determined using aerial photographs and USGS quadrangles. The following details land cover in the Noisette Drainage basin.

Commercial	788 acres
Industrial	597 acres
Open space	170 acres
Marsh	134 acres
Impervious	44 acres
Open water	14 acres

2.2.4.2 Rainfall

Charleston County receives an average of approximately 51 inches of rainfall per year, based on records maintained by the SCDNR Office of Climatology, which has compiled rainfall data from 1930 to 2000. The US EPA has also compiled data for selected regions of the country and determined mean rainfall event statistics for them as part of the NPDES storm water sampling protocol development. The mean storm event for the Southeast, which includes Charleston, was 0.75 inches of rainfall (Urban Targeting and BMP Selection, EPA Region 5, November 1990). Using the most current National Weather Service data, the Natural Resources

Conservation Service has compiled infrequent-event rainfall amounts. Event rainfall amounts are listed below for 24-hour events for the Charleston, South Carolina, area.

Return Period (years)	Rainfall Depth (inches)
2	4.6
5	5.9
10	6.8
25	7.8
50	8.8
100	10

2.2.4.3 Runoff Estimates

Peak runoff rates were determined using NRCS Technical Release No. 55 (TR55). Runoff volumes were computed using Soil Conservation Service (SCS) methodology for all storm events, except the mean rainfall event. Runoff volumes for the mean rainfall event were computed using the rational method. Noisette Creek runoff is summarized below:

	Mean Event	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Rainfall (inches)	0.75	4.6	5.9	6.8	7.8	8.8	10
Peak Runoff (cfs)	—	2,380	3,179	3,720	4,333	4,936	5,659
Runoff Volume (acre-ft)	92.8	523.2	707.3	835.7	979.1	1,123.0	1,296.0
Runoff from CNC (acre-ft)	6.3	35.3	47.7	56.4	66.1	75.8	87.5

The annual Noisette Creek average flow is estimated to be 8.2 cfs; approximately 0.5 cfs is from the CNC property.

2.2.4.4 Tidal Flushing and Dilution Analysis

The estimated volume of the Cooper River water flowing into and out of Noisette Creek due to tidal action was used to evaluate the flushing capabilities of Noisette Creek and to evaluate the ambient dilution of storm water discharges. The tidal flow volume, also known as the "tidal prism," is the volume of water in the creek between high and low tides. Based on an average tide range of 5.43 feet and the open water and marsh areas presented in the previous section, the estimated tidal prism is 344 acre-ft. This calculation is based on the assumption that the tidal marsh is approximately 2 ft below mean high water. The average tidal flow is computed to be 670 cfs and the maximum tidal flow during an average tide will be 1,053 cfs. The tidal prism is approximately 3.7 times the total runoff volume from an average storm event in the Noisette

Creek basin, and approximately 55 times the runoff volume from the CNC during an average storm event. The tidal prism, which enters Noisette Creek twice a day, is approximately 66 percent of the runoff volume from a 2-year, 24-hour storm event in the Noisette Creek basin.

The volume of water in Noisette Creek at mean low water (MLW) is estimated to be 46 acre-ft and the volume of water at mean high water (MHW) is 340 acre-ft. Compared to the tidal prism volume, approximately 88 percent of the water in the creek can be flushed out of the system within one tidal cycle (12.4 hours).

The hydrologic and hydrodynamic analysis of Noisette Creek can be summarized as follows:

- The dilution ratio between the total Noisette Creek runoff and the CNC runoff to Noisette Creek is approximately 14.7 to 1.
- The dilution ratio between tidal flow and the CNC runoff to Noisette Creek during an average storm event is approximately 55 to 1.
- The dilution ratio between tidal flow and total Noisette Creek runoff during an average storm event is approximately 3.7 to 1.
- Noisette Creek hydraulics is dominated by storm water runoff during severe storm events (e.g., a 2-year, 24-hour storm).
- Noisette Creek has efficient flushing capabilities. More than 90 percent of the storm water runoff to Noisette Creek can be flushed into the Cooper River by tidal flow within 1 day.

Noisette Creek hydraulics may be dominated by large storm events, especially during low tide when the creek is shallow. There can be considerable velocity in the creek channel to carry suspended sediments (fine or coarse) into the Cooper River. The coarse material may be deposited in the Cooper River near Noisette Creek's mouth; fine material may be transported great distances and deposited when it reaches a low-energy zone such as Shipyard Creek, dry dock area in Zone E, a near-shore shallow area at Zone I (especially during ebb tide), Middle Ground at SE of the Shutes Folly Island (during ebb tide), and shallow areas near Crab Bank (south of Hog Island, especially during ebb tide).

Sediments from the CNC may be deposited when they enter Noisette Creek, if the particles are large (coarse sand or silt). Most of the fine materials probably will be carried by storm water or tidal current to the Cooper River.

2.3 Development Impacting Noisette Creek

In addition to portions of CNC, light commercial and residential developments line Noisette Creek, which is not navigable or dredged.

2.3.1 CNC Sources Potentially Impacting Noisette Creek

Potential sources of COPCs in Noisette Creek are the upstream and near-shore SWMUs and AOCs. According to the 1998 Davis & Floyd drainage system evaluation report for CNC, the complex consists of 98 delineated drainage basins and associated storm water outfalls. Fourteen of the drainage basins with upland SWMUs/AOCs discharge to Noisette Creek.

A small pond approximately 300 feet south of Noisette Creek receives runoff from the former golf course. According to base storm drainage maps, overflow from this pond drains through an underground pipe into Noisette Creek. The routine application of fertilizers, herbicides, and pesticides for turf maintenance at the former golf courses may have once posed a threat to Noisette Creek, but the fairways and greens have not been treated for several years and associated impacts are anticipated to be negligible.

Fifteen identified storm water outfalls line Noisette Creek's half-mile run through the CNC. The following SWMUs and AOCs are associated with a drainage basin discharging to Noisette Creek:

Zone A

SWMU 39, a former storage area for petroleum, oil and lubricant (POL) drums, is located along the northwest portion of Zone A on an asphalt-paved area north of Building 1604. POL drum storage operations have been discontinued and the area is now an outdoor storage yard for the Defense Reutilization and Marketing Office (DRMO).

SWMU 42 and AOC 505 overlap one another in the southwest portion of Zone A. SWMU 42 is the site where a now-demolished asphalt plant and associated tanks operated from 1947 until 1962. AOC 505 consists of the former golf course maintenance shop (Building 1803) and an area used to store creosote cross ties and railroad ballasts during the 1960s and 1970s. Operations in this area were discontinued in the 1970s.

SWMU 43, the Publications and Printing Plant, operated from 1979 to 1996. A darkroom and hazardous materials locker were on the ground floor of the building. Before installation of the lockers, hazardous materials were stored in two areas outside the main building. Noisette Creek is approximately 200 feet south of the site.

Zone C

SWMU 44/AOC 721 is a coal storage yard used for unloading railcars and for the intermediate storage of coal before its use at the steam-generation plant in Building 32. Operations began in the 1940s, but were scaled down in late 1995. Two coal piles were on-site during the field investigation; the larger was estimated to be 80 feet by 400 feet. The site is in the northern portion of Zone C and bounded to the west and north by Noisette Creek, to the south by a drainage ditch, and to the east by Avenue D. A drainage ditch also crosses the site, parallel to the railway.

SWMU 47, a burning dump area noted on early 1920s Naval Base Charleston maps, was once located where buildings NSC 64, 66 and 67 now stand. No indications of burning activities remain at the site.

AOC 512 is the former site of Incinerator 67, which was operated from 1943 to approximately 1958. The site is currently a grassy area southwest of Building 1079. Small amounts of construction rubble and disturbed land were noted west of the former incinerator location.

AOC 700 is located at Building 1646, the Golf Maintenance Building, and surrounding area. This structure was built in 1975 and used for lawnmower storage and repair and pesticide storage and mixing. The building is no longer being used, and all the chemicals and equipment have been removed.

Additional SWMUs/AOCs may sheet-flow directly into the water body, these SWMUs/AOCs will be included in the Navy evaluation of those contaminant migration pathways and be included in the revised SLERA.

2.4 Other Investigations in Noisette Creek

Noisette Creek was evaluated in a study of[7] water quality parameters; sediment characteristics, contaminants, and toxicity tests; benthic communities; and nektonic (free-swimming) assemblages conducted at 84 sites from Virginia to Florida. One location in Noisette Creek (CP94NOI) was selected as a supplemental station and sampled during the summer of the pilot year, 1994.

Although comprehensive sampling was not conducted at the supplemental stations, sediment samples were collected for contaminant analyses, characterization, and toxicity testing. Unfortunately, sediment results from Noisette Creek were not presented in the report, perhaps because the creek was a new site and results may not have been available. However, results from bioaccumulation studies on oysters and clams deployed in the creek were provided and

[7] *Year One Demonstration Project Studies Conducted in the Carolinian Province* (MRRI, Final Report, September 1995)

they showed adverse effects on oyster and clam growth rates. Clams also experienced a high mortality (60%), which was attributed in part to the low salinity in Noisette Creek. The report concluded that conditions in Noisette Creek were possibly toxic based on Microtox and seed clam toxicity tests.

2.5 Contaminant Fate-and-Transport Mechanisms

The physical and chemical dynamics within the Charleston estuarine system are perhaps the most influential and complicating factors in the overall assessment of Zone J, and probably have a severe effect on contaminant distribution. Contaminants present on upland CNC SWMUs and AOCs could potentially enter Noisette Creek via the following contaminant fate-and-transport mechanisms:

- Sheet flow of soil contaminants into the storm water discharge system and discharge directly into Noisette Creek at the identified outfalls and discharge points
- Overland flow of soil contaminants directly into the marsh and Noisette Creek from AOCs and SWMUs that are not drained by the CNC storm water system
- Migration of contaminated groundwater either directly into Noisette Creek or into the storm water effluent system, and then into the creek via the CNC outfalls

CNC contaminant fate-and-transport mechanisms will be re-evaluated as soon as the Navy provides the necessary upland data on surface soils and groundwater to determine whether contaminants could be transported into Noisette Creek from CNC sources.

2.6 Complete Exposure Pathways

Three exposure pathways are potentially complete, based on the previous investigations conducted at CNC and within Noisette Creek.

These potentially complete exposure pathways will be evaluated in the Noisette Creek SLERA to identify which contaminants may be present at concentrations causing potentially unacceptable risk for exposed ecological receptors.

Potentially Complete Pathways

- Direct exposure to contaminants dissolved in Noisette Creek surface water
- Direct exposure to contaminants in Noisette Creek sediment and surrounding salt marshes
- Uptake of contaminated surface water, sediments, and biota

3.0 STEP 2 – EXPOSURE ESTIMATE AND RISK CALCULATION

The Noisette Creek SLERA will evaluate potential risk from all exposure media: surface water (storm water drainage system effluent), groundwater (via the groundwater-to-surface-water pathway), surface soil (via direct runoff from adjacent SWMUs and AOCs), and sediment. The evaluation will be based on direct exposure using the hazard quotient (HQ) method by comparing the maximum concentration of constituents identified in each medium with the

applicable reference concentrations and US EPA Region 4 ecological screening values (ESVs). Based on risk management decisions made by the CNC partnering team, the maximum concentrations will also be compared with a site-specific reference concentration developed for CNC. The US EPA Region 4 screening value will also be used. These comparisons will be summarized in tables and discussed in the sections below.

? these are not in Creek

3.1 Storm Water Effluent Ecological Effects Evaluation

The storm water effluent samples from nine storm water drainage system locations were included in the investigation for Noisette Creek. Locations are shown on Figure 3-1. Screening was based on the following criteria, as agreed upon by the partnering team:

- Comparison of detected constituents, sample quantitation limits (SQLs), and method detection limits with reference effluent concentrations at locations not related to CNC
- Comparison of detected constituents and SQLs with EPA Region 4 chronic saltwater ESVs
- Comparison of concentrations of nondetected constituents and SQLs with EPA Region 4 chronic saltwater ESVs
- Evaluation of detection and exceedances frequency for each constituent detected.

Results are presented in Table 3-1.

To determine the potential for unacceptable ecological risk with each exposure pathway, environmental media concentrations will be compared with EPA Region 4's ecological screening values, which are presented in the screening COPC tables. Concentrations below EPA Region 4 ESVs are considered an acceptable level of risk. Therefore, this screen can only be used to determine whether there is a level of risk to ecological receptors that requires no further investigation, or additional information is needed to fully evaluate the potential for risk within Noisette Creek.

The US EPA Region 4 saltwater ESVs were derived from Water Quality Criteria documents and represent the chronic ambient surface water quality criteria values for the protection of aquatic life. These criteria are intended to protect 95% of the species, 95% of the time. Therefore, anytime the maximum concentration of a constituent is less than the Region 4 ESV, no adverse ecological effect is expected.

3.1.1 Storm Water Drainage System Inorganic Preliminary COPCs

In all, 21 inorganics were detected in at least one of the nine storm water drainage system effluent samples collected as part of the Zone J investigation. Nine of the 21 were detected at concentrations exceeding EPA Region 4 ESVs and/or reference concentrations: aluminum, arsenic, barium, beryllium, copper, iron, manganese, nickel, and zinc. Each constituent's

maximum concentration was detected in the surface water effluent sample from EFF011. Five constituents exceeded the reference concentration only at EFF011: arsenic, barium, beryllium, copper, and iron. EFF012 was the only other effluent sample location from which constituents exceeded the reference concentration. These effluent samples were collected from drainage basins 10-B (EFF011) and 10-C (EFF012).

3.1.2 Storm Water Drainage System Organic Preliminary COPCs

One pesticide and three SVOCs (PAH) were detected in at least one of the nine storm water drainage system effluent samples collected as part of the Zone J investigation. In the one location from which it was detected (EFF012), the organochlorine pesticide heptachlor (maximum concentration 0.014 µg/L) exceeded its EPA Region 4 ESV (0.0036 µg/L).

Two SVOCs were detected at effluent location EFF008: benzo(b)fluoranthene (maximum 0.39 µg/L) and indeno(1,2,3-cd)pyrene (0.59 µg/L). A third SVOC, *bis*(ethylhexyl)phthalate, was detected at two effluent locations: EFF002 (2.6 µg/L) and EFF009 (0.63 µg/L). These three constituents have no EPA Region 4 ESV or reference concentration; therefore, they will be included as preliminary COPCs for Noisette Creek.

3.2 Groundwater -to-Surface Water Ecological Effects Evaluation

To be completed once the Navy provides data.

3.3 Surface Soil Ecological Effects Evaluation

To be completed once the Navy provides data.

3.4 Noisette Creek Sediment Ecological Effects Evaluation

Fourteen sediment samples have been collected from Noisette Creek as part of the CNC RFI: 10 during the Zone J RFI and four during the Zone C RFI of SWMU 44 for total organic carbon (TOC) only.

The sediment sample locations for Noisette Creek are presented on Figure 3-2. Table 3-2 summarizes the analytical results. Refer to Appendix A for the mean ERM quotients calculated for Noisette Creek sediments.

To identify screening level COPCs, the maximum exposure point (the highest detection) was compared with the US EPA Region 4 ecological screening values using the hazard quotient (HQ) method. Risk managers can use this method to determine which constituents in Noisette Creek do not pose unacceptable levels of risk to the environment.

HQs for Noisette Creek have been included in Table 3-2 and categorized in Table 3-3 based on constituent types (inorganic, SVOC, VOC, pesticide, or PCB), the availability of an ESV for

comparison, and whether its inclusion as a COPC is based on a detected concentration or detection limit.

4.0 CONCLUSIONS AND UNCERTAINTIES

As soon as the additional information from the Navy is incorporated into the SLERA, this section will be completed.

Table 3-1
Noisette Creek
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections			Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No	Constituent
	# det.	# analyzed	Min	Max	Mean	Min SQL	Max SQL								
Aluminum	9	9	120	13,000	917.78			EFF011	NA		NA	3277.67	A	Yes	Aluminum
Antimony	1	9	4.4	4.4	3.98	3.8	20	EFF012	NA		NA	5.93	E	Yes	Antimony
Arsenic	2	9	5.2	190	23.77	2.7	10	EFF011	36	1	5.28	6.88	A	Yes	Arsenic
Barium	9	9	3.6	120	29.26			EFF011	NA		NA	60.31	E	Yes	Barium
Beryllium	2	9	0.16	4.5	0.87	0.1	4	EFF011	NA		NA	0.41	E	Yes	Beryllium
Cadmium	2	9	2.7	3.3	1.37	0.5	5	EFF011	9.3		0.35	1.29	B	No	Cadmium
Calcium	9	9	3200	260000	65466.67			EFF011	NA		NA	53455.56	E	Yes	Calcium
Chromium	5	9	1.5	31	5.88	0.7	0.7	EFF011	50	0	0.62	13	B	No	Chromium
Cobalt	1	9	2.8	2.8	1.68	0.7	10	EFF011	NA		NA	2	E	Yes	Cobalt
Copper	8	9	4.5	130	26.8	11	11	EFF011	2.9	8	44.83	41.98	A	Yes	Copper
Iron	9	9	92	180000	20549.11			EFF011	NA		NA	4134.44	E	Yes	Iron
Lead	5	9	4.9	18	6.27	2.2	3.6	EFF002	8.5	2	2.12	33.63	A	Yes	Lead
Magnesium	9	9	370	100000	8911.67			EFF012	NA		NA	49255.56	E	Yes	Magnesium
Manganese	9	9	5	900	60.32			EFF011	NA		NA	74.52	E	Yes	Manganese
Nickel	5	9	1.7	18	3.05	1.7	40	EFF011	8.3	2	2.17	5.14	A	Yes	Nickel
Potassium	9	9	900	38000	8833.33			EFF012	NA		NA	23678.89	E	Yes	Potassium
Selenium	0	9				3.3	10		71		NC		C	No	Selenium
Silver	0	9				0.5	10		0.23		NC	2.34	F	Yes	Silver
Sodium	9	9	4700	770000	64833.33			EFF011	NA		NA	395333.33	E	Yes	Sodium
Thallium	1	9	4.6	4.6	3.38	5.1	10	EFF008	21.3		0.22	5.77	B	No	Thallium
Tin	2	9	4.7	5	7.82	4.1	50	EFF009	NA		NA		E	Yes	Tin
Vanadium	9	9	1.4	8.1	4.02			EFF004	NA		NA	15.59	E	Yes	Vanadium
Zinc	9	9	19	530	176.78			EFF011	86	6	6.16	307.83	A	Yes	Zinc
Mercury	0	9				0.1	0.1		0.025		NC		F	Yes	Mercury
4,4'-DDD	0	9				0.1	0.1		0.025		NC		F	Yes	4,4'-DDD
4,4'-DDE	0	9				0.1	0.1		0.14		NC		C	No	4,4'-DDE
4,4'-DDT	0	9				0.1	0.1		0.001		NC		F	Yes	4,4'-DDT
Aldrin	0	9				0.05	0.05		0.13		NC		C	No	Aldrin
alpha-BHC	0	9				0.05	0.05		1400		NC		C	No	alpha-BHC
alpha-Chlordane	0	9				0.05	0.05		0.004		NC		F	Yes	alpha-Chlordane
beta-BHC	0	9				0.05	0.005		NA		NC		F	Yes	beta-BHC
Chlordane (technical)	0	9				0.5	0.5		0.004		NC		F	Yes	Chlordane (technical)
delta-BHC	0	9				0.05	0.05		NA		NC		F	Yes	delta-BHC
Dieldrin	0	9				0.1	0.1		0.0019		NC		F	Yes	Dieldrin
Endosulfan I	0	9				0.05	0.05		0.0087		NC		F	Yes	Endosulfan I
Endosulfan II	0	9				0.1	0.1		0.0087		NC		F	Yes	Endosulfan II
Endosulfan sulfate	0	9				0.1	0.1		NA		NC		F	Yes	Endosulfan sulfate
Endrin	0	9				0.1	0.1		0.0023		NC		F	Yes	Endrin
Endrin aldehyde	0	9				0.1	0.1		NA		NC		F	Yes	Endrin aldehyde
Endrin ketone	0	9				0.1	0.1		NA		NC		F	Yes	Endrin ketone
gamma-BHC (Lindane)	0	9				0.05	0.05		0.016		NC		F	Yes	gamma-BHC (Lindane)
gamma-Chlordane	0	9				0.05	0.05		0.004		NC		F	Yes	gamma-Chlordane
Heptachlor	1	9	0.014	0.014	0.023	0.05	0.05	EFF012	0.0036	1	3.89		A	Yes	Heptachlor
Heptachlor epoxide	0	9				0.05	0.05		0.0036		NC		F	Yes	Heptachlor epoxide
Methoxychlor	0	9				0.5	0.5		NA		NC		F	Yes	Methoxychlor
Toxaphene	0	9				5	5		0.0002		NC		F	Yes	Toxaphene
Aroclor-1016	0	9				1	1		0.03		NC		F	Yes	Aroclor-1016

Table 3-1
Noisette Creek
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections			Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No	Constituent
	# det.	# analyzed	Min	Max	Mean	Min SQL	Max SQL								
Aroclor-1221	0	9				2	2		0.03		NC		F	Yes	Aroclor-1221
Aroclor-1232	0	9				1	1		0.03		NC		F	Yes	Aroclor-1232
Aroclor-1242	0	9				1	1		0.03		NC		F	Yes	Aroclor-1242
Aroclor-1248	0	9				1	1		0.03		NC		F	Yes	Aroclor-1248
Aroclor-1254	0	9				1	1		0.03		NC		F	Yes	Aroclor-1254
Aroclor-1260	0	9				1	1		0.03		NC		F	Yes	Aroclor-1260
1,2,4-Trichlorobenzene	0	9				10	10		4.5		NC		F	Yes	1,2,4-Trichlorobenzene
1,2-Dichlorobenzene	0	9				10	10		19.7		NC		C	No	1,2-Dichlorobenzene
1,3-Dichlorobenzene	0	9				10	10		28.5		NC		C	No	1,3-Dichlorobenzene
1,4-Dichlorobenzene	0	9				10	10		19.9		NC		C	No	1,4-Dichlorobenzene
2,2'-Oxybis(1-chloropropane)[bis(2-Chloroisopropyl)ether]	0	9				10	10		NA		NC		F	Yes	2,2'-Oxybis(1-chloropropane)[bis(2-Chloroisopropyl)ether]
2,4,5-Trichlorophenol	0	9				10	10		NA		NC		F	Yes	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	0	9				10	10		NA		NC		F	Yes	2,4,6-Trichlorophenol
2,4-Dichlorophenol	0	9				10	10		NA		NC		F	Yes	2,4-Dichlorophenol
2,4-Dimethylphenol	0	9				10	10		NA		NC		F	Yes	2,4-Dimethylphenol
2,4-Dinitrophenol	0	9				50	50		48.5		NC		F	Yes	2,4-Dinitrophenol
2,4-Dinitrotoluene	0	9				10	10		NA		NC		F	Yes	2,4-Dinitrotoluene
2,6-Dinitrotoluene	0	9				10	10		NA		NC		F	Yes	2,6-Dinitrotoluene
2-Chloronaphthalene	0	9				10	10		NA		NC		F	Yes	2-Chloronaphthalene
2-Chlorophenol	0	9				10	10		NA		NC		F	Yes	2-Chlorophenol
2-Methyl-4,6-dinitrophenol	0	9				50	50		NA		NC		F	Yes	2-Methyl-4,6-dinitrophenol
2-Methylnaphthalene	0	9				10	10		NA		NC		F	Yes	2-Methylnaphthalene
2-Methylphenol (o-Cresol)	0	9				10	10		NA		NC		F	Yes	2-Methylphenol (o-Cresol)
2-Nitroaniline	0	9				50	50		NA		NC		F	Yes	2-Nitroaniline
2-Nitrophenol	0	9				10	10		NA		NC		F	Yes	2-Nitrophenol
3&4-Methylphenol (m&p-c	0	9				10	10		NA		NC		F	Yes	3&4-Methylphenol (m&p-cresol
3,3'-Dichlorobenzidine	0	9				20	20		NA		NC		F	Yes	3,3'-Dichlorobenzidine
3-Nitroaniline	0	9				50	50		NA		NC		F	Yes	3-Nitroaniline
4-Bromophenylphenyl ethe	0	9				10	10		NA		NC		F	Yes	4-Bromophenylphenyl ether
4-Chloro-3-methylphenol	0	9				10	10		NA		NC		F	Yes	4-Chloro-3-methylphenol
4-Chloroaniline	0	9				20	20		NA		NC		F	Yes	4-Chloroaniline
4-Chlorophenylphenyl ethe	0	9				10	10		NA		NC		F	Yes	4-Chlorophenylphenyl ether
4-Nitroaniline	0	9				50	50		NA		NC		F	Yes	4-Nitroaniline
4-Nitrophenol	0	9				50	50		71.7		NC		C	No	4-Nitrophenol
Acenaphthene	0	9				10	10		9.7		NC		F	Yes	Acenaphthene
Acenaphthylene	0	9				10	10		NA		NC		F	Yes	Acenaphthylene
Anthracene	0	9				10	10		NA		NC		F	Yes	Anthracene
Benzo(a)anthracene	0	9				10	10		NA		NC		F	Yes	Benzo(a)anthracene
Benzo(a)pyrene	0	9				10	10		NA		NC		F	Yes	Benzo(a)pyrene
Benzo(b)fluoranthene	1	9	0.39	0.39	4.49	10	10	EFF008	NA		NA		E	Yes	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	0	9				10	10		NA		NC		F	Yes	Benzo(g,h,i)perylene
Benzo(k)fluoranthene	0	9				10	10		NA		NC		F	Yes	Benzo(k)fluoranthene
bis(2-Chloroethoxy)metha	0	9				10	10		NA		NC		F	Yes	bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether	0	9				10	10		NA		NC		F	Yes	bis(2-Chloroethyl)ether
bis(2-Ethylhexyl)phthalate	2	9	0.63	2.6	4.32	10	10	EFF002	NA		NA		E	Yes	bis(2-Ethylhexyl)phthalate

Table 3-1
Noisette Creek
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections			Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No	Constituent
	# det.	# analyzed	Min	Max	Mean	Min SQL	Max SQL								
Butylbenzylphthalate	0	9				*10*	*10*		29.4		NC		C	No	Butylbenzylphthalate
Carbazole	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Carbazole**
Chrysene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Chrysene**
Dibenzo(a,h)anthracene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Dibenzo(a,h)anthracene**
Dibenzofuran	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Dibenzofuran**
Diethylphthalate	0	9				*10*	*10*		75.9		NC		C	No	Diethylphthalate
Dimethylphthalate	0	9				*10*	*10*		580		NC		C	No	Dimethylphthalate
Di-n-butylphthalate	**0**	**9**				***10***	***10***		**3.4**		**NC**		**F**	**Yes**	**Di-n-butylphthalate**
Di-n-octylphthalate	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Di-n-octylphthalate**
Fluoranthene	**0**	**9**				***10***	***10***		**1.6**		**NC**		**F**	**Yes**	**Fluoranthene**
Fluorene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Fluorene**
Hexachlorobenzene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Hexachlorobenzene**
Hexachlorobutadiene	**0**	**9**				***10***	***10***		**0.32**		**NC**		**F**	**Yes**	**Hexachlorobutadiene**
Hexachlorocyclopentadiene	**0**	**9**				***10***	***10***		**0.07**		**NC**		**F**	**Yes**	**Hexachlorocyclopentadiene**
Hexachloroethane	**0**	**9**				***10***	***10***		**9.4**		**NC**		**F**	**Yes**	**Hexachloroethane**
Indeno(1,2,3-cd)pyrene	**1**	**9**	**0.59**	**0.59**	**4.56**	***10***	***10***	**EFF008**	**NA**		**NA**		**E**	**Yes**	**Indeno(1,2,3-cd)pyrene**
Isophorone	0	9				*10*	*10*		129		NC		C	No	Isophorone
Naphthalene	0	9				*10*	*10*		23.5		NC		C	No	Naphthalene
Nitrobenzene	0	9				*10*	*10*		66.8		NC		C	No	Nitrobenzene
n-Nitrosodi-n-propylamine	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**n-Nitrosodi-n-propylamine**
N-Nitrosodiphenylamine	0	9				*10*	*10*		33000		NC		C	No	N-Nitrosodiphenylamine
Pentachlorophenol	**0**	**9**				***50***	***50***		**7.9**		**NC**		**F**	**Yes**	**Pentachlorophenol**
Phenanthrene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Phenanthrene**
Phenol	0	9				*10*	*10*		58		NC		C	No	Phenol
Pyrene	**0**	**9**				***10***	***10***		**NA**		**NC**		**F**	**Yes**	**Pyrene**
Cyanide, Total	0	9				*10*	*10*		1		NC	16.33	C	No	Cyanide, Total

Notes:

NA	Notes constituents for which no EPA Region 4 ESV or reference concentration is available.
NC	Notes contaminants for which there is not sufficient information to calculate a value (primarily used when a constituent was not detected in any sample).
Italicized numbers	Indicates U-flagged data that represents the sample quantitation limits (DL) for each constituent.
A	Max detect greater than EPA Region 4 SV and/or reference concentration.
B	Max detect less than Region 4 SV.
C	Constituent not detected and MDL is either less than EPA Region 4 ESV and reference concentrations or no EPA Region 4 ESV is available. Further analysis provided in text of report.
D	Max detect less than the reference concentration.
E	Constituent detected but no EPA Region 4 SV available.
F	Constituent not detected and MDL is greater than EPA Region 4 SV. Further analysis provided in text of report.

Table 3-2
Noisette Creek SLERA
Sediment COPC Screening Table

PARAMETER	Frequency of Detection	MIN		Max Detect	Location of Max Detect	EPA ESV	Screening HQ	Detection Limit	# of Samples Exceeding ESV	Retained for Refinement?	Rationale	PARAMETER
Inorganics (mg/kg)												
Aluminum	10 / 10	1550.00	–	28900.00	NOIM000201	NA	NC			Yes	E	Aluminum
Antimony	1 / 10	1.10	–	1.10	NOIM000401	12.0000	0.0917	0.49 – 2.00	0	Yes	E	Antimony
Arsenic	10 / 10	1.80	–	19.90	NOIM000801	7.2400	2.7486		7	Yes	A	Arsenic
Barium	10 / 10	3.20	–	44.40	NOIM000401	NA	NC			Yes	E	Barium
Beryllium	8 / 10	0.18	–	1.90	NOIM000401	NA	NC	0.07 – 0.16		Yes	E	Beryllium
Cadmium	8 / 10	0.10	–	0.82	NOIM000201	1.0000	0.8200	0.06 – 0.13	0	No	B	Cadmium
Calcium	10 / 10	2340.00		51200.00	NOIM000401	NA				Yes	C	
Chromium	10 / 10	4.10	–	54.90	NOIM000201	52.3000	1.0497		1	Yes	A	Chromium
Cobalt	10 / 10	0.69	–	10.60	NOIM000401	NA	NC			Yes	E	Cobalt
Copper	10 / 10	4.10	–	127.00	NOIM000401	18.7000	6.7914		5	Yes	A	Copper
Iron	10 / 10	1810.00		31700.00	NOIM000801	NA				Yes	C	
Lead	10 / 10	6.80	–	126.00	NOIM000401	30.2000	4.1722		5	Yes	A	Lead
Magnesium	10 / 10	538.00		6400.00	NOIM000901	NA				Yes	C	
Manganese	10 / 10	11.30	–	233.00	NOIM000501	NA	NC			Yes	E	Manganese
Mercury	6 / 10	0.13	–	1.20	NOIM000201	0.1300	9.2308	0.04 – 0.21	6	Yes	A	Mercury
Nickel	10 / 10	1.40	–	20.50	NOIM000401	15.9000	1.2893		2	Yes	A	Nickel
Potassium	10 / 10	268.00		3290.00	NOIM000201	NA				Yes	C	
Selenium	0 / 10	ND	–	ND	NA	NA	NC	0.67 – 3.50		Yes	C	Selenium
Silver	0 / 10	ND	–	ND	NA	2.0000	NC	0.23 – 1.30	0	No	C	Silver
Sodium	10 / 10	1060.00		26300.00	NOIM000901	NA				Yes	C	
Thallium	0 / 10	ND	–	ND	NA	NA	NC	1.00 – 3.90		Yes	C	Thallium
Tin	1 / 10	48.10	–	48.10	NOIM000401	NA	NC	10.20 – 39.70		Yes	C	Tin
Dibutyltin	0 / 10	ND	–	ND	NA	NA	NC	49.00 – 50.00		Yes	C	Dibutyltin
Monobutyltin	0 / 10	ND	–	ND	NA	NA	NC	49.00 – 50.00		Yes	C	Monobutyltin
Tetrabutyltin	0 / 10	ND	–	ND	NA	NA	NC	49.00 – 50.00		Yes	C	Tetrabutyltin
Tributyltin	0 / 10	ND	–	ND	NA	NA	NC	49.00 – 50.00		Yes	C	Tributyltin
Vanadium	10 / 10	3.70	–	81.20	NOIM000801	NA	NC			Yes	E	Vanadium
Zinc	10 / 10	26.80	–	718.00	NOIM000401	124.0000	5.7903		4	Yes	A	Zinc
Cyanide	0 / 10	ND	–	ND	NA	NA	NC	0.12 – 0.65		Yes	C	Cyanide
Pesticides & PCBs (µg/kg)												
4,4'-DDD	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	4,4'-DDD
4,4'-DDE	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	4,4'-DDE
4,4'-DDT	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	4,4'-DDT
Aldrin	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	Aldrin
alpha-BHC	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	alpha-BHC
alpha-Chlordane	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	alpha-Chlordane
Aroclor-1016	0 / 10	ND	–	ND	NA	33.0000	NC	42.10 – 228.00	0	Yes	F	Aroclor-1016
Aroclor-1221	0 / 10	ND	–	ND	NA	67.0000	NC	85.60 – 463.00	0	Yes	F	Aroclor-1221
Aroclor-1232	0 / 10	ND	–	ND	NA	33.0000	NC	42.10 – 228.00	0	Yes	F	Aroclor-1232
Aroclor-1242	0 / 10	ND	–	ND	NA	33.0000	NC	42.10 – 228.00	0	Yes	F	Aroclor-1242
Aroclor-1248	0 / 10	ND	–	ND	NA	33.0000	NC	42.10 – 228.00	0	Yes	F	Aroclor-1248
Aroclor-1254	0 / 10	ND	–	ND	NA	33.0000	NC	42.10 – 228.00	0	Yes	F	Aroclor-1254
Aroclor-1260	1 / 10	123.00	–	123.00	NOIM000301	33.0000	3.7273	42.10 – 228.00	1	Yes	A	Aroclor-1260
beta-BHC	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	beta-BHC
Chlordane	0 / 10	ND	–	ND	NA	1.7000	NC	42.10 – 228.00	0	Yes	F	Chlordane
delta-BHC	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	delta-BHC
Dieldrin	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	Dieldrin

Table 3-2
Noisette Creek SLERA
Sediment COPC Screening Table

PARAMETER	Frequency of Detection	MIN		Max Detect	Location of Max Detect	EPA ESV	Screening HQ	Detection Limit	# of Samples Exceeding ESV	Retained for Refinement?	Rationale	PARAMETER
Endosulfan I	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	Endosulfan I
Endosulfan II	0 / 10	ND	–	ND	NA	NA	NC	4.21 – 22.80		Yes	C	Endosulfan II
Endosulfan sulfate	0 / 10	ND	–	ND	NA	NA	NC	4.21 – 22.80		Yes	C	Endosulfan sulfate
Endrin	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	Endrin
Endrin aldehyde	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	Endrin aldehyde
Endrin ketone	0 / 10	ND	–	ND	NA	3.3000	NC	4.21 – 22.80	0	Yes	F	Endrin ketone
gamma-BHC (Lindane)	0 / 10	ND	–	ND	NA	3.3000	NC	2.17 – 11.70	0	Yes	F	gamma-BHC (Lindane)
gamma-Chlordane	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	gamma-Chlordane
Heptachlor	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	Heptachlor
Heptachlor epoxide	0 / 10	ND	–	ND	NA	NA	NC	2.17 – 11.70		Yes	C	Heptachlor epoxide
Methoxychlor	0 / 10	ND	–	ND	NA	NA	NC	21.70 – 117.00		Yes	C	Methoxychlor
Toxaphene	0 / 10	ND	–	ND	NA	NA	NC	217.00 – 1170.00		Yes	C	Toxaphene
SVOCs (µg/kg)												
1,2,4-Trichlorobenzene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	1,2,4-Trichlorobenzene
1,2-Dichlorobenzene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	1,2-Dichlorobenzene
1,3-Dichlorobenzene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	1,3-Dichlorobenzene
1,4-Dichlorobenzene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	1,4-Dichlorobenzene
2,2'-oxybis(1-Chloropropane)	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,2'-oxybis(1-Chloropropane)
2,4,5-Trichlorophenol	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,4,6-Trichlorophenol
2,4-Dichlorophenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,4-Dichlorophenol
2,4-Dimethylphenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,4-Dimethylphenol
2,4-Dinitrophenol	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	2,4-Dinitrophenol
2,4-Dinitrotoluene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,4-Dinitrotoluene
2,6-Dinitrotoluene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2,6-Dinitrotoluene
2-Chloronaphthalene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2-Chloronaphthalene
2-Chlorophenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2-Chlorophenol
2-Methyl-4,6-Dinitrophenol	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	2-Methyl-4,6-Dinitrophenol
2-Methylnaphthalene	0 / 10	ND	–	ND	NA	330.0000	NC	420.00 – 2400.00	0	Yes	F	2-Methylnaphthalene
2-Methylphenol (o-Cresol)	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2-Methylphenol (o-Cresol)
2-Nitroaniline	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	2-Nitroaniline
2-Nitrophenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	2-Nitrophenol
3,3'-Dichlorobenzidine	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	3,3'-Dichlorobenzidine
3-Nitroaniline	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	3-Nitroaniline
4-Bromophenyl-phenylether	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	4-Bromophenyl-phenylether
4-Chloro-3-methylphenol	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	4-Chloro-3-methylphenol
4-Chloroaniline	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	4-Chloroaniline
4-Chlorophenylphenylether	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	4-Chlorophenylphenylether
4-Methylphenol (p-Cresol)	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	4-Methylphenol (p-Cresol)
4-Nitroaniline	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	4-Nitroaniline
4-Nitrophenol	0 / 10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	4-Nitrophenol
Acenaphthene	0 / 10	ND	–	ND	NA	330.0000	NC	420.00 – 2400.00	0	Yes	F	Acenaphthene
Acenaphthylene	1 / 10	140.00	–	140.00	NOIM001001	330.0000	0.4242	420.00 – 2400.00	0	N	B	Acenaphthylene
Aniline	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Aniline
Anthracene	2 / 10	200.00	–	610.00	NOIM000401	330.0000	1.8485	420.00 – 2400.00	1	Yes	A	Anthracene
Azobenzene	0 / 10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Azobenzene
Benzo(a)anthracene	7 / 10	61.00	–	2400.00	NOIM001001	330.0000	7.2727	920.00 – 2400.00	1	Yes	A	Benzo(a)anthracene
Benzo(a)pyrene	6 / 10	65.00	–	1400.00	NOIM001001	330.0000	4.2424	920.00 – 2400.00	1	Yes	A	Benzo(a)pyrene

Table 3-2
Noisette Creek SLERA
Sediment COPC Screening Table

PARAMETER	Frequency of Detection	MIN		Max Detect	Location of Max Detect	EPA ESV	Screening HQ	Detection Limit	# of Samples Exceeding ESV	Retained for Refinement?	Rationale	PARAMETER
Benzo(b)fluoranthene	7/10	96.00	–	2500.00	NOIM001001	NA	NC	920.00 – 2400.00		Yes	F	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	2/10	210.00	–	740.00	NOIM001001	NA	NC	420.00 – 2400.00		Yes	F	Benzo(g,h,i)perylene
Benzo(k)fluoranthene	5/10	130.00	–	960.00	NOIM001001	NA	NC	420.00 – 2400.00		Yes	F	Benzo(k)fluoranthene
Benzoic acid	0/10	ND	–	ND	NA	NA	NC	2200.00 – 12000.00		Yes	C	Benzoic acid
Benzyl alcohol	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Benzyl alcohol
bis(2-Chloroethoxy)methane	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	bis(2-Chloroethyl)ether
bis(2-Ethylhexyl)phthalate (BEHP)	1/10	1800.00	–	1800.00	NOIM000301	182.0000	9.8901	420.00 – 2400.00	1	Yes	A	bis(2-Ethylhexyl)phthalate (BEHP)
Butylbenzylphthalate	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Butylbenzylphthalate
Carbazole	1/10	160.00	–	160.00	NOIM001001	NA	NC	420.00 – 2400.00		Yes	F	Carbazole
Chrysene	7/10	70.00	–	3400.00	NOIM001001	330.0000	10.3030	920.00 – 2400.00	1	Yes	A	Chrysene
Dibenz(a,h)anthracene	2/10	150.00	–	190.00	NOIM001001	330.0000	0.5758	420.00 – 2400.00	0	N	B	Dibenz(a,h)anthracene
Dibenzofuran	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Dibenzofuran
Diethylphthalate	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Diethylphthalate
Dimethyl phthalate	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Dimethyl phthalate
Di-n-butylphthalate	1/10	74.00	–	74.00	NOIM000701	NA	NC	420.00 – 2400.00		Yes	F	Di-n-butylphthalate
Di-n-octyl phthalate	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Di-n-octyl phthalate
Fluoranthene	9/10	120.00	–	4800.00	NOIM001001	330.0000	14.5455	920.00 – 920.00	3	Yes	A	Fluoranthene
Fluorene	0/10	ND	–	ND	NA	330.0000	NC	420.00 – 2400.00	0	Yes	C	Fluorene
Hexachlorobenzene	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Hexachlorobenzene
Hexachlorocyclopentadiene	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Hexachlorocyclopentadiene
Hexachloroethane	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Hexachloroethane
Indeno(1,2,3-cd)pyrene	2/10	270.00	–	760.00	NOIM001001	NA	NC	420.00 – 2400.00		Yes	F	Indeno(1,2,3-cd)pyrene
Isophorone	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Isophorone
Naphthalene	0/10	ND	–	ND	NA	330.0000	NC	420.00 – 2400.00	0	Yes	C	Naphthalene
Nitrobenzene	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Nitrobenzene
N-Nitrosodimethylamine	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	N-Nitrosodimethylamine
N-Nitroso-di-n-propylamine	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	N-Nitrosodiphenylamine
Pentachlorophenol	0/10	ND	–	ND	NA	NA	NC	1000.00 – 5700.00		Yes	C	Pentachlorophenol
Phenanthrene	4/10	83.00	–	340.00	NOIM000901	330.0000	1.0303	440.00 – 1300.00	1	Yes	A	Phenanthrene
Phenol	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Phenol
Pyrene	9/10	120.00	–	5100.00	NOIM001001	330.0000	15.4545	920.00 – 920.00	3	Yes	A	Pyrene
Pyridine	0/10	ND	–	ND	NA	NA	NC	420.00 – 2400.00		Yes	C	Pyridine
Total PAH	9/10	1658.00	–	18920.00	NOIM001001	1684.0000	11.2352		10	Yes	A	Total PAH
VOCs (µg/kg)												
1,1,1-Trichloroethane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,1,2-Trichloroethane
1,1-Dichloroethane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,1-Dichloroethane
1,1-Dichloroethene	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,1-Dichloroethene
1,2-Dichloroethane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,2-Dichloroethane
1,2-Dichloropropane	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	1,2-Dichloropropane
2-Butanone (MEK)	5/10	5.00	–	19.00	NOIM000901	NA	NC	13.00 – 28.00		Yes	F	2-Butanone (MEK)
2-Chloroethyl vinyl ether	0/10	ND	–	ND	NA	NA	NC	6.00 – 36.00		Yes	C	2-Chloroethyl vinyl ether
2-Hexanone	0/10	ND	–	ND	NA	NA	NC	13.00 – 71.00		Yes	C	2-Hexanone
4-Methyl-2-Pentanone (MIBK)	0/10	ND	–	ND	NA	NA	NC	13.00 – 71.00		Yes	C	4-Methyl-2-Pentanone (MIBK)
Acetone	3/10	130.00	–	490.00	NOIM001001	NA	NC	18.00 – 91.00		Yes	F	Acetone

Table 3-2
Noisette Creek SLERA
Sediment COPC Screening Table

PARAMETER	Frequency of Detection	MIN		Max Detect	Location of Max Detect	EPA ESV	Screening HQ	Detection Limit	# of Samples Exceeding ESV	Retained for Refinement?	Rationale	PARAMETER
Benzene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Benzene
Bromodichloromethane	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Bromodichloromethane
Bromoform	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Bromoform
Bromomethane	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Bromomethane
Carbon disulfide	7 / 10	10.00	-	52.00	NOIM000901	NA	NC	6.00 - 7.00		Yes	F	Carbon disulfide
Carbon tetrachloride	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Carbon tetrachloride
Chlorobenzene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Chlorobenzene
Chloroethane	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Chloroethane
Chloroform	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Chloroform
Chloromethane	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Chloromethane
cis-1,3-Dichloropropene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	cis-1,3-Dichloropropene
Dibromochloromethane	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Dibromochloromethane
Ethylbenzene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Ethylbenzene
Methylene chloride	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Methylene chloride
Styrene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Styrene
Tetrachloroethene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Tetrachloroethene
Toluene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Toluene
trans-1,2-Dichloroethene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	trans-1,2-Dichloroethene
trans-1,3-Dichloropropene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	trans-1,3-Dichloropropene
Trichloroethene	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Trichloroethene
Vinyl acetate	0 / 10	ND	-	ND	NA	NA	NC	13.00 - 71.00		Yes	C	Vinyl acetate
Vinyl chloride	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Vinyl chloride
Xylenes (Total)	0 / 10	ND	-	ND	NA	NA	NC	6.00 - 36.00		Yes	C	Xylenes (Total)

Notes:

NSV	No screening value available.
SV	Screening Value. Sediment screening values for this SLERA were taken from:
	USEPA. 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published in November 1995
	Website version updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecobul.htm
-	Indicates that this column is not applicable to this contaminant
Rationale for retaining COPCs	
A	Maximum detected concentration is greater than Region 4 SV
B	Maximum detected concentration is less than Region 4 SV
C	No EPA screening value available for comparison.
D	Minimum detection limit is greater than the screening vaue

Table 3-3
Noisette Creek SLERA
Sediment COPC Summary Table

Inorganics		Pesticides and PCBs		SVOCs		VOCs	
Constituents exceeding Screening Value							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Aluminum		Aroclor-1260	4,4'-DDD	Anthracene	2-Methylnaphthalene		
Antimony			4,4'-DDE	Benzo(a)anthracene	Acenaphthene		
Arsenic			4,4'-DDT	Benzo(a)pyrene	Fluorene		
Chromium			Aroclor-1016	Bis(2-Ethylhexyl)phthalate (BEHP)	Naphthalene		
Copper			Aroclor-1221	Chrysene			
Lead			Aroclor-1232	Fluoranthene			
Mercury			Aroclor-1242	Phenanthrene			
Nickel			Aroclor-1248	Pyrene			
Zinc			Aroclor-1254	Total PAH			
			Chlordane				
			Dieldrin				
			Endrin				
			Endrin aldehyde				
			Endrin ketone				
			gamma-BHC (Lindane)				
Constituents with No Screening Value							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Aluminum	Selenium		Aldrin	Benzo(b)fluoranthene	1,2,4-Trichlorobenzene	2-Butanone (MEK)	1,1,1-Trichloroethane
Barium	Thallium		alpha-BHC	Benzo(g,h,i)perylene	1,2-Dichlorobenzene	Acetone	1,1,2,2-Tetrachloroethane
Beryllium	Dibutyltin		alpha-Chlordane	Benzo(k)fluoranthene	1,3-Dichlorobenzene	Carbon disulfide	1,1,2-Trichloroethane
Cobalt	Tetrabutyltin		delta-BHC	Di-n-butylphthalate	2,2'-oxybis(1-Chloropropane)		1,1-Dichloroethene
Iron	Tributyltin		Endosulfan I	Indeno(1,2,3-cd)pyrene	2,4,5-Trichlorophenol		1,2-Dichloroethane
Magnesium	Cyanide		Endosulfan II		2,4,6-Trichlorophenol		1,2-Dichloropropane
Manganese			Endosulfan sulfate		2,4-Dichlorophenol		2-Chloroethyl vinyl ether
Potassium			gamma-Chlordane		2,4-Dimethylphenol		2-Hexanone
Sodium			Heptachlor		2,4-Dinitrophenol		4-Methyl-2-Pentanone (MIBK)
Tin			Heptachlor epoxide		2,4-Dinitrotoluene		Benzene
Vanadium			Methoxychlor		2,6-Dinitrotoluene		Bromodichloromethane
			Toxaphene		2-Chloronaphthalene		Bromoform
					2-Chlorophenol		Bromomethane
					2-Methyl-4,6-Dinitrophenol		Carbon tetrachloride
					2-Methylphenol (o-Cresol)		Chlorobenzene
					2-Nitroaniline		Chloroethane
					2-Nitrophenol		Chloroform
					3,3'-Dichlorobenzidine		Chloromethane
					3-Nitroaniline		cis-1,3-Dichloropropene
					4-Bromophenyl-phenylether		Dibromochloromethane
					4-Chloro-3-methylphenol		Ethylbenzene
					4-Chloroaniline		Methylene chloride
					4-Chlorophenylphenylether		Styrene
					4-Methylphenol (p-Cresol)		Tetrachloroethene
					4-Nitroaniline		Toluene
					4-Nitrophenol		trans-1,2-Dichloroethene
					Aniline		trans-1,3-Dichloropropene
					Azobenzene		Trichloroethene
					Benzoic acid		Vinyl acetate
					Benzyl alcohol		Vinyl chloride
					bis(2-Chloroethoxy)methane		Xylenes (Total)
					bis(2-Chloroethyl)ether		
					Butylbenzylphthalate		
					Dibenzofuran		
					Diethylphthalate		
					Dimethyl phthalate		
					Di-n-octyl phthalate		
					Hexachlorobenzene		
					Hexachlorocyclopentadiene		
					Hexachloroethane		
					Isophorone		
					Nitrobenzene		
					N-Nitrosodimethylamine		
					N-Nitroso-di-n-propylamine		
					N-Nitrosodiphenylamine		
					Pentachlorophenol		
					Phenol		
					Pyridine		

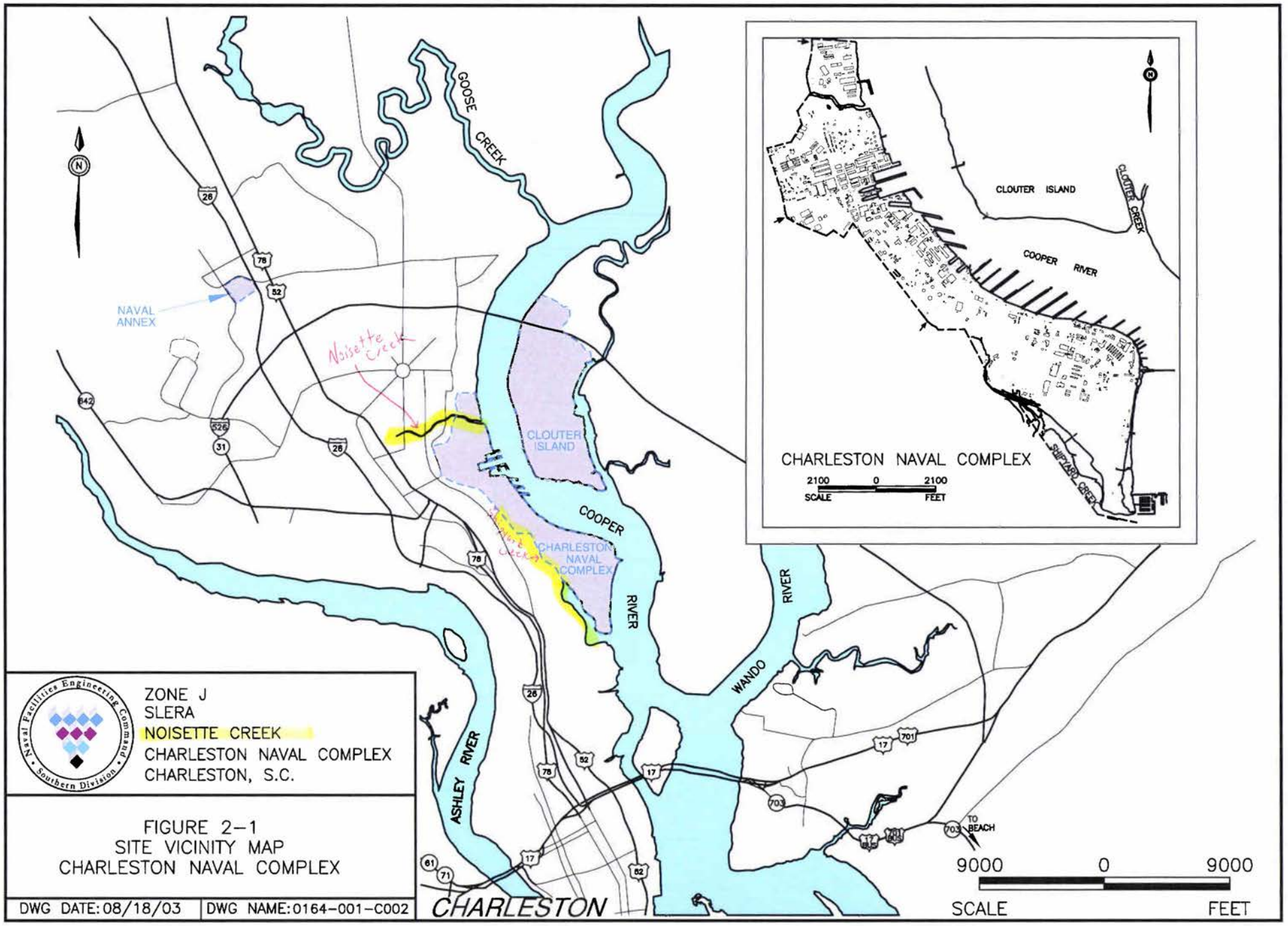
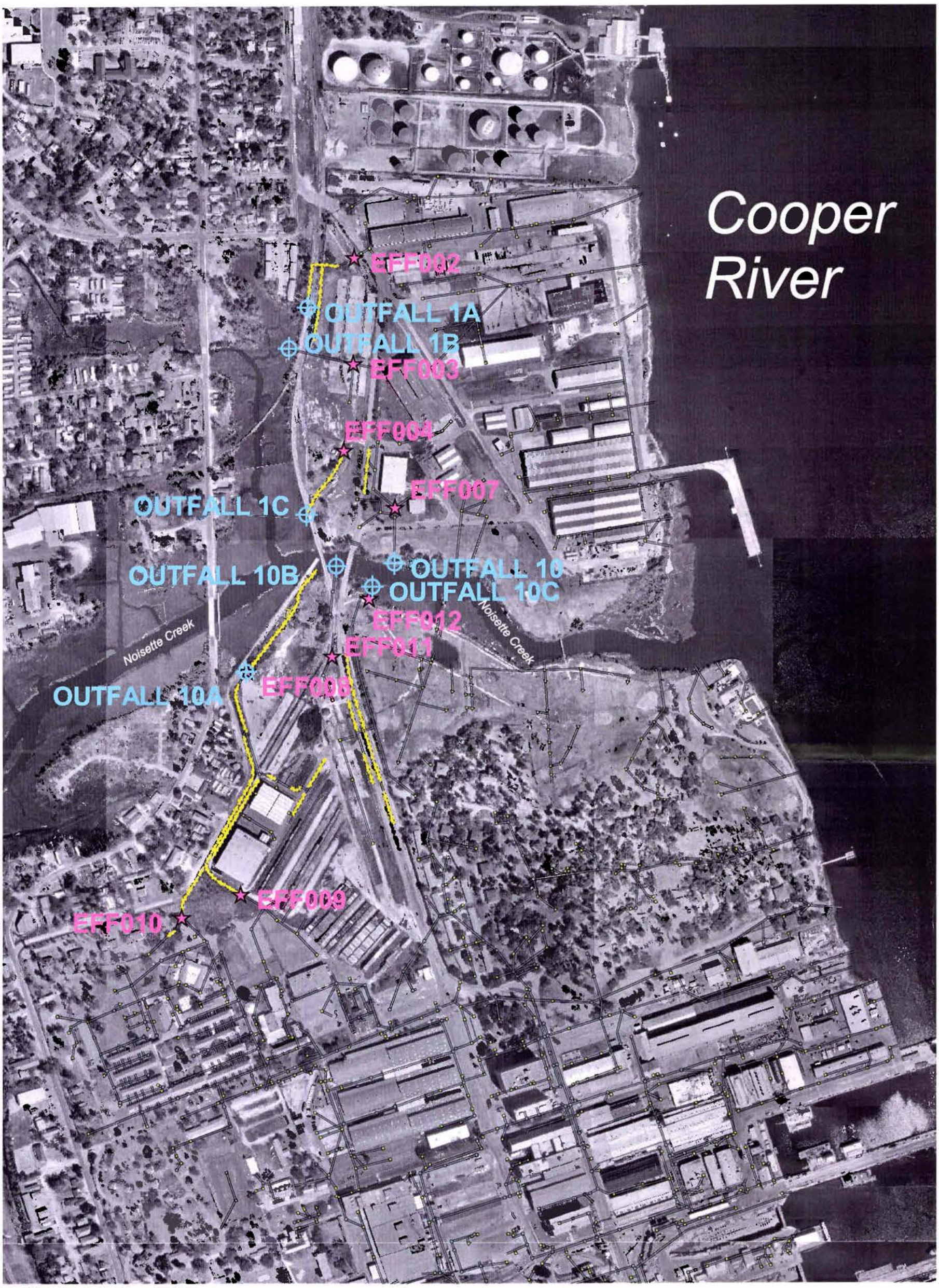


FIGURE 2-1
SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX

DWG DATE: 08/18/03 | DWG NAME: 0164-001-C002



500 0 500 Feet

LEGEND

Noisette Creek Storm Water Outfall

Noisette Creek Storm Water Effluent Sample

Storm Water Lines

ZONE-J-CATCH-BASIN

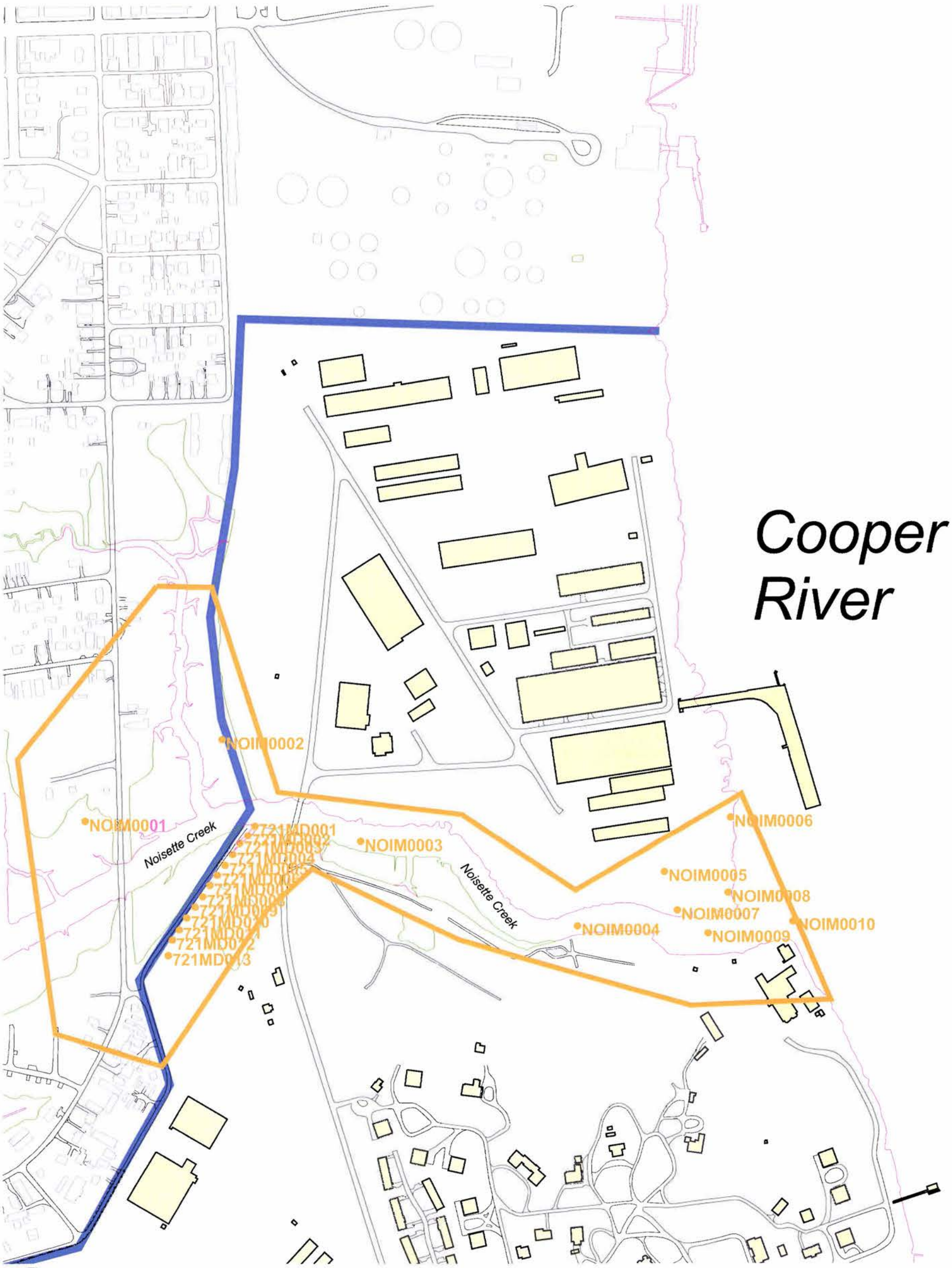
ZONE-J-DRAIN-LINE

ZONE-J-DRAINAGE-DITCH

Zone J SLERA - Noisette Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 3-1
RFI Storm Water Effluent and Outfall Locations

August 2003 | Zone J Main Project



LEGEND

- Noisette Creek SLERA Sediiment Locations
- Shoreline
- CNC Perimeter

Zone J SLERA - Noisette Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 3-2
RFI Sediment Sampling Locations

August 2003	Zone J Main Project

Appendix A

Noisette Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM Quotient
NOIM000101	MG/KG	14.6000		Arsenic (As)	8.20	70.00	0.21
NOIM000101	MG/KG	0.2900	J	Cadmium (Cd)	1.20	9.60	0.03
NOIM000101	MG/KG	26.3000	J	Chromium (Cr)	81.00	370.00	0.07
NOIM000101	MG/KG	14.7000		Copper (Cu)	34.00	270.00	0.05
NOIM000101	MG/KG	18.5000		Lead (Pb)	46.70	218.00	0.08
NOIM000101	MG/KG	0.0700	U	Mercury (Hg)	0.15	0.71	0.10
NOIM000101	MG/KG	7.7000	J	Nickel (Ni)	20.90	51.60	0.15
NOIM000101	MG/KG	0.3600	U	Silver (Ag)	1.00	3.70	0.10
NOIM000101	MG/KG	117.0000	J	Zinc (Zn)	150.00	410.00	0.29
NOIM000101	UG/KG	9.2400	U	4,4'-DDE	2.20	27.00	0.34
NOIM000101	UG/KG	9.2400	U	4,4'-DDT	1.58	46.10	0.20
NOIM000101	UG/KG	371.2000	U	Total PCBs	22.70	180.00	2.06
NOIM000101	UG/KG	920.0000	UJ	2-Methylnaphthalene	70.00	670.00	1.37
NOIM000101	UG/KG	920.0000	UJ	Acenaphthene	16.00	500.00	1.84
NOIM000101	UG/KG	920.0000	UJ	Acenaphthylene	44.00	640.00	1.44
NOIM000101	UG/KG	920.0000	UJ	Anthracene	85.30	1100.00	0.84
NOIM000101	UG/KG	920.0000	UJ	Benzo(a)anthracene	261.00	1600.00	0.58
NOIM000101	UG/KG	920.0000	UJ	Benzo(a)pyrene	430.00	1600.00	0.58
NOIM000101	UG/KG	920.0000	UJ	Chrysene	384.00	2800.00	0.33
NOIM000101	UG/KG	920.0000	UJ	Dibenz(a,h)anthracene	63.40	260.00	3.54
NOIM000101	UG/KG	920.0000	UJ	Fluoranthene	600.00	5100.00	0.18
NOIM000101	UG/KG	920.0000	UJ	Fluorene	19.00	540.00	1.70
NOIM000101	UG/KG	920.0000	UJ	Naphthalene	160.00	2100.00	0.44
NOIM000101	UG/KG	920.0000	UJ	Phenanthrene	240.00	1500.00	0.61
NOIM000101	UG/KG	920.0000	UJ	Pyrene	665.00	2600.00	0.35
				ERM Quotient Sum			17.48
NOIM000101				Mean ERM Quotient			0.70
NOIM000101				Mean ERM Quotient without ND			0.04
NOIM000201	MG/KG	19.9000		Arsenic (As)	8.20	70.00	0.28
NOIM000201	MG/KG	0.8200	J	Cadmium (Cd)	1.20	9.60	0.09
NOIM000201	MG/KG	54.9000	J	Chromium (Cr)	81.00	370.00	0.15
NOIM000201	MG/KG	36.3000		Copper (Cu)	34.00	270.00	0.13
NOIM000201	MG/KG	39.9000		Lead (Pb)	46.70	218.00	0.18
NOIM000201	MG/KG	1.2000		Mercury (Hg)	0.15	0.71	1.69
NOIM000201	MG/KG	16.4000	J	Nickel (Ni)	20.90	51.60	0.32
NOIM000201	MG/KG	0.4000	U	Silver (Ag)	1.00	3.70	0.11
NOIM000201	MG/KG	151.0000	J	Zinc (Zn)	150.00	410.00	0.37
NOIM000201	UG/KG	9.1800	U	4,4'-DDE	2.20	27.00	0.34
NOIM000201	UG/KG	9.1800	U	4,4'-DDT	1.58	46.10	0.20
NOIM000201	UG/KG	368.4000	U	Total PCBs	22.70	180.00	2.05
NOIM000201	UG/KG	920.0000	U	2-Methylnaphthalene	70.00	670.00	1.37
NOIM000201	UG/KG	920.0000	U	Acenaphthene	16.00	500.00	1.84
NOIM000201	UG/KG	920.0000	U	Acenaphthylene	44.00	640.00	1.44
NOIM000201	UG/KG	920.0000	U	Anthracene	85.30	1100.00	0.84
NOIM000201	UG/KG	110.0000	J	Benzo(a)anthracene	261.00	1600.00	0.07
NOIM000201	UG/KG	920.0000	U	Benzo(a)pyrene	430.00	1600.00	0.58
NOIM000201	UG/KG	260.0000	J	Chrysene	384.00	2800.00	0.09
NOIM000201	UG/KG	920.0000	U	Dibenz(a,h)anthracene	63.40	260.00	3.54
NOIM000201	UG/KG	160.0000	J	Fluoranthene	600.00	5100.00	0.03
NOIM000201	UG/KG	920.0000	U	Fluorene	19.00	540.00	1.70
NOIM000201	UG/KG	920.0000	U	Naphthalene	160.00	2100.00	0.44
NOIM000201	UG/KG	920.0000	U	Phenanthrene	240.00	1500.00	0.61
NOIM000201	UG/KG	120.0000	J	Pyrene	665.00	2600.00	0.05
				ERM Quotient Sum			18.50
NOIM000201				Mean ERM Quotient			0.74
NOIM000201				Mean ERM Quotient without ND			0.14

Noisette Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM Quotient
NOIM000301	MG/KG	4.5000		Arsenic (As)	8.20	70.00	0.06
NOIM000301	MG/KG	0.1300	U	Cadmium (Cd)	1.20	9.60	0.01
NOIM000301	MG/KG	7.0000		Chromium (Cr)	81.00	370.00	0.02
NOIM000301	MG/KG	15.6000		Copper (Cu)	34.00	270.00	0.06
NOIM000301	MG/KG	16.3000		Lead (Pb)	46.70	218.00	0.07
NOIM000301	MG/KG	0.0400	U	Mercury (Hg)	0.15	0.71	0.06
NOIM000301	MG/KG	6.3000	J	Nickel (Ni)	20.90	51.60	0.12
NOIM000301	MG/KG	0.7600	U	Silver (Ag)	1.00	3.70	0.21
NOIM000301	MG/KG	41.1000		Zinc (Zn)	150.00	410.00	0.10
NOIM000301	UG/KG	4.3800	U	4,4'-DDE	2.20	27.00	0.16
NOIM000301	UG/KG	4.3800	U	4,4'-DDT	1.58	46.10	0.10
NOIM000301	**UG/KG**	**276.9500**		**Total PCBs**	**22.70**	**180.00**	**1.54**
NOIM000301	UG/KG	440.0000	U	2-Methylnaphthalene	70.00	670.00	0.66
NOIM000301	UG/KG	440.0000	U	Acenaphthene	16.00	500.00	0.88
NOIM000301	UG/KG	440.0000	U	Acenaphthylene	44.00	640.00	0.69
NOIM000301	UG/KG	440.0000	U	Anthracene	85.30	1100.00	0.40
NOIM000301	UG/KG	61.0000	J	Benzo(a)anthracene	261.00	1600.00	0.04
NOIM000301	UG/KG	65.0000	J	Benzo(a)pyrene	430.00	1600.00	0.04
NOIM000301	UG/KG	70.0000	J	Chrysene	384.00	2800.00	0.03
NOIM000301	UG/KG	440.0000	U	Dibenz(a,h)anthracene	63.40	260.00	1.69
NOIM000301	UG/KG	120.0000	J	Fluoranthene	600.00	5100.00	0.02
NOIM000301	UG/KG	440.0000	U	Fluorene	19.00	540.00	0.81
NOIM000301	UG/KG	440.0000	U	Naphthalene	160.00	2100.00	0.21
NOIM000301	UG/KG	440.0000	U	Phenanthrene	240.00	1500.00	0.29
NOIM000301	UG/KG	170.0000	J	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			8.34
NOIM000301				Mean ERM Quotient			0.33
NOIM000301				Mean ERM Quotient without ND			0.09
NOIM000401	MG/KG	10.7000		Arsenic (As)	8.20	70.00	0.15
NOIM000401	MG/KG	0.4500	J	Cadmium (Cd)	1.20	9.60	0.05
NOIM000401	MG/KG	25.3000		Chromium (Cr)	81.00	370.00	0.07
NOIM000401	MG/KG	127.0000		Copper (Cu)	34.00	270.00	0.47
NOIM000401	MG/KG	126.0000		Lead (Pb)	46.70	218.00	0.58
NOIM000401	MG/KG	0.1600		Mercury (Hg)	0.15	0.71	0.23
NOIM000401	MG/KG	20.5000		Nickel (Ni)	20.90	51.60	0.40
NOIM000401	MG/KG	0.9800	U	Silver (Ag)	1.00	3.70	0.26
NOIM000401	**MG/KG**	**718.0000**		**Zinc (Zn)**	**150.00**	**410.00**	**1.75**
NOIM000401	UG/KG	5.6500	U	4,4'-DDE	2.20	27.00	0.21
NOIM000401	UG/KG	5.6500	U	4,4'-DDT	1.58	46.10	0.12
NOIM000401	UG/KG	227.0000	U	Total PCBs	22.70	180.00	1.26
NOIM000401	UG/KG	570.0000	U	2-Methylnaphthalene	70.00	670.00	0.85
NOIM000401	UG/KG	570.0000	U	Acenaphthene	16.00	500.00	1.14
NOIM000401	UG/KG	570.0000	U	Acenaphthylene	44.00	640.00	0.89
NOIM000401	UG/KG	610.0000		Anthracene	85.30	1100.00	0.55
NOIM000401	UG/KG	1000.0000		Benzo(a)anthracene	261.00	1600.00	0.63
NOIM000401	UG/KG	990.0000		Benzo(a)pyrene	430.00	1600.00	0.62
NOIM000401	UG/KG	1500.0000		Chrysene	384.00	2800.00	0.54
NOIM000401	UG/KG	150.0000	J	Dibenz(a,h)anthracene	63.40	260.00	0.58
NOIM000401	UG/KG	1500.0000		Fluoranthene	600.00	5100.00	0.29
NOIM000401	UG/KG	570.0000	U	Fluorene	19.00	540.00	1.06
NOIM000401	UG/KG	570.0000	U	Naphthalene	160.00	2100.00	0.27
NOIM000401	UG/KG	83.0000	J	Phenanthrene	240.00	1500.00	0.06
NOIM000401	UG/KG	950.0000		Pyrene	665.00	2600.00	0.37
				ERM Quotient Sum			13.38
NOIM000401				Mean ERM Quotient			0.54
NOIM000401				Mean ERM Quotient without ND			0.29

Noisette Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM Quotient
NOIM000501	MG/KG	14.5000		Arsenic (As)	8.20	70.00	0.21
NOIM000501	MG/KG	0.5100	J	Cadmium (Cd)	1.20	9.60	0.05
NOIM000501	MG/KG	32.3000		Chromium (Cr)	81.00	370.00	0.09
NOIM000501	MG/KG	23.2000		Copper (Cu)	34.00	270.00	0.09
NOIM000501	MG/KG	32.3000		Lead (Pb)	46.70	218.00	0.15
NOIM000501	MG/KG	0.2400		Mercury (Hg)	0.15	0.71	0.34
NOIM000501	MG/KG	10.8000	J	Nickel (Ni)	20.90	51.60	0.21
NOIM000501	MG/KG	1.3000	U	Silver (Ag)	1.00	3.70	0.35
NOIM000501	MG/KG	106.0000		Zinc (Zn)	150.00	410.00	0.26
NOIM000501	UG/KG	7.8900	U	4,4'-DDE	2.20	27.00	0.29
NOIM000501	UG/KG	7.8900	U	4,4'-DDT	1.58	46.10	0.17
NOIM000501	UG/KG	316.7000	U	Total PCBs	22.70	180.00	1.76
NOIM000501	UG/KG	790.0000	U	2-Methylnaphthalene	70.00	670.00	1.18
NOIM000501	UG/KG	790.0000	U	Acenaphthene	16.00	500.00	1.58
NOIM000501	UG/KG	790.0000	U	Acenaphthylene	44.00	640.00	1.23
NOIM000501	UG/KG	790.0000	U	Anthracene	85.30	1100.00	0.72
NOIM000501	UG/KG	170.0000	J	Benzo(a)anthracene	261.00	1600.00	0.11
NOIM000501	UG/KG	230.0000	J	Benzo(a)pyrene	430.00	1600.00	0.14
NOIM000501	UG/KG	190.0000	J	Chrysene	384.00	2800.00	0.07
NOIM000501	UG/KG	790.0000	U	Dibenz(a,h)anthracene	63.40	260.00	3.04
NOIM000501	UG/KG	750.0000	J	Fluoranthene	600.00	5100.00	0.15
NOIM000501	UG/KG	790.0000	U	Fluorene	19.00	540.00	1.46
NOIM000501	UG/KG	790.0000	U	Naphthalene	160.00	2100.00	0.38
NOIM000501	UG/KG	790.0000	U	Phenanthrene	240.00	1500.00	0.53
NOIM000501	UG/KG	660.0000	J	Pyrene	665.00	2600.00	0.25
				ERM Quotient Sum			14.80
NOIM000501				Mean ERM Quotient			0.59
NOIM000501				Mean ERM Quotient without ND			0.08
NOIM000601	MG/KG	1.8000	J	Arsenic (As)	8.20	70.00	0.03
NOIM000601	MG/KG	0.0600	U	Cadmium (Cd)	1.20	9.60	0.01
NOIM000601	MG/KG	4.1000		Chromium (Cr)	81.00	370.00	0.01
NOIM000601	MG/KG	4.1000	J	Copper (Cu)	34.00	270.00	0.02
NOIM000601	MG/KG	6.8000		Lead (Pb)	46.70	218.00	0.03
NOIM000601	MG/KG	0.1400		Mercury (Hg)	0.15	0.71	0.20
NOIM000601	MG/KG	1.4000	J	Nickel (Ni)	20.90	51.60	0.03
NOIM000601	MG/KG	0.7200	U	Silver (Ag)	1.00	3.70	0.19
NOIM000601	MG/KG	26.8000		Zinc (Zn)	150.00	410.00	0.07
NOIM000601	UG/KG	4.2100	U	4,4'-DDE	2.20	27.00	0.16
NOIM000601	UG/KG	4.2100	U	4,4'-DDT	1.58	46.10	0.09
NOIM000601	UG/KG	169.1000	U	Total PCBs	22.70	180.00	0.94
NOIM000601	UG/KG	420.0000	U	2-Methylnaphthalene	70.00	670.00	0.63
NOIM000601	UG/KG	420.0000	U	Acenaphthene	16.00	500.00	0.84
NOIM000601	UG/KG	420.0000	U	Acenaphthylene	44.00	640.00	0.66
NOIM000601	UG/KG	420.0000	U	Anthracene	85.30	1100.00	0.38
NOIM000601	UG/KG	100.0000	J	Benzo(a)anthracene	261.00	1600.00	0.06
NOIM000601	UG/KG	65.0000	J	Benzo(a)pyrene	430.00	1600.00	0.04
NOIM000601	UG/KG	72.0000	J	Chrysene	384.00	2800.00	0.03
NOIM000601	UG/KG	420.0000	U	Dibenz(a,h)anthracene	63.40	260.00	1.62
NOIM000601	UG/KG	180.0000	J	Fluoranthene	600.00	5100.00	0.04
NOIM000601	UG/KG	420.0000	U	Fluorene	19.00	540.00	0.78
NOIM000601	UG/KG	420.0000	U	Naphthalene	160.00	2100.00	0.20
NOIM000601	UG/KG	110.0000	J	Phenanthrene	240.00	1500.00	0.07
NOIM000601	UG/KG	150.0000	J	Pyrene	665.00	2600.00	0.06
				ERM Quotient Sum			7.15
NOIM000601				Mean ERM Quotient			0.29
NOIM000601				Mean ERM Quotient without ND			0.03

Noisette Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM Quotient
NOIM000701	MG/KG	14.7000		Arsenic (As)	8.20	70.00	0.21
NOIM000701	MG/KG	0.2600	J	Cadmium (Cd)	1.20	9.60	0.03
NOIM000701	MG/KG	21.0000	J	Chromium (Cr)	81.00	370.00	0.06
NOIM000701	MG/KG	16.3000		Copper (Cu)	34.00	270.00	0.06
NOIM000701	MG/KG	21.5000		Lead (Pb)	46.70	218.00	0.10
NOIM000701	MG/KG	0.1300		Mercury (Hg)	0.15	0.71	0.18
NOIM000701	MG/KG	6.1000	J	Nickel (Ni)	20.90	51.60	0.12
NOIM000701	MG/KG	0.2500	U	Silver (Ag)	1.00	3.70	0.07
NOIM000701	MG/KG	61.9000	J	Zinc (Zn)	150.00	410.00	0.15
NOIM000701	UG/KG	6.8300	U	4,4'-DDE	2.20	27.00	0.25
NOIM000701	UG/KG	6.8300	U	4,4'-DDT	1.58	46.10	0.15
NOIM000701	UG/KG	274.4000	U	Total PCBs	22.70	180.00	1.52
NOIM000701	UG/KG	690.0000	U	2-Methylnaphthalene	70.00	670.00	1.03
NOIM000701	UG/KG	690.0000	U	Acenaphthene	16.00	500.00	1.38
NOIM000701	UG/KG	690.0000	U	Acenaphthylene	44.00	640.00	1.08
NOIM000701	UG/KG	690.0000	U	Anthracene	85.30	1100.00	0.63
NOIM000701	UG/KG	110.0000	J	Benzo(a)anthracene	261.00	1600.00	0.07
NOIM000701	UG/KG	110.0000	J	Benzo(a)pyrene	430.00	1600.00	0.07
NOIM000701	UG/KG	110.0000	J	Chrysene	384.00	2800.00	0.04
NOIM000701	UG/KG	690.0000	U	Dibenz(a,h)anthracene	63.40	260.00	2.65
NOIM000701	UG/KG	210.0000	J	Fluoranthene	600.00	5100.00	0.04
NOIM000701	UG/KG	690.0000	U	Fluorene	19.00	540.00	1.28
NOIM000701	UG/KG	690.0000	U	Naphthalene	160.00	2100.00	0.33
NOIM000701	UG/KG	690.0000	U	Phenanthrene	240.00	1500.00	0.46
NOIM000701	UG/KG	190.0000	J	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			12.02
NOIM000701				Mean ERM Quotient			0.48
NOIM000701				Mean ERM Quotient without ND			0.05
NOIM000801	MG/KG	19.9000		Arsenic (As)	8.20	70.00	0.28
NOIM000801	MG/KG	0.4000	J	Cadmium (Cd)	1.20	9.60	0.04
NOIM000801	MG/KG	47.4000	J	Chromium (Cr)	81.00	370.00	0.13
NOIM000801	MG/KG	27.9000		Copper (Cu)	34.00	270.00	0.10
NOIM000801	MG/KG	59.1000		Lead (Pb)	46.70	218.00	0.27
NOIM000801	MG/KG	0.2800		Mercury (Hg)	0.15	0.71	0.39
NOIM000801	MG/KG	12.5000	J	Nickel (Ni)	20.90	51.60	0.24
NOIM000801	MG/KG	0.5800	U	Silver (Ag)	1.00	3.70	0.16
NOIM000801	MG/KG	124.0000	J	Zinc (Zn)	150.00	410.00	0.30
NOIM000801	UG/KG	12.8000	U	4,4'-DDE	2.20	27.00	0.47
NOIM000801	UG/KG	12.8000	U	4,4'-DDT	1.58	46.10	0.28
NOIM000801	UG/KG	514.0000	U	Total PCBs	22.70	180.00	2.86
NOIM000801	UG/KG	1300.0000	U	2-Methylnaphthalene	70.00	670.00	1.94
NOIM000801	UG/KG	1300.0000	U	Acenaphthene	16.00	500.00	2.60
NOIM000801	UG/KG	1300.0000	U	Acenaphthylene	44.00	640.00	2.03
NOIM000801	UG/KG	1300.0000	U	Anthracene	85.30	1100.00	1.18
NOIM000801	UG/KG	1300.0000	U	Benzo(a)anthracene	261.00	1600.00	0.81
NOIM000801	UG/KG	1300.0000	U	Benzo(a)pyrene	430.00	1600.00	0.81
NOIM000801	UG/KG	1300.0000	U	Chrysene	384.00	2800.00	0.46
NOIM000801	UG/KG	1300.0000	U	Dibenz(a,h)anthracene	63.40	260.00	5.00
NOIM000801	UG/KG	150.0000	J	Fluoranthene	600.00	5100.00	0.03
NOIM000801	UG/KG	1300.0000	U	Fluorene	19.00	540.00	2.41
NOIM000801	UG/KG	1300.0000	U	Naphthalene	160.00	2100.00	0.62
NOIM000801	UG/KG	1300.0000	U	Phenanthrene	240.00	1500.00	0.87
NOIM000801	UG/KG	130.0000	J	Pyrene	665.00	2600.00	0.05
				ERM Quotient Sum			24.35
NOIM000801				Mean ERM Quotient			0.97
NOIM000801				Mean ERM Quotient without ND			0.07

Noisette Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM Quotient
NOIM000901	MG/KG	7.5000	J	Arsenic (As)	8.20	70.00	0.11
NOIM000901	MG/KG	0.3600	J	Cadmium (Cd)	1.20	9.60	0.04
NOIM000901	MG/KG	22.8000	J	Chromium (Cr)	81.00	370.00	0.06
NOIM000901	MG/KG	31.0000		Copper (Cu)	34.00	270.00	0.11
NOIM000901	MG/KG	62.6000		Lead (Pb)	46.70	218.00	0.29
NOIM000901	MG/KG	0.2100	U	Mercury (Hg)	0.15	0.71	0.30
NOIM000901	MG/KG	6.4000	J	Nickel (Ni)	20.90	51.60	0.12
NOIM000901	MG/KG	0.9000	U	Silver (Ag)	1.00	3.70	0.24
NOIM000901	MG/KG	156.0000	J	Zinc (Zn)	150.00	410.00	0.38
NOIM000901	UG/KG	22.8000	U	4,4'-DDE	2.20	27.00	0.84
NOIM000901	UG/KG	22.8000	U	4,4'-DDT	1.58	46.10	0.49
NOIM000901	UG/KG	915.5000	U	Total PCBs	22.70	180.00	5.09
NOIM000901	UG/KG	2400.0000	U	2-Methylnaphthalene	70.00	670.00	3.58
NOIM000901	UG/KG	2400.0000	U	Acenaphthene	16.00	500.00	4.80
NOIM000901	UG/KG	2400.0000	U	Acenaphthylene	44.00	640.00	3.75
NOIM000901	UG/KG	2400.0000	U	Anthracene	85.30	1100.00	2.18
NOIM000901	UG/KG	2400.0000	U	Benzo(a)anthracene	261.00	1600.00	1.50
NOIM000901	UG/KG	2400.0000	U	Benzo(a)pyrene	430.00	1600.00	1.50
NOIM000901	UG/KG	2400.0000	U	Chrysene	384.00	2800.00	0.86
NOIM000901	UG/KG	2400.0000	U	Dibenz(a,h)anthracene	63.40	260.00	9.23
NOIM000901	UG/KG	560.0000	J	Fluoranthene	600.00	5100.00	0.11
NOIM000901	UG/KG	2400.0000	U	Fluorene	19.00	540.00	4.44
NOIM000901	UG/KG	2400.0000	U	Naphthalene	160.00	2100.00	1.14
NOIM000901	UG/KG	340.0000	J	Phenanthrene	240.00	1500.00	0.23
NOIM000901	UG/KG	410.0000	J	Pyrene	665.00	2600.00	0.16
				ERM Quotient Sum			41.56
NOIM000901				Mean ERM Quotient			1.66
NOIM000901				Mean ERM Quotient without ND			0.06
NOIM001001	MG/KG	5.3000		Arsenic (As)	8.20	70.00	0.08
NOIM001001	MG/KG	0.1000	J	Cadmium (Cd)	1.20	9.60	0.01
NOIM001001	MG/KG	9.2000	J	Chromium (Cr)	81.00	370.00	0.02
NOIM001001	MG/KG	7.5000		Copper (Cu)	34.00	270.00	0.03
NOIM001001	MG/KG	9.4000		Lead (Pb)	46.70	218.00	0.04
NOIM001001	MG/KG	0.0400	U	Mercury (Hg)	0.15	0.71	0.06
NOIM001001	MG/KG	4.7000	J	Nickel (Ni)	20.90	51.60	0.09
NOIM001001	MG/KG	0.2300	U	Silver (Ag)	1.00	3.70	0.06
NOIM001001	MG/KG	36.4000	J	Zinc (Zn)	150.00	410.00	0.09
NOIM001001	UG/KG	4.9300	U	4,4'-DDE	2.20	27.00	0.18
NOIM001001	UG/KG	4.9300	U	4,4'-DDT	1.58	46.10	0.11
NOIM001001	UG/KG	197.9000	U	Total PCBs	22.70	180.00	1.10
NOIM001001	UG/KG	490.0000	U	2-Methylnaphthalene	70.00	670.00	0.73
NOIM001001	UG/KG	490.0000	U	Acenaphthene	16.00	500.00	0.98
NOIM001001	UG/KG	140.0000	J	Acenaphthylene	44.00	640.00	0.22
NOIM001001	UG/KG	200.0000	J	Anthracene	85.30	1100.00	0.18
NOIM001001	**UG/KG**	**2400.0000**	**J**	**Benzo(a)anthracene**	**261.00**	**1600.00**	**1.50**
NOIM001001	UG/KG	1400.0000	J	Benzo(a)pyrene	430.00	1600.00	0.88
NOIM001001	**UG/KG**	**3400.0000**	**J**	**Chrysene**	**384.00**	**2800.00**	**1.21**
NOIM001001	UG/KG	190.0000	J	Dibenz(a,h)anthracene	63.40	260.00	0.73
NOIM001001	UG/KG	4800.0000	J	Fluoranthene	600.00	5100.00	0.94
NOIM001001	UG/KG	490.0000	U	Fluorene	19.00	540.00	0.91
NOIM001001	UG/KG	490.0000	U	Naphthalene	160.00	2100.00	0.23
NOIM001001	UG/KG	310.0000	J	Phenanthrene	240.00	1500.00	0.21
NOIM001001	**UG/KG**	**5100.0000**	**J**	**Pyrene**	**665.00**	**2600.00**	**1.96**
				ERM Quotient Sum			12.55
NOIM001001				Mean ERM Quotient			0.50
NOIM001001				Mean ERM Quotient without ND			0.33

Notes:

ERL = Effects Range-Low
ERM = Effects Range-Median
J = Estimated Number
ND = Not Detected
U = Sample Quantitation Limit
VQUAL = Validation Qualifier
Highlighted cells indicate constituents that exceed the NOAA ER-L.
Bold indicates constituents that exceed the NOAA ER-L and ER-M.

APPENDIX G

ZONE J SHIPYARD CREEK SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0164

ZONE J SHIPYARD CREEK SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT TECHNICAL MEMORANDUM PROGRESS REPORT

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DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA

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1.0 INTRODUCTION

Background

The screening level ecological risk assessment (SLERA) for Shipyard Creek is one part of the Zone J investigation of three water bodies that surround the Charleston Naval Complex (CNC).[1] Each Zone J water body, although part of one dynamic watershed, differs in size, flow, and level of near-shore industrialization. Therefore, it was necessary to segregate the data collected from each water body and assess Shipyard Creek, the Cooper River, and Noisette Creek separately.

For detailed descriptions of each Zone J water body, surrounding land uses, and known locations of near-shore AOC/SWMUs, see Section 1 of the *Zone J Storm Water Effluent Evaluation Report* (EnSafe October 2003), which details storm water discharge points to Shipyard Creek and the other water bodies. It also summarizes findings of previous independent studies conducted in the Charleston Harbor and surrounding tidal creeks, including information on the system's hydrography, physical dynamics, biological communities, contaminants, and toxicity.

Purpose of SLERA and Progress Report

This SLERA evaluates all potential exposure pathways and contaminant migration pathways in Shipyard Creek. It will document the constituents present in the creek's environmental media at concentrations that may pose unacceptable ecological risk. This evaluation will include screening constituents in the following migration pathways: (1) effluent via the storm water drainage system, (2) surface water overland flow, and (3) groundwater discharge into Shipyard Creek. These migration pathways will be evaluated by screening the constituents in storm water drainage system effluent water samples, surface soil samples at SWMUs and AOCs[2] adjacent to (and draining directly into) Shipyard Creek, and groundwater from wells closest to Shipyard Creek. These contaminant migration pathways will be used not only to evaluate the potential for unacceptable risk, but also to identify potential upgradient sources for any unacceptable exposure within Shipyard Creek habitats.

This progress report documents Steps 1 and 2 of EPA's 8-step ecological risk assessment[3] as well as its contaminant of potential concern (COPC) refinement. Its purpose is to provide risk managers with data they need to determine the final list of COPCs and evaluate whether any additional site-specific investigations or remedial alternatives are needed to deal with ecological risk in Shipyard Creek. The Navy will provide screening constituents for the surface water overland flow and groundwater discharge migration pathways; as soon as data are incorporated, this report will need to be revised.

[1] Zone J consists of the Cooper River, Shipyard Creek, and Noisette Creek, which adjoin CNC properties.
[2] Solid waste management units and areas of concern
[3] Screening level problem formulation and exposure estimate and risk calculation

2.0 STEP 1 – SCREENING LEVEL PROBLEM FORMULATION

2.1 Zone J and Shipyard Creek Description

The Charleston Naval Complex (CNC) flanks the western shore of the Cooper River, approximately 6.75 miles upriver from Fort Sumter (Figure 2-1). CNC's 3.75-mile waterfront is dominated by 25 piers and five dry docks; most of its length is protected by a wooden or concrete seawall. Large ships are repaired and maintained all along the industrial areas of CNC. Industrial areas also border Shipyard Creek, with offsite point-source discharges (i.e., National Pollution Discharge Elimination System [NPDES] outfalls) present in this tributary.

Shipyard Creek, a 61-acre drainage creek to the lower Cooper River, is partially inside CNC's southwestern property boundary and receives westerly runoff from the central and southern portions of the base, specifically RFI Zones G, H, and I and easterly runoff from several industrial sources along its eastern border. The estuarine intertidal and subtidal marsh habitat that lines the shore of this half-mile creek equals the size of the open water habitat and has areas of unconsolidated shore and bottom. Marsh vegetation typical of the area consists primarily of cord grass (*Spartina* spp.). The mudflats and scrub-shrub vegetation of the wetland and intertidal zone provide foraging habitat for numerous ecological receptors.

Along the eastern side of the creek are several points of tidal conveyance to and from onshore wetlands and drainage ways at CNC. Fewer such areas were present on the opposite shore which is mainly industrial. The wetlands along the southern shores were also less widespread due to the construction of the shipyard and several industrial piers.

In addition to the cord grass wetland within the creek, riparian vegetation lines both shores; species include southern hackberry, mulberry, wax myrtle, and tallow trees. Numerous wading birds, such as green-backed heron, snowy egret, and great blue heron were observed in or near the creek during site visits. Seagulls, brown pelicans, kingfisher, red-tailed hawks, and osprey also forage in the open waters and nest in surrounding treetops. Boat-tailed grackle and red-wing blackbirds forage throughout the wetland vegetation. Small fish and turtles live in the open water and fiddler crabs abound in the wetland mudflats during low tide. Mammals such

as muskrats, river otter, marsh rabbit, raccoon, and opossum also forage amidst the riparian areas.

2.2 Shipyard Creek Hydrodynamics

Shipyard Creek is a two-mile-long tidal tributary of the lower Cooper River. It borders the southwestern property boundary of the CNC. The lower one-mile segment consists of dredged navigation channels and two turning basins. Estuarine intertidal and subtidal marsh habitat line the eastern shore of the creek and the area around its upstream portion.

Several large industrial facilities and recreational docks line the Shipyard Creek basin. The Cooper River Marina anchors the southern tip of the CNC where Shipyard Creek and the Cooper River converge. Major industrial facilities such as Macalloy and Foster Wheeler dominate the western shore of Shipyard Creek. Chevron Products, Kinder Morgan Bulk Terminal, and Salmon Dredging Corporation help complete the industrial landscape.

2.2.1 Bathymetry

At mean low water (mlw), the water in the approach channel, the entrance channel, and the outer turning basin of Shipyard Creek is about 50 ft deep. The interior channel and the second turning basin are about 44 ft deep at MLW. The total dredged area in Shipyard Creek, as measured from the creek entrance, is about 46 acres; the total open water in Shipyard Creek almost doubles that at approximately 91 acres. Shipyard Creek's tidal marsh area covers roughly 105 acres. The mouth of the creek is about 600 ft wide, with an average depth of 41.7 ft at MLW. In the Cooper River near Shipyard Creek, the Daniel Island Reach is about 43 ft deep at mlw.

2.2.2 Tides and Currents

According to National Oceanic and Atmospheric Administration's (NOAA) tide table, the average tide range in Shipyard Creek is about 5.3 ft, and the spring tide range is 6.1 ft. No published tidal current information is available for Shipyard Creek. The computed average peak current speed at the Shipyard Creek entrance channel is about 0.05 feet per second (fps), based on an estimated tidal prism of 692 acre-ft and a cross-sectional area of 26,600 square feet at mean

sea level (msl). It is evident that Shipyard Creek is a low tidal energy environment because of the small tidal prism compared with its large cross-sectional area.

In contrast to the low current velocity in the Shipyard Creek, the tidal currents in the Cooper River are much stronger. According to NOAA's tidal current table, the average peak ebb current in the Cooper River near the Shipyard Creek entrance is approximately 2.5 fps; the average peak flood current is 0.8 fps. The average peak ebb current in the Daniel Island Reach of the Cooper River is about 3.8 fps and the average peak flood current is 2.2 fps.

2.2.3 Drainage

The Shipyard Creek basin drains approximately 1,157 acres, including the open water and tidal marsh areas. The tidal marsh area covers approximately 105 acres and the open water in the creek at low tide covers about 91 acres, resulting in approximately 961 acres in the total upland drainage area of the Shipyard Creek basin. About 279 acres of the drainage area (about 29 percent of the total upland drainage area) is within the CNC property. The remainder lies in the urban area west of the CNC property. The drainage basin delineation is based on the CNC drainage evaluation (Davis and Floyd, 1998) and U.S. Geological Survey (USGS) quadrangles.

Only five storm water outfalls in the Shipyard Creek basin are within the CNC boundary. Most of the surface drainage to the Shipyard Creek from the CNC is in the form of overland sheet flow. Storm water outfalls are listed in Table 2-1.

Table 2-1
Shipyard Creek Storm Water Outfalls Inventory

Outfall ID	Diameter (inches)	Contributing Drainage Basin Area (acres)	Sample ID
51H	6x4 box	7.822	EFF063
52	ditch	45.92	EFF064 to EFF068
52A	ditch	33.417	EFF069
54	36	5.829	none
54A	15	23.815	none
55	NA	81.08	none
56	NA	38.65	none

A major factor in determining the diluting and flushing capacity of a tidal creek is the quantity (volume and rate) of storm water runoff that enters the creek versus the magnitude of the creek's tidal water exchange. Storm water runoff was estimated for comparison with creek tidal flows. Runoff volume and peak flow rates were estimated for annual average, storm-event average, and larger, more infrequent storm events.

Estimating the runoff required evaluating the area's topography and drainage infrastructure to determine drainage basins, rainfall statistics, and land cover, including impervious surface. These evaluations were carried out for the Shipyard Creek basin. Details and results are presented in the following sections.

2.2.3.1 Land Cover

Using the available GIS coverage for the CNC, the area of impervious cover and open space was computed. Land cover outside the CNC was determined using aerial photographs and USGS quadrangles. The following details land cover in the Shipyard Creek drainage basin.

Industrial	460 acres
Open space	283 acres
Marsh and Wetland	183 acres
High-Density Residential	123 acres
Open water	91 acres

Impervious	14 acres
Gravel Lot	6 acres

2.2.3.2 Tidal Flushing and Dilution Analysis

The estimated volume of the Cooper River water flowing into and out of Shipyard Creek due to tidal action was used to evaluate the flushing capabilities of Shipyard Creek and to evaluate the ambient dilution of storm water discharges. The tidal flow volume, also known as the "tidal prism," is the volume of water in the creek between high and low tides. Based on an average tide range of 5.3 ft and the open water and marsh areas presented in the previous section, the estimated tidal prism is 692 acre-ft. This calculation is based on the assumption that the tidal marsh is about 2 ft below mean high water (mhw). The average tidal flow is computed to be 1,348 cfs and the maximum tidal flow during an average tide will be 2,118 cfs. The tidal prism is about 14 times the total runoff volume from an average storm event in the Shipyard Creek basin, and about 117 times the runoff volume from the CNC during an average storm event. The tidal prism, which enters the Shipyard Creek twice a day, is about 2.4 times the runoff volume from a 2-year, 24-hour storm event in the Shipyard Creek basin and is about the same volume as a 50-year, 24-hour storm runoff.

The estimated Shipyard Creek water volume at MLW is 2,620 acre-ft; water volume at MHW is 3,312 acre-ft. Compared with the tidal prism volume, only about 21 percent of the water in the creek can be flushed out of the system within one tidal cycle (12.4 hours). Approximately 10 tidal cycles, or 5.2 days, will be required to reduce the concentration in the creek to 10 percent of its initial value.

Shipyard Creek Hydrologic and Hydrodynamic Analysis

- The dilution ratio between the total Shipyard Creek runoff and the CNC runoff to Shipyard Creek is about 8.4 to 1.
- The dilution ratio between tidal flow and the CNC runoff to Shipyard Creek during an average storm event is about 117 to 1.
- The dilution ratio between tidal flow and total Shipyard Creek runoff during an average storm event is about 14 to 1.

- Shipyard Creek hydraulics is dominated by the tidal flow over the effects of storm water runoff, except when the storm event is more severe than a 50-year, 24-hour event.
- Shipyard Creek does not have efficient flushing capabilities. It would take more than 5 days to flush out 90 percent of a pollutant spill in the creek.

Shipyard Creek is in a low tidal energy environment. Pollutants move quite slowly in the creek, and suspended solids tend to be deposited in Shipyard Creek due to small current velocity and long hydraulic retention time. The suspended material carried from the Cooper River into Shipyard Creek during a flood tide may also be deposited in the lower reach of Shipyard Creek.

2.3 Development Impacting Shipyard Creek

For this report, potential impacts to Shipyard Creek have been divided into those related to CNC and those related to other industrial activities in the immediate area.

2.3.1 Non-CNC Sources Potentially Impacting Shipyard Creek

The downstream portion of Shipyard Creek is considered a navigable water body, maintained to the USACE-authorized depth of 30 feet below MLW level to give large ships access to ship maintenance service piers on the southwestern shore. According to the USACE, Shipyard Creek can be dredged annually or as needed. The last reported dredging event was in 1996, when dredge spoils are reported to have been discharged onto Daniel Island, a designated upland Dredge Materials Area (DMA) on non-Navy property. The last Shipyard Creek dredge deposited in the Navy's DMA is reported to have been in 1986. As typical in dredged areas, periodic dredging can adversely affect the benthic communities.

A survey of the opposing shoreline indicated several potential non-CNC sources of contamination into the creek, most notably the Macalloy ferrochromium plant near the headwaters of the creek, which operated from the 1940s until 1988. It is now closed and undergoing USEPA-required remediation. The ferrochromium alloy plant operated four surface water discharge points under an NPDES permit issued by SCDHEC. These outfalls discharge

into the headwaters of Shipyard Creek; the permit limits for total chromium and hexavalent chromium had been exceeded repeatedly. On April 30, 1998, SCDHEC issued an emergency order closing Shipyard Creek to the harvesting of all shellfish due to the high concentrations of chromium detected in edible fish tissue. The order was to remain in effect until data show that the estuary's shrimp and crabs are safe for human consumption. This ban has since been lifted from Shipyard Creek.

Several large industrial facilities and recreational docks dominate the Shipyard Creek waters. The CNC lines the eastern shore, and portions of Zones G, H, and I drain to the creek. Currently a marina anchors the southernmost tip of the CNC, at the point where Shipyard Creek and the Cooper River converge. Shipyard Creek, Macalloy, and Foster Wheeler line the creek's western shore. Chevron Products and Kinder Morgan Bulk Terminal help complete the industrial landscape.

- The Macalloy Corporation facility covers 125 acres at the headwaters of Shipyard Creek, into which surface water runoff from the plant flows. The ferrochromium manufacturing facility was operated continuously by various owners from 1941 until 1998, when alloy production ceased. The following wastes were generated from the facility during the ferrochromium manufacturing process: chromium, arsenic, lead, barium, manganese, mercury, and zinc.

- Foster Wheeler Resource Recovery Plant, the largest incinerator of municipal solid waste in South Carolina, provided Charleston Naval Shipyard with most of its process steam from 1989 until the shipyard closed in 1996.

- Chevron Products Co. plant produces lubricants with additives at a plant along the western shore of Shipyard Creek. The plant is a part of the Chevron/Texaco Corporation.

- Kinder Morgan Bulk Terminal, known locally as Shipyard River Terminal (SRT), stores dry and liquid bulk products, including coal and petroleum coke, for shipment. Product can be transported from truck to rail to storage to ship or from ship to storage to truck to rail. The annual capacity for this location is 2,500,000 tons with a design system rate of 2,500 tons/hour for coal and petroleum coke. Storage consists of 250,000 tons open and 50,000 tons covered storage. SRT was modified for the transfer of cement for a dedicated customer. Product is transferred from oceangoing vessels to storage at an average rate of 7,000 tons per working day and product can be transferred from storage to rail cars or trucks at an average rate of 200 tons per hour per loading spout. The annual capacity for cement will be approximately 1,500,000 tons. Two storage domes were constructed to store the cement.

2.3.2 CNC-Related Sources Potentially Impacting Shipyard Creek

Potential CNC sources of COPCs in Shipyard Creek are the upstream and near-shore SWMUs and AOCs, particularly SWMUs [redacted], [redacted], and [redacted] and AOC [redacted] in Zone H, and AOCs [redacted] and [redacted] in Zone I. One of the two dewatering outfalls from the Zone I dredge materials area also discharge into the emergent wetlands along Shipyard Creek. According to the 1998 Davis & Floyd drainage system evaluation report for CNC, the complex consists of 98 delineated drainage basins and associated storm water outfalls. Six of these drainage basins with upland SWMUs/AOCs discharge to Shipyard Creek.

Seven identified storm water outfalls line Shipyard Creek. The following SWMUs and AOCs are associated with a drainage basin discharging to Shipyard Creek: SWMUs [redacted] and [redacted]9 and AOCs [redacted]3, [redacted]4, [redacted], [redacted]7, [redacted], [redacted], [redacted]4, [redacted], [redacted], [redacted].

Additional SWMUs/AOCs may sheet-flow into the water body but have no identified/associated drainage basin. For site descriptions of the above-listed SWMUs/AOCs, see Section 6 of the *Zone J Storm Water Effluent Evaluation Report* (EnSafe October 2002).

Zone H

SWMU 9 is a closed landfill at the southeast end of CNC. Shipyard Creek delineates its southwest boundary and submerges a portion of the site during high tide. Few areas of the site are paved or capped to prevent rainwater infiltration. The following SWMUs and AOCs are in the SWMU 9 boundary.

SWMU 19	A flat, fenced, non-vegetated area used for temporary storage of solid waste before transport offsite.
SWMU 20	Previously a waste disposal/storage area; has minimal vegetative cover and evidence of buried debris.
SWMU 121	Consists of Building 801 (used to collect, sort, and store recyclable material) and a satellite accumulation area (SAA).
AOCs 649-51	Former storage areas for ship repair, painting, and sandblasting supplies; situated in an open, grassy, low-lying area.
AOC 654	A former septic tank and leach field for Building 661; located in the southeast corner of SWMU 9.

Surface and subsurface soils were sampled in these SWMUs/AOCs, except for AOC 651. During the initial stages of the RFI, the evaluation of constituent transfer from soil to groundwater was based on a comparison of the soil data from these SWMUs/AOCs and the shallow groundwater data from the entire SWMU 9 area. Based on surface topography and associated surface water drainage patterns, the most likely receptors for migratory constituents originating in area are Shipyard Creek and its associated wetlands.

Groundwater-to-Surface Water: Contaminants were detected in groundwater associated with SWMU 9. This contaminant migration pathway will be evaluated in detail when the Navy provides groundwater COPCs for this SWMU.

Soil-to-Sediment: Contaminants were detected in soils during the SWMU 9 Remedial Investigation. The potential for these soils to migrate into Shipyard Creek and the surrounding wetlands will be further evaluated when the Navy provides soil COPCs for this SWMU.

SWMU 159, near Building 665 in the south-central portion of Zone H, is a former SAA used for the temporary storage of hazardous materials such as batteries, aerosol cans, and paint. An aboveground storage tank (AST) containing diesel fuel, a can crusher, and scattered debris were also found at this SWMU.

Surface Soil-to-Sediment/Surface Water: A thorough evaluation of this migration pathway will be included once the Navy provides the soil COPCs for this SWMU.

SWMU 196 is the area around Building 1838. Full containers (55-gallon drums to quart cans) of unknown or hazardous contents (paints, solvents, battery acid, and lube oils) were stored around Building 1838. Most were corroded and sitting directly on the ground between the building and the marsh associated with Shipyard Creek. Transformers were also stored in the area; there was no indication as to whether they may contain PCBs. Analytical results for samples from a nearby monitoring well indicated contamination concentrations that required further investigation.

This area is currently being leased by Charleston Public Works, which is using the area northwest of Building 1838 as a pipe lay-down yard. The inside of the building is being used for miscellaneous equipment storage. The areas northeast and east of Building 1838 are covered with open scrub grass and porous gravel. Because this area appears to have contamination issues separate from SWMU 9, it is currently being investigated as a separate waste management area.

Groundwater-to-Surface Water: This pathway will be closely evaluated due to the SWMU's proximity to Shipyard Creek as soon as the Navy provides the groundwater COPCs for this SWMU.

Surface Soil-to-Sediment: This pathway will be fully evaluated as soon as the Navy provides surface soil COPCs for this SWMU.

Zone I

SWMU 12, the former firefighter training area in the southwestern portion of the southern peninsula, is the site where flammable liquids were pumped into a shallow 30' to 50' diameter pit, ignited, and then extinguished with water. Training occurred here between 1966 and 1971; the frequency of training and types of flammable liquids used are not documented. A gravel road and a clearing at the SWMU, which was used infrequently as a construction lay-down yard, are near the former training area's location.

Groundwater-to-Surface Water: This migration pathway will be evaluated when the Navy provides groundwater COPCs.

AOC 689 is the unpaved marina parking area and surrounding marshlands marking the southern tip of the base. The parking lot is currently in use. This site is bounded to the east by Cooper River, to the west by the dredged materials area roads, and to the south by Shipyard Creek. The marina parking area was reportedly used for unauthorized disposal of unknown materials during filling activities. This site also has a potential point-source discharge.

AOC 690, the network of roadways at the southern tip of the base, includes the Lunsford Loop, a portion of Juneau Avenue, and West Road. This site extends along West Road between Zones I and H. The roadside areas along these gravel roads, totaling approximately 4,500 feet, are reported locations of unauthorized hazardous materials dumping by Navy personnel. Petroleum products were suspected materials of concern, although the history of hazardous materials dumping is largely unknown. No groundwater samples were collected at this site; therefore, the groundwater-to-surface-water pathway could not be assessed. However, the site investigation did assess the soil-to-groundwater pathway.

The DMA covers approximately 68 acres at the southern end of the complex. This diked area has received dredging materials from the Cooper River and Shipyard Creek since the 1940s. Several area USACE dike relocation projects are documented in files in the Charleston Division office. Two spillways at the southern portion of the diked area allow deposited sediments to dewater, and then discharges them to Shipyard Creek and the Cooper River.

Soil-to-Sediment: This migration pathway will be fully evaluated when the Navy provides soil COPCs for this SWMU.

2.4 Other Investigations in Shipyard Creek

In August 1988, USEPA submitted a final report on an assessment of sediments from five proposed dredge Charleston Estuary locations to the USACE. This report[4] presented toxicological effects to marine organisms by sediments from proposed dredge locations. Data from only one site (Site 5 in Shipyard Creek) were deemed applicable to the Zone J evaluation.

Ten-day tests with whole sediment and 96-hour tests with the suspended particulate phase identified no effects to lugworms, oysters, shrimp, or mysids from Site 5 sediment. No significant effects were noted based on this toxicity information.

At the same time as the toxicological study, sediment was analyzed at all locations to determine if constituents were accumulating in tissues of environmental receptors (bioaccumulation). Based on information on selected metals in Site 5 sediment, only arsenic and zinc exceeded USEPA Region 4 SVs. Bioaccumulation information indicated that cadmium, mercury, and zinc concentrations were significantly higher in oysters at Site 5 than at a reference location. Mercury, lead, and chromium were also significantly higher in Site 5 shrimp than reference concentrations. In addition lugworms bioaccumulated lead in tissue. For more details, refer to the *Zone J RFI Work Plan (EnSafe/Allen & Hoshall September 1996).*

The comprehensive 1990 Charleston Harbor Study (CHS) detected high chromium concentrations in Shipyard Creek sediments (81.18 mg/kg at the uppermost station). Copper concentrations in Shipyard Creek were also high, exceeding those observed in the Cooper River.

In May 1992, the USACE conducted the Shipyard River New Work Project to collect and analyze soil samples from six CNC sites near Shipyard Creek (the west shoreline of the southern peninsula) to document the suitability of this material for disposal. Specific

[4] *Biological and Chemical Assessment of Sediments from Proposed Dredge Sites in Charleston Harbor*

parameters analyzed were metals (including organotins), volatile organics, and dioxins. Results showed the presence of organotins at all six sampling locations, with the lowest concentrations for tributyltin along the shoreline and within the intertidal area; the highest concentrations were in dry upland soils. Several PAH compounds were identified at stations within the wooded areas; dioxins were detected in soil and sediment from both inland and intertidal areas.

A May 1995 report[5] documented the results of studies conducted to evaluate existing Environmental Monitoring and Assessment Program (EMAP) indicators and develop new indicators of environmental quality for southeastern Atlantic estuaries. At 24 stations throughout the Carolinian Province, physicochemical parameters were measured in addition to sediment contamination, laboratory toxicity tests, bioaccumulation, and fish, shellfish, and benthos abundance. A single station was sampled in Shipyard Creek (SPY) and the tributary was classified as "degraded" based on bulk sediment contamination exceedances of Long and Morgan's (1990) ER-L (effects range-low) values for several metals (arsenic, chromium, copper, lead, manganese, and zinc) and PAH compounds. Also, significant toxicity for sediments from Shipyard Creek was found in both the seed clam toxicity test and Microtox bioassay. However, other toxicity tests with amphipods and mysid shrimp, however, indicated that Shipyard Creek sediments were not toxic to these species.

In bioaccumulation studies on oysters, chromium, zinc, copper, nickel, iron, and manganese tissue concentrations were increased after oyster exposure to Shipyard Creek sediment. Benthic community indices for Shipyard Creek were considerably lower than those found in reference areas.

The findings presented in a 1995 MRRI report[6] evaluated water quality parameters, sediment characteristics, contaminants, and toxicity tests; benthic communities; and nektonic (free-

[5] *EMAP/NS&T Studies in the Carolinian Province: Indicator Testing and Evaluation in Southeastern Estuaries*
[6] *Year One Demonstration Project Studies Conducted in the Carolinian Province: Results and Summaries* (Marine Resource Research Institute, September 1995)

swimming) assemblages conducted at 84 sites from Virginia to Florida. One location in Shipyard Creek was selected as a supplemental station and sampled during the pilot year, 1994.

Although comprehensive sampling was not conducted at the supplemental stations, sediment samples were collected for contaminant analyses, characterization, and toxicity testing. Also, oysters and clams were deployed to determine bioaccumulation rates.

Concentrations of PAHs, pesticides, arsenic, and chromium exceeded NOAA Effect Range-Low (ER-L) values in Shipyard Creek sediments during this sampling program. Based on the classification scheme presented in the MRRI document Shipyard Creek was designated as a "degraded" site.

Survival data for a sediment 10-day solid-phase toxicity test, using the amphipod *Ampelisca abdita*, indicated that Shipyard Creek was not toxic. But when amphipod *A. verrilli* was used, survival rates were significantly lower than they were in the control group and toxicity assays using seed clams, indicating that Shipyard Creek was toxic.

For both clams and oysters, growth was significantly different than it was in control groups. Based on the sediment concentrations, bioaccumulation studies showed elevated concentrations of chromium in oysters deployed in Shipyard Creek. Clam concentrations did not reflect the sediment loads.

The March 1996 *Tidal Creek Project: Interim Report* discussed the results of a 1994 MRRI study to develop information needed to ensure that tidal creek nursery habitats were adequately protected. Twenty-four tidal creeks were sampled for numerous parameters to determine environmental and ecological status and thus provide resource agencies with a baseline against which they could measure their protection policies and programs. Two locations at Shipyard Creek, one each in the upper and lower reaches, were included in this project.

In this report, Shipyard Creek was classified as a "developed-industrial" tidal creek system. Physicochemical attributes in Shipyard Creek were similar to other "developed" creeks studies.

Sediment trace metal concentrations for chromium copper, lead, arsenic, and zinc exceeded NOAA ER-L values in the upper reach of the creek. Arsenic, chromium, lead, and zinc concentrations were higher than the ER-L values in the lower reach. Chromium also exceeded NOAA's effects range-median (ER-M) value in both reaches of the creek. Pesticide concentrations in the creek were insignificant and PAH concentrations were not measured.

Benthic assemblage data did not identify anything unique for Shipyard Creek. Species composition and abundance were similar to the other "developed" creeks studied. Grass shrimp populations in the creek were much lower than in the other four creeks selected for comparison. No relationships were presented for shrimp abundance to contaminant exposure, habitat availability, or water quality regimes.

2.5 Contaminant Fate-and-Transport Mechanisms

The physical and chemical dynamics within the Charleston estuarine system are perhaps the most influential and complicating factors in the overall assessment of Zone J, and probably have a severe effect on contaminant distribution. Contaminants present on upland CNC SWMUs and AOCs could potentially enter Shipyard creek via the following contaminant fate-and-transport mechanisms:

- Sheet flow of soil contaminants into the storm water discharge system and discharge directly into Shipyard Creek at the identified outfalls and discharge points
- Overland flow of soil contaminants directly into the marsh and Shipyard Creek from AOCs and SWMUs that are not drained by the CNC storm water system
- Migration of contaminated groundwater either directly into Shipyard Creek or into the storm water effluent system and then into the creek via the CNC outfalls

CNC contaminant fate-and-transport mechanisms will be re-evaluated as soon as the Navy provides the necessary upland data on surface soils and groundwater to determine whether contaminants could be transported into the Cooper River from CNC sources.

2.6 Complete Exposure Pathways

Three exposure pathways are potentially complete based on the previous investigations conducted at CNC and within Shipyard Creek. These potentially complete exposure pathways will be evaluated in the Shipyard Creek SLERA to identify which contaminants may be present at concentrations causing potentially unacceptable risk for exposed ecological receptors.

- Direct exposure to contaminants dissolved in Shipyard Creek surface water
- Direct exposure to contaminants in Shipyard Creek sediment and surrounding wetlands
- Uptake from ingestion of contaminated surface water, sediments and prey (biota)

3.0 STEP 2 – EXPOSURE ESTIMATE AND RISK CALCULATION

The Shipyard Creek SLERA will evaluate potential risk from all exposure media: surface water (storm water drainage system effluent), groundwater (via the groundwater-to-surface-water pathway), surface soil (via direct runoff from adjacent SWMUs and AOCs), and sediment. The evaluation will be based on direct exposure using the hazard quotient (HQ) method by comparing the maximum concentration of constituents identified in each medium with the applicable reference concentrations and US EPA Region 4 ecological screening values. Based on risk management decisions made by the CNC partnering team, the maximum concentrations will also be compared with a site-specific reference concentration developed for CNC. Region 4 screening values will also be used. These comparisons will be summarized in tables and discussed in the sections below.

3.1 Surface Water Effluent Ecological Effects Evaluation

The storm water effluent samples from seven storm water drainage system locations were included for the Shipyard Creek investigation. Locations are shown on Figure 3-1. Screening was based on the following criteria, as agreed upon by the partnering team:

- Comparison of maximum concentrations of detected constituents and sample quantitation limits (SQLs) with reference effluent concentrations at locations not related to CNC

- Comparison of maximum concentrations of detected constituents and SQLs to EPA Region 4 chronic saltwater ESVs
- Comparison of concentrations of nondetected constituents and SQLs to EPA Region 4 chronic saltwater ESVs
- Evaluation of detection and exceedances frequency for each constituent detected.

Results are presented in Table 3-1.

To determine the potential for unacceptable ecological risk with each exposure pathway, environmental media concentrations will be compared with EPA Region 4's ecological screening values, which are presented in the screening COPC tables. Concentrations below EPA Region 4 ESVs are considered an acceptable level of risk. Therefore, this screen can only be used to determine whether there is a level of risk to ecological receptors that requires no further investigation, or if additional information is needed to fully evaluate the potential for risk within Shipyard Creek.

The US EPA Region 4 saltwater ESVs were derived from Water Quality Criteria documents and represent the chronic ambient water quality criteria values for the protection of aquatic life. These criteria are intended to protect 95% of the species, 95% of the time. Therefore, anytime the maximum concentration of a constituent is less than the USEPA Region 4 ESV, no adverse ecological effect is expected.

3.2 Groundwater-to -Surface Water Ecological Effects Evaluation

To be completed once the Navy provides data.

3.3 Surface Soil Ecological Effects Evaluation

To be completed once the Navy provides data.

3.4 Shipyard Creek Sediment Ecological Effects Evaluation

To date, 48 CNC sediment samples have been collected from Shipyard Creek: 24 collected as part of Zone J RFI, 15 collected from SWMU 9 (a former landfill) as part of the Zone H RFI, and 9 from the headwaters of the Shipyard Creek as part of the ongoing assessment of SWMU 196. The sediment sample locations for Shipyard Creek are shown on Figure 3-2. Table 3-2 summarizes the analytical results.

To identify screening-level COPCs, the maximum exposure point (the highest detected concentration) was compared with the USEPA Region 4 ecological screening values using the hazard quotient (HQ) method. Risk managers can use this method to determine the constituents in Shipyard Creek that do not pose unacceptable levels of risk to the environment.

HQs for Shipyard Creek have been included in Table 3-2 and categorized in Table 3-3 based on constituent types (inorganic, SVOC, VOC, pesticide, or PCB), the availability of an SV for comparison, and whether its inclusion as a COPC is based on a detected concentration or detection limit.

4.0 CONCLUSIONS AND UNCERTAINTIES

As soon as the additional information from the Navy is incorporated into the SLERA the conclusions and uncertainties section will be completed.

Table 3-1
Shipyard Creek SLERA
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections					Sample Quantitation Limits (SQL)		Location of Maximum Detection	Screening Value (SV)	Detections Exceeding SV	Screening HQ	Reference Concentration	COPC Category	COPC Yes / No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
Aluminum	7	7	140	J	930		584.29			EFF068	NSV		NA	3277.67	D	No
Antimony	0	7						*3.8*	*20*		NSV		NA	5.93	C	No
Arsenic	0	7						*2.7*	*10*		36		NA	6.88	C	No
Barium	**7**	**7**	**7.6**	**J**	**100**		**33.80**			**EFF067**	**NSV**		NA	**60.31**	**A**	**Yes**
Beryllium	0	7						*0.3*	*4*		NSV		NA	0.41	C	No
Cadmium	1	7	0.61	J	0.61	J	0.94	*0.5*	*5*	EFF067	9.3	0	0.07	1.29	B, D	No
Calcium	7	7	20000		70000		37571.43			EFF067	NSV		NA	53455.56	A	No*
Chromium	6	7	1.5	J	3.3	J	2.06	*0.7*	*0.7*	EFF068	50	0	0.07	13	B, C	No
Cobalt	0	7						*0.8*	*10*		NSV		NA	2	D	No
Copper	7	7	3.8	J	25		10.26			EFF068	2.9	7	8.62	41.98	A, D	No
Iron	7	7	510		1000		692.86			EFF068	NSV		NA	4134.44	A, D	No
Lead	5	7	2.5	J	7.5		3.86	*2.2*	*5*	EFF068	8.5	0	0.88	33.63	B, D	No
Magnesium	7	7	2500		28000		11700.00			EFF063	NSV	7	NA	49255.56	A	No*
Manganese	**7**	**7**	**16**		**140**		**52.43**			**EFF063**	**NSV**	**7**	NA	**74.52**	**A**	**Yes**
Nickel	2	7	1.3	J	2.6	J	3.90	*1.7*	*40*	EFF068	8.3	0	0.31	5.14	B, D	No
Potassium	7	7	2300		13000		7300.00			EFF068	NSV		NA	23678.89	D	No
Selenium	1	7	5.6	J	5.6	J	3.99	*4.9*	*10*	EFF064	71	0	0.08	NA	B, D	No
Silver	0	7						*1.4*	*10*		0.23	0	NA	2.34	F	No
Sodium	7	7	14000	J	260000		116571.43			EFF067	NSV		NA	395333.33	D	No
Thallium	0	7						*6.3*	*10*		21.3	0	NA	5.77	C	No
Tin	0	7						*4.1*	*50*		NSV		NA	NA	C	No
Vanadium	7	7	2.2	J	5.4	J	3.50			EFF065	NSV		NA	15.59	D	No
Zinc	7	7	18	J	110		56.43			EFF065	86	2	1.28	307.83	A, D	No
Mercury	0	7						*0.1*	*0.1*		0.025	0	NA	NA	C	No
4,4'-DDD	0	7						*0.1*	*0.1*		0.025	0	NA	NA	C	No
4,4'-DDE	0	7						*0.1*	*0.1*		0.14	0	NA	NA	C	No
4,4'-DDT	**0**	**7**						***0.1***	***0.1***		**0.001**	0	NA	**NA**	**F**	**Yes**
Aldrin	0	7						*0.05*	*0.05*		0.13	0	NA	NA	C	No
alpha-BHC	0	7						*0.05*	*0.05*		1400	0	NA	NA	C	No
alpha-Chlordane	**0**	**7**						***0.05***	***0.05***		**0.004**	0	NA	**NA**	**F**	**Yes**
beta-BHC	0	7						*0.05*	*0.05*		NSV		NA	NA	C	No
Chlordane (technical)	**0**	**7**						***0.5***	***0.5***		**0.004**	0	NA	**NA**	**F**	**Yes**
delta-BHC	0	7						*0.05*	*0.05*		NSV		NA	NA	C	No
Dieldrin	**0**	**7**						***0.1***	***0.1***		**0.0019**	0	NA	**NA**	**F**	**Yes**
Endosulfan I	**0**	**7**						***0.05***	***0.05***		**0.0087**	0	NA	**NA**	**F**	**Yes**
Endosulfan II	**0**	**7**						***0.1***	***0.1***		**0.0087**	0	NA	**NA**	**F**	**Yes**
Endosulfan sulfate	0	7						*0.1*	*0.1*		NSV		NA	NA	C	No
Endrin	0	7						*0.1*	*0.1*		0.0023	0	NA	NA	C	No

Table 3-1
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Constituent	Frequency of Detection		Range of Detections					Sample Quantitation Limits (SQL)		Location of Maximum Detection	Screening Value (SV)	Detections Exceeding SV	Screening HQ	Reference Concentration	COPC Category	COPC Yes / No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
Endrin aldehyde	0	7						0.1	0.1		NSV		NA	NA	C	No
Endrin ketone	0	7						0.1	0.1		NSV		NA	NA	C	No
gamma-BHC (Lindane)	0	7						0.05	0.05		0.016	0	NA	NA	C	No
gamma-Chlordane	**0**	**7**						**0.05**	**0.05**		**0.004**	0	NA	**NA**	**F**	**Yes**
Heptachlor	**0**	**7**						**0.05**	**0.05**		**0.0036**	0	NA	**NA**	**F**	**Yes**
Heptachlor epoxide	**0**	**7**						**0.05**	**0.05**		**0.0036**	0	NA	**NA**	**F**	**Yes**
Methoxychlor	0	7						0.5	0.5		NSV		NA	NA	C	No
Toxaphene	**0**	**7**						**5**	**5**		**0.0002**	0	NA	**NA**	**F**	**Yes**
Aroclor-1016	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1221	**0**	**7**						**2**	**2**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1232	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1242	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1248	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1254	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
Aroclor-1260	**0**	**7**						**1**	**1**		**0.03**	0	NA	**NA**	**F**	**Yes**
1,2,4-Trichlorobenzene	0	7						10	10		4.5	0	NA	NA	C	No
1,2-Dichlorobenzene	0	7						10	10		19.7	0	NA	NA	C	No
1,3-Dichlorobenzene	0	7						10	10		28.5	0	NA	NA	C	No
1,4-Dichlorobenzene	0	7						10	10		19.9	0	NA	NA	C	No
2,2'-Oxybis(1-chloropropane)[bis(2-Chloroisopropyl)ether]	0	7						10	10		NSV		NA	NA	C	No
2,4,5-Trichlorophenol	0	7						10	10		NSV		NA	NA	C	No
2,4,6-Trichlorophenol	0	7						10	10		NSV		NA	NA	C	No
2,4-Dichlorophenol	0	7						10	10		NSV		NA	NA	C	No
2,4-Dimethylphenol	0	7						10	10		NSV		NA	NA	C	No
2,4-Dinitrophenol	0	7						50	50		48.5		NA	NA	C	No
2,4-Dinitrotoluene	0	7						10	10		NSV		NA	NA	C	No
2,6-Dinitrotoluene	0	7						10	10		NSV		NA	NA	C	No
2-Chloronaphthalene	0	7						10	10		NSV		NA	NA	C	No
2-Chlorophenol	0	7						10	10		NSV		NA	NA	C	No
2-Methyl-4,6-dinitrophenol	0	7						50	50		NSV		NA	NA	C	No
2-Methylnaphthalene	0	7						10	10		NSV		NA	NA	C	No
2-Methylphenol (o-Cresol)	0	7						10	10		NSV		NA	NA	C	No
2-Nitroaniline	0	7						50	50		NSV		NA	NA	C	No
2-Nitrophenol	0	7						10	10		NSV		NA	NA	C	No
3&4-Methylphenol (m&p-cresol)	0	7						10	10		NSV		NA	NA	C	No
3,3'-Dichlorobenzidine	0	7						20	20		NSV		NA	NA	C	No

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	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
3-Nitroaniline	0	7						*50*	*50*		NSV		NA	NA	C	No
4-Bromophenylphenyl ether	0	7						*10*	*10*		NSV		NA	NA	C	No
4-Chloro-3-methylphenol	0	7						*10*	*10*		NSV		NA	NA	C	No
4-Chloroaniline	0	7						*20*	*20*		NSV		NA	NA	C	No
4-Chlorophenylphenyl ether	0	7						*10*	*10*		NSV		NA	NA	C	No
4-Nitroaniline	0	7						*50*	*50*		NSV		NA	NA	C	No
4-Nitrophenol	0	7						*50*	*50*		71.7	0	NA	NA	C	No
Acenaphthene	0	7						*10*	*10*		9.7	0	NA	NA	C	No
Acenaphthylene	0	7						*10*	*10*		NSV		NA	NA	C	No
Anthracene	0	7						*10*	*10*		NSV		NA	NA	C	No
Benzo(a)anthracene	0	7						*10*	*10*		NSV		NA	NA	C	No
Benzo(a)pyrene	0	7						*10*	*10*		NSV		NA	NA	C	No
Benzo(b)fluoranthene	0	7						*10*	*10*		NSV		NA	NA	C	No
Benzo(g,h,i)perylene	0	7						*10*	*10*		NSV		NA	NA	C	No
Benzo(k)fluoranthene	0	7						*10*	*10*		NSV		NA	NA	C	No
bis(2-Chloroethoxy)methane	0	7						*10*	*10*		NSV		NA	NA	C	No
bis(2-Chloroethyl)ether	0	7						*10*	*10*		NSV		NA	NA	C	No
bis(2-Ethylhexyl)phthalate	0	7						*10*	*10*		NSV		NA	NA	C	No
Butylbenzylphthalate	0	7						*10*	*10*		29.4	0	NA	NA	C	No
Carbazole	0	7						*10*	*10*		NSV		NA	NA	C	No
Chrysene	0	7						*10*	*10*		NSV		NA	NA	C	No
Dibenzo(a,h)anthracene	0	7						*10*	*10*		NSV		NA	NA	C	No
Dibenzofuran	0	7						*10*	*10*		NSV		NA	NA	C	No
Diethylphthalate	0	7						*10*	*10*		75.9	0	NA	NA	C	No
Dimethylphthalate	0	7						*10*	*10*		580	0	NA	NA	C	No
Di-n-butylphthalate	0	7						*10*	*10*		3.4	0	NA	NA	C	No
Di-n-octylphthalate	0	7						*10*	*10*		NSV		NA	NA	C	No
Fluoranthene	0	7						*10*	*10*		1.6	0	NA	NA	C	No
Fluorene	0	7						*10*	*10*		NSV		NA	NA	C	No
Hexachlorobenzene	0	7						*10*	*10*		NSV		NA	NA	C	No
Hexachlorobutadiene	**0**	**7**						***10***	***10***		**0.32**	**0**	NA	**NA**	**F**	**Yes**
Hexachlorocyclopentadiene	**0**	**7**						***10***	***10***		**0.07**	**0**	NA	**NA**	**F**	**Yes**
Hexachloroethane	0	7						*10*	*10*		9.4	0	NA	NA	C	No
Indeno(1,2,3-cd)pyrene	0	7						*10*	*10*		NSV		NA	NA	C	No
Isophorone	0	7						*10*	*10*		129		NA	NA	C	No
Naphthalene	0	7						*10*	*10*		23.5	0	NA	NA	C	No
Nitrobenzene	0	7						*10*	*10*		66.8	0	NA	NA	C	No
n-Nitrosodi-n-propylamine	0	7						*10*	*10*		NSV		NA	NA	C	No

Table 3-1
Shipyard Creek SLERA
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections					Sample Quantitation Limits (SQL)		Location of Maximum Detection	Screening Value (SV)	Detections Exceeding SV	Screening HQ	Reference Concentration	COPC Category	COPC Yes / No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
N-Nitrosodiphenylamine	0	7						*10*	*10*		33000	0	NA	NA	C	No
Pentachlorophenol	**1**	**7**	**14**	**J**	**14**	**J**	**23.43**	***50***	***50***	**EFF067**	**7.9**	**1**	**1.77**	**NA**	**A**	**Yes**
Phenanthrene	0	7						*10*	*10*		NSV		NA	NA	C	No
Phenol	0	7						*10*	*10*		58	0	NA	NA	C	No
Pyrene	0	7						*10*	*10*		NSV		NA	NA	C	No
Cyanide, Total	0	7						*10*	*10*		1	0	NA	16.33	C	No

Notes:

NSV	Notes constituents for which no EPA Region 4 SV or site specific reference concentration is available.
NA	Notes that a screening HQ cannot be calculated (either no SV or constituent was not detected).
Italicized numbers	Indicates U-flagged data that represent the sample quantitation limits (DL) for each constituent.
Contaminant Categories	
A	Max detect greater than EPA Region 4 SV and/or reference concentration.
B	Max detect less than Region 4 SV.
C	Constituent not detected and MDL is either less than EPA Region 4 ESV and reference concentrations or no EPA Region 4 ESV is available. Further analysis provided in text of report.
D	Max detect less than the reference concentration.
E	Constituent detected but no EPA Region 4 SV available.
F	Constituent not detected and MDL exceeds EPA Region 4 SV. Further analysis provided in text of report.
*	Notes a category 4 COPC, which is not being considered a COPC for this SLERA because it is considered to be an essential nutrient and are part of the normal makeup of saltwater.

Table 3-2
Shipyard Creek SLERA
Sediment COPC Screening Table

Parameter	Frequency of Detection	Max Detect	Location of Maximum Conc.	Screening Value (SV)	Max. HQ	# of Samples Exceeding SBV	Range of Non-detects		Retained for Refinement?	Rationale	Parameter
							Min	Max			
Inorganics (mg/kg)											**Inorganics (mg/kg)**
Aluminum	48/48	34,300.0	SYCM016A01	NSV	-	-	-	-	Yes	C	Aluminum
Antimony	9/48	6.9	009M001301	12	0.58	0	0.26 UJ	7.8 U	No	B	Antimony
Arsenic	48/48	22.7	SYCM001701	7.24	3.14	36	-	-	Yes	A	Arsenic
Barium	48/48	122.0	009M001401	NSV	-	-	-	-	Yes	C	Barium
Beryllium	48/48	1.5	SYCM001701	NSV	-	-	-	-	Yes	C	Beryllium
Cadmium	40/48	1.7	009M000801	1	1.70	4	0.7 U	0.03 U	Yes	A	Cadmium
Calcium	48/48	220,000.0	009M000801	NSV	-	-	-	-	Yes	C	Calcium
Chromium	48/48	291.0	009M000401	52.3	5.56	21	-	-	Yes	A	Chromium
Cobalt	48/48	7.6	SYCM016A01	NSV	-	-	-	-	Yes	C	Cobalt
Copper	48/48	228.0	009M000201	18.7	12.19	26	-	-	Yes	A	Copper
Iron	48/48	66,300.0	009M001401	NSV	-	-	-	-	Yes	C	Iron
Lead	44/48	150.0	196M000202	30.2	4.97	11	1.9 U	10.1 U	Yes	A	Lead
Magnesium	48/48	12,300.0	SYCM000701	NSV	-	-	-	-	Yes	C	Magnesium
Manganese	48/48	838.0	SYCM002001	NSV	-	-	-	-	Yes	C	Manganese
Mercury	24/48	0.7	009M000401	0.13	5.31	17	0.02 U	0.17 U	Yes	A	Mercury
Nickel	48/48	37.3	009M000401	15.9	2.35	23	-	-	Yes	A	Nickel
Potassium	48/48	4,390.0	SYCM001401	NSV	-	-	-	-	Yes	C	Potassium
Selenium	27/48	2.9	SYCM002001	NSV	-	-	-	-	Yes	C	Selenium
Silver	7/48	1.4	SYCM002001	2	0.70	0	-	-	No	B	Silver
Sodium	48/48	31,400.0	SYCM002001	NSV	-	-	-	-	Yes	C	Sodium
Thallium	6/48	3.3	SYCM001201	NSV	-	-	-	-	Yes	C	Thallium
Tin	10/33	129.0	196M000201	NSV	-	-	-	-	Yes	C	Tin
Monobutyltin	0/39	-	-	NSV	-	-	1.0 U	50.0 U	Yes	C	Monobutyltin
Dibutyltin	0/39	-	-	NSV	-	-	1.0 U	50 U	Yes	C	Dibutyltin
Tributyltin	0/39	-	-	NSV	-	-	1.0 U	50 U	Yes	C	Tributyltin
Tetrabutyltin	0/24	-	-	NSV	-	-	1.0 U	50 U	Yes	C	Tetrabutyltin
Vanadium	48/48	83.9	SYCM001401	NSV	-	-	-	-	Yes	C	Vanadium
Zinc	48/48	387.0	009M000401	124	3.12	-	-	-	Yes	A	Zinc
SVOCs (µg/kg)											**SVOCs (µg/kg)**
1,2,4-Trichlorobenzene	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	1,2,4-Trichlorobenzene
1,2-Dichlorobenzene	3/48	400.0	-	NSV	-	-			Yes	C	1,2-Dichlorobenzene
1,3-Dichlorobenzene	3/48	830.0	-	NSV	-	-			Yes	C	1,3-Dichlorobenzene
1,4-Dichlorobenzene	5/48	3,900.0	-	NSV	-	-	190 U	18000 U	Yes	C	1,4-Dichlorobenzene
2,2'-oxybis(1-Chloropropane)	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2,2'-oxybis(1-Chloropropane)
2,4,5-Trichlorophenol	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2,4,6-Trichlorophenol
2,4-Dichlorophenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2,4-Dichlorophenol
2,4-Dimethylphenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2,4-Dimethylphenol
2,4-Dinitrophenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2,4-Dinitrophenol
2,4-Dinitrotoluene	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	2,4-Dinitrotoluene
2,6-Dinitrotoluene	0/48	-	-	NSV	-	-	190U	18000 U	Yes	C	2,6-Dinitrotoluene
2-Chloronaphthalene	0/48	-	-	NSV	-	-	190U	18000 U	Yes	C	2-Chloronaphthalene
2-Chlorophenol	0/48	-	-	NSV	-	-	190U	18000 U	Yes	C	2-Chlorophenol
2-Methyl-4,6-Dinitrophenol	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	2-Methyl-4,6-Dinitrophenol
2-Methylnaphthalene	4/48	52.0	196M000101	20.23	2.57	-	70 U	3600 U	Yes	A	2-Methylnaphthalene

Table 3-2
Shipyard Creek SLERA
Sediment COPC Screening Table

Parameter	Frequency of Detection	Max Detect	Location of Maximum Conc.	Screening Value (SV)	Max. HQ	# of Samples Exceeding SBV	Range of Non-detects		Retained for Refinement?	Rationale	Parameter
							Min	Max			
2-Methylphenol (o-Cresol)	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2-Methylphenol (o-Cresol)
2-Nitroaniline	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	2-Nitroaniline
2-Nitrophenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	2-Nitrophenol
3,3'-Dichlorobenzidine	0/48	-	-	NSV	-	-	380U	36000 U	Yes	C	3,3'-Dichlorobenzidine
3-Nitroaniline	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	3-Nitroaniline
4-Bromophenyl-phenylether	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	4-Bromophenyl-phenylether
4-Chloro-3-methylphenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	4-Chloro-3-methylphenol
4-Chloroaniline	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	4-Chloroaniline
4-Chlorophenylphenylether	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	4-Chlorophenylphenylether
4-Methylphenol (p-Cresol)	1/48	49.0	196M000102	NSV	-	-	190 U	18000 U	Yes	C	4-Methylphenol (p-Cresol)
4-Nitroaniline	0/48	-	-	NSV	-	-	960 UJ	91000 U	Yes	C	4-Nitroaniline
4-Nitrophenol	0/48	-	-	NSV	-	-	960 U	91000 U	Yes	C	4-Nitrophenol
Acenaphthene	1/48	230.0	009M001401	6.71	34.28	-	70 U	3600 U	Yes	A	Acenaphthene
Acenaphthylene	5/48	94.0	196M000101	5.87	16.01	-	70 U	3600 U	Yes	A	Acenaphthylene
Aniline	0/39		-	NSV	-	-	190 U	18000 U	Yes	C	Aniline
Anthracene	6/48	110.0	196M000201	46.9	2.35	-	70 U	3600 U	Yes	A	Anthracene
Benzidine	0/15		-	NSV	-	-	960 U	91000 U	Yes	C	Benzidine
Benzo(a)anthracene	15/48	860.0	196M000101	74.8	11.5	-	190 U	18000 U	Yes	A	Benzo(a)anthracene
Benzo(a)pyrene	11/48	1,600.0	196M000101	88.8	18.0	-	190 U	18000 U	Yes	A	Benzo(a)pyrene
Benzo(b)fluoranthene	13/48	270.0	196M000102	NSV	-	-	190 UJ	18000 U	Yes	C	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	9/48	780.0	196M000101	NSV	-	-	190 U	18000 U	Yes	C	Benzo(g,h,i)perylene
Benzo(k)fluoranthene	9/48	870.0	196M000101	NSV	-	-	190 UJ	18000 UJ	Yes	C	Benzo(k)fluoranthene
Benzoic acid	8/48	64.0	196M000101	NSV	-	-	810 U	91000 U	Yes	C	Benzoic acid
Benzyl alcohol	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	Benzyl alcohol
bis(2-Chloroethoxy)methane	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	bis(2-Chloroethyl)ether
bis(2-Ethylhexyl)phthalate (BEHP)	6/48	1,600.0	SYCM000301	182	8.8	-	190 U	18000 U	Yes	A	bis(2-Ethylhexyl)phthalate (BEHP)
Butylbenzylphthalate	1/48	47.0	196M000103	NSV	-	-	190 U	18000 U	Yes	C	Butylbenzylphthalate
Carbazole	0/24	-	-	NSV	-	-	400 U	1600 U	Yes	C	Carbazole
Chrysene	15/48	970.0	196M000101	108	9.0	-	190 U	18000 U	Yes	A	Chrysene
Dibenz(a,h)anthracene	2/48	80.0	196M000103	6.22	12.9	-	190 U	18000 U	Yes	A	Dibenz(a,h)anthracene
Dibenzofuran	1/48	140.0	009M001401	NSV	-	-	190 U	18000 U	Yes	C	Dibenzofuran
Diethylphthalate	2/48	1,400.0	SYCM001401	NSV	-	-	190 U	18000 U	Yes	C	Diethylphthalate
Dimethyl phthalate	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Dimethyl phthalate
Di-n-butylphthalate	10/48	200.0	SYCM000801	NSV	-	-	190 U	18000 U	Yes	C	Di-n-butylphthalate
Di-n-octyl phthalate	1/48	110.0	SYCM002101	NSV	-	-	190 U	18000 U	Yes	C	Di-n-octyl phthalate
Fluoranthene	22/48	9,500.0	009M000401	113	84.1	-	190 UR	1500 U	Yes	A	Fluoranthene
Fluorene	1/48	160.0	009M001401	21.2	7.5	-	70 U	3600 U	Yes	A	Fluorene
Hexachlorobenzene	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Hexachlorobenzene
Hexachlorobutadiene	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Hexachlorobutadiene
Hexachlorocyclopentadiene	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Hexachlorocyclopentadiene
Hexachloroethane	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Hexachloroethane
Indeno(1,2,3-cd)pyrene	8/48	320.0	196M000101	NSV	-	-	190 U	18000 U	Yes	C	Indeno(1,2,3-cd)pyrene
Isophorone	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Isophorone
Naphthalene	9/48	200.0	196M000101	34.6	5.8	-	190 U	18000 U	Yes	A	Naphthalene
Nitrobenzene	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Nitrobenzene
N-Nitrosodimethylamine	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	N-Nitrosodimethylamine

Table 3-2
Shipyard Creek SLERA
Sediment COPC Screening Table

Parameter	Frequency of Detection	Max Detect	Location of Maximum Conc.	Screening Value (SV)	Max. HQ	# of Samples Exceeding SBV	Range of Non-detects		Retained for Refinement?	Rationale	Parameter
							Min	Max			
N-Nitroso-di-n-propylamine	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	N-Nitrosodiphenylamine
Pentachlorophenol	0/48	-	-	NSV	-	-	190 U	18000 U	Yes	C	Pentachlorophenol
Phenanthrene	12/48	170.0	SYCM002001	86.7	2.0	-	190 U	18000 U	Yes	A	Phenanthrene
Phenol	0/48	-	-	NSV	-	-	190 UJ	18000 U	Yes	C	Phenol
Pyrene	18/48	6,400.0	009M000401	153	41.83	-	180 UR	1600 U	Yes	A	Pyrene
Total PAHs	22/48	78,900.0	009M000401	1684	46.85	-	-	-	Yes	A	Total PAHs
Pesticides/PCBs (µg/kg)											**Pesticides/PCBs (µg/kg)**
4,4'-DDD	6/48	91.0	009M000501	3.3	27.58	-	4 U	72 U	Yes	A	4,4'-DDD
4,4'-DDE	12/48	150.0	009M000501	3.3	45.45	-	2 U	72 U	Yes	A	4,4'-DDE
4,4'-DDT	8/48	140.0	009M000501	3.3	42.42	-	4 U	72 U	Yes	A	4,4'-DDT
Aldrin	2/48	18.0	009M000401	NSV	-	-	2 UJ	38 U	Yes	C	Aldrin
alpha-BHC	0/48	-	-	NSV	-	-	2 U	38 U	Yes	C	alpha-BHC
alpha-Chlordane	3/48	29.0	009M001501	1.7	17.06	3	2 U	38 U	Yes	C	alpha-Chlordane
beta-BHC	1/48	7.0	009M000201	NSV	-	-	2 U	38 U	Yes	C	beta-BHC
Chlordane	0/24	-	-	1.7	-	-	40.1 U	160 U	Yes	C	Chlordane
delta-BHC	0/48	-	-	NSV	-	-	2 U	38 U	Yes	C	delta-BHC
Dieldrin	0/48	-	-	3.3	-	-	2 U	70 U	Yes	C	Dieldrin
Endosulfan I	0/48	-	-	NSV	-	-	2 U	38 U	Yes	C	Endosulfan I
Endosulfan II	0/48	-	-	NSV	-	-	4 U	72 U	Yes	C	Endosulfan II
Endosulfan sulfate	0/48	-	-	NSV	-	-	4 U	72 U	Yes	C	Endosulfan sulfate
Endrin	0/48	-	-	3.3	-	-	2 U	72 U	Yes	D	Endrin
Endrin aldehyde	0/48	-	-	3.3	-	-	2 U	72 U	Yes	D	Endrin aldehyde
Endrin ketone	0/48	-	-	3.3	-	-	4 U	72 U	Yes	D	Endrin ketone
gamma-BHC (Lindane)	0/48	-	-	3.3	-	-	2 UJ	38 U	Yes	D	gamma-BHC (Lindane)
gamma-Chlordane	3/48	26.0	009M001501	1.7	15.3	2	2 U	38 U	Yes	A	gamma-Chlordane
Heptachlor	0/48	-	-	NSV	-	-	2 U	38 U	Yes	C	Heptachlor
Heptachlor epoxide	0/48	-	-	NSV	-	-	2 U	38 U	Yes	C	Heptachlor epoxide
Methoxychlor	0/48	-	-	NSV	-	-	20 U	380 U	Yes	C	Methoxychlor
Toxaphene	0/48	-	-	NSV	-	-	80 U	2400 U	Yes	C	Toxaphene
Aroclor-1016	0/48	-	-	33	-	-	20 U	200 U	Yes	D	Aroclor-1016
Aroclor-1221	0/48	-	-	67	-	-	20 U	325 U	Yes	D	Aroclor-1221
Aroclor-1232	0/48	-	-	33	-	-	20 U	200 U	Yes	D	Aroclor-1232
Aroclor-1242	0/48	-	-	33	-	-	20 U	200 U	Yes	D	Aroclor-1242
Aroclor-1248	2/48	3,000.0	009M000401	33	90.91	-	20 U	200 U	Yes	A	Aroclor-1248
Aroclor-1254	4/48	690.0	009M000401	33	20.91	-	20 U	160 U	Yes	A	Aroclor-1254
Aroclor-1260	10/48	890.0	009M001501	33	26.97	-	20 U	160 U	Yes	A	Aroclor-1260
Total PCBs	38/48	4,860.0	009M000401	33	147.27	-	-	-	Yes	A	Total PCBs
VOAs (µg/kg)											**VOAs (µg/kg)**
1,1,1-Trichloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,1,2-Trichloroethane
1,1-Dichloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,1-Dichloroethane
1,1-Dichloroethene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,1-Dichloroethene
1,2-Dichloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,2-Dichloroethane

Table 3-2
Shipyard Creek SLERA
Sediment COPC Screening Table

Parameter	Frequency of Detection	Max Detect	Location of Maximum Conc.	Screening Value (SV)	Max. HQ	# of Samples Exceeding SBV	Range of Non-detects		Retained for Refinement?	Rationale	Parameter
							Min	Max			
1,2-Dichloroethene (total)	0/48	-	-	NSV	-	-	6 U	21 U	Yes	C	1,2-Dichloroethene (total)
1,2-Dichloropropane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	1,2-Dichloropropane
2-Butanone (MEK)	14/48	96.0	SYCM016A01	NSV	-	-	10 U	110 UJ	Yes	C	2-Butanone (MEK)
2-Hexanone	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	2-Hexanone
4-Methyl-2-Pentanone (MIBK)	0/48	-	-	NSV	-	-	10 U	110 U	Yes	C	4-Methyl-2-Pentanone (MIBK)
Acetone	12/48	1,500.0	SYCM002101	NSV	-	-	10 U	390 U	Yes	C	Acetone
Benzene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Benzene
Bromodichloromethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Bromodichloromethane
Bromoform	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Bromoform
Bromomethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Bromomethane
Carbon disulfide	27/48	150.0	009M000301	NSV	-	-	6 U	42 U	Yes	C	Carbon disulfide
Carbon tetrachloride	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Carbon tetrachloride
Chlorobenzene	4/48	10,000.0	196M000202	NSV	-	-	6 U	42 U	Yes	C	Chlorobenzene
Chloroethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Chloroethane
Chloroform	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Chloroform
Chloromethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Chloromethane
cis-1,3-Dichloropropene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	cis-1,3-Dichloropropene
Dibromochloromethane	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Dibromochloromethane
Ethylbenzene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Ethylbenzene
Methylene chloride	1/48	72.0	009M001401	NSV	-	-	6 U	69 U	Yes	C	Methylene chloride
Styrene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Styrene
Tetrachloroethene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Tetrachloroethene
Tetrahydrofuran	0/48	-	-	NSV	-	-	29 U	110 U	Yes	C	Tetrahydrofuran
Toluene	1/48	4.7	009M000701	NSV	-	-	6 U	42 U	Yes	C	Toluene
trans-1,3-Dichloropropene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	trans-1,3-Dichloropropene
Trichloroethene	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Trichloroethene
Trichlorofluoromethane	0/48	-	-	NSV	-	-	6 U	21 U	Yes	C	Trichlorofluoromethane

Table 3-2
Shipyard Creek SLERA
Sediment COPC Screening Table

Parameter	Frequency of Detection	Max Detect	Location of Maximum Conc.	Screening Value (SV)	Max. HQ	# of Samples Exceeding SBV	Range of Non-detects		Retained for Refinement?	Rationale	Parameter
							Min	Max			
Vinyl acetate	0/48	-	-	NSV	-	-	10 U	83 U	Yes	C	Vinyl acetate
Vinyl chloride	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Vinyl chloride
Xylene (Total)	0/48	-	-	NSV	-	-	6 U	42 U	Yes	C	Xylene (Total)

Notes:

NSV	No screening value available.
SV	Screening Value. Sediment screening values for this SLERA were taken from: USEPA. 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published in November 1995. Website version updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecobul.htm
-	Indicates that this column is not applicable to this contaminant.

Rationale for retaining COPCs

A	Maximum detected concentration is greater than Region 4 SV.
B	Maximum detected concentration is less than Region 4 SV.
C	No EPA screening value available for comparison.
D	Minimum detection limit is greater than the screening vaue.

Table 3-3
Shipyard Creek SLERA
Sediment COPC Summary Table

Inorganics		Pesticides and PCBs		SVOCs		VOCs	
Constituents exceeding Screening Values							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Arsenic		4,4'-DDD	Chlordane	2-Methylnaphthalene			
Cadmium		4,4'-DDE	Dieldrin	Acenaphthene			
Chromium		4,4'-DDT	Endrin	Acenaphthylene			
Copper		alpha-Chlordane	Endrin aldehyde	Anthracene			
Lead		gamma-Chlordane	Endrin ketone	Benzo(a)anthracene			
Mercury		Aroclor-1248	gamma-BHC (Lindane)	Benzo(a)pyrene			
Nickel		Aroclor-1254	Aroclor-1016	bis(2-Ethylhexyl)phthalate (BEHP)			
Zinc		Aroclor-1260	Aroclor-1221	Chrysene			
		Total PCBs	Aroclor-1232	Dibenz(a,h)anthracene			
			Aroclor-1242	Fluoranthene			
				Fluorene			
				Naphthalene			
				Phenanthrene			
				Pyrene			
				Total PAHs			
Constituents with No Screening Values							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Aluminum	Monobutyltin	Aldrin	alpha-BHC	1,2-Dichlorobenzene	1,2,4-Trichlorobenzene	2-Butanone (MEK)	1,1,1-Trichloroethane
Barium	Dibutyltin	beta-BHC	delta-BHC	1,3-Dichlorobenzene	2,2'-oxybis(1-Chloropropane)	Acetone	1,1,2,2-Tetrachloroethane
Beryllium	Tributyltin		Endosulfan I	1,4-Dichlorobenzene	2,4,5-Trichlorophenol	Carbon disulfide	1,1,2-Trichloroethane
Calcium	Tetrabutyltin		Endosulfan II	4-Methylphenol (p-Cresol)	2,4,6-Trichlorophenol	Chlorobenzene	1,1-Dichloroethane
Cobalt			Endosulfan sulfate	Benzo(b)fluoranthene	2,4-Dichlorophenol	Methylene chloride	1,1-Dichloroethene
Iron			Heptachlor	Benzo(g,h,i)perylene	2,4-Dimethylphenol	Toluene	1,2-Dichloroethane
Magnesium			Heptachlor epoxide	Benzo(k)fluoranthene	2,4-Dinitrophenol		1,2-Dichloroethene (total)
Manganese			Methoxychlor	Benzoic acid	2,4-Dinitrotoluene		1,2-Dichloropropane
Potassium			Toxaphene	Butylbenzylphthalate	2,6-Dinitrotoluene		2-Hexanone
Selenium				Dibenzofuran	2-Chloronaphthalene		4-Methyl-2-Pentanone (MIBK)
Sodium				Diethylphthalate	2-Chlorophenol		Benzene
Thallium				Dimethylphthalate	2-Methyl-4,6-Dinitrophenol		Bromodichloromethane
Tin				Di-n-octylphthalate	2-Methylphenol (o-Cresol)		Bromoform
Vanadium				Indeno(1,2,3-cd)pyrene	2-Nitroaniline		Bromomethane
				Naphthalene	2-Nitrophenol		Carbon tetrachloride
				N-Nitrosodiphenylamine	3,3'-Dichlorobenzidine		Chloroethane
				Phenol	3-Nitroaniline		Chloroform
				Pyrene	4-Bromophenyl-phenylether		Chloromethane
				Total PAHs	4-Chloro-3-methylphenol		cis-1,3-Dichloropropene
					4-Chloroaniline		Dibromochloromethane
					4-Chlorophenylphenylether		Ethylbenzene
					4-Nitroaniline		Styrene
					4-Nitrophenol		Tetrachloroethene
					Aniline		Tetrahydrofuran
					Benzidine		trans-1,3-Dichloropropene
					Benzyl alcohol		Trichloroethene
					bis(2-Chloroethoxy)methane		Trichlorofluoromethane
					bis(2-Chloroethyl)ether		Vinyl acetate
					Carbazole		Vinyl chloride
					Dimethyl phthalate		Xylene (Total)
					Hexachlorobenzene		
					Hexachlorobutadiene		
					Hexachlorocyclopentadiene		
					Hexachloroethane		
					Isophorone		
					Nitrobenzene		
					N-Nitrosodimethylamine		
					N-Nitroso-di-n-propylamine		
					N-Nitrosodiphenylamine		
					Pentachlorophenol		
					Phenol		

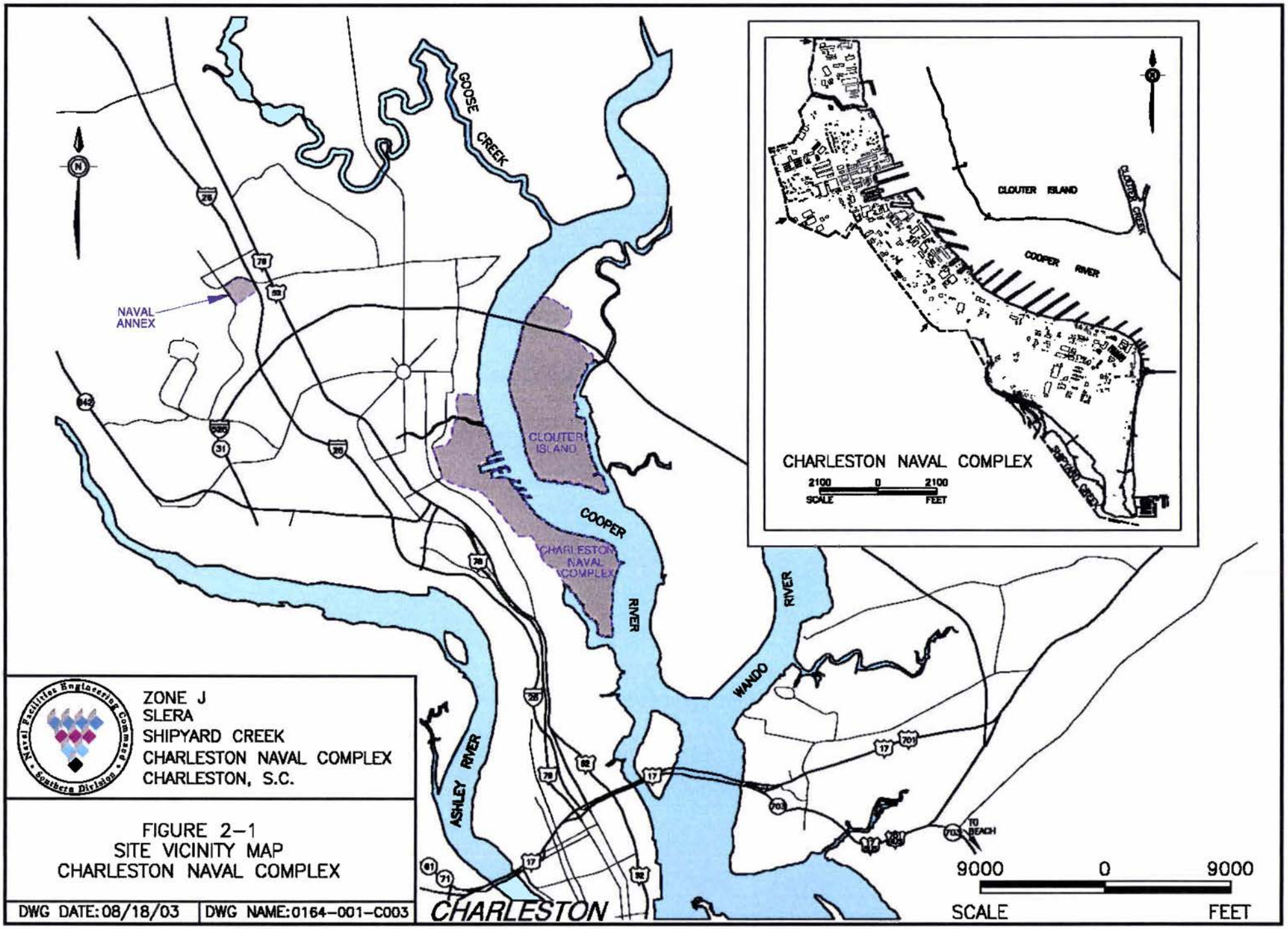
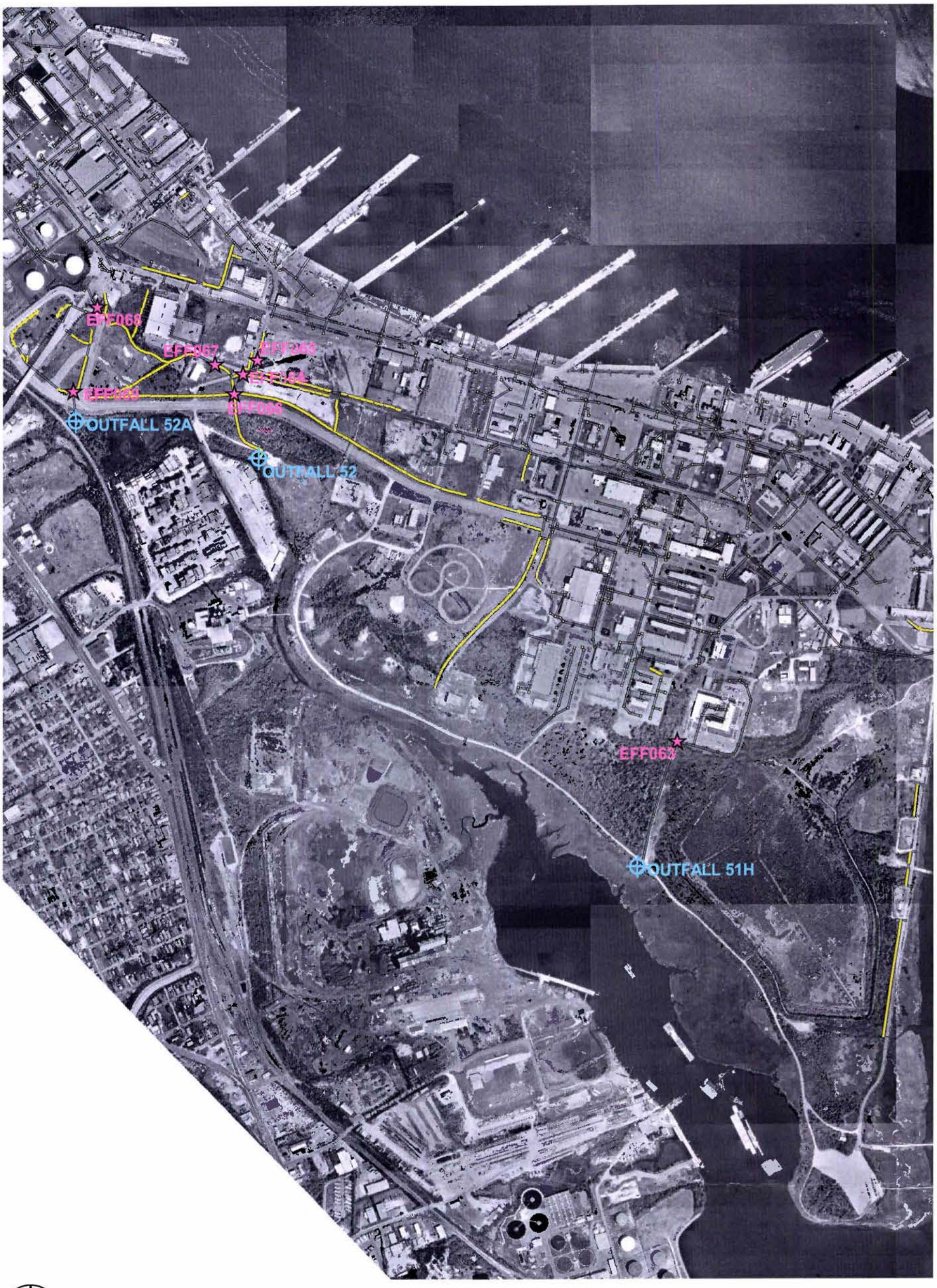


FIGURE 2-1
SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX

DWG DATE: 08/18/03 | DWG NAME: 0164-001-C003



800 0 800 Feet

LEGEND

Shipyard Creek Storm Water Outfall

Shipyard Creek Storm Water Effluent Sample

Storm Water Lines

ZONE-J-CATCH-BASIN

ZONE-J-DRAIN-LINE

ZONE-J-DRAINAGE-DITCH

Zone J SLERA - Shipyard Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 3-1
RFI Storm Water Effluent and Outfall Locations

August 2003 | Zone J Main Project

500 0 500 Feet

LEGEND

- Shipyard Creek SLERA Sediment Locations
- Shoreline
- CNC Perimeter

Zone J SLERA - Shipyard Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 3-2
RFI Sediment Sampling Locations

August 2003	Zone J Main Project

800 0 800 Feet

LEGEND

Shipyard Creek Storm Water Outfall

Shipyard Creek Storm Water Effluent Sample

Storm Water Lines

ZONE-J-CATCH-BASIN

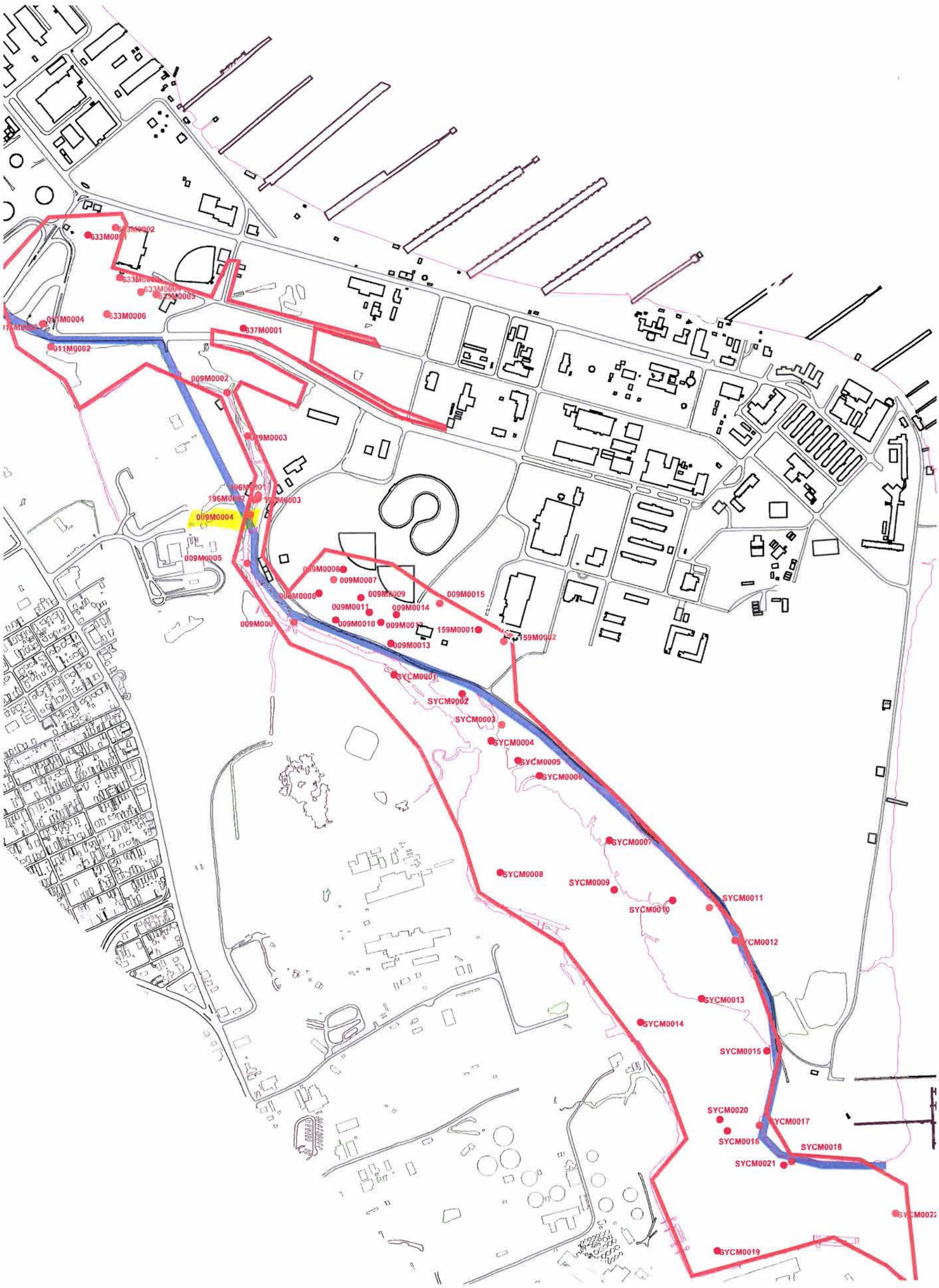
ZONE-J-DRAIN-LINE

ZONE-J-DRAINAGE-DITCH

Zone J SLERA - Shipyard Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 6-3
RFI Storm Water Effluent and Outfall Locations

August 2003 | Zone J Main Project



500 0 500 Feet

LEGEND

- Shipyard Creek SLERA Sediment Locations
- Shoreline
- CNC Perimeter

Zone J SLERA - Shipyard Creek
Charleston Naval Complex
Charleston, South Carolina

Figure 6-4
RFI Sediment Sampling Locations

August 2003	Zone J Main Project

Appendix A

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM000101	MG/KG	13.10		Arsenic (As)	8.20	70.00	0.19
SYCM000101	MG/KG	1.00	J	Cadmium (Cd)	1.20	9.60	0.10
SYCM000101	MG/KG	132.00		Chromium (Cr)	81.00	370.00	0.36
SYCM000101	MG/KG	20.10		Copper (Cu)	34.00	270.00	0.07
SYCM000101	MG/KG	22.90		Lead (Pb)	46.70	218.00	0.11
SYCM000101	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
SYCM000101	MG/KG	27.80		Nickel (Ni)	20.90	51.60	0.54
SYCM000101	MG/KG	0.36	U	Silver (Ag)	1.00	3.70	0.10
SYCM000101	MG/KG	115.00		Zinc (Zn)	150.00	410.00	0.28
SYCM000101	UG/KG	7.69	U	4,4'-DDE	2.20	27.00	0.28
SYCM000101	UG/KG	7.69	U	4,4'-DDT	1.58	46.10	0.17
SYCM000101	UG/KG	308.70	U	Total PCBs	22.70	180.00	1.72
SYCM000101	UG/KG	790.00	U	2-Methylnaphthalene	70.00	670.00	1.18
SYCM000101	UG/KG	790.00	U	Acenaphthene	16.00	500.00	1.58
SYCM000101	UG/KG	790.00	U	Acenaphthylene	44.00	640.00	1.23
SYCM000101	UG/KG	790.00	U	Anthracene	85.30	1100.00	0.72
SYCM000101	UG/KG	790.00	U	Benzo(a)anthracene	261.00	1600.00	0.49
SYCM000101	UG/KG	790.00	U	Benzo(a)pyrene	430.00	1600.00	0.49
SYCM000101	UG/KG	790.00	U	Chrysene	384.00	2800.00	0.28
SYCM000101	UG/KG	790.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.04
SYCM000101	UG/KG	790.00	U	Fluoranthene	600.00	5100.00	0.15
SYCM000101	UG/KG	790.00	U	Fluorene	19.00	540.00	1.46
SYCM000101	UG/KG	790.00	U	Naphthalene	160.00	2100.00	0.38
SYCM000101	UG/KG	790.00	U	Phenanthrene	240.00	1500.00	0.53
SYCM000101	UG/KG	790.00	U	Pyrene	665.00	2600.00	0.30
				ERM Quotient Sum			15.85
SYCM000101				Mean ERM Quotient			0.63
SYCM000101				Mean ERM Quotient without ND			0.07
SYCM000201	MG/KG	12.90		Arsenic (As)	8.20	70.00	0.18
SYCM000201	MG/KG	0.77	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM000201	MG/KG	97.70		Chromium (Cr)	81.00	370.00	0.26
SYCM000201	MG/KG	18.60		Copper (Cu)	34.00	270.00	0.07
SYCM000201	MG/KG	18.00		Lead (Pb)	46.70	218.00	0.08
SYCM000201	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM000201	MG/KG	25.40		Nickel (Ni)	20.90	51.60	0.49
SYCM000201	MG/KG	0.44	J	Silver (Ag)	1.00	3.70	0.12
SYCM000201	MG/KG	89.30		Zinc (Zn)	150.00	410.00	0.22
SYCM000201	UG/KG	7.38	U	4,4'-DDE	2.20	27.00	0.27
SYCM000201	UG/KG	7.38	U	4,4'-DDT	1.58	46.10	0.16
SYCM000201	UG/KG	296.40	U	Total PCBs	22.70	180.00	1.65
SYCM000201	UG/KG	730.00	U	2-Methylnaphthalene	70.00	670.00	1.09
SYCM000201	UG/KG	730.00	U	Acenaphthene	16.00	500.00	1.46
SYCM000201	UG/KG	730.00	U	Acenaphthylene	44.00	640.00	1.14
SYCM000201	UG/KG	730.00	U	Anthracene	85.30	1100.00	0.66
SYCM000201	UG/KG	730.00	U	Benzo(a)anthracene	261.00	1600.00	0.46
SYCM000201	UG/KG	730.00	U	Benzo(a)pyrene	430.00	1600.00	0.46
SYCM000201	UG/KG	730.00	U	Chrysene	384.00	2800.00	0.26
SYCM000201	UG/KG	730.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.81
SYCM000201	UG/KG	730.00	U	Fluoranthene	600.00	5100.00	0.14
SYCM000201	UG/KG	730.00	U	Fluorene	19.00	540.00	1.35
SYCM000201	UG/KG	730.00	U	Naphthalene	160.00	2100.00	0.35
SYCM000201	UG/KG	730.00	U	Phenanthrene	240.00	1500.00	0.49
SYCM000201	UG/KG	730.00	U	Pyrene	665.00	2600.00	0.28
				ERM Quotient Sum			14.62
SYCM000201				Mean ERM Quotient			0.58
SYCM000201				Mean ERM Quotient without ND			0.06

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM000301	MG/KG	13.2u		Arsenic (As)	8.20	70.00	0.19
SYCM000301	MG/KG	0.97	J	Cadmium (Cd)	1.20	9.60	0.10
SYCM000301	MG/KG	53.70		Chromium (Cr)	81.00	370.00	0.15
SYCM000301	MG/KG	14.00		Copper (Cu)	34.00	270.00	0.05
SYCM000301	MG/KG	11.50		Lead (Pb)	46.70	218.00	0.05
SYCM000301	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
SYCM000301	MG/KG	21.50		Nickel (Ni)	20.90	51.60	0.42
SYCM000301	MG/KG	0.49	J	Silver (Ag)	1.00	3.70	0.13
SYCM000301	MG/KG	67.00		Zinc (Zn)	150.00	410.00	0.16
SYCM000301	UG/KG	8.03	U	4,4'-DDE	2.20	27.00	0.30
SYCM000301	UG/KG	8.03	U	4,4'-DDT	1.58	46.10	0.17
SYCM000301	UG/KG	322.40	U	Total PCBs	22.70	180.00	1.79
SYCM000301	UG/KG	800.00	U	2-Methylnaphthalene	70.00	670.00	1.19
SYCM000301	UG/KG	800.00	U	Acenaphthene	16.00	500.00	1.60
SYCM000301	UG/KG	800.00	U	Acenaphthylene	44.00	640.00	1.25
SYCM000301	UG/KG	800.00	U	Anthracene	85.30	1100.00	0.73
SYCM000301	UG/KG	800.00	U	Benzo(a)anthracene	261.00	1600.00	0.50
SYCM000301	UG/KG	800.00	U	Benzo(a)pyrene	430.00	1600.00	0.50
SYCM000301	UG/KG	800.00	U	Chrysene	384.00	2800.00	0.29
SYCM000301	UG/KG	800.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.08
SYCM000301	UG/KG	800.00	U	Fluoranthene	600.00	5100.00	0.16
SYCM000301	UG/KG	800.00	U	Fluorene	19.00	540.00	1.48
SYCM000301	UG/KG	800.00	U	Naphthalene	160.00	2100.00	0.38
SYCM000301	UG/KG	800.00	U	Phenanthrene	240.00	1500.00	0.53
SYCM000301	UG/KG	800.00	U	Pyrene	665.00	2600.00	0.31
				ERM Quotient Sum			15.62
SYCM000301				Mean ERM Quotient			0.62
SYCM000301				Mean ERM Quotient without ND			0.05
SYCM000401	MG/KG	9.40		Arsenic (As)	8.20	70.00	0.13
SYCM000401	MG/KG	0.66	J	Cadmium (Cd)	1.20	9.60	0.07
SYCM000401	MG/KG	79.40		Chromium (Cr)	81.00	370.00	0.21
SYCM000401	MG/KG	10.70		Copper (Cu)	34.00	270.00	0.04
SYCM000401	MG/KG	10.90		Lead (Pb)	46.70	218.00	0.05
SYCM000401	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
SYCM000401	MG/KG	22.00		Nickel (Ni)	20.90	51.60	0.43
SYCM000401	MG/KG	0.38	J	Silver (Ag)	1.00	3.70	0.10
SYCM000401	MG/KG	67.50		Zinc (Zn)	150.00	410.00	0.16
SYCM000401	UG/KG	5.37	U	4,4'-DDE	2.20	27.00	0.20
SYCM000401	UG/KG	5.37	U	4,4'-DDT	1.58	46.10	0.12
SYCM000401	UG/KG	215.60	U	Total PCBs	22.70	180.00	1.20
SYCM000401	UG/KG	530.00	U	2-Methylnaphthalene	70.00	670.00	0.79
SYCM000401	UG/KG	530.00	U	Acenaphthene	16.00	500.00	1.06
SYCM000401	UG/KG	530.00	U	Acenaphthylene	44.00	640.00	0.83
SYCM000401	UG/KG	530.00	U	Anthracene	85.30	1100.00	0.48
SYCM000401	UG/KG	530.00	U	Benzo(a)anthracene	261.00	1600.00	0.33
SYCM000401	UG/KG	530.00	U	Benzo(a)pyrene	430.00	1600.00	0.33
SYCM000401	UG/KG	530.00	U	Chrysene	384.00	2800.00	0.19
SYCM000401	UG/KG	530.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.04
SYCM000401	UG/KG	530.00	U	Fluoranthene	600.00	5100.00	0.10
SYCM000401	UG/KG	530.00	U	Fluorene	19.00	540.00	0.98
SYCM000401	UG/KG	530.00	U	Naphthalene	160.00	2100.00	0.25
SYCM000401	UG/KG	530.00	U	Phenanthrene	240.00	1500.00	0.35
SYCM000401	UG/KG	530.00	U	Pyrene	665.00	2600.00	0.20
				ERM Quotient Sum			10.73
SYCM000401				Mean ERM Quotient			0.43
SYCM000401				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM000501	MG/KG	12.80		Arsenic (As)	8.20	70.00	0.18
SYCM000501	MG/KG	0.80	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM000501	MG/KG	63.40		Chromium (Cr)	81.00	370.00	0.17
SYCM000501	MG/KG	11.90		Copper (Cu)	34.00	270.00	0.04
SYCM000501	MG/KG	10.00		Lead (Pb)	46.70	218.00	0.05
SYCM000501	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM000501	MG/KG	22.30		Nickel (Ni)	20.90	51.60	0.43
SYCM000501	MG/KG	0.29	U	Silver (Ag)	1.00	3.70	0.08
SYCM000501	MG/KG	56.50		Zinc (Zn)	150.00	410.00	0.14
SYCM000501	UG/KG	6.33	U	4,4'-DDE	2.20	27.00	0.23
SYCM000501	UG/KG	6.33	U	4,4'-DDT	1.58	46.10	0.14
SYCM000501	UG/KG	254.40	U	Total PCBs	22.70	180.00	1.41
SYCM000501	UG/KG	630.00	U	2-Methylnaphthalene	70.00	670.00	0.94
SYCM000501	UG/KG	630.00	U	Acenaphthene	16.00	500.00	1.26
SYCM000501	UG/KG	630.00	U	Acenaphthylene	44.00	640.00	0.98
SYCM000501	UG/KG	630.00	U	Anthracene	85.30	1100.00	0.57
SYCM000501	UG/KG	630.00	U	Benzo(a)anthracene	261.00	1600.00	0.39
SYCM000501	UG/KG	630.00	U	Benzo(a)pyrene	430.00	1600.00	0.39
SYCM000501	UG/KG	630.00	U	Chrysene	384.00	2800.00	0.23
SYCM000501	UG/KG	630.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.42
SYCM000501	UG/KG	630.00	U	Fluoranthene	600.00	5100.00	0.12
SYCM000501	UG/KG	630.00	U	Fluorene	19.00	540.00	1.17
SYCM000501	UG/KG	630.00	U	Naphthalene	160.00	2100.00	0.30
SYCM000501	UG/KG	630.00	U	Phenanthrene	240.00	1500.00	0.42
SYCM000501	UG/KG	630.00	U	Pyrene	665.00	2600.00	0.24
				ERM Quotient Sum			12.49
SYCM000501				Mean ERM Quotient			0.50
SYCM000501				Mean ERM Quotient without ND			0.04
SYCM000601	MG/KG	9.10		Arsenic (As)	8.20	70.00	0.13
SYCM000601	MG/KG	0.64	J	Cadmium (Cd)	1.20	9.60	0.07
SYCM000601	MG/KG	50.00		Chromium (Cr)	81.00	370.00	0.14
SYCM000601	MG/KG	13.50		Copper (Cu)	34.00	270.00	0.05
SYCM000601	MG/KG	3.80		Lead (Pb)	46.70	218.00	0.02
SYCM000601	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
SYCM000601	MG/KG	20.90		Nickel (Ni)	20.90	51.60	0.41
SYCM000601	MG/KG	0.22	U	Silver (Ag)	1.00	3.70	0.06
SYCM000601	MG/KG	41.40		Zinc (Zn)	150.00	410.00	0.10
SYCM000601	UG/KG	4.73	U	4,4'-DDE	2.20	27.00	0.18
SYCM000601	UG/KG	4.73	U	4,4'-DDT	1.58	46.10	0.10
SYCM000601	UG/KG	189.90	U	Total PCBs	22.70	180.00	1.06
SYCM000601	UG/KG	470.00	UJ	2-Methylnaphthalene	70.00	670.00	0.70
SYCM000601	UG/KG	470.00	UJ	Acenaphthene	16.00	500.00	0.94
SYCM000601	UG/KG	470.00	UJ	Acenaphthylene	44.00	640.00	0.73
SYCM000601	UG/KG	470.00	UJ	Anthracene	85.30	1100.00	0.43
SYCM000601	UG/KG	470.00	UJ	Benzo(a)anthracene	261.00	1600.00	0.29
SYCM000601	UG/KG	470.00	UJ	Benzo(a)pyrene	430.00	1600.00	0.29
SYCM000601	UG/KG	470.00	UJ	Chrysene	384.00	2800.00	0.17
SYCM000601	UG/KG	470.00	UJ	Dibenz(a,h)anthracene	63.40	260.00	1.81
SYCM000601	UG/KG	470.00	UJ	Fluoranthene	600.00	5100.00	0.09
SYCM000601	UG/KG	470.00	UJ	Fluorene	19.00	540.00	0.87
SYCM000601	UG/KG	470.00	UJ	Naphthalene	160.00	2100.00	0.22
SYCM000601	UG/KG	470.00	UJ	Phenanthrene	240.00	1500.00	0.31
SYCM000601	UG/KG	470.00	UJ	Pyrene	665.00	2600.00	0.18
				ERM Quotient Sum			9.41
SYCM000601				Mean ERM Quotient			0.38
SYCM000601				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM000701	MG/KG	12.80		Arsenic (As)	8.20	70.00	0.18
SYCM000701	MG/KG	0.68	J	Cadmium (Cd)	1.20	9.60	0.07
SYCM000701	MG/KG	76.50		Chromium (Cr)	81.00	370.00	0.21
SYCM000701	MG/KG	23.40		Copper (Cu)	34.00	270.00	0.09
SYCM000701	MG/KG	23.00		Lead (Pb)	46.70	218.00	0.11
SYCM000701	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
SYCM000701	MG/KG	24.30		Nickel (Ni)	20.90	51.60	0.47
SYCM000701	MG/KG	0.38	U	Silver (Ag)	1.00	3.70	0.10
SYCM000701	MG/KG	76.40		Zinc (Zn)	150.00	410.00	0.19
SYCM000701	UG/KG	8.63	U	4,4'-DDE	2.20	27.00	0.32
SYCM000701	UG/KG	8.63	U	4,4'-DDT	1.58	46.10	0.19
SYCM000701	UG/KG	346.40	U	Total PCBs	22.70	180.00	1.92
SYCM000701	UG/KG	870.00	U	2-Methylnaphthalene	70.00	670.00	1.30
SYCM000701	UG/KG	870.00	U	Acenaphthene	16.00	500.00	1.74
SYCM000701	UG/KG	870.00	U	Acenaphthylene	44.00	640.00	1.36
SYCM000701	UG/KG	870.00	U	Anthracene	85.30	1100.00	0.79
SYCM000701	UG/KG	110.00	J	Benzo(a)anthracene	261.00	1600.00	0.07
SYCM000701	UG/KG	870.00	U	Benzo(a)pyrene	430.00	1600.00	0.54
SYCM000701	UG/KG	170.00	J	Chrysene	384.00	2800.00	0.06
SYCM000701	UG/KG	870.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.35
SYCM000701	UG/KG	99.00	J	Fluoranthene	600.00	5100.00	0.02
SYCM000701	UG/KG	870.00	U	Fluorene	19.00	540.00	1.61
SYCM000701	UG/KG	870.00	U	Naphthalene	160.00	2100.00	0.41
SYCM000701	UG/KG	870.00	U	Phenanthrene	240.00	1500.00	0.58
SYCM000701	UG/KG	100.00	J	Pyrene	665.00	2600.00	0.04
				ERM Quotient Sum			15.83
SYCM000701				Mean ERM Quotient			0.63
SYCM000701				Mean ERM Quotient without ND			0.06
SYCM000801	MG/KG	21.60		Arsenic (As)	8.20	70.00	0.31
SYCM000801	MG/KG	0.84	J	Cadmium (Cd)	1.20	9.60	0.09
SYCM000801	MG/KG	63.20	J	Chromium (Cr)	81.00	370.00	0.17
SYCM000801	MG/KG	20.80	J	Copper (Cu)	34.00	270.00	0.08
SYCM000801	MG/KG	27.70	J	Lead (Pb)	46.70	218.00	0.13
SYCM000801	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
SYCM000801	MG/KG	13.70	J	Nickel (Ni)	20.90	51.60	0.27
SYCM000801	MG/KG	2.50	U	Silver (Ag)	1.00	3.70	0.68
SYCM000801	MG/KG	99.30	J	Zinc (Zn)	150.00	410.00	0.24
SYCM000801	UG/KG	16.00	U	4,4'-DDE	2.20	27.00	0.59
SYCM000801	UG/KG	16.00	U	4,4'-DDT	1.58	46.10	0.35
SYCM000801	UG/KG	642.50	U	Total PCBs	22.70	180.00	3.57
SYCM000801	UG/KG	1600.00	U	2-Methylnaphthalene	70.00	670.00	2.39
SYCM000801	UG/KG	1600.00	U	Acenaphthene	16.00	500.00	3.20
SYCM000801	UG/KG	1600.00	U	Acenaphthylene	44.00	640.00	2.50
SYCM000801	UG/KG	1600.00	U	Anthracene	85.30	1100.00	1.45
SYCM000801	UG/KG	1600.00	U	Benzo(a)anthracene	261.00	1600.00	1.00
SYCM000801	UG/KG	1600.00	U	Benzo(a)pyrene	430.00	1600.00	1.00
SYCM000801	UG/KG	1600.00	U	Chrysene	384.00	2800.00	0.57
SYCM000801	UG/KG	1600.00	U	Dibenz(a,h)anthracene	63.40	260.00	6.15
SYCM000801	UG/KG	210.00	J	Fluoranthene	600.00	5100.00	0.04
SYCM000801	UG/KG	1600.00	U	Fluorene	19.00	540.00	2.96
SYCM000801	UG/KG	1600.00	U	Naphthalene	160.00	2100.00	0.76
SYCM000801	UG/KG	1600.00	U	Phenanthrene	240.00	1500.00	1.07
SYCM000801	UG/KG	1600.00	U	Pyrene	665.00	2600.00	0.62
				ERM Quotient Sum			30.42
SYCM000801				Mean ERM Quotient			1.22
SYCM000801				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM000901	MG/KG	13.90		Arsenic (As)	8.20	70.00	0.20
SYCM000901	MG/KG	0.76	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM000901	MG/KG	60.50	J	Chromium (Cr)	81.00	370.00	0.16
SYCM000901	MG/KG	41.90	J	Copper (Cu)	34.00	270.00	0.16
SYCM000901	MG/KG	28.10	J	Lead (Pb)	46.70	218.00	0.13
SYCM000901	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
SYCM000901	MG/KG	10.20	J	Nickel (Ni)	20.90	51.60	0.20
SYCM000901	MG/KG	0.91	U	Silver (Ag)	1.00	3.70	0.25
SYCM000901	MG/KG	94.90	J	Zinc (Zn)	150.00	410.00	0.23
SYCM000901	UG/KG	6.56	U	4,4'-DDE	2.20	27.00	0.24
SYCM000901	UG/KG	6.56	U	4,4'-DDT	1.58	46.10	0.14
SYCM000901	UG/KG	263.30	U	Total PCBs	22.70	180.00	1.46
SYCM000901	UG/KG	660.00	U	2-Methylnaphthalene	70.00	670.00	0.99
SYCM000901	UG/KG	660.00	U	Acenaphthene	16.00	500.00	1.32
SYCM000901	UG/KG	660.00	U	Acenaphthylene	44.00	640.00	1.03
SYCM000901	UG/KG	660.00	U	Anthracene	85.30	1100.00	0.60
SYCM000901	UG/KG	100.00	J	Benzo(a)anthracene	261.00	1600.00	0.06
SYCM000901	UG/KG	110.00	J	Benzo(a)pyrene	430.00	1600.00	0.07
SYCM000901	UG/KG	120.00	J	Chrysene	384.00	2800.00	0.04
SYCM000901	UG/KG	660.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.54
SYCM000901	UG/KG	190.00	J	Fluoranthene	600.00	5100.00	0.04
SYCM000901	UG/KG	660.00	U	Fluorene	19.00	540.00	1.22
SYCM000901	UG/KG	660.00	U	Naphthalene	160.00	2100.00	0.31
SYCM000901	UG/KG	74.00	J	Phenanthrene	240.00	1500.00	0.05
SYCM000901	UG/KG	180.00	J	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			11.69
SYCM000901				Mean ERM Quotient			0.47
SYCM000901				Mean ERM Quotient without ND			0.06

SYCM001001	MG/KG	13.40		Arsenic (As)	8.20	70.00	0.19
SYCM001001	MG/KG	0.73	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM001001	MG/KG	73.10		Chromium (Cr)	81.00	370.00	0.20
SYCM001001	MG/KG	21.00		Copper (Cu)	34.00	270.00	0.08
SYCM001001	MG/KG	21.50		Lead (Pb)	46.70	218.00	0.10
SYCM001001	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
SYCM001001	MG/KG	20.00		Nickel (Ni)	20.90	51.60	0.39
SYCM001001	MG/KG	1.10	J	Silver (Ag)	1.00	3.70	0.30
SYCM001001	MG/KG	87.40		Zinc (Zn)	150.00	410.00	0.21
SYCM001001	UG/KG	7.71	U	4,4'-DDE	2.20	27.00	0.29
SYCM001001	UG/KG	7.71	U	4,4'-DDT	1.58	46.10	0.17
SYCM001001	UG/KG	309.30	U	Total PCBs	22.70	180.00	1.72
SYCM001001	UG/KG	770.00	U	2-Methylnaphthalene	70.00	670.00	1.15
SYCM001001	UG/KG	770.00	U	Acenaphthene	16.00	500.00	1.54
SYCM001001	UG/KG	770.00	U	Acenaphthylene	44.00	640.00	1.20
SYCM001001	UG/KG	770.00	U	Anthracene	85.30	1100.00	0.70
SYCM001001	UG/KG	770.00	U	Benzo(a)anthracene	261.00	1600.00	0.48
SYCM001001	UG/KG	770.00	U	Benzo(a)pyrene	430.00	1600.00	0.48
SYCM001001	UG/KG	770.00	U	Chrysene	384.00	2800.00	0.28
SYCM001001	UG/KG	770.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.96
SYCM001001	UG/KG	770.00	U	Fluoranthene	600.00	5100.00	0.15
SYCM001001	UG/KG	770.00	U	Fluorene	19.00	540.00	1.43
SYCM001001	UG/KG	770.00	U	Naphthalene	160.00	2100.00	0.37
SYCM001001	UG/KG	770.00	U	Phenanthrene	240.00	1500.00	0.51
SYCM001001	UG/KG	770.00	U	Pyrene	665.00	2600.00	0.30
				ERM Quotient Sum			15.35
SYCM001001				Mean ERM Quotient			0.61
SYCM001001				Mean ERM Quotient without ND			0.06

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM001101	MG/KG	6.90		Arsenic (As)	8.20	70.00	0.10
SYCM001101	MG/KG	0.15	J	Cadmium (Cd)	1.20	9.60	0.02
SYCM001101	MG/KG	26.00		Chromium (Cr)	81.00	370.00	0.07
SYCM001101	MG/KG	11.40		Copper (Cu)	34.00	270.00	0.04
SYCM001101	MG/KG	10.60		Lead (Pb)	46.70	218.00	0.05
SYCM001101	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
SYCM001101	MG/KG	6.50	J	Nickel (Ni)	20.90	51.60	0.13
SYCM001101	MG/KG	0.70	J	Silver (Ag)	1.00	3.70	0.19
SYCM001101	MG/KG	39.20		Zinc (Zn)	150.00	410.00	0.10
SYCM001101	UG/KG	5.46	U	4,4'-DDE	2.20	27.00	0.20
SYCM001101	UG/KG	5.46	U	4,4'-DDT	1.58	46.10	0.12
SYCM001101	UG/KG	219.30	U	Total PCBs	22.70	180.00	1.22
SYCM001101	UG/KG	550.00	U	2-Methylnaphthalene	70.00	670.00	0.82
SYCM001101	UG/KG	550.00	U	Acenaphthene	16.00	500.00	1.10
SYCM001101	UG/KG	550.00	U	Acenaphthylene	44.00	640.00	0.86
SYCM001101	UG/KG	550.00	U	Anthracene	85.30	1100.00	0.50
SYCM001101	UG/KG	550.00	U	Benzo(a)anthracene	261.00	1600.00	0.34
SYCM001101	UG/KG	550.00	U	Benzo(a)pyrene	430.00	1600.00	0.34
SYCM001101	UG/KG	550.00	U	Chrysene	384.00	2800.00	0.20
SYCM001101	UG/KG	550.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.12
SYCM001101	UG/KG	550.00	U	Fluoranthene	600.00	5100.00	0.11
SYCM001101	UG/KG	550.00	U	Fluorene	19.00	540.00	1.02
SYCM001101	UG/KG	550.00	U	Naphthalene	160.00	2100.00	0.26
SYCM001101	UG/KG	550.00	U	Phenanthrene	240.00	1500.00	0.37
SYCM001101	UG/KG	550.00	U	Pyrene	665.00	2600.00	0.21
				ERM Quotient Sum			10.54
SYCM001101				Mean ERM Quotient			0.42
SYCM001101				Mean ERM Quotient without ND			0.03
SYCM001201	MG/KG	8.10		Arsenic (As)	8.20	70.00	0.12
SYCM001201	MG/KG	0.56	J	Cadmium (Cd)	1.20	9.60	0.06
SYCM001201	MG/KG	59.20		Chromium (Cr)	81.00	370.00	0.16
SYCM001201	MG/KG	24.10		Copper (Cu)	34.00	270.00	0.09
SYCM001201	MG/KG	17.30		Lead (Pb)	46.70	218.00	0.08
SYCM001201	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM001201	MG/KG	16.50		Nickel (Ni)	20.90	51.60	0.32
SYCM001201	MG/KG	0.31	U	Silver (Ag)	1.00	3.70	0.08
SYCM001201	MG/KG	74.80		Zinc (Zn)	150.00	410.00	0.18
SYCM001201	UG/KG	6.49	U	4,4'-DDE	2.20	27.00	0.24
SYCM001201	UG/KG	6.49	U	4,4'-DDT	1.58	46.10	0.14
SYCM001201	UG/KG	260.70	U	Total PCBs	22.70	180.00	1.45
SYCM001201	UG/KG	650.00	U	2-Methylnaphthalene	70.00	670.00	0.97
SYCM001201	UG/KG	650.00	U	Acenaphthene	16.00	500.00	1.30
SYCM001201	UG/KG	650.00	U	Acenaphthylene	44.00	640.00	1.02
SYCM001201	UG/KG	650.00	U	Anthracene	85.30	1100.00	0.59
SYCM001201	UG/KG	650.00	U	Benzo(a)anthracene	261.00	1600.00	0.41
SYCM001201	UG/KG	650.00	U	Benzo(a)pyrene	430.00	1600.00	0.41
SYCM001201	UG/KG	650.00	U	Chrysene	384.00	2800.00	0.23
SYCM001201	UG/KG	650.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.50
SYCM001201	UG/KG	650.00	U	Fluoranthene	600.00	5100.00	0.13
SYCM001201	UG/KG	650.00	U	Fluorene	19.00	540.00	1.20
SYCM001201	UG/KG	650.00	U	Naphthalene	160.00	2100.00	0.31
SYCM001201	UG/KG	650.00	U	Phenanthrene	240.00	1500.00	0.43
SYCM001201	UG/KG	650.00	U	Pyrene	665.00	2600.00	0.25
				ERM Quotient Sum			12.75
SYCM001201				Mean ERM Quotient			0.51
SYCM001201				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM001301	MG/KG	7.30		Arsenic (As)	8.20	70.00	0.10
SYCM001301	MG/KG	0.28	J	Cadmium (Cd)	1.20	9.60	0.03
SYCM001301	MG/KG	104.00		Chromium (Cr)	81.00	370.00	0.28
SYCM001301	MG/KG	36.50		Copper (Cu)	34.00	270.00	0.14
SYCM001301	MG/KG	36.90		Lead (Pb)	46.70	218.00	0.17
SYCM001301	MG/KG	0.09		Mercury (Hg)	0.15	0.71	0.13
SYCM001301	MG/KG	19.90	J	Nickel (Ni)	20.90	51.60	0.39
SYCM001301	MG/KG	1.40	J	Silver (Ag)	1.00	3.70	0.38
SYCM001301	MG/KG	87.50		Zinc (Zn)	150.00	410.00	0.21
SYCM001301	UG/KG	9.02	U	4,4'-DDE	2.20	27.00	0.33
SYCM001301	UG/KG	9.02	U	4,4'-DDT	1.58	46.10	0.20
SYCM001301	UG/KG	362.10	U	Total PCBs	22.70	180.00	2.01
SYCM001301	UG/KG	890.00	U	2-Methylnaphthalene	70.00	670.00	1.33
SYCM001301	UG/KG	890.00	U	Acenaphthene	16.00	500.00	1.78
SYCM001301	UG/KG	890.00	U	Acenaphthylene	44.00	640.00	1.39
SYCM001301	UG/KG	890.00	U	Anthracene	85.30	1100.00	0.81
SYCM001301	UG/KG	890.00	U	Benzo(a)anthracene	261.00	1600.00	0.56
SYCM001301	UG/KG	890.00	U	Benzo(a)pyrene	430.00	1600.00	0.56
SYCM001301	UG/KG	890.00	U	Chrysene	384.00	2800.00	0.32
SYCM001301	UG/KG	890.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.42
SYCM001301	UG/KG	890.00	U	Fluoranthene	600.00	5100.00	0.17
SYCM001301	UG/KG	890.00	U	Fluorene	19.00	540.00	1.65
SYCM001301	UG/KG	890.00	U	Naphthalene	160.00	2100.00	0.42
SYCM001301	UG/KG	890.00	U	Phenanthrene	240.00	1500.00	0.59
SYCM001301	UG/KG	890.00	U	Pyrene	665.00	2600.00	0.34
				ERM Quotient Sum			17.71
SYCM001301				Mean ERM Quotient			0.71
SYCM001301				Mean ERM Quotient without ND			0.07
SYCM001401	MG/KG	18.80		Arsenic (As)	8.20	70.00	0.27
SYCM001401	MG/KG	0.87	J	Cadmium (Cd)	1.20	9.60	0.09
SYCM001401	MG/KG	57.70	J	Chromium (Cr)	81.00	370.00	0.16
SYCM001401	MG/KG	24.40	J	Copper (Cu)	34.00	270.00	0.09
SYCM001401	MG/KG	27.00	J	Lead (Pb)	46.70	218.00	0.12
SYCM001401	MG/KG	0.14	U	Mercury (Hg)	0.15	0.71	0.20
SYCM001401	MG/KG	17.00	J	Nickel (Ni)	20.90	51.60	0.33
SYCM001401	MG/KG	2.30	U	Silver (Ag)	1.00	3.70	0.62
SYCM001401	MG/KG	102.00	J	Zinc (Zn)	150.00	410.00	0.25
SYCM001401	UG/KG	14.60	U	4,4'-DDE	2.20	27.00	0.54
SYCM001401	UG/KG	14.60	U	4,4'-DDT	1.58	46.10	0.32
SYCM001401	UG/KG	586.00	U	Total PCBs	22.70	180.00	3.26
SYCM001401	UG/KG	1400.00	U	2-Methylnaphthalene	70.00	670.00	2.09
SYCM001401	UG/KG	1400.00	U	Acenaphthene	16.00	500.00	2.80
SYCM001401	UG/KG	1400.00	U	Acenaphthylene	44.00	640.00	2.19
SYCM001401	UG/KG	1400.00	U	Anthracene	85.30	1100.00	1.27
SYCM001401	UG/KG	1400.00	U	Benzo(a)anthracene	261.00	1600.00	0.88
SYCM001401	UG/KG	1400.00	U	Benzo(a)pyrene	430.00	1600.00	0.88
SYCM001401	UG/KG	1400.00	U	Chrysene	384.00	2800.00	0.50
SYCM001401	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.40	260.00	5.38
SYCM001401	UG/KG	1400.00	U	Fluoranthene	600.00	5100.00	0.27
SYCM001401	UG/KG	1400.00	U	Fluorene	19.00	540.00	2.59
SYCM001401	UG/KG	1400.00	U	Naphthalene	160.00	2100.00	0.67
SYCM001401	UG/KG	1400.00	U	Phenanthrene	240.00	1500.00	0.93
SYCM001401	UG/KG	1400.00	U	Pyrene	665.00	2600.00	0.54
				ERM Quotient Sum			27.23
SYCM001401				Mean ERM Quotient			1.09
SYCM001401				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM001501	MG/KG	21.70		Arsenic (As)	8.20	70.00	0.31
SYCM001501	MG/KG	0.35	J	Cadmium (Cd)	1.20	9.60	0.04
SYCM001501	MG/KG	58.20		Chromium (Cr)	81.00	370.00	0.16
SYCM001501	MG/KG	17.30		Copper (Cu)	34.00	270.00	0.06
SYCM001501	MG/KG	20.90		Lead (Pb)	46.70	218.00	0.10
SYCM001501	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
SYCM001501	MG/KG	17.70	J	Nickel (Ni)	20.90	51.60	0.34
SYCM001501	MG/KG	0.78	J	Silver (Ag)	1.00	3.70	0.21
SYCM001501	MG/KG	60.50		Zinc (Zn)	150.00	410.00	0.15
SYCM001501	UG/KG	8.21	U	4,4'-DDE	2.20	27.00	0.30
SYCM001501	UG/KG	8.21	U	4,4'-DDT	1.58	46.10	0.18
SYCM001501	UG/KG	329.80	U	Total PCBs	22.70	180.00	1.83
SYCM001501	UG/KG	820.00	U	2-Methylnaphthalene	70.00	670.00	1.22
SYCM001501	UG/KG	820.00	U	Acenaphthene	16.00	500.00	1.64
SYCM001501	UG/KG	820.00	U	Acenaphthylene	44.00	640.00	1.28
SYCM001501	UG/KG	820.00	U	Anthracene	85.30	1100.00	0.75
SYCM001501	UG/KG	820.00	U	Benzo(a)anthracene	261.00	1600.00	0.51
SYCM001501	UG/KG	820.00	U	Benzo(a)pyrene	430.00	1600.00	0.51
SYCM001501	UG/KG	820.00	U	Chrysene	384.00	2800.00	0.29
SYCM001501	UG/KG	820.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.15
SYCM001501	UG/KG	820.00	U	Fluoranthene	600.00	5100.00	0.16
SYCM001501	UG/KG	820.00	U	Fluorene	19.00	540.00	1.52
SYCM001501	UG/KG	820.00	U	Naphthalene	160.00	2100.00	0.39
SYCM001501	UG/KG	820.00	U	Phenanthrene	240.00	1500.00	0.55
SYCM001501	UG/KG	820.00	U	Pyrene	665.00	2600.00	0.32
				ERM Quotient Sum			16.09
SYCM001501				Mean ERM Quotient			0.64
SYCM001501				Mean ERM Quotient without ND			0.05
SYCM001601	MG/KG	21.00		Arsenic (As)	8.20	70.00	0.30
SYCM001601	MG/KG	0.94	J	Cadmium (Cd)	1.20	9.60	0.10
SYCM001601	MG/KG	48.20	J	Chromium (Cr)	81.00	370.00	0.13
SYCM001601	MG/KG	21.70	J	Copper (Cu)	34.00	270.00	0.08
SYCM001601	MG/KG	27.40	J	Lead (Pb)	46.70	218.00	0.13
SYCM001601	MG/KG	0.13	U	Mercury (Hg)	0.15	0.71	0.18
SYCM001601	MG/KG	13.20	J	Nickel (Ni)	20.90	51.60	0.26
SYCM001601	MG/KG	2.50	U	Silver (Ag)	1.00	3.70	0.68
SYCM001601	MG/KG	91.90	J	Zinc (Zn)	150.00	410.00	0.22
SYCM001601	UG/KG	14.80	U	4,4'-DDE	2.20	27.00	0.55
SYCM001601	UG/KG	14.80	U	4,4'-DDT	1.58	46.10	0.32
SYCM001601	UG/KG	594.00	U	Total PCBs	22.70	180.00	3.30
SYCM001601	UG/KG	1500.00	UJ	2-Methylnaphthalene	70.00	670.00	2.24
SYCM001601	UG/KG	1500.00	UJ	Acenaphthene	16.00	500.00	3.00
SYCM001601	UG/KG	1500.00	UJ	Acenaphthylene	44.00	640.00	2.34
SYCM001601	UG/KG	1500.00	UJ	Anthracene	85.30	1100.00	1.36
SYCM001601	UG/KG	1500.00	UJ	Benzo(a)anthracene	261.00	1600.00	0.94
SYCM001601	UG/KG	1500.00	UJ	Benzo(a)pyrene	430.00	1600.00	0.94
SYCM001601	UG/KG	1500.00	UJ	Chrysene	384.00	2800.00	0.54
SYCM001601	UG/KG	1500.00	UJ	Dibenz(a,h)anthracene	63.40	260.00	5.77
SYCM001601	UG/KG	1500.00	UJ	Fluoranthene	600.00	5100.00	0.29
SYCM001601	UG/KG	1500.00	UJ	Fluorene	19.00	540.00	2.78
SYCM001601	UG/KG	1500.00	UJ	Naphthalene	160.00	2100.00	0.71
SYCM001601	UG/KG	1500.00	UJ	Phenanthrene	240.00	1500.00	1.00
SYCM001601	UG/KG	1500.00	UJ	Pyrene	665.00	2600.00	0.58
				ERM Quotient Sum			28.73
SYCM001601				Mean ERM Quotient			1.15
SYCM001601				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM001701	MG/KG	22.70		Arsenic (As)	8.20	70.00	0.32
SYCM001701	MG/KG	0.19	J	Cadmium (Cd)	1.20	9.60	0.02
SYCM001701	MG/KG	45.20		Chromium (Cr)	81.00	370.00	0.12
SYCM001701	MG/KG	12.90		Copper (Cu)	34.00	270.00	0.05
SYCM001701	MG/KG	22.20		Lead (Pb)	46.70	218.00	0.10
SYCM001701	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM001701	MG/KG	13.90	J	Nickel (Ni)	20.90	51.60	0.27
SYCM001701	MG/KG	0.39	U	Silver (Ag)	1.00	3.70	0.11
SYCM001701	MG/KG	47.60		Zinc (Zn)	150.00	410.00	0.12
SYCM001701	UG/KG	8.29	U	4,4'-DDE	2.20	27.00	0.31
SYCM001701	UG/KG	8.29	U	4,4'-DDT	1.58	46.10	0.18
SYCM001701	UG/KG	332.70	U	Total PCBs	22.70	180.00	1.85
SYCM001701	UG/KG	820.00	U	2-Methylnaphthalene	70.00	670.00	1.22
SYCM001701	UG/KG	820.00	U	Acenaphthene	16.00	500.00	1.64
SYCM001701	UG/KG	820.00	U	Acenaphthylene	44.00	640.00	1.28
SYCM001701	UG/KG	820.00	U	Anthracene	85.30	1100.00	0.75
SYCM001701	UG/KG	820.00	U	Benzo(a)anthracene	261.00	1600.00	0.51
SYCM001701	UG/KG	820.00	U	Benzo(a)pyrene	430.00	1600.00	0.51
SYCM001701	UG/KG	820.00	U	Chrysene	384.00	2800.00	0.29
SYCM001701	UG/KG	820.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.15
SYCM001701	UG/KG	820.00	U	Fluoranthene	600.00	5100.00	0.16
SYCM001701	UG/KG	820.00	U	Fluorene	19.00	540.00	1.52
SYCM001701	UG/KG	820.00	U	Naphthalene	160.00	2100.00	0.39
SYCM001701	UG/KG	820.00	U	Phenanthrene	240.00	1500.00	0.55
SYCM001701	UG/KG	820.00	U	Pyrene	665.00	2600.00	0.32
				ERM Quotient Sum			15.82
SYCM001701				Mean ERM Quotient			0.63
SYCM001701				Mean ERM Quotient without ND			0.04

SYCM001801	MG/KG	11.50		Arsenic (As)	8.20	70.00	0.16
SYCM001801	MG/KG	0.59	J	Cadmium (Cd)	1.20	9.60	0.06
SYCM001801	MG/KG	37.10		Chromium (Cr)	81.00	370.00	0.10
SYCM001801	MG/KG	61.80		Copper (Cu)	34.00	270.00	0.23
SYCM001801	MG/KG	10.50		Lead (Pb)	46.70	218.00	0.05
SYCM001801	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
SYCM001801	MG/KG	8.30	J	Nickel (Ni)	20.90	51.60	0.16
SYCM001801	MG/KG	0.18	U	Silver (Ag)	1.00	3.70	0.05
SYCM001801	MG/KG	30.90		Zinc (Zn)	150.00	410.00	0.08
SYCM001801	UG/KG	4.01	U	4,4'-DDE	2.20	27.00	0.15
SYCM001801	UG/KG	4.01	U	4,4'-DDT	1.58	46.10	0.09
SYCM001801	UG/KG	161.00	U	Total PCBs	22.70	180.00	0.89
SYCM001801	UG/KG	400.00	U	2-Methylnaphthalene	70.00	670.00	0.60
SYCM001801	UG/KG	400.00	U	Acenaphthene	16.00	500.00	0.80
SYCM001801	UG/KG	400.00	U	Acenaphthylene	44.00	640.00	0.63
SYCM001801	UG/KG	400.00	U	Anthracene	85.30	1100.00	0.36
SYCM001801	UG/KG	92.00	J	Benzo(a)anthracene	261.00	1600.00	0.06
SYCM001801	UG/KG	75.00	J	Benzo(a)pyrene	430.00	1600.00	0.05
SYCM001801	UG/KG	110.00	J	Chrysene	384.00	2800.00	0.04
SYCM001801	UG/KG	400.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.54
SYCM001801	UG/KG	160.00	J	Fluoranthene	600.00	5100.00	0.03
SYCM001801	UG/KG	400.00	U	Fluorene	19.00	540.00	0.74
SYCM001801	UG/KG	400.00	U	Naphthalene	160.00	2100.00	0.19
SYCM001801	UG/KG	83.00	J	Phenanthrene	240.00	1500.00	0.06
SYCM001801	UG/KG	160.00	J	Pyrene	665.00	2600.00	0.06
				ERM Quotient Sum			7.22
SYCM001801				Mean ERM Quotient			0.29
SYCM001801				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM001901	MG/KG	21.70		Arsenic (As)	8.20	70.00	0.31
SYCM001901	MG/KG	0.84	J	Cadmium (Cd)	1.20	9.60	0.09
SYCM001901	MG/KG	52.40	J	Chromium (Cr)	81.00	370.00	0.14
SYCM001901	MG/KG	21.30	J	Copper (Cu)	34.00	270.00	0.08
SYCM001901	MG/KG	28.60	J	Lead (Pb)	46.70	218.00	0.13
SYCM001901	MG/KG	0.16	U	Mercury (Hg)	0.15	0.71	0.23
SYCM001901	MG/KG	14.40	J	Nickel (Ni)	20.90	51.60	0.28
SYCM001901	MG/KG	2.50	U	Silver (Ag)	1.00	3.70	0.68
SYCM001901	MG/KG	103.00	J	Zinc (Zn)	150.00	410.00	0.25
SYCM001901	UG/KG	15.30	U	4,4'-DDE	2.20	27.00	0.57
SYCM001901	UG/KG	15.30	U	4,4'-DDT	1.58	46.10	0.33
SYCM001901	UG/KG	614.50	U	Total PCBs	22.70	180.00	3.41
SYCM001901	UG/KG	1500.00	U	2-Methylnaphthalene	70.00	670.00	2.24
SYCM001901	UG/KG	1500.00	U	Acenaphthene	16.00	500.00	3.00
SYCM001901	UG/KG	1500.00	U	Acenaphthylene	44.00	640.00	2.34
SYCM001901	UG/KG	1500.00	U	Anthracene	85.30	1100.00	1.36
SYCM001901	UG/KG	1500.00	U	Benzo(a)anthracene	261.00	1600.00	0.94
SYCM001901	UG/KG	1500.00	U	Benzo(a)pyrene	430.00	1600.00	0.94
SYCM001901	UG/KG	1500.00	U	Chrysene	384.00	2800.00	0.54
SYCM001901	UG/KG	1500.00	U	Dibenz(a,h)anthracene	63.40	260.00	5.77
SYCM001901	UG/KG	1500.00	U	Fluoranthene	600.00	5100.00	0.29
SYCM001901	UG/KG	1500.00	U	Fluorene	19.00	540.00	2.78
SYCM001901	UG/KG	1500.00	U	Naphthalene	160.00	2100.00	0.71
SYCM001901	UG/KG	1500.00	U	Phenanthrene	240.00	1500.00	1.00
SYCM001901	UG/KG	1500.00	U	Pyrene	665.00	2600.00	0.58
				ERM Quotient Sum			28.98
SYCM001901				Mean ERM Quotient			1.16
SYCM001901				Mean ERM Quotient without ND			0.05
SYCM002001	MG/KG	20.60		Arsenic (As)	8.20	70.00	0.29
SYCM002001	MG/KG	0.17	U	Cadmium (Cd)	1.20	9.60	0.02
SYCM002001	MG/KG	53.40	J	Chromium (Cr)	81.00	370.00	0.14
SYCM002001	MG/KG	18.30	J	Copper (Cu)	34.00	270.00	0.07
SYCM002001	MG/KG	22.50		Lead (Pb)	46.70	218.00	0.10
SYCM002001	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
SYCM002001	MG/KG	14.40	J	Nickel (Ni)	20.90	51.60	0.28
SYCM002001	MG/KG	1.40	UJ	Silver (Ag)	1.00	3.70	0.38
SYCM002001	MG/KG	76.50		Zinc (Zn)	150.00	410.00	0.19
SYCM002001	UG/KG	15.60	UJ	4,4'-DDE	2.20	27.00	0.58
SYCM002001	UG/KG	15.60	UJ	4,4'-DDT	1.58	46.10	0.34
SYCM002001	UG/KG	624.00	U	Total PCBs	22.70	180.00	3.47
SYCM002001	UG/KG	1600.00	U	2-Methylnaphthalene	70.00	670.00	2.39
SYCM002001	UG/KG	1600.00	U	Acenaphthene	16.00	500.00	3.20
SYCM002001	UG/KG	1600.00	U	Acenaphthylene	44.00	640.00	2.50
SYCM002001	UG/KG	1600.00	U	Anthracene	85.30	1100.00	1.45
SYCM002001	UG/KG	1600.00	U	Benzo(a)anthracene	261.00	1600.00	1.00
SYCM002001	UG/KG	1600.00	U	Benzo(a)pyrene	430.00	1600.00	1.00
SYCM002001	UG/KG	180.00	J	Chrysene	384.00	2800.00	0.06
SYCM002001	UG/KG	1600.00	U	Dibenz(a,h)anthracene	63.40	260.00	6.15
SYCM002001	UG/KG	350.00	J	Fluoranthene	600.00	5100.00	0.07
SYCM002001	UG/KG	1600.00	U	Fluorene	19.00	540.00	2.96
SYCM002001	UG/KG	1600.00	U	Naphthalene	160.00	2100.00	0.76
SYCM002001	UG/KG	170.00	J	Phenanthrene	240.00	1500.00	0.11
SYCM002001	UG/KG	250.00	J	Pyrene	665.00	2600.00	0.10
				ERM Quotient Sum			27.86
SYCM002001				Mean ERM Quotient			1.11
SYCM002001				Mean ERM Quotient without ND			0.06

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM002101	MG/KG	13.70		Arsenic (As)	8.20	70.00	0.20
SYCM002101	MG/KG	0.08	J	Cadmium (Cd)	1.20	9.60	0.01
SYCM002101	MG/KG	40.20	J	Chromium (Cr)	81.00	370.00	0.11
SYCM002101	MG/KG	11.30		Copper (Cu)	34.00	270.00	0.04
SYCM002101	MG/KG	17.50		Lead (Pb)	46.70	218.00	0.08
SYCM002101	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM002101	MG/KG	14.50		Nickel (Ni)	20.90	51.60	0.28
SYCM002101	MG/KG	0.50	UJ	Silver (Ag)	1.00	3.70	0.14
SYCM002101	MG/KG	43.20		Zinc (Zn)	150.00	410.00	0.11
SYCM002101	UG/KG	5.51	UJ	4,4'-DDE	2.20	27.00	0.20
SYCM002101	UG/KG	5.51	UJ	4,4'-DDT	1.58	46.10	0.12
SYCM002101	UG/KG	220.30	U	Total PCBs	22.70	180.00	1.22
SYCM002101	UG/KG	550.00	U	2-Methylnaphthalene	70.00	670.00	0.82
SYCM002101	UG/KG	550.00	U	Acenaphthene	16.00	500.00	1.10
SYCM002101	UG/KG	550.00	U	Acenaphthylene	44.00	640.00	0.86
SYCM002101	UG/KG	550.00	U	Anthracene	85.30	1100.00	0.50
SYCM002101	UG/KG	68.00	J	Benzo(a)anthracene	261.00	1600.00	0.04
SYCM002101	UG/KG	60.00	J	Benzo(a)pyrene	430.00	1600.00	0.04
SYCM002101	UG/KG	74.00	J	Chrysene	384.00	2800.00	0.03
SYCM002101	UG/KG	550.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.12
SYCM002101	UG/KG	71.00	J	Fluoranthene	600.00	5100.00	0.01
SYCM002101	UG/KG	550.00	U	Fluorene	19.00	540.00	1.02
SYCM002101	UG/KG	550.00	U	Naphthalene	160.00	2100.00	0.26
SYCM002101	UG/KG	550.00	U	Phenanthrene	240.00	1500.00	0.37
SYCM002101	UG/KG	210.00	J	Pyrene	665.00	2600.00	0.08
				ERM Quotient Sum			9.83
SYCM002101				Mean ERM Quotient			0.39
SYCM002101				Mean ERM Quotient without ND			0.04
SYCM002201	MG/KG	13.80		Arsenic (As)	8.20	70.00	0.20
SYCM002201	MG/KG	0.72	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM002201	MG/KG	37.00	J	Chromium (Cr)	81.00	370.00	0.10
SYCM002201	MG/KG	16.10	J	Copper (Cu)	34.00	270.00	0.06
SYCM002201	MG/KG	19.70	J	Lead (Pb)	46.70	218.00	0.09
SYCM002201	MG/KG	0.13	U	Mercury (Hg)	0.15	0.71	0.18
SYCM002201	MG/KG	10.80	J	Nickel (Ni)	20.90	51.60	0.21
SYCM002201	MG/KG	1.90	U	Silver (Ag)	1.00	3.70	0.51
SYCM002201	MG/KG	69.20	J	Zinc (Zn)	150.00	410.00	0.17
SYCM002201	UG/KG	11.50	U	4,4'-DDE	2.20	27.00	0.43
SYCM002201	UG/KG	11.50	U	4,4'-DDT	1.58	46.10	0.25
SYCM002201	UG/KG	462.00	U	Total PCBs	22.70	180.00	2.57
SYCM002201	UG/KG	1100.00	UJ	2-Methylnaphthalene	70.00	670.00	1.64
SYCM002201	UG/KG	1100.00	UJ	Acenaphthene	16.00	500.00	2.20
SYCM002201	UG/KG	1100.00	UJ	Acenaphthylene	44.00	640.00	1.72
SYCM002201	UG/KG	1100.00	UJ	Anthracene	85.30	1100.00	1.00
SYCM002201	UG/KG	1100.00	UJ	Benzo(a)anthracene	261.00	1600.00	0.69
SYCM002201	UG/KG	1100.00	UJ	Benzo(a)pyrene	430.00	1600.00	0.69
SYCM002201	UG/KG	1100.00	UJ	Chrysene	384.00	2800.00	0.39
SYCM002201	UG/KG	1100.00	UJ	Dibenz(a,h)anthracene	63.40	260.00	4.23
SYCM002201	UG/KG	1100.00	UJ	Fluoranthene	600.00	5100.00	0.22
SYCM002201	UG/KG	1100.00	UJ	Fluorene	19.00	540.00	2.04
SYCM002201	UG/KG	1100.00	UJ	Naphthalene	160.00	2100.00	0.52
SYCM002201	UG/KG	1100.00	UJ	Phenanthrene	240.00	1500.00	0.73
SYCM002201	UG/KG	1100.00	UJ	Pyrene	665.00	2600.00	0.42
				ERM Quotient Sum			21.33
SYCM002201				Mean ERM Quotient			0.85
SYCM002201				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCM016A01	MG/KG	21.30		Arsenic (As)	8.20	70.00	0.30
SYCM016A01	MG/KG	1.10	J	Cadmium (Cd)	1.20	9.60	0.11
SYCM016A01	MG/KG	55.40	J	Chromium (Cr)	81.00	370.00	0.15
SYCM016A01	MG/KG	20.90	J	Copper (Cu)	34.00	270.00	0.08
SYCM016A01	MG/KG	25.40	J	Lead (Pb)	46.70	218.00	0.12
SYCM016A01	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
SYCM016A01	MG/KG	16.20	J	Nickel (Ni)	20.90	51.60	0.31
SYCM016A01	MG/KG	2.60	U	Silver (Ag)	1.00	3.70	0.70
SYCM016A01	MG/KG	96.80	J	Zinc (Zn)	150.00	410.00	0.24
SYCM016A01	UG/KG	15.00	U	4,4'-DDE	2.20	27.00	0.56
SYCM016A01	UG/KG	15.00	U	4,4'-DDT	1.58	46.10	0.33
SYCM016A01	UG/KG	602.00	U	Total PCBs	22.70	180.00	3.34
SYCM016A01	UG/KG	1500.00	U	2-Methylnaphthalene	70.00	670.00	2.24
SYCM016A01	UG/KG	1500.00	U	Acenaphthene	16.00	500.00	3.00
SYCM016A01	UG/KG	1500.00	U	Acenaphthylene	44.00	640.00	2.34
SYCM016A01	UG/KG	1500.00	U	Anthracene	85.30	1100.00	1.36
SYCM016A01	UG/KG	1500.00	U	Benzo(a)anthracene	261.00	1600.00	0.94
SYCM016A01	UG/KG	1500.00	U	Benzo(a)pyrene	430.00	1600.00	0.94
SYCM016A01	UG/KG	1500.00	U	Chrysene	384.00	2800.00	0.54
SYCM016A01	UG/KG	1500.00	U	Dibenz(a,h)anthracene	63.40	260.00	5.77
SYCM016A01	UG/KG	180.00	J	Fluoranthene	600.00	5100.00	0.04
SYCM016A01	UG/KG	1500.00	U	Fluorene	19.00	540.00	2.78
SYCM016A01	UG/KG	1500.00	U	Naphthalene	160.00	2100.00	0.71
SYCM016A01	UG/KG	1500.00	U	Phenanthrene	240.00	1500.00	1.00
SYCM016A01	UG/KG	1500.00	U	Pyrene	665.00	2600.00	0.58
				ERM Quotient Sum			28.71
SYCM016A01				Mean ERM Quotient			1.15
SYCM016A01				Mean ERM Quotient without ND			0.05
SYCM018A01	MG/KG	11.40		Arsenic (As)	8.20	70.00	0.16
SYCM018A01	MG/KG	0.78	J	Cadmium (Cd)	1.20	9.60	0.08
SYCM018A01	MG/KG	39.80	J	Chromium (Cr)	81.00	370.00	0.11
SYCM018A01	MG/KG	15.10	J	Copper (Cu)	34.00	270.00	0.06
SYCM018A01	MG/KG	15.40	J	Lead (Pb)	46.70	218.00	0.07
SYCM018A01	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCM018A01	MG/KG	12.90	J	Nickel (Ni)	20.90	51.60	0.25
SYCM018A01	MG/KG	0.97	U	Silver (Ag)	1.00	3.70	0.26
SYCM018A01	MG/KG	56.30	J	Zinc (Zn)	150.00	410.00	0.14
SYCM018A01	UG/KG	5.82	U	4,4'-DDE	2.20	27.00	0.22
SYCM018A01	UG/KG	5.82	U	4,4'-DDT	1.58	46.10	0.13
SYCM018A01	UG/KG	233.60	U	Total PCBs	22.70	180.00	1.30
SYCM018A01	UG/KG	580.00	U	2-Methylnaphthalene	70.00	670.00	0.87
SYCM018A01	UG/KG	580.00	U	Acenaphthene	16.00	500.00	1.16
SYCM018A01	UG/KG	580.00	U	Acenaphthylene	44.00	640.00	0.91
SYCM018A01	UG/KG	580.00	U	Anthracene	85.30	1100.00	0.53
SYCM018A01	UG/KG	60.00	J	Benzo(a)anthracene	261.00	1600.00	0.04
SYCM018A01	UG/KG	580.00	U	Benzo(a)pyrene	430.00	1600.00	0.36
SYCM018A01	UG/KG	76.00	J	Chrysene	384.00	2800.00	0.03
SYCM018A01	UG/KG	580.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.23
SYCM018A01	UG/KG	210.00	J	Fluoranthene	600.00	5100.00	0.04
SYCM018A01	UG/KG	580.00	U	Fluorene	19.00	540.00	1.07
SYCM018A01	UG/KG	580.00	U	Naphthalene	160.00	2100.00	0.28
SYCM018A01	UG/KG	110.00	J	Phenanthrene	240.00	1500.00	0.07
SYCM018A01	UG/KG	180.00	J	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			10.50
SYCM018A01				Mean ERM Quotient			0.42
SYCM018A01				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCN001601	MG/KG	19.00		Arsenic (As)	8.20	70.00	0.27
SYCN001601	MG/KG	0.90	J	Cadmium (Cd)	1.20	9.60	0.09
SYCN001601	MG/KG	47.20	J	Chromium (Cr)	81.00	370.00	0.13
SYCN001601	MG/KG	19.00	J	Copper (Cu)	34.00	270.00	0.07
SYCN001601	MG/KG	24.50	J	Lead (Pb)	46.70	218.00	0.11
SYCN001601	MG/KG	0.12	U	Mercury (Hg)	0.15	0.71	0.17
SYCN001601	MG/KG	12.90	J	Nickel (Ni)	20.90	51.60	0.25
SYCN001601	MG/KG	2.00	U	Silver (Ag)	1.00	3.70	0.54
SYCN001601	MG/KG	83.60	J	Zinc (Zn)	150.00	410.00	0.20
SYCN001601	UG/KG	13.80	U	4,4'-DDE	2.20	27.00	0.51
SYCN001601	UG/KG	13.80	U	4,4'-DDT	1.58	46.10	0.30
SYCN001601	UG/KG	553.50	U	Total PCBs	22.70	180.00	3.08
SYCN001601	UG/KG	1400.00	UJ	2-Methylnaphthalene	70.00	670.00	2.09
SYCN001601	UG/KG	1400.00	UJ	Acenaphthene	16.00	500.00	2.80
SYCN001601	UG/KG	1400.00	UJ	Acenaphthylene	44.00	640.00	2.19
SYCN001601	UG/KG	1400.00	UJ	Anthracene	85.30	1100.00	1.27
SYCN001601	UG/KG	1400.00	UJ	Benzo(a)anthracene	261.00	1600.00	0.88
SYCN001601	UG/KG	1400.00	UJ	Benzo(a)pyrene	430.00	1600.00	0.88
SYCN001601	UG/KG	1400.00	UJ	Chrysene	384.00	2800.00	0.50
SYCN001601	UG/KG	1400.00	UJ	Dibenz(a,h)anthracene	63.40	260.00	5.38
SYCN001601	UG/KG	1400.00	UJ	Fluoranthene	600.00	5100.00	0.27
SYCN001601	UG/KG	1400.00	UJ	Fluorene	19.00	540.00	2.59
SYCN001601	UG/KG	1400.00	UJ	Naphthalene	160.00	2100.00	0.67
SYCN001601	UG/KG	1400.00	UJ	Phenanthrene	240.00	1500.00	0.93
SYCN001601	UG/KG	1400.00	UJ	Pyrene	665.00	2600.00	0.54
				ERM Quotient Sum			26.71
SYCN001601				Mean ERM Quotient			1.07
SYCN001601				Mean ERM Quotient without ND			0.05
SYCN001701	MG/KG	25.70		Arsenic (As)	8.20	70.00	0.37
SYCN001701	MG/KG	0.45	J	Cadmium (Cd)	1.20	9.60	0.05
SYCN001701	MG/KG	42.40		Chromium (Cr)	81.00	370.00	0.11
SYCN001701	MG/KG	11.50	J	Copper (Cu)	34.00	270.00	0.04
SYCN001701	MG/KG	17.00		Lead (Pb)	46.70	218.00	0.08
SYCN001701	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
SYCN001701	MG/KG	13.90	J	Nickel (Ni)	20.90	51.60	0.27
SYCN001701	MG/KG	0.87	J	Silver (Ag)	1.00	3.70	0.24
SYCN001701	MG/KG	46.10		Zinc (Zn)	150.00	410.00	0.11
SYCN001701	UG/KG	8.18	U	4,4'-DDE	2.20	27.00	0.30
SYCN001701	UG/KG	8.18	U	4,4'-DDT	1.58	46.10	0.18
SYCN001701	UG/KG	328.40	U	Total PCBs	22.70	180.00	1.82
SYCN001701	UG/KG	820.00	U	2-Methylnaphthalene	70.00	670.00	1.22
SYCN001701	UG/KG	820.00	U	Acenaphthene	16.00	500.00	1.64
SYCN001701	UG/KG	820.00	U	Acenaphthylene	44.00	640.00	1.28
SYCN001701	UG/KG	820.00	U	Anthracene	85.30	1100.00	0.75
SYCN001701	UG/KG	820.00	U	Benzo(a)anthracene	261.00	1600.00	0.51
SYCN001701	UG/KG	820.00	U	Benzo(a)pyrene	430.00	1600.00	0.51
SYCN001701	UG/KG	820.00	U	Chrysene	384.00	2800.00	0.29
SYCN001701	UG/KG	820.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.15
SYCN001701	UG/KG	820.00	U	Fluoranthene	600.00	5100.00	0.16
SYCN001701	UG/KG	820.00	U	Fluorene	19.00	540.00	1.52
SYCN001701	UG/KG	820.00	U	Naphthalene	160.00	2100.00	0.39
SYCN001701	UG/KG	820.00	U	Phenanthrene	240.00	1500.00	0.55
SYCN001701	UG/KG	820.00	U	Pyrene	665.00	2600.00	0.32
				ERM Quotient Sum			15.95
SYCN001701				Mean ERM Quotient			0.64
SYCN001701				Mean ERM Quotient without ND			0.05

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
SYCN002101	MG/KG	15.90		Arsenic (As)	8.20	70.00	0.23
SYCN002101	MG/KG	0.29	J	Cadmium (Cd)	1.20	9.60	0.03
SYCN002101	MG/KG	46.40	J	Chromium (Cr)	81.00	370.00	0.13
SYCN002101	MG/KG	13.90		Copper (Cu)	34.00	270.00	0.05
SYCN002101	MG/KG	17.90		Lead (Pb)	46.70	218.00	0.08
SYCN002101	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
SYCN002101	MG/KG	16.00		Nickel (Ni)	20.90	51.60	0.31
SYCN002101	MG/KG	0.53	UJ	Silver (Ag)	1.00	3.70	0.14
SYCN002101	MG/KG	58.90		Zinc (Zn)	150.00	410.00	0.14
SYCN002101	UG/KG	5.92	UJ	4,4'-DDE	2.20	27.00	0.22
SYCN002101	UG/KG	5.92	UJ	4,4'-DDT	1.58	46.10	0.13
SYCN002101	UG/KG	226.60	U	Total PCBs	22.70	180.00	1.26
SYCN002101	UG/KG	610.00	U	2-Methylnaphthalene	70.00	670.00	0.91
SYCN002101	UG/KG	610.00	U	Acenaphthene	16.00	500.00	1.22
SYCN002101	UG/KG	610.00	U	Acenaphthylene	44.00	640.00	0.95
SYCN002101	UG/KG	610.00	U	Anthracene	85.30	1100.00	0.55
SYCN002101	UG/KG	69.00	J	Benzo(a)anthracene	261.00	1600.00	0.04
SYCN002101	UG/KG	610.00	U	Benzo(a)pyrene	430.00	1600.00	0.38
SYCN002101	UG/KG	66.00	J	Chrysene	384.00	2800.00	0.02
SYCN002101	UG/KG	610.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.35
SYCN002101	UG/KG	160.00	J	Fluoranthene	600.00	5100.00	0.03
SYCN002101	UG/KG	610.00	U	Fluorene	19.00	540.00	1.13
SYCN002101	UG/KG	610.00	U	Naphthalene	160.00	2100.00	0.29
SYCN002101	UG/KG	69.00	J	Phenanthrene	240.00	1500.00	0.05
SYCN002101	UG/KG	130.00	J	Pyrene	665.00	2600.00	0.05
				ERM Quotient Sum			10.76
SYCN002101				Mean ERM Quotient			0.43
SYCN002101				Mean ERM Quotient without ND			0.05
SYCN018A01	MG/KG	12.00		Arsenic (As)	8.20	70.00	0.17
SYCN018A01	MG/KG	0.81	J	Cadmium (Cd)	1.20	9.60	0.08
SYCN018A01	MG/KG	44.30	J	Chromium (Cr)	81.00	370.00	0.12
SYCN018A01	MG/KG	15.90	J	Copper (Cu)	34.00	270.00	0.06
SYCN018A01	MG/KG	16.50	J	Lead (Pb)	46.70	218.00	0.08
SYCN018A01	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
SYCN018A01	MG/KG	14.10		Nickel (Ni)	20.90	51.60	0.27
SYCN018A01	MG/KG	0.87	U	Silver (Ag)	1.00	3.70	0.24
SYCN018A01	MG/KG	60.30	J	Zinc (Zn)	150.00	410.00	0.15
SYCN018A01	UG/KG	5.65	U	4,4'-DDE	2.20	27.00	0.21
SYCN018A01	UG/KG	5.65	U	4,4'-DDT	1.58	46.10	0.12
SYCN018A01	UG/KG	227.00	U	Total PCBs	22.70	180.00	1.26
SYCN018A01	UG/KG	560.00	U	2-Methylnaphthalene	70.00	670.00	0.84
SYCN018A01	UG/KG	560.00	U	Acenaphthene	16.00	500.00	1.12
SYCN018A01	UG/KG	560.00	U	Acenaphthylene	44.00	640.00	0.88
SYCN018A01	UG/KG	560.00	U	Anthracene	85.30	1100.00	0.51
SYCN018A01	UG/KG	190.00	J	Benzo(a)anthracene	261.00	1600.00	0.12
SYCN018A01	UG/KG	220.00	J	Benzo(a)pyrene	430.00	1600.00	0.14
SYCN018A01	UG/KG	180.00	J	Chrysene	384.00	2800.00	0.06
SYCN018A01	UG/KG	560.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.15
SYCN018A01	UG/KG	240.00	J	Fluoranthene	600.00	5100.00	0.05
SYCN018A01	UG/KG	560.00	U	Fluorene	19.00	540.00	1.04
SYCN018A01	UG/KG	560.00	U	Naphthalene	160.00	2100.00	0.27
SYCN018A01	UG/KG	560.00	U	Phenanthrene	240.00	1500.00	0.37
SYCN018A01	UG/KG	280.00	J	Pyrene	665.00	2600.00	0.11
				ERM Quotient Sum			10.48
SYCN018A01				Mean ERM Quotient			0.42
SYCN018A01				Mean ERM Quotient without ND			0.06

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M000101	MG/KG	14.10		Arsenic (As)	8.20	70.00	0.20
009M000101	MG/KG	0.26	U	Cadmium (Cd)	1.20	9.60	0.03
009M000101	MG/KG	132.00		Chromium (Cr)	81.00	370.00	0.36
009M000101	MG/KG	31.40		Copper (Cu)	34.00	270.00	0.12
009M000101	MG/KG	44.80		Lead (Pb)	46.70	218.00	0.21
009M000101	MG/KG	0.16		Mercury (Hg)	0.15	0.71	0.23
009M000101	MG/KG	24.30		Nickel (Ni)	20.90	51.60	0.47
009M000101	MG/KG	0.44	U	Silver (Ag)	1.00	3.70	0.12
009M000101	MG/KG	115.00		Zinc (Zn)	150.00	410.00	0.28
009M000101	UG/KG	4.00		4,4'-DDE	2.20	27.00	0.15
009M000101	UG/KG	9.00	U	4,4'-DDT	1.58	46.10	0.20
009M000101	UG/KG	230.00		Total PCBs	22.70	180.00	1.28
009M000101	UG/KG	88.00	UJ	2-Methylnaphthalene	70.00	670.00	0.13
009M000101	UG/KG	88.00	UJ	Acenaphthene	16.00	500.00	0.18
009M000101	UG/KG	88.00	UJ	Acenaphthylene	44.00	640.00	0.14
009M000101	UG/KG	88.00	UJ	Anthracene	85.30	1100.00	0.08
009M000101	UG/KG	87.00	J	Benzo(a)anthracene	261.00	1600.00	0.05
009M000101	UG/KG	440.00	UJ	Benzo(a)pyrene	430.00	1600.00	0.28
009M000101	UG/KG	440.00	UJ	Chrysene	384.00	2800.00	0.16
009M000101	UG/KG	440.00	UJ	Dibenz(a,h)anthracene	63.40	260.00	1.69
009M000101	UG/KG	230.00	J	Fluoranthene	600.00	5100.00	0.05
009M000101	UG/KG	88.00	UJ	Fluorene	19.00	540.00	0.16
009M000101	UG/KG	440.00	UJ	Naphthalene	160.00	2100.00	0.21
009M000101	UG/KG	440.00	UJ	Phenanthrene	240.00	1500.00	0.29
009M000101	UG/KG	280.00	J	Pyrene	665.00	2600.00	0.11
				ERM Quotient Sum			7.15
009M000101				Mean ERM Quotient			0.29
009M000101				Mean ERM Quotient without ND			0.14
009M000201	MG/KG	3.30		Arsenic (As)	8.20	70.00	0.05
009M000201	MG/KG	0.07	U	Cadmium (Cd)	1.20	9.60	0.01
009M000201	MG/KG	17.80		Chromium (Cr)	81.00	370.00	0.05
009M000201	MG/KG	228.00		Copper (Cu)	34.00	270.00	0.84
009M000201	MG/KG	102.00		Lead (Pb)	46.70	218.00	0.47
009M000201	MG/KG	0.02	J	Mercury (Hg)	0.15	0.71	0.03
009M000201	MG/KG	14.20		Nickel (Ni)	20.90	51.60	0.28
009M000201	MG/KG	0.11	U	Silver (Ag)	1.00	3.70	0.03
009M000201	MG/KG	133.00		Zinc (Zn)	150.00	410.00	0.32
009M000201	UG/KG	4.00		4,4'-DDE	2.20	27.00	0.15
009M000201	UG/KG	15.00		4,4'-DDT	1.58	46.10	0.33
009M000201	UG/KG	190.00		Total PCBs	22.70	180.00	1.06
009M000201	UG/KG	210.00	U	2-Methylnaphthalene	70.00	670.00	0.31
009M000201	UG/KG	210.00	U	Acenaphthene	16.00	500.00	0.42
009M000201	UG/KG	210.00	U	Acenaphthylene	44.00	640.00	0.33
009M000201	UG/KG	210.00	U	Anthracene	85.30	1100.00	0.19
009M000201	UG/KG	210.00	U	Benzo(a)anthracene	261.00	1600.00	0.13
009M000201	UG/KG	210.00	U	Benzo(a)pyrene	430.00	1600.00	0.13
009M000201	UG/KG	210.00	U	Chrysene	384.00	2800.00	0.08
009M000201	UG/KG	210.00	U	Dibenz(a,h)anthracene	63.40	260.00	0.81
009M000201	UG/KG	210.00	U	Fluoranthene	600.00	5100.00	0.04
009M000201	UG/KG	210.00	U	Fluorene	19.00	540.00	0.39
009M000201	UG/KG	210.00	U	Naphthalene	160.00	2100.00	0.10
009M000201	UG/KG	210.00	U	Phenanthrene	240.00	1500.00	0.14
009M000201	UG/KG	210.00	U	Pyrene	665.00	2600.00	0.08
				ERM Quotient Sum			6.75
009M000201				Mean ERM Quotient			0.27
009M000201				Mean ERM Quotient without ND			0.14

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M000301	MG/KG	15.60		Arsenic (As)	8.20	70.00	0.22
009M000301	MG/KG	0.23	J	Cadmium (Cd)	1.20	9.60	0.02
009M000301	MG/KG	48.30		Chromium (Cr)	81.00	370.00	0.13
009M000301	MG/KG	28.70		Copper (Cu)	34.00	270.00	0.11
009M000301	MG/KG	74.50		Lead (Pb)	46.70	218.00	0.34
009M000301	MG/KG	0.51		Mercury (Hg)	0.15	0.71	0.72
009M000301	MG/KG	18.30		Nickel (Ni)	20.90	51.60	0.35
009M000301	MG/KG	0.28	U	Silver (Ag)	1.00	3.70	0.08
009M000301	MG/KG	121.00		Zinc (Zn)	150.00	410.00	0.30
009M000301	UG/KG	21.00		4,4'-DDE	2.20	27.00	0.78
009M000301	UG/KG	10.00	U	4,4'-DDT	1.58	46.10	0.22
009M000301	UG/KG	175.00	U	Total PCBs	22.70	180.00	0.97
009M000301	UG/KG	110.00	UR	2-Methylnaphthalene	70.00	670.00	0.16
009M000301	UG/KG	110.00	UR	Acenaphthene	16.00	500.00	0.22
009M000301	UG/KG	110.00	UR	Acenaphthylene	44.00	640.00	0.17
009M000301	UG/KG	110.00	UR	Anthracene	85.30	1100.00	0.10
009M000301	UG/KG	530.00	UR	Benzo(a)anthracene	261.00	1600.00	0.33
009M000301	UG/KG	530.00	UR	Benzo(a)pyrene	430.00	1600.00	0.33
009M000301	UG/KG	530.00	UR	Chrysene	384.00	2800.00	0.19
009M000301	UG/KG	530.00	UR	Dibenz(a,h)anthracene	63.40	260.00	2.04
009M000301	UG/KG	190.00	UR	Fluoranthene	600.00	5100.00	0.04
009M000301	UG/KG	110.00	UR	Fluorene	19.00	540.00	0.20
009M000301	UG/KG	530.00	UR	Naphthalene	160.00	2100.00	0.25
009M000301	UG/KG	530.00	UR	Phenanthrene	240.00	1500.00	0.35
009M000301	UG/KG	180.00	UR	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			8.70
009M000301				Mean ERM Quotient			0.35
009M000301				Mean ERM Quotient without ND			0.12

009M000401	MG/KG	11.90		Arsenic (As)	8.20	70.00	0.17
009M000401	MG/KG	0.64	J	Cadmium (Cd)	1.20	9.60	0.07
009M000401	MG/KG	291.00		Chromium (Cr)	81.00	370.00	0.79
009M000401	MG/KG	141.00		Copper (Cu)	34.00	270.00	0.52
009M000401	MG/KG	107.00		Lead (Pb)	46.70	218.00	0.49
009M000401	MG/KG	0.69		Mercury (Hg)	0.15	0.71	0.97
009M000401	MG/KG	37.30		Nickel (Ni)	20.90	51.60	0.72
009M000401	MG/KG	0.46	U	Silver (Ag)	1.00	3.70	0.12
009M000401	MG/KG	387.00		Zinc (Zn)	150.00	410.00	0.94
009M000401	**UG/KG**	**110.00**		**4,4'-DDE**	**2.20**	**27.00**	**4.07**
009M000401	UG/KG	50.00	U	4,4'-DDT	1.58	46.10	1.08
009M000401	**UG/KG**	**4660.00**		**Total PCBs**	**22.70**	**180.00**	**27.00**
009M000401	UG/KG	3600.00	U	2-Methylnaphthalene	70.00	670.00	5.37
009M000401	UG/KG	3600.00	U	Acenaphthene	16.00	500.00	7.20
009M000401	UG/KG	3600.00	U	Acenaphthylene	44.00	640.00	5.63
009M000401	UG/KG	3600.00	U	Anthracene	85.30	1100.00	3.27
009M000401	UG/KG	18000.00	U	Benzo(a)anthracene	261.00	1600.00	11.25
009M000401	UG/KG	18000.00	U	Benzo(a)pyrene	430.00	1600.00	11.25
009M000401	UG/KG	18000.00	U	Chrysene	384.00	2800.00	6.43
009M000401	UG/KG	18000.00	U	Dibenz(a,h)anthracene	63.40	260.00	69.23
009M000401	UG/KG	9500.00	J	Fluoranthene	600.00	5100.00	1.86
009M000401	UG/KG	3600.00	U	Fluorene	19.00	540.00	6.67
009M000401	UG/KG	18000.00	U	Naphthalene	160.00	2100.00	8.57
009M000401	UG/KG	18000.00	U	Phenanthrene	240.00	1500.00	12.00
009M000401	UG/KG	6400.00	J	Pyrene	665.00	2600.00	2.46
				ERM Quotient Sum			188.15
009M000401				Mean ERM Quotient			7.53
009M000401				Mean ERM Quotient without ND			1.60

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M000501	MG/KG	7.30		Arsenic (As)	8.20	70.00	0.10
009M000501	MG/KG	0.61	J	Cadmium (Cd)	1.20	9.60	0.06
009M000501	MG/KG	168.00		Chromium (Cr)	81.00	370.00	0.45
009M000501	MG/KG	90.00		Copper (Cu)	34.00	270.00	0.33
009M000501	MG/KG	74.80		Lead (Pb)	46.70	218.00	0.34
009M000501	MG/KG	0.33		Mercury (Hg)	0.15	0.71	0.46
009M000501	MG/KG	21.20		Nickel (Ni)	20.90	51.60	0.41
009M000501	MG/KG	0.34	U	Silver (Ag)	1.00	3.70	0.09
009M000501	MG/KG	261.00		Zinc (Zn)	150.00	410.00	0.64
009M000501	UG/KG	150.00		4,4'-DDE	2.20	27.00	5.56
009M000501	UG/KG	140.00		4,4'-DDT	1.58	46.10	3.04
009M000501	UG/KG	1390.00		Total PCBs	22.70	180.00	7.72
009M000501	UG/KG	130.00	U	2-Methylnaphthalene	70.00	670.00	0.19
009M000501	UG/KG	130.00	U	Acenaphthene	16.00	500.00	0.26
009M000501	UG/KG	130.00	U	Acenaphthylene	44.00	640.00	0.20
009M000501	UG/KG	130.00	U	Anthracene	85.30	1100.00	0.12
009M000501	UG/KG	140.00	J	Benzo(a)anthracene	261.00	1600.00	0.09
009M000501	UG/KG	640.00	U	Benzo(a)pyrene	430.00	1600.00	0.40
009M000501	UG/KG	640.00	U	Chrysene	384.00	2800.00	0.23
009M000501	UG/KG	640.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.46
009M000501	UG/KG	350.00	J	Fluoranthene	600.00	5100.00	0.07
009M000501	UG/KG	130.00	U	Fluorene	19.00	540.00	0.24
009M000501	UG/KG	640.00	U	Naphthalene	160.00	2100.00	0.30
009M000501	UG/KG	640.00	U	Phenanthrene	240.00	1500.00	0.43
009M000501	UG/KG	340.00	J	Pyrene	665.00	2600.00	0.13
				ERM Quotient Sum			24.34
009M000501				Mean ERM Quotient			0.97
009M000501				Mean ERM Quotient without ND			0.78
009M000601	MG/KG	8.60	J	Arsenic (As)	8.20	70.00	0.12
009M000601	MG/KG	0.38	J	Cadmium (Cd)	1.20	9.60	0.04
009M000601	MG/KG	55.00		Chromium (Cr)	81.00	370.00	0.15
009M000601	MG/KG	9.90		Copper (Cu)	34.00	270.00	0.04
009M000601	MG/KG	2.20	U	Lead (Pb)	46.70	218.00	0.01
009M000601	MG/KG	0.04	J	Mercury (Hg)	0.15	0.71	0.06
009M000601	MG/KG	24.60		Nickel (Ni)	20.90	51.60	0.48
009M000601	MG/KG	0.35	U	Silver (Ag)	1.00	3.70	0.09
009M000601	MG/KG	56.80		Zinc (Zn)	150.00	410.00	0.14
009M000601	UG/KG	2.00		4,4'-DDE	2.20	27.00	0.07
009M000601	UG/KG	5.00	U	4,4'-DDT	1.58	46.10	0.11
009M000601	UG/KG	70.00	U	Total PCBs	22.70	180.00	0.39
009M000601	UG/KG	240.00	U	2-Methylnaphthalene	70.00	670.00	0.36
009M000601	UG/KG	240.00	U	Acenaphthene	16.00	500.00	0.48
009M000601	UG/KG	240.00	U	Acenaphthylene	44.00	640.00	0.38
009M000601	UG/KG	240.00	U	Anthracene	85.30	1100.00	0.22
009M000601	UG/KG	240.00	U	Benzo(a)anthracene	261.00	1600.00	0.15
009M000601	UG/KG	240.00	U	Benzo(a)pyrene	430.00	1600.00	0.15
009M000601	UG/KG	240.00	U	Chrysene	384.00	2800.00	0.09
009M000601	UG/KG	240.00	U	Dibenz(a,h)anthracene	63.40	260.00	0.92
009M000601	UG/KG	240.00	U	Fluoranthene	600.00	5100.00	0.05
009M000601	UG/KG	240.00	U	Fluorene	19.00	540.00	0.44
009M000601	UG/KG	240.00	U	Naphthalene	160.00	2100.00	0.11
009M000601	UG/KG	240.00	U	Phenanthrene	240.00	1500.00	0.16
009M000601	UG/KG	240.00	U	Pyrene	665.00	2600.00	0.09
				ERM Quotient Sum			5.29
009M000601				Mean ERM Quotient			0.21
009M000601				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M000701	MG/KG	5.30		Arsenic (As)	8.20	70.00	0.08
009M000701	MG/KG	1.20	J	Cadmium (Cd)	1.20	9.60	0.13
009M000701	MG/KG	36.10		Chromium (Cr)	81.00	370.00	0.10
009M000701	MG/KG	6.30	J	Copper (Cu)	34.00	270.00	0.02
009M000701	MG/KG	8.50	U	Lead (Pb)	46.70	218.00	0.04
009M000701	MG/KG	0.02	U	Mercury (Hg)	0.15	0.71	0.03
009M000701	MG/KG	21.30		Nickel (Ni)	20.90	51.60	0.41
009M000701	MG/KG	1.40	U	Silver (Ag)	1.00	3.70	0.38
009M000701	MG/KG	41.50		Zinc (Zn)	150.00	410.00	0.10
009M000701	UG/KG	2.00	U	4,4'-DDE	2.20	27.00	0.07
009M000701	UG/KG	4.00	U	4,4'-DDT	1.58	46.10	0.09
009M000701	UG/KG	70.00	U	Total PCBs	22.70	180.00	0.39
009M000701	UG/KG	220.00	U	2-Methylnaphthalene	70.00	670.00	0.33
009M000701	UG/KG	220.00	U	Acenaphthene	16.00	500.00	0.44
009M000701	UG/KG	220.00	U	Acenaphthylene	44.00	640.00	0.34
009M000701	UG/KG	220.00	U	Anthracene	85.30	1100.00	0.20
009M000701	UG/KG	220.00	U	Benzo(a)anthracene	261.00	1600.00	0.14
009M000701	UG/KG	220.00	U	Benzo(a)pyrene	430.00	1600.00	0.14
009M000701	UG/KG	220.00	U	Chrysene	384.00	2800.00	0.08
009M000701	UG/KG	220.00	U	Dibenz(a,h)anthracene	63.40	260.00	0.85
009M000701	UG/KG	220.00	U	Fluoranthene	600.00	5100.00	0.04
009M000701	UG/KG	220.00	U	Fluorene	19.00	540.00	0.41
009M000701	UG/KG	220.00	U	Naphthalene	160.00	2100.00	0.10
009M000701	UG/KG	220.00	U	Phenanthrene	240.00	1500.00	0.15
009M000701	UG/KG	220.00	U	Pyrene	665.00	2600.00	0.08
				ERM Quotient Sum			5.13
009M000701				Mean ERM Quotient			0.21
009M000701				Mean ERM Quotient without ND			0.03
009M000801	MG/KG	8.50		Arsenic (As)	8.20	70.00	0.12
009M000801	MG/KG	1.70	J	Cadmium (Cd)	1.20	9.60	0.18
009M000801	MG/KG	50.90		Chromium (Cr)	81.00	370.00	0.14
009M000801	MG/KG	13.30		Copper (Cu)	34.00	270.00	0.05
009M000801	MG/KG	10.10	U	Lead (Pb)	46.70	218.00	0.05
009M000801	MG/KG	0.03	J	Mercury (Hg)	0.15	0.71	0.04
009M000801	MG/KG	19.90		Nickel (Ni)	20.90	51.60	0.39
009M000801	MG/KG	1.60	U	Silver (Ag)	1.00	3.70	0.43
009M000801	MG/KG	82.20		Zinc (Zn)	150.00	410.00	0.20
009M000801	UG/KG	3.00	U	4,4'-DDE	2.20	27.00	0.11
009M000801	UG/KG	6.00	U	4,4'-DDT	1.58	46.10	0.13
009M000801	UG/KG	105.00	U	Total PCBs	22.70	180.00	0.58
009M000801	UG/KG	300.00	U	2-Methylnaphthalene	70.00	670.00	0.45
009M000801	UG/KG	300.00	U	Acenaphthene	16.00	500.00	0.60
009M000801	UG/KG	300.00	U	Acenaphthylene	44.00	640.00	0.47
009M000801	UG/KG	300.00	U	Anthracene	85.30	1100.00	0.27
009M000801	UG/KG	300.00	U	Benzo(a)anthracene	261.00	1600.00	0.19
009M000801	UG/KG	300.00	U	Benzo(a)pyrene	430.00	1600.00	0.19
009M000801	UG/KG	300.00	U	Chrysene	384.00	2800.00	0.11
009M000801	UG/KG	300.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.15
009M000801	UG/KG	300.00	U	Fluoranthene	600.00	5100.00	0.06
009M000801	UG/KG	300.00	U	Fluorene	19.00	540.00	0.56
009M000801	UG/KG	300.00	U	Naphthalene	160.00	2100.00	0.14
009M000801	UG/KG	300.00	U	Phenanthrene	240.00	1500.00	0.20
009M000801	UG/KG	300.00	U	Pyrene	665.00	2600.00	0.12
				ERM Quotient Sum			6.91
009M000801				Mean ERM Quotient			0.28
009M000801				Mean ERM Quotient without ND			0.04

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M000901	MG/KG	0.62	J	Arsenic (As)	8.20	70.00	0.01
009M000901	MG/KG	0.15	U	Cadmium (Cd)	1.20	9.60	0.02
009M000901	MG/KG	6.50		Chromium (Cr)	81.00	370.00	0.02
009M000901	MG/KG	53.70		Copper (Cu)	34.00	270.00	0.20
009M000901	MG/KG	5.30		Lead (Pb)	46.70	218.00	0.02
009M000901	MG/KG	0.05	J	Mercury (Hg)	0.15	0.71	0.07
009M000901	MG/KG	2.80		Nickel (Ni)	20.90	51.60	0.05
009M000901	MG/KG	0.25	U	Silver (Ag)	1.00	3.70	0.07
009M000901	MG/KG	8.50		Zinc (Zn)	150.00	410.00	0.02
009M000901	UG/KG	2.00	U	4,4'-DDE	2.20	27.00	0.07
009M000901	UG/KG	3.00	J	4,4'-DDT	1.58	46.10	0.07
009M000901	UG/KG	70.00	U	Total PCBs	22.70	180.00	0.39
009M000901	UG/KG	190.00	U	2-Methylnaphthalene	70.00	670.00	0.28
009M000901	UG/KG	190.00	U	Acenaphthene	16.00	500.00	0.38
009M000901	UG/KG	190.00	U	Acenaphthylene	44.00	640.00	0.30
009M000901	UG/KG	190.00	U	Anthracene	85.30	1100.00	0.17
009M000901	UG/KG	190.00	U	Benzo(a)anthracene	261.00	1600.00	0.12
009M000901	UG/KG	190.00	U	Benzo(a)pyrene	430.00	1600.00	0.12
009M000901	UG/KG	190.00	U	Chrysene	384.00	2800.00	0.07
009M000901	UG/KG	190.00	U	Dibenz(a,h)anthracene	63.40	260.00	0.73
009M000901	UG/KG	190.00	U	Fluoranthene	600.00	5100.00	0.04
009M000901	UG/KG	190.00	U	Fluorene	19.00	540.00	0.35
009M000901	UG/KG	190.00	U	Naphthalene	160.00	2100.00	0.09
009M000901	UG/KG	190.00	U	Phenanthrene	240.00	1500.00	0.13
009M000901	UG/KG	190.00	U	Pyrene	665.00	2600.00	0.07
				ERM Quotient Sum			3.85
009M000901				Mean ERM Quotient			0.15
009M000901				Mean ERM Quotient without ND			0.02
009M001001	MG/KG	7.70		Arsenic (As)	8.20	70.00	0.11
009M001001	MG/KG	0.70	J	Cadmium (Cd)	1.20	9.60	0.07
009M001001	MG/KG	45.50		Chromium (Cr)	81.00	370.00	0.12
009M001001	MG/KG	42.80		Copper (Cu)	34.00	270.00	0.16
009M001001	MG/KG	15.80	J	Lead (Pb)	46.70	218.00	0.07
009M001001	MG/KG	0.13		Mercury (Hg)	0.15	0.71	0.18
009M001001	MG/KG	15.80		Nickel (Ni)	20.90	51.60	0.31
009M001001	MG/KG	1.00	U	Silver (Ag)	1.00	3.70	0.27
009M001001	MG/KG	111.00		Zinc (Zn)	150.00	410.00	0.27
009M001001	UG/KG	11.00		4,4'-DDE	2.20	27.00	0.41
009M001001	UG/KG	16.00		4,4'-DDT	1.58	46.10	0.35
009M001001	UG/KG	300.00		Total PCBs	22.70	180.00	1.67
009M001001	UG/KG	280.00	U	2-Methylnaphthalene	70.00	670.00	0.42
009M001001	UG/KG	280.00	U	Acenaphthene	16.00	500.00	0.56
009M001001	UG/KG	280.00	U	Acenaphthylene	44.00	640.00	0.44
009M001001	UG/KG	280.00	U	Anthracene	85.30	1100.00	0.25
009M001001	UG/KG	280.00	U	Benzo(a)anthracene	261.00	1600.00	0.18
009M001001	UG/KG	280.00	U	Benzo(a)pyrene	430.00	1600.00	0.18
009M001001	UG/KG	280.00	U	Chrysene	384.00	2800.00	0.10
009M001001	UG/KG	280.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.08
009M001001	UG/KG	280.00	U	Fluoranthene	600.00	5100.00	0.05
009M001001	UG/KG	280.00	U	Fluorene	19.00	540.00	0.52
009M001001	UG/KG	280.00	U	Naphthalene	160.00	2100.00	0.13
009M001001	UG/KG	280.00	U	Phenanthrene	240.00	1500.00	0.19
009M001001	UG/KG	280.00	U	Pyrene	665.00	2600.00	0.11
				ERM Quotient Sum			8.19
009M001001				Mean ERM Quotient			0.33
009M001001				Mean ERM Quotient without ND			0.15

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M001101	MG/KG	13.30		Arsenic (As)	8.20	70.00	0.19
009M001101	MG/KG	0.14	U	Cadmium (Cd)	1.20	9.60	0.01
009M001101	MG/KG	47.50		Chromium (Cr)	81.00	370.00	0.13
009M001101	MG/KG	18.70		Copper (Cu)	34.00	270.00	0.07
009M001101	MG/KG	22.60		Lead (Pb)	46.70	218.00	0.10
009M001101	MG/KG	0.12		Mercury (Hg)	0.15	0.71	0.17
009M001101	MG/KG	17.70		Nickel (Ni)	20.90	51.60	0.34
009M001101	MG/KG	0.24	U	Silver (Ag)	1.00	3.70	0.06
009M001101	MG/KG	118.00		Zinc (Zn)	150.00	410.00	0.29
009M001101	UG/KG	3.00	J	4,4'-DDE	2.20	27.00	0.11
009M001101	UG/KG	8.00	U	4,4'-DDT	1.58	46.10	0.17
009M001101	UG/KG	140.00	U	Total PCBs	22.70	180.00	0.78
009M001101	UG/KG	80.00	U	2-Methylnaphthalene	70.00	670.00	0.12
009M001101	UG/KG	80.00	U	Acenaphthene	16.00	500.00	0.16
009M001101	UG/KG	80.00	U	Acenaphthylene	44.00	640.00	0.13
009M001101	UG/KG	80.00	U	Anthracene	85.30	1100.00	0.07
009M001101	UG/KG	420.00	U	Benzo(a)anthracene	261.00	1600.00	0.26
009M001101	UG/KG	420.00	U	Benzo(a)pyrene	430.00	1600.00	0.26
009M001101	UG/KG	420.00	U	Chrysene	384.00	2800.00	0.15
009M001101	UG/KG	420.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.62
009M001101	UG/KG	420.00	U	Fluoranthene	600.00	5100.00	0.08
009M001101	UG/KG	80.00	U	Fluorene	19.00	540.00	0.15
009M001101	UG/KG	420.00	U	Naphthalene	160.00	2100.00	0.20
009M001101	UG/KG	420.00	U	Phenanthrene	240.00	1500.00	0.28
009M001101	UG/KG	420.00	U	Pyrene	665.00	2600.00	0.16
				ERM Quotient Sum			6.07
009M001101				Mean ERM Quotient			0.24
009M001101				Mean ERM Quotient without ND			0.06
009M001201	MG/KG	6.30		Arsenic (As)	8.20	70.00	0.09
009M001201	MG/KG	0.24	J	Cadmium (Cd)	1.20	9.60	0.03
009M001201	MG/KG	25.90		Chromium (Cr)	81.00	370.00	0.07
009M001201	MG/KG	9.10		Copper (Cu)	34.00	270.00	0.03
009M001201	MG/KG	1.90	U	Lead (Pb)	46.70	218.00	0.01
009M001201	MG/KG	0.03	J	Mercury (Hg)	0.15	0.71	0.04
009M001201	MG/KG	12.90		Nickel (Ni)	20.90	51.60	0.25
009M001201	MG/KG	0.30	U	Silver (Ag)	1.00	3.70	0.08
009M001201	MG/KG	29.30		Zinc (Zn)	150.00	410.00	0.07
009M001201	UG/KG	2.00	U	4,4'-DDE	2.20	27.00	0.07
009M001201	UG/KG	4.00	U	4,4'-DDT	1.58	46.10	0.09
009M001201	UG/KG	70.00	U	Total PCBs	22.70	180.00	0.39
009M001201	UG/KG	200.00	U	2-Methylnaphthalene	70.00	670.00	0.30
009M001201	UG/KG	200.00	U	Acenaphthene	16.00	500.00	0.40
009M001201	UG/KG	200.00	U	Acenaphthylene	44.00	640.00	0.31
009M001201	UG/KG	200.00	U	Anthracene	85.30	1100.00	0.18
009M001201	UG/KG	200.00	U	Benzo(a)anthracene	261.00	1600.00	0.13
009M001201	UG/KG	200.00	U	Benzo(a)pyrene	430.00	1600.00	0.13
009M001201	UG/KG	200.00	U	Chrysene	384.00	2800.00	0.07
009M001201	UG/KG	200.00	U	Dibenz(a,h)anthracene	63.40	260.00	0.77
009M001201	UG/KG	200.00	U	Fluoranthene	600.00	5100.00	0.04
009M001201	UG/KG	200.00	U	Fluorene	19.00	540.00	0.37
009M001201	UG/KG	200.00	U	Naphthalene	160.00	2100.00	0.10
009M001201	UG/KG	200.00	U	Phenanthrene	240.00	1500.00	0.13
009M001201	UG/KG	200.00	U	Pyrene	665.00	2600.00	0.08
				ERM Quotient Sum			4.22
009M001201				Mean ERM Quotient			0.17
009M001201				Mean ERM Quotient without ND			0.02

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M001301	MG/KG	19.60		Arsenic (As)	8.20	70.00	0.28
009M001301	MG/KG	0.11	U	Cadmium (Cd)	1.20	9.60	0.01
009M001301	MG/KG	59.20		Chromium (Cr)	81.00	370.00	0.16
009M001301	MG/KG	46.00		Copper (Cu)	34.00	270.00	0.17
009M001301	MG/KG	34.40		Lead (Pb)	46.70	218.00	0.16
009M001301	MG/KG	0.16		Mercury (Hg)	0.15	0.71	0.23
009M001301	MG/KG	18.60		Nickel (Ni)	20.90	51.60	0.36
009M001301	MG/KG	0.19	U	Silver (Ag)	1.00	3.70	0.05
009M001301	MG/KG	126.00		Zinc (Zn)	150.00	410.00	0.31
009M001301	UG/KG	36.00		4,4'-DDE	2.20	27.00	1.33
009M001301	UG/KG	18.00		4,4'-DDT	1.58	46.10	0.39
009M001301	UG/KG	350.00		Total PCBs	22.70	180.00	1.94
009M001301	UG/KG	70.00	U	2-Methylnaphthalene	70.00	670.00	0.10
009M001301	UG/KG	70.00	U	Acenaphthene	16.00	500.00	0.14
009M001301	UG/KG	70.00	U	Acenaphthylene	44.00	640.00	0.11
009M001301	UG/KG	70.00	U	Anthracene	85.30	1100.00	0.06
009M001301	UG/KG	350.00	U	Benzo(a)anthracene	261.00	1600.00	0.22
009M001301	UG/KG	350.00	U	Benzo(a)pyrene	430.00	1600.00	0.22
009M001301	UG/KG	350.00	U	Chrysene	384.00	2800.00	0.13
009M001301	UG/KG	350.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.35
009M001301	UG/KG	350.00	U	Fluoranthene	600.00	5100.00	0.07
009M001301	UG/KG	70.00	U	Fluorene	19.00	540.00	0.13
009M001301	UG/KG	350.00	U	Naphthalene	160.00	2100.00	0.17
009M001301	UG/KG	350.00	U	Phenanthrene	240.00	1500.00	0.23
009M001301	UG/KG	350.00	U	Pyrene	665.00	2600.00	0.13
				ERM Quotient Sum			8.45
009M001301				Mean ERM Quotient			0.34
009M001301				Mean ERM Quotient without ND			0.21
009M001401	MG/KG	14.50		Arsenic (As)	8.20	70.00	0.21
009M001401	MG/KG	0.70	U	Cadmium (Cd)	1.20	9.60	0.07
009M001401	MG/KG	47.50		Chromium (Cr)	81.00	370.00	0.13
009M001401	MG/KG	31.70		Copper (Cu)	34.00	270.00	0.12
009M001401	MG/KG	92.20		Lead (Pb)	46.70	218.00	0.42
009M001401	MG/KG	0.26		Mercury (Hg)	0.15	0.71	0.37
009M001401	MG/KG	14.60		Nickel (Ni)	20.90	51.60	0.28
009M001401	MG/KG	1.20	U	Silver (Ag)	1.00	3.70	0.32
009M001401	MG/KG	147.00		Zinc (Zn)	150.00	410.00	0.36
009M001401	UG/KG	13.00		4,4'-DDE	2.20	27.00	0.48
009M001401	UG/KG	29.00		4,4'-DDT	1.58	46.10	0.63
009M001401	UG/KG	480.00		Total PCBs	22.70	180.00	2.67
009M001401	UG/KG	80.00	U	2-Methylnaphthalene	70.00	670.00	0.12
009M001401	UG/KG	230.00		Acenaphthene	16.00	500.00	0.46
009M001401	UG/KG	80.00	U	Acenaphthylene	44.00	640.00	0.13
009M001401	UG/KG	80.00	U	Anthracene	85.30	1100.00	0.07
009M001401	UG/KG	410.00	U	Benzo(a)anthracene	261.00	1600.00	0.26
009M001401	UG/KG	410.00	U	Benzo(a)pyrene	430.00	1600.00	0.26
009M001401	UG/KG	140.00	J	Chrysene	384.00	2800.00	0.05
009M001401	UG/KG	410.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.58
009M001401	UG/KG	120.00	J	Fluoranthene	600.00	5100.00	0.02
009M001401	UG/KG	160.00		Fluorene	19.00	540.00	0.30
009M001401	UG/KG	410.00	U	Naphthalene	160.00	2100.00	0.20
009M001401	UG/KG	150.00	J	Phenanthrene	240.00	1500.00	0.10
009M001401	UG/KG	110.00	J	Pyrene	665.00	2600.00	0.04
				ERM Quotient Sum			9.63
009M001401				Mean ERM Quotient			0.39
009M001401				Mean ERM Quotient without ND			0.27

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009M001501	MG/KG	8.50		Arsenic (As)	8.20	70.00	0.12
009M001501	MG/KG	0.62		Cadmium (Cd)	1.20	9.60	0.06
009M001501	MG/KG	40.80		Chromium (Cr)	81.00	370.00	0.11
009M001501	MG/KG	25.40		Copper (Cu)	34.00	270.00	0.09
009M001501	MG/KG	74.20		Lead (Pb)	46.70	218.00	0.34
009M001501	MG/KG	0.15		Mercury (Hg)	0.15	0.71	0.21
009M001501	MG/KG	17.90		Nickel (Ni)	20.90	51.60	0.35
009M001501	MG/KG	0.18	U	Silver (Ag)	1.00	3.70	0.05
009M001501	MG/KG	131.00		Zinc (Zn)	150.00	410.00	0.32
009M001501	UG/KG	15.00		4,4'-DDE	2.20	27.00	0.56
009M001501	UG/KG	51.00		4,4'-DDT	1.58	46.10	1.11
009M001501	UG/KG	1190.00		Total PCBs	22.70	180.00	6.61
009M001501	UG/KG	70.00	U	2-Methylnaphthalene	70.00	670.00	0.10
009M001501	UG/KG	70.00	U	Acenaphthene	16.00	500.00	0.14
009M001501	UG/KG	70.00	U	Acenaphthylene	44.00	640.00	0.11
009M001501	UG/KG	70.00	U	Anthracene	85.30	1100.00	0.06
009M001501	UG/KG	350.00	U	Benzo(a)anthracene	261.00	1600.00	0.22
009M001501	UG/KG	350.00	U	Benzo(a)pyrene	430.00	1600.00	0.22
009M001501	UG/KG	350.00	U	Chrysene	384.00	2800.00	0.13
009M001501	UG/KG	350.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.35
009M001501	UG/KG	100.00	J	Fluoranthene	600.00	5100.00	0.02
009M001501	UG/KG	70.00	U	Fluorene	19.00	540.00	0.13
009M001501	UG/KG	350.00	U	Naphthalene	160.00	2100.00	0.17
009M001501	UG/KG	350.00	U	Phenanthrene	240.00	1500.00	0.23
009M001501	UG/KG	130.00	J	Pyrene	665.00	2600.00	0.05
				ERM Quotient Sum			12.86
009M001501				Mean ERM Quotient			0.51
009M001501				Mean ERM Quotient without ND			0.40
009N001001	MG/KG	8.10	U	Arsenic (As)	8.20	70.00	0.12
009N001001	MG/KG	0.62	UJ	Cadmium (Cd)	1.20	9.60	0.06
009N001001	MG/KG	55.70		Chromium (Cr)	81.00	370.00	0.15
009N001001	MG/KG	51.90	J	Copper (Cu)	34.00	270.00	0.19
009N001001	MG/KG	24.60	UJ	Lead (Pb)	46.70	218.00	0.11
009N001001	MG/KG	0.09	UJ	Mercury (Hg)	0.15	0.71	0.13
009N001001	MG/KG	18.90		Nickel (Ni)	20.90	51.60	0.37
009N001001	MG/KG	1.10	UJ	Silver (Ag)	1.00	3.70	0.30
009N001001	MG/KG	95.40		Zinc (Zn)	150.00	410.00	0.23
009N001001	UG/KG	6.40		4,4'-DDE	2.20	27.00	0.24
009N001001	UG/KG	3.30	U	4,4'-DDT	1.58	46.10	0.07
009N001001	UG/KG	93.30		Total PCBs	22.70	180.00	0.52
009N001001	UG/KG	330.00	U	2-Methylnaphthalene	70.00	670.00	0.49
009N001001	UG/KG	330.00	U	Acenaphthene	16.00	500.00	0.66
009N001001	UG/KG	330.00	U	Acenaphthylene	44.00	640.00	0.52
009N001001	UG/KG	330.00	U	Anthracene	85.30	1100.00	0.30
009N001001	UG/KG	330.00	U	Benzo(a)anthracene	261.00	1600.00	0.21
009N001001	UG/KG	330.00	U	Benzo(a)pyrene	430.00	1600.00	0.21
009N001001	UG/KG	330.00	U	Chrysene	384.00	2800.00	0.12
009N001001	UG/KG	330.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.27
009N001001	UG/KG	61.50	J	Fluoranthene	600.00	5100.00	0.01
009N001001	UG/KG	330.00	U	Fluorene	19.00	540.00	0.61
009N001001	UG/KG	330.00	U	Naphthalene	160.00	2100.00	0.16
009N001001	UG/KG	330.00	U	Phenanthrene	240.00	1500.00	0.22
009N001001	UG/KG	64.90	J	Pyrene	665.00	2600.00	0.02
				ERM Quotient Sum			7.28
009N001001				Mean ERM Quotient			0.29
009N001001				Mean ERM Quotient without ND			0.07

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
009N001501	MG/KG	15.60		Arsenic (As)	8.20	70.00	0.22
009N001501	MG/KG	0.87	J	Cadmium (Cd)	1.20	9.60	0.09
009N001501	MG/KG	71.50		Chromium (Cr)	81.00	370.00	0.19
009N001501	MG/KG	22.80	UJ	Copper (Cu)	34.00	270.00	0.08
009N001501	MG/KG	54.90		Lead (Pb)	46.70	218.00	0.25
009N001501	MG/KG	0.11	UJ	Mercury (Hg)	0.15	0.71	0.15
009N001501	MG/KG	24.50		Nickel (Ni)	20.90	51.60	0.47
009N001501	MG/KG	0.37	UJ	Silver (Ag)	1.00	3.70	0.10
009N001501	MG/KG	125.00		Zinc (Zn)	150.00	410.00	0.30
009N001501	UG/KG	3.70	J	4,4'-DDE	2.20	27.00	0.14
009N001501	UG/KG	3.30	U	4,4'-DDT	1.58	46.10	0.07
009N001501	UG/KG	352.00		Total PCBs	22.70	180.00	1.96
009N001501	UG/KG	330.00	U	2-Methylnaphthalene	70.00	670.00	0.49
009N001501	UG/KG	330.00	U	Acenaphthene	16.00	500.00	0.66
009N001501	UG/KG	330.00	U	Acenaphthylene	44.00	640.00	0.52
009N001501	UG/KG	330.00	U	Anthracene	85.30	1100.00	0.30
009N001501	UG/KG	75.00	J	Benzo(a)anthracene	261.00	1600.00	0.05
009N001501	UG/KG	330.00	U	Benzo(a)pyrene	430.00	1600.00	0.21
009N001501	UG/KG	90.00	J	Chrysene	384.00	2800.00	0.03
009N001501	UG/KG	330.00	U	Dibenz(a,h)anthracene	63.40	260.00	1.27
009N001501	UG/KG	148.00	J	Fluoranthene	600.00	5100.00	0.03
009N001501	UG/KG	330.00	U	Fluorene	19.00	540.00	0.61
009N001501	UG/KG	330.00	U	Naphthalene	160.00	2100.00	0.16
009N001501	UG/KG	330.00	U	Phenanthrene	240.00	1500.00	0.22
009N001501	UG/KG	162.00	J	Pyrene	665.00	2600.00	0.06
				ERM Quotient Sum			8.64
009N001501				Mean ERM Quotient			0.35
009N001501				Mean ERM Quotient without ND			0.15
196M000101	MG/KG	6.10		Arsenic (As)	8.20	70.00	0.09
196M000101	MG/KG	0.19	J	Cadmium (Cd)	1.20	9.60	0.02
196M000101	MG/KG	45.50	J	Chromium (Cr)	81.00	370.00	0.12
196M000101	MG/KG	16.30		Copper (Cu)	34.00	270.00	0.06
196M000101	MG/KG	18.40		Lead (Pb)	46.70	218.00	0.08
196M000101	MG/KG	0.04		Mercury (Hg)	0.15	0.71	0.06
196M000101	MG/KG	8.30		Nickel (Ni)	20.90	51.60	0.16
196M000101	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000101	MG/KG	63.00	J	Zinc (Zn)	150.00	410.00	0.15
196M000101	UG/KG	64.00	U	4,4'-DDE	2.20	27.00	2.37
196M000101	UG/KG	64.00	U	4,4'-DDT	1.58	46.10	1.39
196M000101	UG/KG	294.00	U	Total PCBs	22.70	180.00	1.63
196M000101	UG/KG	52.00	J	2-Methylnaphthalene	70.00	670.00	0.08
196M000101	UG/KG	850.00	U	Acenaphthene	16.00	500.00	1.70
196M000101	UG/KG	94.00	J	Acenaphthylene	44.00	640.00	0.15
196M000101	UG/KG	850.00	U	Anthracene	85.30	1100.00	0.77
196M000101	UG/KG	860.00		Benzo(a)anthracene	261.00	1600.00	0.54
196M000101	UG/KG	1600.00		Benzo(a)pyrene	430.00	1600.00	1.00
196M000101	UG/KG	970.00		Chrysene	384.00	2800.00	0.35
196M000101	UG/KG	850.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.27
196M000101	UG/KG	2400.00		Fluoranthene	600.00	5100.00	0.47
196M000101	UG/KG	850.00	U	Fluorene	19.00	540.00	1.57
196M000101	UG/KG	200.00	J	Naphthalene	160.00	2100.00	0.10
196M000101	UG/KG	850.00	U	Phenanthrene	240.00	1500.00	0.57
196M000101	UG/KG	6300.00		Pyrene	665.00	2600.00	2.42
				ERM Quotient Sum			19.15
196M000101				Mean ERM Quotient			0.77
196M000101				Mean ERM Quotient without ND			0.23

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
196M000102	MG/KG	6.50		Arsenic (As)	8.20	70.00	0.09
196M000102	MG/KG	0.14	J	Cadmium (Cd)	1.20	9.60	0.01
196M000102	MG/KG	18.30	J	Chromium (Cr)	81.00	370.00	0.05
196M000102	MG/KG	11.90		Copper (Cu)	34.00	270.00	0.04
196M000102	MG/KG	20.30		Lead (Pb)	46.70	218.00	0.09
196M000102	MG/KG	0.12		Mercury (Hg)	0.15	0.71	0.17
196M000102	MG/KG	7.50		Nickel (Ni)	20.90	51.60	0.15
196M000102	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000102	MG/KG	40.40	J	Zinc (Zn)	150.00	410.00	0.10
196M000102	UG/KG	62.00	U	4,4'-DDE	2.20	27.00	2.30
196M000102	UG/KG	62.00	U	4,4'-DDT	1.58	46.10	1.34
196M000102	UG/KG	287.00	U	Total PCBs	22.70	180.00	1.59
196M000102	UG/KG	820.00	U	2-Methylnaphthalene	70.00	670.00	1.22
196M000102	UG/KG	820.00	U	Acenaphthene	16.00	500.00	1.64
196M000102	UG/KG	48.00	J	Acenaphthylene	44.00	640.00	0.08
196M000102	UG/KG	87.00	J	Anthracene	85.30	1100.00	0.08
196M000102	UG/KG	360.00	J	Benzo(a)anthracene	261.00	1600.00	0.23
196M000102	UG/KG	290.00	J	Benzo(a)pyrene	430.00	1600.00	0.18
196M000102	UG/KG	180.00	J	Chrysene	384.00	2800.00	0.06
196M000102	UG/KG	820.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.15
196M000102	UG/KG	2000.00		Fluoranthene	600.00	5100.00	0.39
196M000102	UG/KG	820.00	U	Fluorene	19.00	540.00	1.52
196M000102	UG/KG	150.00	J	Naphthalene	160.00	2100.00	0.07
196M000102	UG/KG	81.00	J	Phenanthrene	240.00	1500.00	0.05
196M000102	UG/KG	2700.00		Pyrene	665.00	2600.00	1.04
				ERM Quotient Sum			15.69
196M000102				Mean ERM Quotient			0.63
196M000102				Mean ERM Quotient without ND			0.12
196M000103	MG/KG	5.60		Arsenic (As)	8.20	70.00	0.08
196M000103	MG/KG	0.10	J	Cadmium (Cd)	1.20	9.60	0.01
196M000103	MG/KG	11.80	J	Chromium (Cr)	81.00	370.00	0.03
196M000103	MG/KG	10.90		Copper (Cu)	34.00	270.00	0.04
196M000103	MG/KG	17.30		Lead (Pb)	46.70	218.00	0.08
196M000103	MG/KG	0.06		Mercury (Hg)	0.15	0.71	0.08
196M000103	MG/KG	4.80		Nickel (Ni)	20.90	51.60	0.09
196M000103	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000103	MG/KG	44.50	J	Zinc (Zn)	150.00	410.00	0.11
196M000103	UG/KG	57.00	U	4,4'-DDE	2.20	27.00	2.11
196M000103	UG/KG	57.00	U	4,4'-DDT	1.58	46.10	1.24
196M000103	UG/KG	301.00	U	Total PCBs	22.70	180.00	1.67
196M000103	UG/KG	40.00	J	2-Methylnaphthalene	70.00	670.00	0.06
196M000103	UG/KG	780.00	U	Acenaphthene	16.00	500.00	1.56
196M000103	UG/KG	46.00	J	Acenaphthylene	44.00	640.00	0.07
196M000103	UG/KG	64.00	J	Anthracene	85.30	1100.00	0.06
196M000103	UG/KG	220.00	J	Benzo(a)anthracene	261.00	1600.00	0.14
196M000103	UG/KG	220.00	J	Benzo(a)pyrene	430.00	1600.00	0.14
196M000103	UG/KG	190.00	J	Chrysene	384.00	2800.00	0.07
196M000103	UG/KG	80.00	J	Dibenz(a,h)anthracene	63.40	260.00	0.31
196M000103	UG/KG	230.00	J	Fluoranthene	600.00	5100.00	0.05
196M000103	UG/KG	780.00	U	Fluorene	19.00	540.00	1.44
196M000103	UG/KG	140.00	J	Naphthalene	160.00	2100.00	0.07
196M000103	UG/KG	79.00	J	Phenanthrene	240.00	1500.00	0.05
196M000103	UG/KG	1100.00		Pyrene	665.00	2600.00	0.42
				ERM Quotient Sum			10.01
196M000103				Mean ERM Quotient			0.40
196M000103				Mean ERM Quotient without ND			0.08

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
196M000201	MG/KG	6.70		Arsenic (As)	8.20	70.00	0.10
196M000201	MG/KG	0.05	J	Cadmium (Cd)	1.20	9.60	0.01
196M000201	MG/KG	38.40	J	Chromium (Cr)	81.00	370.00	0.10
196M000201	MG/KG	30.60		Copper (Cu)	34.00	270.00	0.11
196M000201	MG/KG	28.00		Lead (Pb)	46.70	218.00	0.13
196M000201	MG/KG	0.10		Mercury (Hg)	0.15	0.71	0.14
196M000201	MG/KG	9.50		Nickel (Ni)	20.90	51.60	0.18
196M000201	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000201	MG/KG	69.90	J	Zinc (Zn)	150.00	410.00	0.17
196M000201	UG/KG	60.00	U	4,4'-DDE	2.20	27.00	2.22
196M000201	UG/KG	60.00	U	4,4'-DDT	1.58	46.10	1.30
196M000201	UG/KG	398.50		Total PCBs	22.70	180.00	2.21
196M000201	UG/KG	52.00	J	2-Methylnaphthalene	70.00	670.00	0.08
196M000201	UG/KG	720.00	U	Acenaphthene	16.00	500.00	1.44
196M000201	UG/KG	62.00	J	Acenaphthylene	44.00	640.00	0.10
196M000201	UG/KG	110.00	J	Anthracene	85.30	1100.00	0.10
196M000201	UG/KG	250.00	J	Benzo(a)anthracene	261.00	1600.00	0.16
196M000201	UG/KG	590.00	J	Benzo(a)pyrene	430.00	1600.00	0.37
196M000201	UG/KG	220.00	J	Chrysene	384.00	2800.00	0.08
196M000201	UG/KG	720.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.77
196M000201	UG/KG	450.00	J	Fluoranthene	600.00	5100.00	0.09
196M000201	UG/KG	720.00	U	Fluorene	19.00	540.00	1.33
196M000201	UG/KG	97.00	J	Naphthalene	160.00	2100.00	0.05
196M000201	UG/KG	70.00	J	Phenanthrene	240.00	1500.00	0.05
196M000201	UG/KG	1600.00		Pyrene	665.00	2600.00	0.62
				ERM Quotient Sum			13.93
196M000201				Mean ERM Quotient			0.56
196M000201				Mean ERM Quotient without ND			0.19
196M000202	MG/KG	14.90		Arsenic (As)	8.20	70.00	0.21
196M000202	MG/KG	0.07	J	Cadmium (Cd)	1.20	9.60	0.01
196M000202	MG/KG	12.90	J	Chromium (Cr)	81.00	370.00	0.03
196M000202	MG/KG	13.20		Copper (Cu)	34.00	270.00	0.05
196M000202	MG/KG	150.00		Lead (Pb)	46.70	218.00	0.69
196M000202	MG/KG	0.04		Mercury (Hg)	0.15	0.71	0.06
196M000202	MG/KG	6.10		Nickel (Ni)	20.90	51.60	0.12
196M000202	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000202	MG/KG	74.10	J	Zinc (Zn)	150.00	410.00	0.18
196M000202	UG/KG	72.00	U	4,4'-DDE	2.20	27.00	2.67
196M000202	UG/KG	72.00	U	4,4'-DDT	1.58	46.10	1.56
196M000202	UG/KG	336.00	U	Total PCBs	22.70	180.00	1.87
196M000202	UG/KG	920.00	U	2-Methylnaphthalene	70.00	670.00	1.37
196M000202	UG/KG	920.00	U	Acenaphthene	16.00	500.00	1.84
196M000202	UG/KG	920.00	U	Acenaphthylene	44.00	640.00	1.44
196M000202	UG/KG	46.00	J	Anthracene	85.30	1100.00	0.04
196M000202	UG/KG	97.00	J	Benzo(a)anthracene	261.00	1600.00	0.06
196M000202	UG/KG	120.00	J	Benzo(a)pyrene	430.00	1600.00	0.08
196M000202	UG/KG	91.00	J	Chrysene	384.00	2800.00	0.03
196M000202	UG/KG	920.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.54
196M000202	UG/KG	210.00	J	Fluoranthene	600.00	5100.00	0.04
196M000202	UG/KG	920.00	U	Fluorene	19.00	540.00	1.70
196M000202	UG/KG	160.00	J	Naphthalene	160.00	2100.00	0.08
196M000202	UG/KG	85.00	J	Phenanthrene	240.00	1500.00	0.06
196M000202	UG/KG	380.00	J	Pyrene	665.00	2600.00	0.15
				ERM Quotient Sum			17.90
196M000202				Mean ERM Quotient			0.72
196M000202				Mean ERM Quotient without ND			0.08

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
196M000203	MG/KG	8.70		Arsenic (As)	8.20	70.00	0.12
196M000203	MG/KG	0.03	U	Cadmium (Cd)	1.20	9.60	0.00
196M000203	MG/KG	10.70	J	Chromium (Cr)	81.00	370.00	0.03
196M000203	MG/KG	12.30		Copper (Cu)	34.00	270.00	0.05
196M000203	MG/KG	27.20		Lead (Pb)	46.70	218.00	0.12
196M000203	MG/KG	0.04		Mercury (Hg)	0.15	0.71	0.06
196M000203	MG/KG	3.80	J	Nickel (Ni)	20.90	51.60	0.07
196M000203	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000203	MG/KG	42.00	J	Zinc (Zn)	150.00	410.00	0.10
196M000203	UG/KG	59.00	U	4,4'-DDE	2.20	27.00	2.19
196M000203	UG/KG	59.00	U	4,4'-DDT	1.58	46.10	1.28
196M000203	UG/KG	262.50	U	Total PCBs	22.70	180.00	1.46
196M000203	UG/KG	770.00	U	2-Methylnaphthalene	70.00	670.00	1.15
196M000203	UG/KG	770.00	U	Acenaphthene	16.00	500.00	1.54
196M000203	UG/KG	46.00	J	Acenaphthylene	44.00	640.00	0.07
196M000203	UG/KG	47.00	J	Anthracene	85.30	1100.00	0.04
196M000203	UG/KG	72.00	J	Benzo(a)anthracene	261.00	1600.00	0.05
196M000203	UG/KG	82.00	J	Benzo(a)pyrene	430.00	1600.00	0.05
196M000203	UG/KG	62.00	J	Chrysene	384.00	2800.00	0.02
196M000203	UG/KG	770.00	U	Dibenz(a,h)anthracene	63.40	260.00	2.96
196M000203	UG/KG	140.00	J	Fluoranthene	600.00	5100.00	0.03
196M000203	UG/KG	770.00	U	Fluorene	19.00	540.00	1.43
196M000203	UG/KG	200.00	J	Naphthalene	160.00	2100.00	0.10
196M000203	UG/KG	130.00	J	Phenanthrene	240.00	1500.00	0.09
196M000203	UG/KG	770.00	U	Pyrene	665.00	2600.00	0.30
				ERM Quotient Sum			13.33
196M000203				Mean ERM Quotient			0.53
196M000203				Mean ERM Quotient without ND			0.04
196M000301	MG/KG	3.60		Arsenic (As)	8.20	70.00	0.05
196M000301	MG/KG	0.21	J	Cadmium (Cd)	1.20	9.60	0.02
196M000301	MG/KG	45.40	J	Chromium (Cr)	81.00	370.00	0.12
196M000301	MG/KG	31.30		Copper (Cu)	34.00	270.00	0.12
196M000301	MG/KG	33.60		Lead (Pb)	46.70	218.00	0.15
196M000301	MG/KG	0.19		Mercury (Hg)	0.15	0.71	0.27
196M000301	MG/KG	8.30		Nickel (Ni)	20.90	51.60	0.16
196M000301	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000301	MG/KG	105.00	J	Zinc (Zn)	150.00	410.00	0.26
196M000301	UG/KG	50.00	U	4,4'-DDE	2.20	27.00	1.85
196M000301	UG/KG	50.00	U	4,4'-DDT	1.58	46.10	1.08
196M000301	UG/KG	380.50		Total PCBs	22.70	180.00	2.11
196M000301	UG/KG	39.00	J	2-Methylnaphthalene	70.00	670.00	0.06
196M000301	UG/KG	660.00	U	Acenaphthene	16.00	500.00	1.32
196M000301	UG/KG	660.00	U	Acenaphthylene	44.00	640.00	1.03
196M000301	UG/KG	41.00	J	Anthracene	85.30	1100.00	0.04
196M000301	UG/KG	130.00	J	Benzo(a)anthracene	261.00	1600.00	0.08
196M000301	UG/KG	130.00	J	Benzo(a)pyrene	430.00	1600.00	0.08
196M000301	UG/KG	170.00	J	Chrysene	384.00	2800.00	0.06
196M000301	UG/KG	44.00	J	Dibenz(a,h)anthracene	63.40	260.00	0.17
196M000301	UG/KG	270.00	J	Fluoranthene	600.00	5100.00	0.05
196M000301	UG/KG	660.00	U	Fluorene	19.00	540.00	1.22
196M000301	UG/KG	56.00	J	Naphthalene	160.00	2100.00	0.03
196M000301	UG/KG	78.00	J	Phenanthrene	240.00	1500.00	0.05
196M000301	UG/KG	320.00	J	Pyrene	665.00	2600.00	0.12
				ERM Quotient Sum			10.55
196M000301				Mean ERM Quotient			0.42
196M000301				Mean ERM Quotient without ND			0.16

Shipyard Creek
Sediment Mean ERM Quotients

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
196M000302	MG/KG	5.00		Arsenic (As)	8.20	70.00	0.07
196M000302	MG/KG	0.38	J	Cadmium (Cd)	1.20	9.60	0.04
196M000302	MG/KG	27.80	J	Chromium (Cr)	81.00	370.00	0.08
196M000302	MG/KG	29.10		Copper (Cu)	34.00	270.00	0.11
196M000302	MG/KG	25.60		Lead (Pb)	46.70	218.00	0.12
196M000302	MG/KG	0.19		Mercury (Hg)	0.15	0.71	0.27
196M000302	MG/KG	8.00		Nickel (Ni)	20.90	51.60	0.16
196M000302	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000302	MG/KG	77.70	J	Zinc (Zn)	150.00	410.00	0.19
196M000302	UG/KG	130.00	J	4,4'-DDE	2.20	27.00	4.81
196M000302	UG/KG	64.00	J	4,4'-DDT	1.58	46.10	1.39
196M000302	UG/KG	477.00		Total PCBs	22.70	180.00	2.65
196M000302	UG/KG	810.00	U	2-Methylnaphthalene	70.00	670.00	1.21
196M000302	UG/KG	810.00	U	Acenaphthene	16.00	500.00	1.62
196M000302	UG/KG	810.00	U	Acenaphthylene	44.00	640.00	1.27
196M000302	UG/KG	810.00	U	Anthracene	85.30	1100.00	0.74
196M000302	UG/KG	100.00	J	Benzo(a)anthracene	261.00	1600.00	0.06
196M000302	UG/KG	110.00	J	Benzo(a)pyrene	430.00	1600.00	0.07
196M000302	UG/KG	78.00	J	Chrysene	384.00	2800.00	0.03
196M000302	UG/KG	810.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.12
196M000302	UG/KG	360.00	J	Fluoranthene	600.00	5100.00	0.07
196M000302	UG/KG	810.00	U	Fluorene	19.00	540.00	1.50
196M000302	UG/KG	83.00	J	Naphthalene	160.00	2100.00	0.04
196M000302	UG/KG	48.00	J	Phenanthrene	240.00	1500.00	0.03
196M000302	UG/KG	370.00	J	Pyrene	665.00	2600.00	0.14
				ERM Quotient Sum			19.80
196M000302				Mean ERM Quotient			0.79
196M000302				Mean ERM Quotient without ND			0.41
196M000303	MG/KG	5.40		Arsenic (As)	8.20	70.00	0.08
196M000303	MG/KG	0.23	J	Cadmium (Cd)	1.20	9.60	0.02
196M000303	MG/KG	14.80	J	Chromium (Cr)	81.00	370.00	0.04
196M000303	MG/KG	6.90		Copper (Cu)	34.00	270.00	0.03
196M000303	MG/KG	7.40		Lead (Pb)	46.70	218.00	0.03
196M000303	MG/KG	0.02	J	Mercury (Hg)	0.15	0.71	0.03
196M000303	MG/KG	6.20		Nickel (Ni)	20.90	51.60	0.12
196M000303	MG/KG	0.12	U	Silver (Ag)	1.00	3.70	0.03
196M000303	MG/KG	27.80	J	Zinc (Zn)	150.00	410.00	0.07
196M000303	UG/KG	65.00	U	4,4'-DDE	2.20	27.00	2.41
196M000303	UG/KG	65.00	U	4,4'-DDT	1.58	46.10	1.41
196M000303	UG/KG	283.50	U	Total PCBs	22.70	180.00	1.58
196M000303	UG/KG	890.00	U	2-Methylnaphthalene	70.00	670.00	1.33
196M000303	UG/KG	890.00	U	Acenaphthene	16.00	500.00	1.78
196M000303	UG/KG	890.00	U	Acenaphthylene	44.00	640.00	1.39
196M000303	UG/KG	890.00	U	Anthracene	85.30	1100.00	0.81
196M000303	UG/KG	890.00	U	Benzo(a)anthracene	261.00	1600.00	0.56
196M000303	UG/KG	890.00	U	Benzo(a)pyrene	430.00	1600.00	0.56
196M000303	UG/KG	890.00	U	Chrysene	384.00	2800.00	0.32
196M000303	UG/KG	890.00	U	Dibenz(a,h)anthracene	63.40	260.00	3.42
196M000303	UG/KG	50.00	J	Fluoranthene	600.00	5100.00	0.01
196M000303	UG/KG	890.00	U	Fluorene	19.00	540.00	1.65
196M000303	UG/KG	59.00	J	Naphthalene	160.00	2100.00	0.03
196M000303	UG/KG	890.00	U	Phenanthrene	240.00	1500.00	0.59
196M000303	UG/KG	890.00	U	Pyrene	665.00	2600.00	0.34
				ERM Quotient Sum			18.62
196M000303				Mean ERM Quotient			0.74
196M000303				Mean ERM Quotient without ND			0.02

Notes:

ERL = Effects Range-Low
ERM = Effects Range-Median
J = Estimated Number
ND = Not Detected
U = Sample Quantitation Limit
VQUAL = Validation Qualifier

APPENDIX H

ZONE J COOPER RIVER SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA
CTO-0164

ZONE J COOPER RIVER SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT TECHNICAL MEMORANDUM PROGRESS REPORT

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1.0 INTRODUCTION

Background

The screening level ecological risk assessment (SLERA) for Cooper River is one part of the Zone J investigation of three water bodies that surround the Charleston Naval Complex (CNC).[1] Each Zone J water body, although part of one dynamic watershed, differs in size, flow, and level of near-shore industrialization. Therefore, it was necessary to segregate the data collected from each water body and assess the Cooper River, Noisette Creek, and Shipyard Creek separately.

For detailed descriptions of each Zone J water body, surrounding land uses, and known locations of near-shore AOC/SWMUs, see Section 1 of the *Zone J Storm Water Effluent Evaluation Report* (EnSafe October 2003), which details storm water discharge points to Noisette Creek and the other water bodies. It also summarizes findings of previous independent studies conducted in the Charleston Harbor and surrounding tidal creeks, including information on the system's hydrography, physical dynamics, biological communities, contaminants, and toxicity.

Purpose of SLERA and Progress Report

This SLERA evaluates all potential exposure pathways and contaminant migration pathways in the Cooper River. It will document the constituents present in the creek's environmental media at concentrations that may pose unacceptable ecological risk. This evaluation will screen constituents in the following migration pathways: (1) effluent via the storm water drainage system, (2) surface water overland flow, and (3) groundwater discharge into the Cooper River. These migration pathways will be evaluated by screening the constituents in storm water drainage system effluent water samples, surface soil samples at SWMUs and AOCs[2] adjacent to (and draining directly into) the Cooper River, and groundwater from wells closest to the river. These contaminant migration pathways will be used not only to evaluate the potential for unacceptable risk, but also to identify potential upgradient sources for any unacceptable exposure within Cooper River habitats.

This progress report documents Steps 1 and 2 of EPA's 8-step ecological risk assessment process[3] as well as its contaminant of potential concern (COPC) refinement. Its purpose is to provide risk managers with data they need to determine the final list of COPCs and evaluate whether any additional site-specific investigations or remedial alternatives are needed to deal with ecological risk in the Cooper River. The Navy will provide screening constituents for the surface water overland flow and groundwater discharge migration pathways; as soon as data are incorporated, this report will need to be revised.

[1] Zone J consists of the Cooper River, Shipyard Creek, and Noisette Creek, which adjoin CNC properties.
[2] Solid waste management units and areas of concern
[3] Screening level problem formulation and exposure estimate and risk calculation

2.0 STEP 1 – SCREENING LEVEL PROBLEM FORMULATION

2.1 Zone J and Cooper River Description

The Charleston Naval Complex (CNC) flanks the western shore of the Cooper River, approximately 6.75 miles upriver from Fort Sumter (Figure 2-1). CNC's 3.75-mile waterfront is dominated by 25 piers and five dry docks; most of its length is protected by a wooden or concrete seawall. Large ships are repaired and maintained all along the industrial areas of CNC. Industrial areas also border the Cooper River.

The Cooper River, the largest Zone J water body, flows south past CNC and ultimately empties into the Charleston Harbor. Several areas of fringe wetland and salt marsh bordering CNC's less- industrialized northern and southern portions. These sensitive wetland areas, some some of which are quite large, remain from the marshland that once covered the entire CNC peninsula. Instead of a quay wall, riprap interspersed with a variety of solid waste, primarily concrete construction debris has been used to control erosion along the non-industrialized portions of the CNC shoreline and is interspersed with a variety of solid waste, primarily concrete construction debris. Water quality for the Harbor, including the Zone J water bodies, is rated "SC", which applies to tidal salt waters suitable for secondary contact recreation, crabbing, and fishing, except for harvesting clams, mussels, or oysters for sale or personal consumption (SCDHEC, 1996).

The harbor, formed by the confluence of the Cooper, Ashley, and Wando Rivers, ranks as the third-largest estuarine drainage area in South Carolina. The 26,000+ hectares of coastal marshlands and open-water habitat support a diverse population of flora and fauna, including more than 80 species of macrophytes, 580 planktonic taxa, and more than 570 macroinvertebrate and finfish species (VanDolah et al., 1990). The harbor also supports large populations of commercially harvested white and brown shrimp and blue crab, as well as important recreational species, including red drum, spotted sea trout, flounder, spot, Atlantic croaker, and catfish. Habitat types such as mud flats and Spartina and cattail marshes line the Cooper River. Along the stretch of the river associated with CNC, most of this habitat type has grown along the southern end of CNC around the Cooper River's confluence with Shipyard Creek.

Avian fauna dominate the wildlife types across the base, with smaller mammal species such as raccoon, opossum, and rabbit most likely to live in undeveloped portions of the base. A variety of reptiles, amphibians, passerine bird species, and smaller raptors typical of the southeastern U.S. occur across the base. Avian species associated with aquatic environments (shorebirds) are plentiful.

Threatened and endangered species in the area include least terns, which have formed colonies on CNS building rooftops. Wading bird colonies of species such as herons and egrets live in

isolated areas of CNC. Special status marine species likely to occur in local waters include the loggerhead turtle, Kemp's Ridley sea turtle, West Indian manatee, and the short-nose sturgeon.

For details on the history of the Cooper River and Charleston Harbor, see the *Zone J Storm Water Effluent Evaluation Report* (EnSafe December 2002).

2.2 Cooper River Hydrodynamics

The Charleston Harbor Estuary, a complex tidal estuarine system made up of the Charleston Harbor, Cooper River, Ashley River, Wando River, and other small tributaries, covers more than 100 square miles (mi^2) of coastal marshlands and open water habitat. The hydrodynamics of the Cooper River are mostly dominated by the tidal currents generated by the tidal propagation. Although freshwater inflows play a secondary role in the hydrodynamics of the river, they affect water quality, salinity distribution, and aquatic habitat in the system in important ways. The effects on long-term pollutant transport and flushing are also important.

2.2.1 Freshwater Inflow

The Cooper River, the largest freshwater source of the Charleston Harbor Estuary, has been impacted by human activities more than the other tributaries. The Cooper River began as a small tidal river with an average freshwater flow rate of 70 cubic feet per second (cfs) (2 cubic meters per second [m^3/sec]) (Conrads, et al., 1997). The combined discharge of the Ashley, Cooper, and Wando Rivers was only 353 cfs (10 m^3/sec) (U.S. Army Corps of Engineers [USACE], 1966).

In 1942, the South Carolina Public Service Authority (SCPSA) completed the first Cooper River diversion project, which was to provide hydroelectric power to the Santee-Cooper area. This project involved construction of the Wilson Dam on the Santee River to form Lake Marion, construction of the Pinopolis Dam at the headwaters of the Cooper River to form Lake Moultrie, and construction of a 7.5-mile canal between the two lakes through which approximately 88 percent of the freshwater flow from the Santee River was directed to the Cooper River (Little, 1974; Kjerfve, 1976; Kjerfve and Magill, 1990; USACE, 1975). The diversion project increased the Cooper River drainage area to 15,700 mi^2 (Neiheisel and Weaver, 1967) and consequently increased the average freshwater flow into the Cooper River to approximately 15,600 cfs (442 m^3/sec) (Kjerfve, 1976). This reduced mean salinity in the harbor from 30.0 to 16.8 parts per thousand (ppt) (Zelter, 1953). The freshwater diversion also resulted in greater density stratification in the estuary. In addition, the increased sediment load to the Cooper River, associated with the increased freshwater flow, caused significant sedimentation in the Cooper River. As a result, significant dredging was required to maintain the navigation channel.

To alleviate the shoaling problems attributed to the 1942 diversion project and still maintain the potential for hydroelectric power generation, the USACE completed the Cooper River Rediversion Project in August 1985. This project redirected approximately 70 percent of the water flow from the Cooper River back into the Santee River through a new 11.5-mile canal near St. Stephens, South Carolina. Since rediversion, the monthly mean flow into the Cooper River has been reduced to approximately 4,500 cfs. According to Cooney et al. (1996), the mean annual flows from Pinopolis Dam to the West Branch Cooper River were 5,470 in 1993 and 5,270 cfs in1994. The USACE estimated a reduction in shoaling by 40 to 70 percent after the rediversion project was complete.

2.2.2 Tides

According to the NOAA tide tables (2002a), the mean tidal range at Fort Sumter near the Charleston Harbor entrance is 5.09 ft and the spring tide range is 5.90 ft. The tide range is amplified when the tidal wave propagates from the harbor entrance up the Cooper River. The tide range reaches its maximum near the north entrance of the Clouter Creek, about 3.3 miles north of Noisette Creek, where the mean and spring tide ranges are 5.48 and 6.36 ft, respectively. Farther upstream from this location, the tide range is gradually dampened.

2.2.3 Water Quality

Water quality data in the Cooper River were collected by the South Carolina Department of Health and Environmental Control at several locations: the Cooper River above Shipyard Creek (MD-045), the Cooper River at Noisette Creek (MD-773), and the Cooper River at I-526 (MD-248). Tables 2.1 to 2.3 present the water quality data summary at MD-045, MD-773, and MD-248, respectively.

Table 2.1
Water Quality Data at Cooper River above Shipyard Creek (MD-045), 1999-2000

	Unit	Mean	Min	Max	Stdv	Sample #
Alkalinity, Carbonate as $CaCO_3$	mg/L	73.06	56	100	11.55	18
Biochemical Oxygen Demand	mg/L	0.54	ND	1.6	0.50	18
Cadmium	µg/L	ND	ND	ND	NA	7
Chromium	µg/L	ND	ND	ND	NA	7
Copper	µg/L	ND	ND	ND	NA	7
Dissolved Oxygen	mg/L	6.48	4.71	9.44	1.46	20
Iron	µg/L	305.7	ND	770	189.5	7
Lead	µg/L	ND	ND	ND	NA	7

Table 2.1
Water Quality Data at Cooper River above Shipyard Creek (MD-045), 1999-2000

	Unit	Mean	Min	Max	Stdv	Sample #
Manganese	µg/L	10	ND	20	6.71	7
Mercury	µg/L	ND	ND	ND	NA	7
Nickel	µg/L	ND	ND	ND	NA	7
Nitrogen, ammonia (NH_3)	mg/L	0.15	ND	0.38	0.12	17
Nitrogen, Kjeldahl	mg/L	0.29	ND	0.51	0.12	22
Nitrogen, Nitrite (NO_2) + Nitrate (NO_3)	mg/L	0.084	0.04	0.25	0.049	22
pH	su	7.68	7.38	8.18	0.20	20
Phosphorus as P	mg/L	0.049	ND	0.11	0.0295	21
Salinity	ppt	17.6	8	28	5.3	21
Specific conductance	µmho/cm	25,567	14,000	40,000	7,279	21
Temperature, water	°C	21.8	12	31	6.3	21
Total Fecal Coliform	#/100mL	40.6	2	130	41.7	17
Total Organic Carbon	mg/L	3.34	2.5	5.1	0.96	7
Turbidity	NTU	9.91	1.7	55	13.61	18
Zinc	µg/L	5.71	ND	20	7.87	7

Notes:

°C	Degrees Celsius
µg/L	micrograms per liter
µmho/cm	micro siemens per centimeter
mg/L	milligrams per liter
NA	Not Applicable
ND	Not Detected; zero values used to calculate mean and standard deviation
NTU	Nephelometric Turbidity Units
ppt	parts per thousand
Stdv	Standard Deviation
su	Standard Unit

Table 2.2
Water Quality Data at Cooper River at Noisette Creek (MD-773), 1993

	Unit	Mean	Min	Max	Stdev	# Samples
Dissolved oxygen	mg/L	5.71	3.80	7.20	1.18	99
Chlorophyll a	µg/L	3.10	1.20	6.13	1.42	15
Nitrogen, ammonia (NH_3)	mg/L	0.051	0.050	0.060	0.0022	20
Unionized ammonia	mg/L	0.0014	0.00063	0.00367	0.00077	15
Nitrogen, Kjeldahl	mg/L	0.47	0.27	0.74	0.15	20
Nitrogen, Nitrite (NO_2) + Nitrate (NO_3)	mg/L	0.107	0.070	0.140	0.021	20
pH	su	7.62	7.20	8.20	0.26	15
Phosphorus as P	mg/L	0.09	0.02	0.32	0.066	20
Salinity	ppt	17.77	10.00	26.20	5.03	100
Specific conductance	µmho/cm	26,808	25	43,800	7,642	100
Temperature, water	°C	23.66	19.90	30.00	4.37	100

Table 2.3
Water Quality Data at Cooper River at I-526 (MD-248), 1999-2000

	Unit	Mean	Min	Max	Stdev	# Samples
Alkalinity, Carbonate as $CaCO_3$	mg/L	60.37	41	73	8.74	19
Biological Oxygen Demand	mg/L	0.49	ND	1.1	0.42	19
Cadmium	µg/L	ND	ND	ND	NA	7
Chromium	µg/L	ND	ND	ND	NA	7
Copper	µg/L	ND	ND	ND	NA	7
DO	mg/L	6.53	4.50	9.39	1.52	22
Iron	µg/L	262.9	ND	430	141.6	7
Lead	µg/L	ND	ND	ND	NA	7
Manganese	µg/L	14.29	ND	30	8.89	7
Mercury	µg/L	ND	ND	ND	NA	7

Table 2.3
Water Quality Data at Cooper River at I-526 (MD-248), 1999-2000

	Unit	Mean	Min	Max	Stdev	# Samples
Nickel	µg/L	ND	ND	ND	NA	7
Nitrogen, ammonia (NH_3)	mg/L	0.15	ND	0.27	0.08	19
Nitrogen, Kjeldahl	mg/L	0.32	ND	0.5	0.12	22
Nitrogen, Nitrite (NO_2) + Nitrate (NO_3)	mg/L	0.082	0.04	0.17	0.031	22
pH	su	7.66	7.17	8.40	0.28	21
Phosphorus as P	mg/L	0.050	ND	0.14	0.0322	21
Salinity	ppt	12.6	5	21	4.2	23
Specific conductance	µmho/cm	18,869	9,000	31,000	6,019	23
Temperature, water	°C	21.4	11.5	31	6.2	23
Total Fecal Coliform	#/100 mL	33.3	7	140	30.7	19
Total Organic Carbon	mg/L	3.77	1.7	10	2.13	7
Turbidity	NTU	5.09	1.7	10	2.24	19
Zinc	µg/L	15.71	ND	50	17.18	7

Salinity monitoring has been conducted by USGS in the Cooper River at the Army Depot near North Charleston since 1992. Continuous salinity data were recorded near water surface and near bottom. Statistical analysis of the salinity data indicated that the average near-surface salinity was 11.3 ppt and varied from 0.1 to 26.4 ppt. The average near-bottom salinity was 14.3 ppt and varied from 0.3 to 33.9 ppt. The average daily salinity fluctuation near-surface was 10.8 ppt, and the average daily salinity fluctuation near-bottom was 12.1 ppt. The average salinity difference from near-surface to near-bottom was 2.9 ppt. The data showed that the daily changes in salinity were much greater than vertical salinity stratification.

2.2.4 Drainage

Drainage basins were delineated based on information contained in the CNC drainage evaluation (Davis and Floyd, 1998), the North Charleston drainage inventory (Davis and Floyd, 1980), and USGS quadrangles. The total area that drains into the Cooper River along the CNC shoreline fronting the river is approximately 1,326 acres, including tidal marsh areas, and 440 acres of offsite drainage area. Tidal marsh areas cover approximately 37 acres within the CNC

property and 7 acres offsite. Therefore, the total upland drainage area (minus tidal marsh area) that drains into Cooper River basin along the property boundary is approximately 1,282 acres. Approximately 849 acres (approximately 66 percent) of the upland drainage area is in the CNC property. The remainder (433 acres) is in the City of North Charleston.

Eighty-six storm water outfalls in the Cooper River basin fall within the CNC boundary. The storm water effluent impacting the Cooper River is analyzed in the *Zone J Stormwater Effluent Evaluation Report Addendum* (EnSafe, December 2002). Runoff from offsite drainage areas drain into the Cooper River via Outfalls 38 and 37, a 42"x 60" box culvert.

2.2.5 Land Cover

Using the available GIS coverage for the CNC, the area of impervious cover and open space were computed. Land cover outside of the CNC was determined using aerial photographs, USGS quadrangles, and the SCDNR land use and land cover GIS data. The text box to the right details land cover in the Cooper River drainage basin.

Impervious*	521 acres
Open Space*	318 acres
Residential	262 acres
Commercial	171 acres
Marsh	44 acres
Gravel	17 acres
* within CNS	

2.2.6 Rainfall

Charleston County receives on average approximately 51 inches of rainfall per year, based on records maintained by the SCDNR Office of Climatology, which has compiled rainfall data records from 1930 to 2000. The US EPA has also compiled data for selected regions of the country and determined mean rainfall event statistics for them as part of NPDES storm water sampling protocol development. The mean storm event for the Southeast, including Charleston, was 0.75 inches of rainfall (Urban Targeting and BMP Selection, EPA Region 5, November 1990). Using the most current National Weather Service data, the Natural Resources Conservation Service (NRCS) has compiled infrequent-event rainfall amounts. Event rainfall amounts are listed below for 24-hour storm events for the Charleston, South Carolina, area.

Return Period (yrs)	Rainfall Depth (inches)
2	4.6
5	5.9
10	6.8
25	7.8
50	8.8
100	10

2.3 Development Impacting the Cooper River

Santee-Cooper Hydroelectric Project: In 1942, the South Carolina Public Service Authority (SCPCA) conducted a major water diversion project. The Wilson Dam was constructed on the Santee River to form Lake Marion, and the Pinopolis Dam was built on the Cooper River to form Lake Moultrie. An approximately 7.5-mile canal was then constructed between the two lakes. It is through this channel that 88% of the freshwater flow from the Santee River was directed to the Cooper River. This change increased the freshwater flow into the Cooper from 10 m^3/s to approximately 442 m^3/s and reduced salinity in the harbor from 30.0 ppt to 16.8 ppt. Another consequence of this massive freshwater input was the change from a tidal circulation mode to a gravitational circulation mode with a partially mixed salinity structure. Together, these changes increased shoaling and sedimentation in the Harbor, resulting in the need for more frequent maintenance dredging of the ship channel.

To alleviate the shoaling problems caused by the diversion and still maintain the potential for hydroelectric power, the U.S. Army Corps of Engineers and the SCPCA began the Cooper River Rediversion Project, which was completed in 1985. This project rediverted 70% of the water flow from the Cooper back into the Santee River through a new 11.5-mile canal between Lake Moultrie and the Santee near St. Stephens, South Carolina. Since rediversion, the monthly mean flow into the Pinopolis Dam has been reduced to approximately 122 m^3/s.

Industrialization: Of the three rivers making up the Charleston Harbor estuary, the Cooper River boasts the largest number of industrial and port facilities. Most, including U.S. Navy port facilities, commercial facilities associated with the State Port Authority, and private facilities, line the western shore The Cooper River's eastern shore remains largely undeveloped, although several large diked disposal areas line the maintained channel (Clouter and Daniel Islands).

Past and Future Dredging: The USACE constructed and maintains the harbor's navigation channels, turning basins, and access channels. Around the CNC, between the main channel and the piers, the CNC Redevelopment Authority (RDA) conducts annual maintenance dredging. According to the 1998 dredging permit the USACE issued to the RDA, some CNC piers are dredged three times a year to a project depth of 38 feet. The main channels are dredged to 40 feet deep; they range from 200 to 800 feet wide and reach 16 miles up the Cooper River, with extension channels serving users on the Wando River, Shipyard Creek, and Town Creek.

Engineering studies of the Charleston Harbor concluded that the existing channels in the harbor were inadequate to accommodate the dramatic changes in Charleston's vessel fleet and the rapid growth of commodity traffic during the last decade. The main channel was deepened to the current project depth of 40 feet in 1991. The deepening of the Wando River Extension was completed in 1994; Shipyard Creek's deepening was completed in 1996. However, the volume

of containerized cargo shipped through Charleston has increased from 8% to 15% annually, greatly exceeding all projections. Container ships that call on the harbor are more than 200 feet longer than the vessels for which the existing channel was designed.

A study to determine the feasibility of improving navigation in Charleston Harbor was completed in February 1996. It called for deepening the harbor's main channels from 40 to 45 feet, widening and realigning selected reaches, and constructing a turning basin to serve a new container terminal to be built on Daniel Island.

Implementation began in March 1999 with the award of a contract to deepen the entrance of the main channel by removing approximately 14 million cubic yards, most of which will be deposited at an ocean disposal site. The plan also called for the following activities:

- Removal of the existing contraction dike at the southern tip of Daniel Island
- Deepening 16.3 miles of entrance channel to 47 feet
- Deepening interior channels and turning basins to 45 feet
- Realigning the channel in the Shutes/Folly reach in the lower harbor
- Reducing the Town Creek Channel from the Cooper River bridges to Myers Bend to a depth of 16 feet and a width of 250 feet
- Widening the Daniel Island Reach of the Cooper River to 875 feet at Myers Bend and tapering it to a width of 600 feet at Daniel Island Bend

2.3.1 CNC-Related Sources Potentially Impacting Cooper River

Potential sources of COPCs in Cooper River include the upstream and near-shore SWMUs and AOCs. According to the 1998 Davis & Floyd drainage system evaluation report for CNC, the complex consists of 98 delineated drainage basins and associated storm water outfalls. Thirty-nine of the 72 drainage basins discharging to the Cooper River contain upland SWMUs/AOCs.

The following SWMUs/AOCs are associated with a drainage basin discharging to the Cooper River:

SWMUs: (48 total)

2	18	53	106
3	19	54	109
4	21	63	120
5	22	65	136
6	23	67	138
7	24	70	145
8	25	83	170
12	36	84	171
13	37	87	172
14	38	97	173
15	39	100	177
17	47	102	178

AOCs: (107 total)

504	541	574	628	676
506	542	576	633	677
507	543	578	635	678
508	544	579	636	679
511	548	580	638	680
513	549	583	642	681
515	550	586	643	684
516	551	590	653	685
517	552	596	655	687
518	554	598	656	688
519	559	602	660	690
				Clouter Island
520	560	603	661	(693, 694, 695)
522	561	604	662	DMA
523	562	605	663	FDS
525	563	607	665	G07
526	564	609	666	G38
528	566	611	667	G80
530	567	613	670	RTC
531	569	616	671	SGC
538	570	617	672	
539	572	619	673	
540	573	620	675	

For site descriptions and histories of the SWMUs/AOCs listed above, see Section 4 of the *Zone J Storm Water Effluent Report Addendum*. Additional SWMUs/AOCs may sheet-flow directly into the water body, these SWMUs/AOCs will be included in the Navy evaluation of those contaminant migration pathways and be included in the revised SLERA.

2.4 Other Investigations in the Cooper River

Most of the Cooper River studies evaluating hydrology and water and sediment quality have covered the entire Charleston Harbor System or the even larger Carolinian Province, with limited focus on the water bodies near CNC. Information therefore consists primarily of data from the few isolated stations near CNC and what can be assimilated from overall system conditions. This section summarizes the data obtained from some of these studies.

In 1994, the USACE collected 11 predredging sediment elutriate samples from the Cooper River and compared the total modified elutriate results with 1987 US EPA Ambient Water Quality Criteria (AWQC) for Chemicals of Concern in Marine Waters. Sample concentrations from the

four locations near CNC were reported to be either below acute concentrations or not detected. However, the laboratory's detection limit for several metals (copper, nickel, and silver), pesticides, (chlordane, endosulfan, and toxaphene), and fluoranthene, a polynuclear aromatic hydrocarbon (PAH), exceeded the AWQC. Therefore some exceedances may not have been detected.

In 1995, the USACE collected 17 predredging sediment samples from the Charleston Harbor; three were from locations near the CNC. Results were compared with US EPA's soil screening values (SSVs). Seven exceeded their SSV at one or more locations: arsenic, chromium, copper, mercury, fluoranthene, total high-molecular-weight PAHs, and DDD.

A 1995 study[4]. assessed information on terrestrial and aquatic environments occurring on or near CNC. It described vegetation and wildlife species living across the base and described threatened and endangered species near the base.

An earlier evaluation[5], commonly known as the Charleston Harbor Study (CHS), reviewed numerous pertinent studies and a collection of long-term trend data. This report was submitted to the South Carolina Coastal Council to characterize hydrographic conditions and selected biological communities in the estuarine portions of the Cooper, Wando, and Ashley Rivers, as well as the Charleston Harbor basin following a rediversion project in the upper portion of the watershed. The report included data related to risk determination such as water quality, sediment distribution, benthic macroinfaunal communities, finfish/invertebrate communities, and contaminant concentrations and distributions. Findings were summarized in the Zone J RFI work plan. Sediments, aquatic communities, and detected contaminants are discussed below.

Sediments: During the long-term study, sediments observed at CR01, a center channel location in the Cooper River near CNC, contained the highest percentage of fine material found within the targeted river areas, although the percentage fluctuated substantially throughout the study. Sediments at this location consisted primarily of silt and clay; percentages varied erratically from one sampling effort to the next.

In the intensive short-term study, investigators observed a wide diversity of sediment types at CR01. No specific trend in sediment particle size was obvious from the data. The greatest concentrations of fine-grained materials were in regions where hydrographic energy was obstructed by piers and docking facilities, such as the Navy Base, Naval Shipyard, and industrial centers. Sediments near CNC were described as unconsolidated material. However, sand dominated sediments along the east bank of the Cooper River across from the Naval Shipyard.

[4] *Final Environmental Impact Statement—Charleston Naval Base*, Ecology and Environment, Inc. (1995)
[5] *A Physical and Ecological Characterization of the Charleston Harbor Estuarine System* (1990).

Benthic Macrofaunal Communities: The long-term seasonal investigation of benthic macrofaunal communities within the Cooper River indicated that species diversity and richness were higher at CR01 than at other stations near CNC. Salinity was determined to be the most important determinant of benthic community structure, with sediment type playing a secondary, more site-specific role.

Contaminants: During the two-year study, both metals and organics were measured in sediment and tissue from spot, flounder, crab, shrimp, and oyster. Only sediment metals were measured during the more intensive study. This study only gave limited consideration to any correlation between existing contaminants and tissue information because of the transient nature of most of the selected tissue species (except oysters) and the fact that the CNC is not necessarily the sole contributor of contaminants in the area.

At CR01 near the CNC, the only metal constituents detected in sediment during the two-year study were mercury (22.4 mg/kg), chromium (36.5 mg/kg), and copper (19.4 mg/kg). According to the report, no organics were detected at this location during the two-year study. During the more intensive study, chromium and copper were detected at the Cooper River stations. Chromium concentrations varied but, in general, lower values were observed in the center of the channel; higher concentrations were detected toward the banks. Copper concentrations in the Cooper River were lower than copper concentrations from both stations in Shipyard Creek, which exceeded 20 mg/kg.

2.5 Contaminant Fate-and-Transport Mechanisms

The physical and chemical dynamics within the Charleston estuarine system are perhaps the most influential and complicating factors in the overall assessment of Zone J and probably have a severe effect on contaminant distribution. Contaminants present on upland CNC SWMUs and AOCs could potentially enter the Cooper River via the following fate-and-transport mechanisms:

- Sheet flow of soil contaminants into the storm water discharge system and discharge directly into the Cooper River
- Discharge of contaminated surface waters and suspended sediments from Shipyard Creek and Noisette Creek
- Overland flow of soil contaminants directly into the Cooper River from AOCs and SWMUs that do not drain into the storm water sewer system
- Migration of contaminated groundwater either directly into the Cooper River or into the storm water effluent system, and then into the river via CNC outfalls

CNC contaminant fate-and-transport mechanisms will be re-evaluated as soon as the Navy provides the necessary upland data on surface soils and groundwater to determine whether contaminants could be transported into the Cooper River from CNC sources.

2.6 Complete Exposure Pathways

Three exposure pathways are potentially complete, based on previous investigations conducted at CNC and within Cooper River.

These potentially complete exposure pathways will be evaluated in this SLERA for Cooper River to identify which contaminants may be present at concentrations causing potentially unacceptable risk for exposed ecological receptors.

Potentially Complete Exposure Pathways

- Direct exposure to contaminants dissolved in Cooper River surface water
- Direct exposure to contaminants in Cooper River sediment and surrounding wetlands
- Uptake from ingestion of contaminated surface water, sediments and prey (biota)

3.0 STEP 2 – EXPOSURE ESTIMATE AND RISK CALCULATION

The Cooper River SLERA will evaluate potential risk from all exposure media: surface water (storm water drainage system effluent), groundwater (via the groundwater-to-surface-water pathway), surface soil (via direct runoff from adjacent SWMUs and AOCs), and sediment. The evaluation will be based on direct exposure using the hazard quotient (HQ) method by comparing the maximum concentration of constituents identified in each media with the applicable reference concentrations and US EPA Region 4 ecological screening values. These comparisons will be summarized in tables and discussed in the sections below.

3.1 Storm Water Effluent Ecological Effects Evaluation

The storm water effluent samples from 54 storm water drainage system locations were included in the investigation of the Cooper River. Locations are shown on Figure 3-1. Screening was based on the following criteria as agreed upon by the partnering team:

- Comparison of detected constituents and sample quantitation limits (SQLs) with reference effluent concentrations at other locations not related to CNC
- Comparison of detected constituents and SQLs with EPA Region 4 chronic saltwater ecological screening values (ESVs)
- Comparison of concentrations of nondetected constituents and SQLs with EPA Region 4 chronic saltwater ESVs
- Evaluation of detection and exceedance frequencies for each constituent detected.

Results are presented in Table 3-1.

To determine the potential for unacceptable ecological risk with each exposure pathway, environmental media concentrations will be compared with EPA Region 4's ecological screening values, which are presented in the screening COPC tables. Concentrations below EPA Region 4

ESVs are considered an acceptable level of risk. Therefore, this screen can only be used to determine whether there is a level of risk to ecological receptors that requires no further investigation, or if additional information is needed to fully evaluate the potential for risk within the Cooper River.

The US EPA Region 4 saltwater ESVs were derived from Water Quality Criteria documents and represent the chronic ambient water quality criteria values for the protection of aquatic life. These criteria are intended to protect 95% of the species, 95% of the time. Therefore, anytime the maximum concentration of a constituent is less than the Region 4 ESV, no adverse ecological effect is expected.

3.2 Groundwater – to – Surface Water Ecological Effects Evaluation

To be completed once the Navy provides data.

3.3 Surface Soil Ecological Effects Evaluation

To be completed once the Navy provides data.

3.4 Summary of Cooper River Sediment Analyses

To date, 86 CNC sediment samples have been collected from Cooper River: 24 as part of the Zone J RFI, and the remaining from SWMU-specific remedial investigations. The sediment sample locations for Cooper River are shown on Figures 3-2A and 3-2B. To identify screening-level COPCs, the maximum exposure point (the highest detected concentration) was compared with the US EPA Region 4 sediment ESVs using the hazard quotient (HQ) method. Risk managers can use this method to determine which constituents in the Cooper River do not pose unacceptable levels of risk to the environment.

HQs for Cooper River have been included in Table 3-2 and categorized in Table 3-3, based on constituent types (inorganic, SVOC, VOC, pesticide, or PCB), the availability of a ESV for comparison, and whether its inclusion as a COPC is based on a detected concentration or detection limit.

4.0 CONCLUSIONS AND UNCERTAINTIES

As soon as the additional information from the Navy is incorporated into the SLERA, the conclusions and uncertainties section will be completed.

Table 3-1
Cooper River SLERA
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections					Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
Aluminum	**54**	**54**	**36**	**J**	**16,000**		**1436.7**			**EFF039**	**NA**		**NC**	**3277.67**	**A**	**Yes**
Antimony	**5**	**54**	**5.7**	**J**	**9.9**	**J**	**2.6**	***3***	***20***	**EFF039**	**NA**		**NC**	**5.93**	**A**	**Yes**
Arsenic	15	54	3.4	J	35		4.2	*2.7*	*10*	CAP001	36	0	0.97	6.88	B	No
Barium	**54**	**54**	**1.9**	**J**	**140**	**J**	**17.8**			**EFF039**	**NA**		**NC**	**60.31**	**A**	**Yes**
Beryllium	**6**	**54**	**0.14**	**J**	**0.88**	**J**	**0.2**	***0.1***	***4***	**EFF039**	**NA**		**NC**	**0.41**	**A**	**Yes**
Cadmium	7	54	0.52	J	1.5	J	0.4	*0.5*	*0.6*	EFF055	9.3	0	0.16	1.29	B	No
Calcium	54	54	2000		290000		26803.6			EFF039	NA		NC	53455.56	A	No*
Chromium	**46**	**54**	**0.95**	**J**	**62**		**6.6**	***0.7***	***0.9***	**EFF039**	**50**	**1**	**1.24**	**13**	**A**	**Yes**
Cobalt	**16**	**54**	**0.72**	**J**	**6.7**	**J**	**0.9**	***0.7***	***10***	**EFF039**	**NA**		**NC**	**2**	**A**	**Yes**
Copper	**44**	**54**	**4.5**	**J**	**5000**		**130.5**	***3.7***	***22***	**EFF071**	**2.9**	**44**	**1724.14**	**41.98**	**A**	**Yes**
Iron	**54**	**54**	**54**		**16000**		**1679.7**			**EFF039**	**NA**		**NC**	**4134.44**	**A**	**Yes**
Lead	**40**	**54**	**2.4**	**J**	**220**		**19.5**	***2.1***	***7.4***	**EFF071**	**8.5**	**24**	**25.88**	**33.63**	**A**	**Yes**
Magnesium	54	54	86	J	140000		13844.3			EFF028	NA		NC	49255.56	A	No*
Manganese	**54**	**54**	**2**	**J**	**1200**		**61.2**			**EFF071**	**NA**		**NC**	**74.52**	**A**	**Yes**
Nickel	**31**	**54**	**1.8**	**J**	**240**		**8.5**	***1.5***	***1.7***	**EFF022**	**8.3**	**6**	**28.92**	**5.14**	**A**	**Yes**
Potassium	54	54	98	J	53000		7193.6			EFF036	NA		NC	23678.89	A	No*
Selenium	0	54						*3.1*	*3.1*		71	0	NC	NA	C	No
Silver	5	54	0.5	J	2	J	0.6	*0.5*	*10*	EFF071	0.23	5	8.70	2.34	D	No
Sodium	54	54	860		1100000		99032.55			EFF028	NA		NC	395333.33	A	No*
Thallium	3	54	5.2	J	6.8	J	3	*5.1*	*10*	EFF016	21.3	0	0.32	5.77	B	No
Tin	**4**	**54**	**3.8**	**J**	**290**		**8.4**	***2.7***	***50***	**EFF071**	**NA**		**NC**	**NA**	**E**	**Yes**
Vanadium	**54**	**54**	**1.3**	**J**	**130**		**11.8**			**EFF022**	**NA**		**NC**	**15.59**	**A**	**Yes**
Zinc	**49**	**54**	**9.5**	**J**	**1000**		**142.8**	***31***	***71***	**EFF015**	**86**	**25**	**11.63**	**307.83**	**A**	**Yes**
Mercury	**3**	**54**	**0.17**	**J**	**0.22**		**0.06**	***0.1***	***0.1***	**CAP001**	**0.025**	**3**	**8.80**	**NA**	**A**	**Yes**
4,4'-DDD	**2**	**54**	**0.033**	**J**	**0.065**	**J**	**0.05**	***0.1***	***0.1***	**EFF044**	**0.025**	**3**	**2.60**	**NA**	**A**	**Yes**
4,4'-DDE	0	54						*0.1*	*0.1*		0.14		NC	NA	C	No
4,4'-DDT	**1**	**54**	**0.034**	**J**	**0.034**	**J**	**0.05**	***0.1***	***0.1***	**EFF052**	**0.001**	**1**	**34.00**	**NA**	**A**	**Yes**
Aldrin	0	54						*0.05*	*0.05*		0.13		NC	NA	C	No
alpha-BHC	2	54	0.018	J	0.023	J	0.02	*0.011*	*0.05*	EFF022	1400	0	0.00	NA	B	No
alpha-Chlordane	**1**	**54**	**0.013**	**J**	**0.013**	**J**	**0.02**	***0.05***	***0.05***	**EFF032**	**0.004**	**1**	**3.25**	**NA**	**A**	**Yes**
beta-BHC	**1**	**54**	**0.0076**	**J**	**0.0076**	**J**	**0.02**	***0.05***	***0.05***	**EFF070**	**NA**		**NC**	**NA**	**E**	**Yes**
Chlordane (technical)	**0**	**54**						***0.5***	***0.5***		**0.004**		**NC**	**NA**	**F**	**Yes**
delta-BHC	0	54						*0.05*	*0.05*		NA		NC	NA	C	No
Dieldrin	0	54						*0.1*	*0.1*		0.0019		NC	NA	C	No
Endosulfan I	**1**	**54**	**0.022**	**J**	**0.022**	**J**	**0.01**	***0.05***	***0.05***	**EFF053**	**0.0087**		**2.53**	**NA**	**A**	**Yes**
Endosulfan II	**1**	**54**	**0.018**	**J**	**0.018**	**J**	**0.05**	***0.1***	***0.1***	**EFF052**	**0.0087**		**2.07**	**NA**	**A**	**Yes**
Endosulfan sulfate	**2**	**54**	**0.021**	**J**	**0.053**	**J**	**0.05**	***0.022***	***0.1***	**EFF040**	**NA**		**NC**	**NA**	**E**	**Yes**
Endrin	0	54						*0.1*	*0.1*		0.0023		NC	NA	C	No
Endrin aldehyde	0	54						*0.1*	*0.1*		NA		NC	NA	C	No
Endrin ketone	0	54						*0.1*	*0.1*		NA		NC	NA	C	No
gamma-BHC (Lindane)	**2**	**54**	**0.0095**	**J**	**0.025**	**J**	**0.02**	***0.05***	***0.05***	**EFF070**	**0.016**		**1.56**	**NA**	**A**	**Yes**
gamma-Chlordane	0	54						*0.0088*	*0.05*		0.004		NC	NA	C	No
Heptachlor	**4**	**54**	**0.0086**	**J**	**0.038**	**J**	**0.012**	***0.018***	***0.05***	**EFF052**	**0.0036**		**10.56**	**NA**	**A**	**Yes**
Heptachlor epoxide	0	54						*0.05*	*0.05*		0.0036		NC	NA	C	No
Methoxychlor	**1**	**54**	**0.17**	**J**	**0.17**	**J**	**0.25**	***0.5***	***0.5***	**EFF047**	**NA**		**NC**	**NA**	**E**	**Yes**
Toxaphene	0	54						*5*	*5*		0.0002		NC	NA	C	No
Aroclor-1016	**0**	**54**						***1***	***1***		**0.03**		**NC**	**NA**	**F**	**Yes**

Table 3-1
Cooper River SLERA
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections					Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
Aroclor-1221	**0**	**54**						*2*	*2*		**0.03**		**NC**	**NA**	**F**	**Yes**
Aroclor-1232	**0**	**54**						*1*	*1*		**0.03**		**NC**	**NA**	**F**	**Yes**
Aroclor-1242	**0**	**54**						*1*	*1*		**0.03**		**NC**	**NA**	**F**	**Yes**
Aroclor-1248	**0**	**54**						*1*	*1*		**0.03**		**NC**	**NA**	**F**	**Yes**
Aroclor-1254	**0**	**54**						*1*	*1*		**0.03**		**NC**	**NA**	**F**	**Yes**
Aroclor-1260	**0**	**54**						*1*	*1*		**0.03**		**NC**	**NA**	**F**	**Yes**
1,2,4-Trichlorobenzene	0	54						*10*	*10*		4.5		NC	NA	C	No
1,2-Dichlorobenzene	0	54						*10*	*10*		19.7		NC	NA	C	No
1,3-Dichlorobenzene	0	54						*10*	*10*		28.5		NC	NA	C	No
1,4-Dichlorobenzene	2	54	0.31	J	0.33	J	4.8	*10*	*10*	EFF072	19.9		0.02	NA	B	No
2,2'-Oxybis(1-chloropropane)[bis(2-Chloroisopropyl)ether]	0	54						*10*	*10*		NA		NC	NA	C	No
2,4,5-Trichlorophenol	0	54						*10*	*10*		NA		NC	NA	C	No
2,4,6-Trichlorophenol	0	54						*10*	*10*		NA		NC	NA	C	No
2,4-Dichlorophenol	0	54						*10*	*10*		NA		NC	NA	C	No
2,4-Dimethylphenol	**3**	**54**	**0.53**	**J**	**1.3**	**J**	**4.8**	***10***	***10***	**EFF043**	**NA**		**NC**	**NA**	**E**	**No**
2,4-Dinitrophenol	0	54						*50*	*50*		48.5		NC	NA	C	No
2,4-Dinitrotoluene	0	54						*10*	*10*		NA		NC	NA	C	No
2,6-Dinitrotoluene	0	54						*10*	*10*		NA		NC	NA	C	No
2-Chloronaphthalene	0	54						*10*	*10*		NA		NC	NA	C	No
2-Chlorophenol	0	54						*10*	*10*		NA		NC	NA	C	No
2-Methyl-4,6-dinitrophenol	0	54						*50*	*50*		NA		NC	NA	C	No
2-Methylnaphthalene	0	54						*10*	*10*		NA		NC	NA	C	No
2-Methylphenol (o-Cresol)	**6**	**54**	**0.38**	**J**	**5.2**	**J**	**4.7**	***10***	***10***	**EFF045**	**NA**		**NC**	**NA**	**E**	**Yes**
2-Nitroaniline	0	54						*50*	*50*		NA		NC	NA	C	No
2-Nitrophenol	0	54						*10*	*10*		NA		NC	NA	C	No
3&4-Methylphenol (m&p-creso	**1**	**54**	**0.75**	**J**	**0.75**	**J**	**4.9**	***10***	***10***	**EFF041**	**NA**		**NC**	**NA**	**E**	**Yes**
3,3'-Dichlorobenzidine	0	54						*20*	*20*		NA		NC	NA	C	No
3-Nitroaniline	0	54						*50*	*50*		NA		NC	NA	C	No
4-Bromophenylphenyl ether	0	54						*10*	*10*		NA		NC	NA	C	No
4-Chloro-3-methylphenol	0	54						*10*	*10*		NA		NC	NA	C	No
4-Chloroaniline	0	54						*20*	*20*		NA		NC	NA	C	No
4-Chlorophenylphenyl ether	0	54						*10*	*10*		NA		NC	NA	C	No
4-Nitroaniline	0	54						*50*	*50*		NA		NC	NA	C	No
4-Nitrophenol	0	54						*50*	*50*		71.7		NC	NA	C	No
Acenaphthene	1	54	6.4	J	6.4	J	5	*10*	*10*	EFF058	9.7		0.66	NA	B	No
Acenaphthylene	0	54						*10*	*10*		NA		NC	NA	C	No
Anthracene	0	54						*10*	*10*		NA		NC	NA	C	No
Benzo(a)anthracene	0	54						*10*	*10*		NA		NC	NA	C	No
Benzo(a)pyrene	**3**	**54**	**0.78**	**J**	**1.3**	**J**	**4.8**	***10***	***10***	**EFF041**	**NA**		**NC**	**NA**	**E**	**Yes**
Benzo(b)fluoranthene	**2**	**54**	**1.2**	**J**	**1.5**	**J**	**4.9**	***10***	***10***	**EFF041**	**NA**		**NC**	**NA**	**E**	**Yes**

Table 3-1
Cooper River SLERA
Storm Water Effluent COPC Screening

Constituent	Frequency of Detection		Range of Detections					Range of U Flagged Data		Location of Maximum Detection	EPA Region 4 ESV	Detections Exceeding Region 4 ESV	Screening HQ	Reference Concentration	COPC Cat.	COPC Yes or No
	# det.	# analyzed	Min	Q	Max	Q	Mean	Min SQL	Max SQL							
Benzo(g,h,i)perylene	**2**	**54**	**0.71**	**J**	**0.75**	**J**	**4.9**	***10***	***10***	**EFF041**	**NA**		**NC**	NA	**E**	**Yes**
Benzo(k)fluoranthene	**2**	**54**	**1.1**	**J**	**1.6**	**J**	**4.9**	***10***	***10***	**EFF041**	**NA**		**NC**	NA	**E**	**Yes**
bis(2-Chloroethoxy)methane	0	54						*10*	*10*		NA		NC	NA	C	No
bis(2-Chloroethyl)ether	0	54						*10*	*10*		NA		NC	NA	C	No
bis(2-Ethylhexyl)phthalate	**14**	**54**	**0.52**	**J**	**16**		**4.8**	***10***	***29***	**EFF019**	**NA**		**NC**	NA	**E**	**Yes**
Butylbenzylphthalate	0	54						*10*	*10*		29.4		NC	NA	C	No
Carbazole	**1**	**54**	**0.56**	**J**	**0.56**	**J**	**4.9**	***10***	***10***	**EFF040**	**NA**		**NC**	NA	**E**	**Yes**
Chrysene	**2**	**54**	**2.1**	**J**	**2.2**	**J**	**4.9**	***10***	***10***	**EFF040**	**NA**		**NC**	NA	**E**	**Yes**
Dibenzo(a,h)anthracene	0	54						*10*	*10*		NA		NC	NA	C	No
Dibenzofuran	**1**	**54**	**0.94**	**J**	**0.94**	**J**	**4.9**	***10***	***10***	**EFF058**	**NA**		**NC**	NA	**E**	**Yes**
Diethylphthalate	0	54						*10*	*10*		75.9		NC	NA	C	No
Dimethylphthalate	1	54	7.9	J	7.9	J	5.1	*10*	*10*	EFF056	580		0.01	NA	B	No
Di-n-butylphthalate	4	54	0.34	J	1.4	J	4.7	*10*	*10*	EFF020	3.4		0.41	NA	B	No
Di-n-octylphthalate	0	54						*10*	*10*		NA		NC	NA	C	No
Fluoranthene	**3**	**54**	**1.70**	**J**	**4.10**	**J**	**4.90**	***10.00***	***10.00***	**EFF040 EFF041**	**1.60**		**2.56**	**NA**	**A**	**Yes**
Fluorene	**1**	**54**	**0.4**	**J**	**0.4**	**J**	**4.9**	***10***	***10***	**EFF058**	**NA**		**NC**	NA	**E**	**Yes**
Hexachlorobenzene	0	54						*10*	*10*		NA		NC	NA	C	No
Hexachlorobutadiene	0	54						*10*	*10*		0.32		NC	NA	C	No
Hexachlorocyclopentadiene	0	54						*10*	*10*		0.07		NC	NA	C	No
Hexachloroethane	0	54						*10*	*10*		9.4		NC	NA	C	No
Indeno(1,2,3-cd)pyrene	**2**	**54**	**0.62**	**J**	**0.71**	**J**	**4.8**	***10***	***10***	**EFF028**	**NA**		**NC**	NA	**E**	**Yes**
Isophorone	0	54						*10*	*10*		129		NC	NA	C	No
Naphthalene	0	54						*10*	*10*		23.5		NC	NA	C	No
Nitrobenzene	0	54						*10*	*10*		66.8		NC	NA	C	No
n-Nitrosodi-n-propylamine	0	54						*10*	*10*		NA		NC	NA	C	No
N-Nitrosodiphenylamine	0	54						*10*	*10*		33000		NC	NA	C	No
Pentachlorophenol	**2**	**54**	**14**	**J**	**14**	**J**	**24.6**	***50***	***50***	**EFF005 EFF006**	**7.9**		**1.772151899**	NA	**A**	**No**
Phenanthrene	**2**	**54**	**2.1**	**J**	**2.6**	**J**	**4.9**	***10***	***10***	**EFF040**	**NA**		**NC**	NA	**E**	**Yes**
Phenol	1	54	16		16		5.2	*10*	*10*	EFF021	58		0.275862069	NA	B	No
Pyrene	**3**	**54**	**0.97**	**J**	**3.1**	**J**	**4.9**	***10***	***10***	**EFF040**	**NA**		**NC**	NA	**E**	**Yes**
Cyanide, Total	1	54	5.4	J	5.4	J	5	*10*	*10*	CAP001	1		NC	16.33	D	No

Notes:

NA	Notes constituents for which no EPA Region 4 ESV or reference concentration is available.
NC	Notes contaminants for which there is not sufficient information to calculate a value (primarily used when a constituent was not detected in any sample).
Italicized numbers	Indicates U-flagged data that represents the sample quantitation limits (DL) for each constituent.

Contaminant Categories

A	Max detect greater than EPA Region 4 SV and/or reference concentration.
B	Max detect less than Region 4 SV.
C	Constituent not detected and MDL is either less than EPA Region 4 ESV and reference concentrations or no EPA Region 4 ESV is available. Further analysis provided in text of report.
D	Max detect less than the reference concentration.
E	Constituent detected but no EPA Region 4 SV available.
F	Constituent not detected and MDL is greater than EPA Region 4 SV. Further analysis provided in text of report.
*	Notes a category 4 COPC which is not being considered a COPC for this SLERA because it is considered to be essential nutrients and are part of the normal make up of saltwater.

Table 3-2
Cooper River SLERA
Sediment COPC Screening Table

Constituent	Frequency of Detection		Range of Detections				Range of U Flagged Data		Location of Maximum Detection	Screening Value (SV)	Screening HQ	Detections Exceeding ESV	Retained for Refinement?	Rationale	Constituent
	# Detected	# analyzed	Min	Q	Max	Q	Min SQL	Max SQL							
Inorganics (mg/kg)															
Aluminum	50	50	1160.00		35000.00				CPRM0001	NSV	NA	NA	Yes	C	Aluminum
Antimony	1	50	0.53	J	0.53	J	0.37 UJ	1.80 UJ	CPRM0020	12	0.04	0	No	B	Antimony
Arsenic	49	50	1.40	J	22.20		1.5 U		CPRM0024	7.24	3.07	32	Yes	A	Arsenic
Barium	50	50	4.10	J	42.10	J			CPRM0001	NSV	NA	NA	Yes	C	Barium
Beryllium	46	50	0.11	J	1.50	J	0.03 UJ	0.09 U	CPRM0001	NSV	NA	NA	Yes	C	Beryllium
Cadmium	42	50	0.09	J	1.40	J	0.05 U	0.26 U	CPRM0017	1	1.40	2	Yes	A	Cadmium
Calcium	50	50	814.00	J	221000.00				CPRM0031	NSV	NA	NA	Yes	C	Calcium
Chromium	50	50	4.40	J	60.90				CPRM0001	52.3	1.16	6	Yes	A	Chromium
Cobalt	48	50	0.48	J	8.70	J	0.18 U	0.19 U	CPRM0001	NSV	NA	NA	Yes	C	Cobalt
Copper	44	50	1.40	J	330.00	J	1.5 U	7.1 U	CPRM0002	18.7	17.65	19	Yes	A	Copper
Iron	50	50	1560.00		31800.00				CPRM0018	NSV	NA	NA	Yes	C	Iron
Lead	50	50	0.75	J	32.30				CPRM0013	30.2	1.07	1	Yes	A	Lead
Magnesium	50	50	537.00	J	10500.00				CPRM0029	NSV	NA	NA	Yes	C	Magnesium
Manganese	50	50	23.20		789.00				CPRM0024	NSV	NA	NA	Yes	C	Manganese
Mercury	2	50	0.09		0.12		0.03 U	0.18 U	CPRM0020	0.13	0.92	0	No	B	Mercury
Nickel	50	50	0.94	J	18.70	J			CPRM0001	15.9	1.18	2	Yes	A	Nickel
Potassium	50	50	165.00	J	4690.00				CPRM0040	NSV	NA	NA	Yes	C	Potassium
Selenium	3	50	1.10	J	2.20	J	0.64 UJ	2.5 U	CPRM0036	NSV	NA	NA	Yes	C	Selenium
Silver	3	50	0.19	J	0.85	J	0.18 U	2.6 U	CPRM0026	2	0.43	0	No	B	Silver
Sodium	50	50	1500.00	J	26900.00	J			CPRM0024	NSV	NA	NA	Yes	C	Sodium
Thallium	6	50	0.85	J	2.00	J	0.72 U	4.3 U	CPRM0033	NSV	NA	NA	Yes	C	Thallium
Tin	0	50					6.5 U	31.4 U	NA	NSV	NA	NA	Yes	C	Tin
Monobutyltin	0	50					49 U	50 U	NA	NSV	NA	NA	Yes	C	Monobutyltin
Dibutyltin	0	50					49 U	50 U	NA	NSV	NA	NA	Yes	C	Dibutyltin
Tributyltin	1	50	52.00	J	52.00	J	49 U	50 U	CPRN0009	NSV	NA	NA	Yes	C	Tributyltin
Tetrabutyltin	0	50					49 U	50 U	NA	NSV	NA	NA	Yes	C	Tetrabutyltin
Vanadium	50	50	4.40	J	82.40				CPRM0001	NSV	NA	NA	Yes	C	Vanadium
Zinc	44	50	10.80	J	167.00	J	6.1 U	21.9 U	CPRN0009	124	1.35	3	Yes	A	Zinc
Cyanide												NA	Yes	C	Cyanide
Pesticides/PCBs (µg/kg)															
4,4'-DDD	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	4,4'-DDD
4,4'-DDE	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	4,4'-DDE
4,4'-DDT	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	4,4'-DDT
Aldrin	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	Aldrin
alpha-BHC	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	alpha-BHC
alpha-Chlordane	0	49					1.7 U	8.06 U		1.7	NA	NA	Yes	D	alpha-Chlordane
beta-BHC	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	beta-BHC
Chlordane	0	49					33 U	156 U		1.7	NA	NA	Yes	D	Chlordane
delta-BHC	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	delta-BHC
Dieldrin	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	Dieldrin
Endosulfan I	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	Endosulfan I
Endosulfan II	0	49					3.3 U	15.6 U		NSV	NA	NA	Yes	C	Endosulfan II
Endosulfan sulfate	0	49					3.3 U	15.6 U		NSV	NA	NA	Yes	C	Endosulfan sulfate
Endrin	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	Endrin
Endrin aldehyde	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	Endrin aldehyde
Endrin ketone	0	49					3.3 U	15.6 U		3.3	NA	NA	Yes	D	Endrin ketone

Table 3-2
Cooper River SLERA
Sediment COPC Screening Table

Constituent	Frequency of Detection		Range of Detections				Range of U Flagged Data		Location of Maximum Detection	Screening Value (SV)	Screening HQ	Detections Exceeding ESV	Retained for Refinement?	Rationale	Constituent
	# Detected	# analyzed	Min	Q	Max	Q	Min SQL	Max SQL							
gamma-BHC (Lindane)	0	49					1.7 U	8.06 U		3.3	NA	NA	Yes	D	gamma-BHC (Lindane)
gamma-Chlordane	0	49					1.7 U	8.06 U		1.7	NA	NA	Yes	D	gamma-Chlordane
Heptachlor	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	Heptachlor
Heptachlor epoxide	0	49					1.7 U	8.06 U		NSV	NA	NA	Yes	C	Heptachlor epoxide
Methoxychlor	0	49					17 U	80.6 U		NSV	NA	NA	Yes	C	Methoxychlor
Toxaphene	0	49					170 U	8.06 U		NSV	NA	NA	Yes	C	Toxaphene
Aroclor-1016	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1016
Aroclor-1221	0	49					67 U	318 U		67	NA	NA	Yes	D	Aroclor-1221
Aroclor-1232	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1232
Aroclor-1242	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1242
Aroclor-1248	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1248
Aroclor-1254	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1254
Aroclor-1260	0	49					33 U	156 U		33	NA	NA	Yes	D	Aroclor-1260
Total PCBs	0	49					132.5	602.5		33	NA	NA	Yes	D	Total PCBs
Semi-volatile Organics (SVOCs) (µg/kg)															
1,2,4-Trichlorobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	1,2,4-Trichlorobenzene
1,2-Dichlorobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	1,2-Dichlorobenzene
1,3-Dichlorobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	1,3-Dichlorobenzene
1,4-Dichlorobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	1,4-Dichlorobenzene
2,2'-oxybis(1-Chloropropane)	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,2'-oxybis(1-Chloropropane)
2,4,5-Trichlorophenol	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	2,4,5-Trichlorophenol
2,4,6-Trichlorophenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,4,6-Trichlorophenol
2,4-Dichlorophenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,4-Dichlorophenol
2,4-Dimethylphenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,4-Dimethylphenol
2,4-Dinitrophenol	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	2,4-Dinitrophenol
2,4-Dinitrotoluene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,4-Dinitrotoluene
2,6-Dinitrotoluene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2,6-Dinitrotoluene
2-Chloronaphthalene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2-Chloronaphthalene
2-Chlorophenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2-Chlorophenol
2-Methyl-4,6-Dinitrophenol	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	2-Methyl-4,6-Dinitrophenol
2-Methylnaphthalene	0	49					360 UJ	1600 U		20.23	NA	NA	Yes	D	2-Methylnaphthalene
2-Methylphenol (o-Cresol)	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2-Methylphenol (o-Cresol)
2-Nitroaniline	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	2-Nitroaniline
2-Nitrophenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	2-Nitrophenol
3,3'-Dichlorobenzidine	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	3,3'-Dichlorobenzidine
3-Nitroaniline	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	3-Nitroaniline
4-Bromophenyl-phenylether	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	4-Bromophenyl-phenylether
4-Chloro-3-methylphenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	4-Chloro-3-methylphenol
4-Chloroaniline	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	4-Chloroaniline
4-Chlorophenylphenylether	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	4-Chlorophenylphenylether
4-Methylphenol (p-Cresol)	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	4-Methylphenol (p-Cresol)
4-Nitroaniline	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	4-Nitroaniline
4-Nitrophenol	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	4-Nitrophenol
Acenaphthene	2	49	300.00	J	730.00	J	360 UJ	1600 U	CPRM002101	6.71	108.79	2	Yes	A	Acenaphthene
Acenaphthylene	0	49					360 UJ	1600 U		5.87	NA	NA	Yes	D	Acenaphthylene
Aniline	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Aniline
Anthracene	8	49	86.00	J	880.00	J	360 UJ	1600 U	CPRM002101	46.9	18.76	8	Yes	A	Anthracene

Table 3-2
Cooper River SLERA
Sediment COPC Screening Table

Constituent	Frequency of Detection		Range of Detections				Range of U Flagged Data		Location of Maximum Detection	Screening Value (SV)	Screening HQ	Detections Exceeding ESV	Retained for Refinement?	Rationale	Constituent
	# Detected	# analyzed	Min	Q	Max	Q	Min SQL	Max SQL							
Azobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Azobenzene
Benzo(a)anthracene	10	49	120.00	J	1100.00	J	360 UJ	1600 U	CPRM003001	74.8	14.71	10	Yes	A	Benzo(a)anthracene
Benzo(a)pyrene	5	49	53.00	J	420.00	J	360 UJ	1600 U	CPRM002101	88.8	4.73	4	Yes	A	Benzo(a)pyrene
Benzo(b)fluoranthene	8	49	210.00	J	560.00	J	360 UJ	1600 U	CPRM003001	NSV	NA	NA	Yes	C	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Benzo(g,h,i)perylene
Benzo(k)fluoranthene	2	49	210.00	J	210.00	J	360 UJ	1600 U	CPRM002001 CPRM003001	NSV	NA	NA	Yes	C	Benzo(k)fluoranthene
Benzoic acid	0	49					1800 UJ	8100 U		NSV	NA	NA	Yes	C	Benzoic acid
Benzyl alcohol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Benzyl alcohol
bis(2-Chloroethoxy)methane	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	bis(2-Chloroethyl)ether
bis(2-Ethylhexyl)phthalate (BEHP)	4	49	55.00	J	1100.00		360 UJ	1600 U	CPRM000201	182	6.04	1	Yes	A	bis(2-Ethylhexyl)phthalate (BEHP)
Butylbenzylphthalate	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Butylbenzylphthalate
Carbazole	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Carbazole
Chrysene	13	49	99.00	J	800.00	J	360 UJ	1600 U	CPRM002101	108	7.41	12	Yes	A	Chrysene
Dibenz(a,h)anthracene	0	49					360 UJ	1600 U		6.22	NA	NA	Yes	D	Dibenz(a,h)anthracene
Dibenzofuran	1	49	390.00	J	390.00	J	360 UJ	1600 U	CPRM002101	NSV	NA	NA	Yes	C	Dibenzofuran
Diethylphthalate	1	49	1200.00		1200.00		360 UJ	2200 U	CPRM001501	NSV	NA	NA	Yes	C	Diethylphthalate
Dimethyl phthalate	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Dimethyl phthalate
Di-n-butylphthalate	1	49	98.00	J	98.00	J	360 UJ	1600 U	CPRM003501	NSV	NA	NA	Yes	C	Di-n-butylphthalate
Di-n-octyl phthalate	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Di-n-octyl phthalate
Fluoranthene	17	49	100.00	J	2600.00		360 UJ	1500 U	CPRM002101 CPRM003001	113	23.01	15	Yes	A	Fluoranthene
Fluorene	1	49	680.00	J	680.00	J	360 UJ	1500 U	CPRM002101	21.2	32.08	1	Yes	A	Fluorene
Hexachlorobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Hexachlorobenzene
Hexachlorobutadiene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Hexachlorobutadiene
Hexachlorocyclopentadiene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Hexachlorocyclopentadiene
Hexachloroethane	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Hexachloroethane
Indeno(1,2,3-cd)pyrene	1	49	100.00	J	100.00	J	360 UJ	1600 U	CPRM002001	NSV	NA	NA	Yes	C	Indeno(1,2,3-cd)pyrene
Isophorone	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Isophorone
Naphthalene	0	49					360 UJ	1600 U		34.6	NA	NA	Yes	D	Naphthalene
Nitrobenzene	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Nitrobenzene
N-Nitrosodimethylamine	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	N-Nitrosodimethylamine
N-Nitroso-di-n-propylamine	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	N-Nitrosodiphenylamine
Pentachlorophenol	0	49					870 UJ	3800 U		NSV	NA	NA	Yes	C	Pentachlorophenol
Phenanthrene	2	49	580.00	J	1900.00		360 UJ	1600 U	CPRM002101	86.7	21.91	2	Yes	A	Phenanthrene
Phenol	0	49					360 UJ	1600 U		NSV	NA	NA	Yes	C	Phenol
Pyrene	17	49	84.00	J	2100.00		360 UJ	1600 U	CPRM003001	153	13.73	12	Yes	A	Pyrene
Pyridine	0	49					360 UJ	1600 U			NA	NA	Yes	C	Pyridine
Total PAHs			2340.00		13550.00				CPRM002101	1684	8.05	49	Yes	A	Total PAHs
Volatile Organics (VOCs) (µg/kg)															
1,1,1-Trichloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,1,2-Trichloroethane
1,1-Dichloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,1-Dichloroethane
1,1-Dichloroethene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,1-Dichloroethene

Table 3-2
Cooper River SLERA
Sediment COPC Screening Table

Constituent	Frequency of Detection		Range of Detections				Range of U Flagged Data		Location of Maximum Detection	Screening Value (SV)	Screening HQ	Detections Exceeding ESV	Retained for Refinement?	Rationale	Constituent
	# Detected	# analyzed	Min	Q	Max	Q	Min SQL	Max SQL							
1,2-Dichloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,2-Dichloroethane
1,2-Dichloropropane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	1,2-Dichloropropane
2-Butanone (MEK)	26	50	3.00	J	130.00		12 U	26 U		NSV	NA	NA	Yes	C	2-Butanone (MEK)
2-Chloroethyl vinyl ether	0	50					6 U	24 U		NSV	NA	NA	Yes	C	2-Chloroethyl vinyl ether
2-Hexanone	0	50					12 U	48 U		NSV	NA	NA	Yes	C	2-Hexanone
4-Methyl-2-Pentanone (MIBK)	0	50					12 U	48 U		NSV	NA	NA	Yes	C	4-Methyl-2-Pentanone (MIBK)
Acetone	23	50	77.00		4100.00	D	14 U	680 U		NSV	NA	NA	Yes	C	Acetone
Benzene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Benzene
Bromodichloromethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Bromodichloromethane
Bromoform	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Bromoform
Bromomethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Bromomethane
Carbon disulfide	25	50	3.00	J	24.00		6 U	24 U		NSV	NA	NA	Yes	C	Carbon disulfide
Carbon tetrachloride	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Carbon tetrachloride
Chlorobenzene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Chlorobenzene
Chloroethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Chloroethane
Chloroform	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Chloroform
Chloromethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Chloromethane
cis-1,3-Dichloropropene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	cis-1,3-Dichloropropene
Dibromochloromethane	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Dibromochloromethane
Ethylbenzene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Ethylbenzene
Methylene chloride	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Methylene chloride
Styrene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Styrene
Tetrachloroethene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Tetrachloroethene
Toluene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Toluene
trans-1,2-Dichloroethene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	trans-1,2-Dichloroethene
trans-1,3-Dichloropropene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	trans-1,3-Dichloropropene
Trichloroethene	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Trichloroethene
Vinyl acetate	0	50					12 U	48 U		NSV	NA	NA	Yes	C	Vinyl acetate
Vinyl chloride	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Vinyl chloride
Xylenes (Total)	0	50					6 U	24 U		NSV	NA	NA	Yes	C	Xylenes (Total)

Notes:

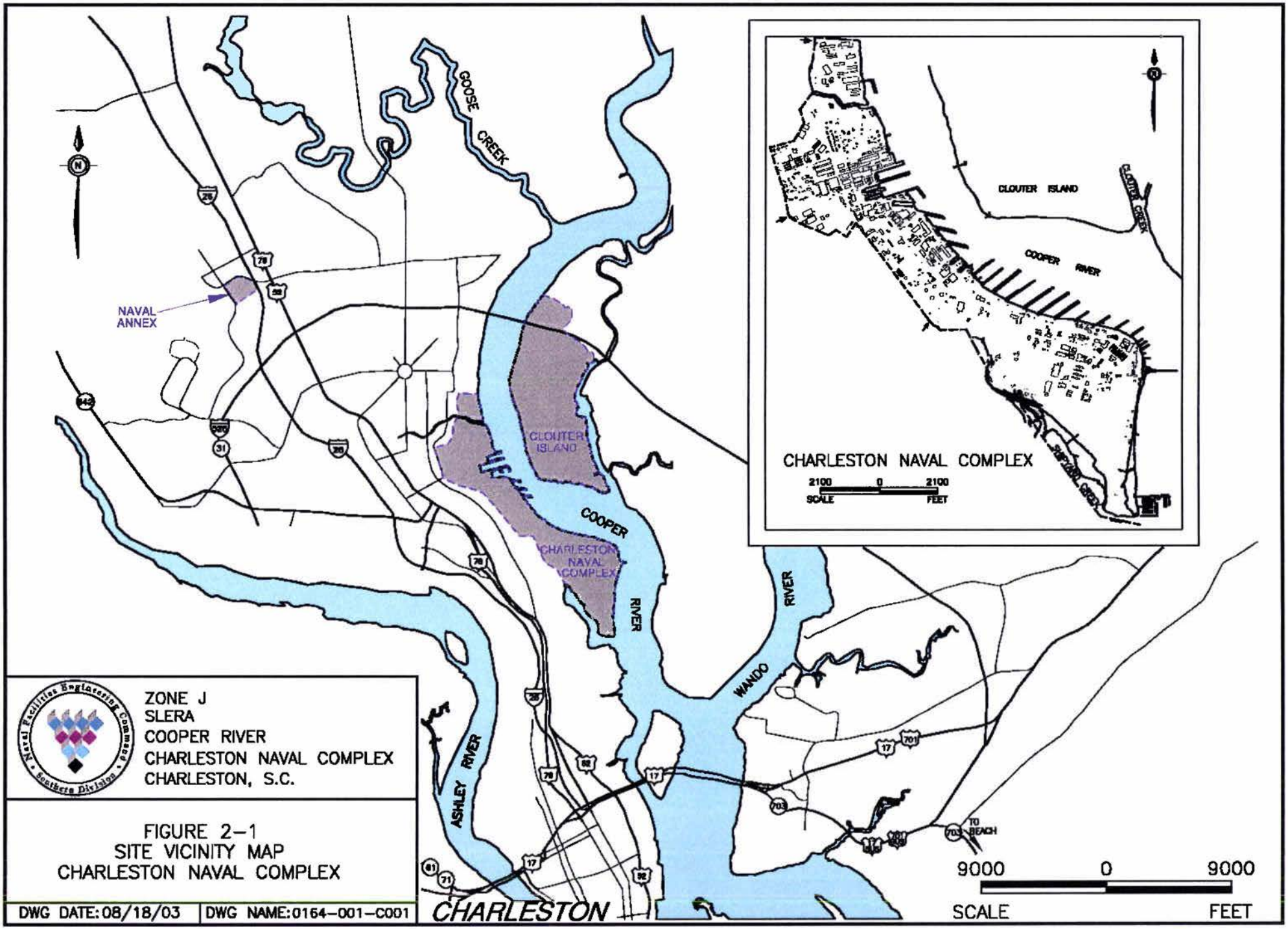
NSV	No screening value available.
SV	Screening Value. Sediment screening values for this SLERA were taken from: USEPA. 2001. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Originally published in November 1995. Website version updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecobul.htm
-	Indicates that this column is not applicable to this contaminant.

Rationale for retaining COPCs

A	Maximum detected concentration is greater than Region 4 SV.
B	Maximum detected concentration is less than Region 4 SV.
C	No EPA screening value available for comparison.
D	Minimum detection limit is greater than the screening vaue.

Table 3-3
Cooper River SLERA
Sediment Screening COPC Summary

Inorganics		Pesticides and PCBs		SVOCs		VOCs	
Constituents exceeding Screening Values							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Arsenic			4,4'-DDD	Anthracene	2-Methylnaphthalene		
Cadmium			4,4'-DDE	Benzo(a)anthracene	Acenaphthylene		
Chromium			4,4'-DDT	Benzo(a)pyrene	Dibenz(a,h)anthracene		
Copper			alpha-Chlordane	bis(2-Ethylhexyl)phthalate (BEHP)	Naphthalene		
Lead			Chlordane	Chrysene			
Nickel			Dieldrin	Fluoranthene			
Zinc			Endrin	Fluorene			
			Endrin aldehyde	Phenanthrene			
			Endrin ketone	Pyrene			
			gamma-BHC (Lindane)	Total PAHs			
			gamma-Chlordane				
			Aroclor-1016				
			Aroclor-1221				
			Aroclor-1232				
			Aroclor-1242				
			Aroclor-1248				
			Aroclor-1254				
			Aroclor-1260				
			Total PCBs				
Constituents with No Screening Values							
Detected	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**	**Detected**	**Non-Detected**
Aluminum	Tin		Aldrin		1,2,4-Trichlorobenzene	2-Butanone (MEK)	1,1,1-Trichloroethane
Barium	Monobutyltin		alpha-BHC		1,2-Dichlorobenzene	Acetone	1,1,2,2-Tetrachloroethane
Beryllium	Dibutyltin		beta-BHC		1,3-Dichlorobenzene	Carbon disulfide	1,1,2-Trichloroethane
Calcium	Tetrabutyltin		delta-BHC		1,4-Dichlorobenzene		1,1-Dichloroethane
Cobalt			Endosulfan I		2,2'-oxybis(1-Chloropropane)		1,1-Dichloroethene
Iron			Endosulfan II		2,4,5-Trichlorophenol		1,2-Dichloroethane
Magnesium			Endosulfan sulfate		2,4,6-Trichlorophenol		1,2-Dichloropropane
Manganese			Heptachlor		2,4-Dichlorophenol		2-Chloroethyl vinyl ether
Potassium			Heptachlor epoxide		2,4-Dimethylphenol		2-Hexanone
Selenium			Methoxychlor		2,4-Dinitrophenol		4-Methyl-2-Pentanone (MIBK)
Sodium			Toxaphene		2,4-Dinitrotoluene		Benzene
Thallium					2,6-Dinitrotoluene		Bromodichloromethane
Tributyltin					2-Chloronaphthalene		Bromoform
Vanadium					2-Chlorophenol		Bromomethane
					2-Methyl-4,6-Dinitrophenol		Carbon tetrachloride
					2-Methylphenol (o-Cresol)		Chlorobenzene
					2-Nitroaniline		Chloroethane
					2-Nitrophenol		Chloroform
					3,3'-Dichlorobenzidine		Chloromethane
					3-Nitroaniline		cis-1,3-Dichloropropene
					4-Bromophenyl-phenylether		Dibromochloromethane
					4-Chloro-3-methylphenol		Ethylbenzene
					4-Chloroaniline		Methylene chloride
					4-Chlorophenylphenylether		Styrene
					4-Methylphenol (p-Cresol)		Tetrachloroethene
					4-Nitroaniline		Toluene
					4-Nitrophenol		trans-1,2-Dichloroethene
					Aniline		trans-1,3-Dichloropropene
					Azobenzene		Trichloroethene
					Benzo(b)fluoranthene		Vinyl acetate
					Benzo(g,h,i)perylene		Vinyl chloride
					Benzo(k)fluoranthene		Xylenes (Total)
					Benzoic acid		
					Benzyl alcohol		
					bis(2-Chloroethoxy)methane		
					bis(2-Chloroethyl)ether		
					Butylbenzylphthalate		
					Carbazole		
					Dibenzofuran		
					Diethylphthalate		
					Dimethyl phthalate		
					Di-n-butylphthalate		
					Di-n-octyl phthalate		
					Hexachlorobenzene		
					Hexachlorobutadiene		
					Hexachlorocyclopentadiene		
					Hexachloroethane		
					Indeno(1,2,3-cd)pyrene		
					Isophorone		
					Nitrobenzene		
					N-Nitrosodimethylamine		
					N-Nitroso-di-n-propylamine		
					N-Nitrosodiphenylamine		
					Pentachlorophenol		
					Phenol		


COOSE CREEK
NAVAL ANNEX
CLOUTER ISLAND
CHARLESTON NAVAL COMPLEX
COOPER RIVER
ASHLEY RIVER
WANDO RIVER
CHARLESTON
TO BEACH
CLOUTER ISLAND
COOPER RIVER
CLOUTER CREEK
SHIPYARD CREEK
CHARLESTON NAVAL COMPLEX
2100 0 2100
SCALE FEET
9000 0 9000
SCALE FEET
ZONE J
SLERA
COOPER RIVER
CHARLESTON NAVAL COMPLEX
CHARLESTON, S.C.
Naval Facilities Engineering Command
Southern Division
FIGURE 2-1
SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX
DWG DATE: 08/18/03
DWG NAME: 0164-001-C001

600 0 600 Feet

LEGEND

Cooper River Storm Water Outfall

Cooper River Storm Water Effluent Sample

Storm Water Lines

ZONE-J-CATCH-BASIN

ZONE-J-DRAIN-LINE

ZONE J-DRAINAGE-DITCH

Zone J SLERA - Cooper River
Charleston Naval Complex
Charleston, South Carolina

Figure 3-1
RFI Storm Water Effluent and Outfall Locations

August 2003 | Zone J Main Project

Cooper River

Charleston Naval Complex

Clouter Island

Cooper River

500 0 500 Feet

LEGEND

- Cooper River SLERA Sediment Locations
- Shoreline
- CNC Perimeter

Zone J SLERA - Cooper River
Charleston Naval Complex
Charleston, South Carolina

Figure 3-2A
RFI Sediment Sampling Locations
Northern Section

August 2003 | Zone J Main Project

Clouter Island

Cooper River

Charleston Naval Complex

Cooper River

Shipyard Creek

500 0 500 Feet

LEGEND

- Cooper River SLERA Sediment Locations
- Shoreline
- CNC Perimeter

Zone J SLERA - Cooper River
Charleston Naval Complex
Charleston, South Carolina

Figure 3-2B
RFI Sediment Sampling Locations
Southern Section

August 2003 | Zone J Main Project

Appendix A

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM000101	MG/KG	21.30		Arsenic (As)	8.2	70.00	0.30
CPRM000101	MG/KG	0.28	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM000101	MG/KG	60.90		Chromium (Cr)	81	370.00	0.16
CPRM000101	MG/KG	23.70		Copper (Cu)	34	270.00	0.09
CPRM000101	MG/KG	23.50		Lead (Pb)	46.7	218.00	0.11
CPRM000101	MG/KG	0.16	U	Mercury (Hg)	0.15	0.71	0.23
CPRM000101	MG/KG	18.70	J	Nickel (Ni)	20.9	51.60	0.36
CPRM000101	MG/KG	2.40	U	Silver (Ag)	1	3.70	0.65
CPRM000101	MG/KG	95.90		Zinc (Zn)	150	410.00	0.23
CPRM000101	UG/KG	3.30	U	4,4'-DDE	2.2	27.00	0.12
CPRM000101	UG/KG	3.30	U	4,4'-DDT	1.58	46.10	0.07
CPRM000101	UG/KG	132.50	U	Total PCBs	22.7	180.00	0.74
CPRM000101	UG/KG	1300.00	U	2-Methylnaphthalene	70	670.00	1.94
CPRM000101	UG/KG	1300.00	U	Acenaphthene	16	500.00	2.60
CPRM000101	UG/KG	1300.00	U	Acenaphthylene	44	640.00	2.03
CPRM000101	UG/KG	1300.00	U	Anthracene	85.3	1100.00	1.18
CPRM000101	UG/KG	1300.00	U	Benzo(a)anthracene	261	1600.00	0.81
CPRM000101	UG/KG	1300.00	U	Benzo(a)pyrene	430	1600.00	0.81
CPRM000101	UG/KG	1300.00	U	Chrysene	384	2800.00	0.46
CPRM000101	UG/KG	1300.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.00
CPRM000101	UG/KG	140.00	J	Fluoranthene	600	5100.00	0.03
CPRM000101	UG/KG	1300.00	U	Fluorene	19	540.00	2.41
CPRM000101	UG/KG	1300.00	U	Naphthalene	160	2100.00	0.62
CPRM000101	UG/KG	1300.00	U	Phenanthrene	240	1500.00	0.87
CPRM000101	UG/KG	1300.00	U	Pyrene	665	2600.00	0.50
				ERM Quotient Sum			22.36
CPRM000101				Mean ERM Quotient			0.89
CPRM000101				Mean ERM Quotient without ND			0.05
CPRM000201	MG/KG	6.70		Arsenic (As)	8.2	70.00	0.10
CPRM000201	MG/KG	0.24	U	Cadmium (Cd)	1.2	9.60	0.03
CPRM000201	MG/KG	28.80		Chromium (Cr)	81	370.00	0.08
CPRM000201	MG/KG	7.80		Copper (Cu)	34	270.00	0.03
CPRM000201	MG/KG	3.70		Lead (Pb)	46.7	218.00	0.02
CPRM000201	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM000201	MG/KG	9.10	J	Nickel (Ni)	20.9	51.60	0.18
CPRM000201	MG/KG	0.88	U	Silver (Ag)	1	3.70	0.24
CPRM000201	MG/KG	30.40		Zinc (Zn)	150	410.00	0.07
CPRM000201	UG/KG	5.22	U	4,4'-DDE	2.2	27.00	0.19
CPRM000201	UG/KG	5.22	U	4,4'-DDT	1.58	46.10	0.11
CPRM000201	UG/KG	209.60	U	Total PCBs	22.7	180.00	1.16
CPRM000201	UG/KG	520.00	U	2-Methylnaphthalene	70	670.00	0.78
CPRM000201	UG/KG	520.00	U	Acenaphthene	16	500.00	1.04
CPRM000201	UG/KG	520.00	U	Acenaphthylene	44	640.00	0.81
CPRM000201	UG/KG	520.00	U	Anthracene	85.3	1100.00	0.47
CPRM000201	UG/KG	520.00	U	Benzo(a)anthracene	261	1600.00	0.33
CPRM000201	UG/KG	520.00	U	Benzo(a)pyrene	430	1600.00	0.33
CPRM000201	UG/KG	520.00	U	Chrysene	384	2800.00	0.19
CPRM000201	UG/KG	520.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.00
CPRM000201	UG/KG	520.00	U	Fluoranthene	600	5100.00	0.10
CPRM000201	UG/KG	520.00	U	Fluorene	19	540.00	0.96
CPRM000201	UG/KG	520.00	U	Naphthalene	160	2100.00	0.25
CPRM000201	UG/KG	520.00	U	Phenanthrene	240	1500.00	0.35
CPRM000201	UG/KG	520.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			10.07
CPRM000201				Mean ERM Quotient			0.40
CPRM000201				Mean ERM Quotient without ND			0.02

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM000401	MG/KG	9.00		Arsenic (As)	8.2	70.00	0.13
CPRM000401	MG/KG	0.38	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM000401	MG/KG	22.20	J	Chromium (Cr)	81	370.00	0.06
CPRM000401	MG/KG	12.10	J	Copper (Cu)	34	270.00	0.04
CPRM000401	MG/KG	8.90	J	Lead (Pb)	46.7	218.00	0.04
CPRM000401	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
CPRM000401	MG/KG	9.80	J	Nickel (Ni)	20.9	51.60	0.19
CPRM000401	MG/KG	1.00	U	Silver (Ag)	1	3.70	0.27
CPRM000401	MG/KG	55.90	J	Zinc (Zn)	150	410.00	0.14
CPRM000401	UG/KG	6.08	U	4,4'-DDE	2.2	27.00	0.23
CPRM000401	UG/KG	6.08	U	4,4'-DDT	1.58	46.10	0.13
CPRM000401	UG/KG	243.90	U	Total PCBs	22.7	180.00	1.36
CPRM000401	UG/KG	610.00	U	2-Methylnaphthalene	70	670.00	0.91
CPRM000401	UG/KG	610.00	U	Acenaphthene	16	500.00	1.22
CPRM000401	UG/KG	610.00	U	Acenaphthylene	44	640.00	0.95
CPRM000401	UG/KG	610.00	U	Anthracene	85.3	1100.00	0.55
CPRM000401	UG/KG	610.00	U	Benzo(a)anthracene	261	1600.00	0.38
CPRM000401	UG/KG	610.00	U	Benzo(a)pyrene	430	1600.00	0.38
CPRM000401	UG/KG	610.00	U	Chrysene	384	2800.00	0.22
CPRM000401	UG/KG	610.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.35
CPRM000401	UG/KG	610.00	U	Fluoranthene	600	5100.00	0.12
CPRM000401	UG/KG	610.00	U	Fluorene	19	540.00	1.13
CPRM000401	UG/KG	610.00	U	Naphthalene	160	2100.00	0.29
CPRM000401	UG/KG	610.00	U	Phenanthrene	240	1500.00	0.41
CPRM000401	UG/KG	610.00	U	Pyrene	665	2600.00	0.23
				ERM Quotient Sum			11.85
CPRM000401				Mean ERM Quotient			0.47
CPRM000401				Mean ERM Quotient without ND			0.03
CPRM000501	MG/KG	10.00		Arsenic (As)	8.2	70.00	0.14
CPRM000501	MG/KG	0.37	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM000501	MG/KG	37.20		Chromium (Cr)	81	370.00	0.10
CPRM000501	MG/KG	16.70		Copper (Cu)	34	270.00	0.06
CPRM000501	MG/KG	11.40		Lead (Pb)	46.7	218.00	0.05
CPRM000501	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
CPRM000501	MG/KG	11.10	J	Nickel (Ni)	20.9	51.60	0.22
CPRM000501	MG/KG	1.10	U	Silver (Ag)	1	3.70	0.30
CPRM000501	MG/KG	59.30		Zinc (Zn)	150	410.00	0.14
CPRM000501	UG/KG	7.19	U	4,4'-DDE	2.2	27.00	0.27
CPRM000501	UG/KG	7.19	U	4,4'-DDT	1.58	46.10	0.16
CPRM000501	UG/KG	288.70	U	Total PCBs	22.7	180.00	1.60
CPRM000501	UG/KG	720.00	U	2-Methylnaphthalene	70	670.00	1.07
CPRM000501	UG/KG	720.00	U	Acenaphthene	16	500.00	1.44
CPRM000501	UG/KG	720.00	U	Acenaphthylene	44	640.00	1.13
CPRM000501	UG/KG	720.00	U	Anthracene	85.3	1100.00	0.65
CPRM000501	UG/KG	720.00	U	Benzo(a)anthracene	261	1600.00	0.45
CPRM000501	UG/KG	720.00	U	Benzo(a)pyrene	430	1600.00	0.45
CPRM000501	UG/KG	720.00	U	Chrysene	384	2800.00	0.26
CPRM000501	UG/KG	720.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.77
CPRM000501	UG/KG	720.00	U	Fluoranthene	600	5100.00	0.14
CPRM000501	UG/KG	720.00	U	Fluorene	19	540.00	1.33
CPRM000501	UG/KG	720.00	U	Naphthalene	160	2100.00	0.34
CPRM000501	UG/KG	720.00	U	Phenanthrene	240	1500.00	0.48
CPRM000501	UG/KG	720.00	U	Pyrene	665	2600.00	0.28
				ERM Quotient Sum			13.99
CPRM000501				Mean ERM Quotient			0.56
CPRM000501				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM000601	MG/KG	19.40		Arsenic (As)	8.2	70.00	0.28
CPRM000601	MG/KG	0.55	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM000601	MG/KG	41.10		Chromium (Cr)	81	370.00	0.11
CPRM000601	MG/KG	19.40		Copper (Cu)	34	270.00	0.07
CPRM000601	MG/KG	20.90		Lead (Pb)	46.7	218.00	0.10
CPRM000601	MG/KG	0.14	U	Mercury (Hg)	0.15	0.71	0.20
CPRM000601	MG/KG	11.30	J	Nickel (Ni)	20.9	51.60	0.22
CPRM000601	MG/KG	1.80	U	Silver (Ag)	1	3.70	0.49
CPRM000601	MG/KG	82.30		Zinc (Zn)	150	410.00	0.20
CPRM000601	UG/KG	12.40	U	4,4'-DDE	2.2	27.00	0.46
CPRM000601	UG/KG	12.40	U	4,4'-DDT	1.58	46.10	0.27
CPRM000601	UG/KG	498.00	U	Total PCBs	22.7	180.00	2.77
CPRM000601	UG/KG	1200.00	U	2-Methylnaphthalene	70	670.00	1.79
CPRM000601	UG/KG	1200.00	U	Acenaphthene	16	500.00	2.40
CPRM000601	UG/KG	1200.00	U	Acenaphthylene	44	640.00	1.88
CPRM000601	UG/KG	1200.00	U	Anthracene	85.3	1100.00	1.09
CPRM000601	UG/KG	1200.00	U	Benzo(a)anthracene	261	1600.00	0.75
CPRM000601	UG/KG	1200.00	U	Benzo(a)pyrene	430	1600.00	0.75
CPRM000601	UG/KG	1200.00	U	Chrysene	384	2800.00	0.43
CPRM000601	UG/KG	1200.00	U	Dibenz(a,h)anthracene	63.4	260.00	4.62
CPRM000601	UG/KG	1200.00	U	Fluoranthene	600	5100.00	0.24
CPRM000601	UG/KG	1200.00	U	Fluorene	19	540.00	2.22
CPRM000601	UG/KG	1200.00	U	Naphthalene	160	2100.00	0.57
CPRM000601	UG/KG	1200.00	U	Phenanthrene	240	1500.00	0.80
CPRM000601	UG/KG	1200.00	U	Pyrene	665	2600.00	0.46
				ERM Quotient Sum			23.20
CPRM000601				Mean ERM Quotient			0.93
CPRM000601				Mean ERM Quotient without ND			0.04
CPRM000701	MG/KG	2.70		Arsenic (As)	8.2	70.00	0.04
CPRM000701	MG/KG	0.05	U	Cadmium (Cd)	1.2	9.60	0.01
CPRM000701	MG/KG	5.10	J	Chromium (Cr)	81	370.00	0.01
CPRM000701	MG/KG	1.90	J	Copper (Cu)	34	270.00	0.01
CPRM000701	MG/KG	3.40		Lead (Pb)	46.7	218.00	0.02
CPRM000701	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM000701	MG/KG	1.10	J	Nickel (Ni)	20.9	51.60	0.02
CPRM000701	MG/KG	0.18	U	Silver (Ag)	1	3.70	0.05
CPRM000701	MG/KG	13.10	J	Zinc (Zn)	150	410.00	0.03
CPRM000701	UG/KG	4.53	U	4,4'-DDE	2.2	27.00	0.17
CPRM000701	UG/KG	4.53	U	4,4'-DDT	1.58	46.10	0.10
CPRM000701	UG/KG	181.90	U	Total PCBs	22.7	180.00	1.01
CPRM000701	UG/KG	450.00	U	2-Methylnaphthalene	70	670.00	0.67
CPRM000701	UG/KG	450.00	U	Acenaphthene	16	500.00	0.90
CPRM000701	UG/KG	450.00	U	Acenaphthylene	44	640.00	0.70
CPRM000701	UG/KG	450.00	U	Anthracene	85.3	1100.00	0.41
CPRM000701	UG/KG	450.00	U	Benzo(a)anthracene	261	1600.00	0.28
CPRM000701	UG/KG	450.00	U	Benzo(a)pyrene	430	1600.00	0.28
CPRM000701	UG/KG	450.00	U	Chrysene	384	2800.00	0.16
CPRM000701	UG/KG	450.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.73
CPRM000701	UG/KG	450.00	U	Fluoranthene	600	5100.00	0.09
CPRM000701	UG/KG	450.00	U	Fluorene	19	540.00	0.83
CPRM000701	UG/KG	450.00	U	Naphthalene	160	2100.00	0.21
CPRM000701	UG/KG	450.00	U	Phenanthrene	240	1500.00	0.30
CPRM000701	UG/KG	450.00	U	Pyrene	665	2600.00	0.17
				ERM Quotient Sum			8.26
CPRM000701				Mean ERM Quotient			0.33
CPRM000701				Mean ERM Quotient without ND			0.01

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM000801	MG/KG	2.40	J	Arsenic (As)	8.2	70.00	0.03
CPRM000801	MG/KG	0.21	J	Cadmium (Cd)	1.2	9.60	0.02
CPRM000801	MG/KG	6.90	J	Chromium (Cr)	81	370.00	0.02
CPRM000801	MG/KG	3.70	U	Copper (Cu)	34	270.00	0.01
CPRM000801	MG/KG	4.40	J	Lead (Pb)	46.7	218.00	0.02
CPRM000801	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM000801	MG/KG	1.90	J	Nickel (Ni)	20.9	51.60	0.04
CPRM000801	MG/KG	0.75	U	Silver (Ag)	1	3.70	0.20
CPRM000801	MG/KG	21.90	U	Zinc (Zn)	150	410.00	0.05
CPRM000801	UG/KG	4.43	U	4,4'-DDE	2.2	27.00	0.16
CPRM000801	UG/KG	4.43	U	4,4'-DDT	1.58	46.10	0.10
CPRM000801	UG/KG	177.90	U	Total PCBs	22.7	180.00	0.99
CPRM000801	UG/KG	450.00	U	2-Methylnaphthalene	70	670.00	0.67
CPRM000801	UG/KG	450.00	U	Acenaphthene	16	500.00	0.90
CPRM000801	UG/KG	450.00	U	Acenaphthylene	44	640.00	0.70
CPRM000801	UG/KG	450.00	U	Anthracene	85.3	1100.00	0.41
CPRM000801	UG/KG	450.00	U	Benzo(a)anthracene	261	1600.00	0.28
CPRM000801	UG/KG	450.00	U	Benzo(a)pyrene	430	1600.00	0.28
CPRM000801	UG/KG	450.00	U	Chrysene	384	2800.00	0.16
CPRM000801	UG/KG	450.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.73
CPRM000801	UG/KG	450.00	U	Fluoranthene	600	5100.00	0.09
CPRM000801	UG/KG	450.00	U	Fluorene	19	540.00	0.83
CPRM000801	UG/KG	450.00	U	Naphthalene	160	2100.00	0.21
CPRM000801	UG/KG	450.00	U	Phenanthrene	240	1500.00	0.30
CPRM000801	UG/KG	450.00	U	Pyrene	665	2600.00	0.17
				ERM Quotient Sum			8.47
CPRM000801				Mean ERM Quotient			0.34
CPRM000801				Mean ERM Quotient without ND			0.01
CPRM000901	MG/KG	16.50		Arsenic (As)	8.2	70.00	0.24
CPRM000901	MG/KG	0.34	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM000901	MG/KG	39.30		Chromium (Cr)	81	370.00	0.11
CPRM000901	MG/KG	22.60		Copper (Cu)	34	270.00	0.08
CPRM000901	MG/KG	18.10		Lead (Pb)	46.7	218.00	0.08
CPRM000901	MG/KG	0.12	U	Mercury (Hg)	0.15	0.71	0.17
CPRM000901	MG/KG	11.60	J	Nickel (Ni)	20.9	51.60	0.22
CPRM000901	MG/KG	2.00	U	Silver (Ag)	1	3.70	0.54
CPRM000901	MG/KG	87.90	J	Zinc (Zn)	150	410.00	0.21
CPRM000901	UG/KG	11.40	U	4,4'-DDE	2.2	27.00	0.42
CPRM000901	UG/KG	11.40	U	4,4'-DDT	1.58	46.10	0.25
CPRM000901	UG/KG	457.50	U	Total PCBs	22.7	180.00	2.54
CPRM000901	UG/KG	1100.00	U	2-Methylnaphthalene	70	670.00	1.64
CPRM000901	UG/KG	1100.00	U	Acenaphthene	16	500.00	2.20
CPRM000901	UG/KG	1100.00	U	Acenaphthylene	44	640.00	1.72
CPRM000901	UG/KG	1100.00	U	Anthracene	85.3	1100.00	1.00
CPRM000901	UG/KG	210.00	J	Benzo(a)anthracene	261	1600.00	0.13
CPRM000901	UG/KG	140.00	J	Benzo(a)pyrene	430	1600.00	0.09
CPRM000901	UG/KG	210.00	J	Chrysene	384	2800.00	0.08
CPRM000901	UG/KG	1100.00	U	Dibenz(a,h)anthracene	63.4	260.00	4.23
CPRM000901	UG/KG	290.00	J	Fluoranthene	600	5100.00	0.06
CPRM000901	UG/KG	1100.00	U	Fluorene	19	540.00	2.04
CPRM000901	UG/KG	1100.00	U	Naphthalene	160	2100.00	0.52
CPRM000901	UG/KG	1100.00	U	Phenanthrene	240	1500.00	0.73
CPRM000901	UG/KG	320.00	J	Pyrene	665	2600.00	0.12
				ERM Quotient Sum			19.46
CPRM000901				Mean ERM Quotient			0.78
CPRM000901				Mean ERM Quotient without ND			0.06

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM001001	MG/KG	2.40	J	Arsenic (As)	8.2	70.00	0.03
CPRM001001	MG/KG	0.05	U	Cadmium (Cd)	1.2	9.60	0.01
CPRM001001	MG/KG	4.70	J	Chromium (Cr)	81	370.00	0.01
CPRM001001	MG/KG	1.40	J	Copper (Cu)	34	270.00	0.01
CPRM001001	MG/KG	2.70		Lead (Pb)	46.7	218.00	0.01
CPRM001001	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM001001	MG/KG	0.94	J	Nickel (Ni)	20.9	51.60	0.02
CPRM001001	MG/KG	0.20	U	Silver (Ag)	1	3.70	0.05
CPRM001001	MG/KG	10.80	J	Zinc (Zn)	150	410.00	0.03
CPRM001001	UG/KG	4.18	U	4,4'-DDE	2.2	27.00	0.15
CPRM001001	UG/KG	4.18	U	4,4'-DDT	1.58	46.10	0.09
CPRM001001	UG/KG	167.80	U	Total PCBs	22.7	180.00	0.93
CPRM001001	UG/KG	420.00	U	2-Methylnaphthalene	70	670.00	0.63
CPRM001001	UG/KG	420.00	U	Acenaphthene	16	500.00	0.84
CPRM001001	UG/KG	420.00	U	Acenaphthylene	44	640.00	0.66
CPRM001001	UG/KG	420.00	U	Anthracene	85.3	1100.00	0.38
CPRM001001	UG/KG	420.00	U	Benzo(a)anthracene	261	1600.00	0.26
CPRM001001	UG/KG	420.00	U	Benzo(a)pyrene	430	1600.00	0.26
CPRM001001	UG/KG	420.00	U	Chrysene	384	2800.00	0.15
CPRM001001	UG/KG	420.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.62
CPRM001001	UG/KG	420.00	U	Fluoranthene	600	5100.00	0.08
CPRM001001	UG/KG	420.00	U	Fluorene	19	540.00	0.78
CPRM001001	UG/KG	420.00	U	Naphthalene	160	2100.00	0.20
CPRM001001	UG/KG	420.00	U	Phenanthrene	240	1500.00	0.28
CPRM001001	UG/KG	420.00	U	Pyrene	665	2600.00	0.16
				ERM Quotient Sum			7.70
CPRM001001				Mean ERM Quotient			0.31
CPRM001001				Mean ERM Quotient without ND			0.00
CPRM001101	MG/KG	14.30		Arsenic (As)	8.2	70.00	0.20
CPRM001101	MG/KG	0.59	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM001101	MG/KG	35.60		Chromium (Cr)	81	370.00	0.10
CPRM001101	MG/KG	19.00		Copper (Cu)	34	270.00	0.07
CPRM001101	MG/KG	15.80		Lead (Pb)	46.7	218.00	0.07
CPRM001101	MG/KG	0.11	U	Mercury (Hg)	0.15	0.71	0.15
CPRM001101	MG/KG	9.60	J	Nickel (Ni)	20.9	51.60	0.19
CPRM001101	MG/KG	1.60	U	Silver (Ag)	1	3.70	0.43
CPRM001101	MG/KG	68.80		Zinc (Zn)	150	410.00	0.17
CPRM001101	UG/KG	9.84	U	4,4'-DDE	2.2	27.00	0.36
CPRM001101	UG/KG	9.84	U	4,4'-DDT	1.58	46.10	0.21
CPRM001101	UG/KG	395.20	U	Total PCBs	22.7	180.00	2.20
CPRM001101	UG/KG	970.00	U	2-Methylnaphthalene	70	670.00	1.45
CPRM001101	UG/KG	970.00	U	Acenaphthene	16	500.00	1.94
CPRM001101	UG/KG	970.00	U	Acenaphthylene	44	640.00	1.52
CPRM001101	UG/KG	970.00	U	Anthracene	85.3	1100.00	0.88
CPRM001101	UG/KG	970.00	U	Benzo(a)anthracene	261	1600.00	0.61
CPRM001101	UG/KG	970.00	U	Benzo(a)pyrene	430	1600.00	0.61
CPRM001101	UG/KG	970.00	U	Chrysene	384	2800.00	0.35
CPRM001101	UG/KG	970.00	U	Dibenz(a,h)anthracene	63.4	260.00	3.73
CPRM001101	UG/KG	140.00	J	Fluoranthene	600	5100.00	0.03
CPRM001101	UG/KG	970.00	U	Fluorene	19	540.00	1.80
CPRM001101	UG/KG	970.00	U	Naphthalene	160	2100.00	0.46
CPRM001101	UG/KG	970.00	U	Phenanthrene	240	1500.00	0.65
CPRM001101	UG/KG	120.00	J	Pyrene	665	2600.00	0.05
				ERM Quotient Sum			18.27
CPRM001101				Mean ERM Quotient			0.73
CPRM001101				Mean ERM Quotient without ND			0.04

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM001201	MG/KG	5.30		Arsenic (As)	8.2	70.00	0.08
CPRM001201	MG/KG	0.26	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM001201	MG/KG	23.50		Chromium (Cr)	81	370.00	0.06
CPRM001201	MG/KG	4.20	J	Copper (Cu)	34	270.00	0.02
CPRM001201	MG/KG	7.40		Lead (Pb)	46.7	218.00	0.03
CPRM001201	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM001201	MG/KG	5.80	J	Nickel (Ni)	20.9	51.60	0.11
CPRM001201	MG/KG	0.86	U	Silver (Ag)	1	3.70	0.23
CPRM001201	MG/KG	31.60		Zinc (Zn)	150	410.00	0.08
CPRM001201	UG/KG	5.25	U	4,4'-DDE	2.2	27.00	0.19
CPRM001201	UG/KG	5.25	U	4,4'-DDT	1.58	46.10	0.11
CPRM001201	UG/KG	210.50	U	Total PCBs	22.7	180.00	1.17
CPRM001201	UG/KG	520.00	U	2-Methylnaphthalene	70	670.00	0.78
CPRM001201	UG/KG	520.00	U	Acenaphthene	16	500.00	1.04
CPRM001201	UG/KG	520.00	U	Acenaphthylene	44	640.00	0.81
CPRM001201	UG/KG	520.00	U	Anthracene	85.3	1100.00	0.47
CPRM001201	UG/KG	520.00	U	Benzo(a)anthracene	261	1600.00	0.33
CPRM001201	UG/KG	520.00	U	Benzo(a)pyrene	430	1600.00	0.33
CPRM001201	UG/KG	520.00	U	Chrysene	384	2800.00	0.19
CPRM001201	UG/KG	520.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.00
CPRM001201	UG/KG	520.00	U	Fluoranthene	600	5100.00	0.10
CPRM001201	UG/KG	520.00	U	Fluorene	19	540.00	0.96
CPRM001201	UG/KG	520.00	U	Naphthalene	160	2100.00	0.25
CPRM001201	UG/KG	520.00	U	Phenanthrene	240	1500.00	0.35
CPRM001201	UG/KG	520.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			9.98
CPRM001201				Mean ERM Quotient			0.40
CPRM001201				Mean ERM Quotient without ND			0.02
CPRM001301	MG/KG	18.20		Arsenic (As)	8.2	70.00	0.26
CPRM001301	MG/KG	0.93	J	Cadmium (Cd)	1.2	9.60	0.10
CPRM001301	MG/KG	51.50		Chromium (Cr)	81	370.00	0.14
CPRM001301	MG/KG	26.10		Copper (Cu)	34	270.00	0.10
CPRM001301	MG/KG	32.30		Lead (Pb)	46.7	218.00	0.15
CPRM001301	MG/KG	0.14	U	Mercury (Hg)	0.15	0.71	0.20
CPRM001301	MG/KG	15.50	J	Nickel (Ni)	20.9	51.60	0.30
CPRM001301	MG/KG	2.20	U	Silver (Ag)	1	3.70	0.59
CPRM001301	MG/KG	130.00		Zinc (Zn)	150	410.00	0.32
CPRM001301	UG/KG	12.40	U	4,4'-DDE	2.2	27.00	0.46
CPRM001301	UG/KG	12.40	U	4,4'-DDT	1.58	46.10	0.27
CPRM001301	UG/KG	498.50	U	Total PCBs	22.7	180.00	2.77
CPRM001301	UG/KG	1300.00	U	2-Methylnaphthalene	70	670.00	1.94
CPRM001301	UG/KG	1300.00	U	Acenaphthene	16	500.00	2.60
CPRM001301	UG/KG	1300.00	U	Acenaphthylene	44	640.00	2.03
CPRM001301	UG/KG	1300.00	U	Anthracene	85.3	1100.00	1.18
CPRM001301	UG/KG	160.00	J	Benzo(a)anthracene	261	1600.00	0.10
CPRM001301	UG/KG	1300.00	U	Benzo(a)pyrene	430	1600.00	0.81
CPRM001301	UG/KG	200.00	J	Chrysene	384	2800.00	0.07
CPRM001301	UG/KG	1300.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.00
CPRM001301	UG/KG	330.00	J	Fluoranthene	600	5100.00	0.06
CPRM001301	UG/KG	1300.00	U	Fluorene	19	540.00	2.41
CPRM001301	UG/KG	1300.00	U	Naphthalene	160	2100.00	0.62
CPRM001301	UG/KG	1300.00	U	Phenanthrene	240	1500.00	0.87
CPRM001301	UG/KG	370.00	J	Pyrene	665	2600.00	0.14
				ERM Quotient Sum			23.49
CPRM001301				Mean ERM Quotient			0.94
CPRM001301				Mean ERM Quotient without ND			0.07

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM001401	MG/KG	8.70		Arsenic (As)	8.2	70.00	0.12
CPRM001401	MG/KG	0.13	J	Cadmium (Cd)	1.2	9.60	0.01
CPRM001401	MG/KG	19.00	J	Chromium (Cr)	81	370.00	0.05
CPRM001401	MG/KG	8.70	J	Copper (Cu)	34	270.00	0.03
CPRM001401	MG/KG	11.50		Lead (Pb)	46.7	218.00	0.05
CPRM001401	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
CPRM001401	MG/KG	5.20	J	Nickel (Ni)	20.9	51.60	0.10
CPRM001401	MG/KG	0.37	U	Silver (Ag)	1	3.70	0.10
CPRM001401	MG/KG	36.00	J	Zinc (Zn)	150	410.00	0.09
CPRM001401	UG/KG	8.43	U	4,4'-DDE	2.2	27.00	0.31
CPRM001401	UG/KG	8.43	U	4,4'-DDT	1.58	46.10	0.18
CPRM001401	UG/KG	338.40	U	Total PCBs	22.7	180.00	1.88
CPRM001401	UG/KG	850.00	U	2-Methylnaphthalene	70	670.00	1.27
CPRM001401	UG/KG	850.00	U	Acenaphthene	16	500.00	1.70
CPRM001401	UG/KG	850.00	U	Acenaphthylene	44	640.00	1.33
CPRM001401	UG/KG	86.00	J	Anthracene	85.3	1100.00	0.08
CPRM001401	UG/KG	120.00	J	Benzo(a)anthracene	261	1600.00	0.08
CPRM001401	UG/KG	850.00	U	Benzo(a)pyrene	430	1600.00	0.53
CPRM001401	UG/KG	110.00	J	Chrysene	384	2800.00	0.04
CPRM001401	UG/KG	850.00	U	Dibenz(a,h)anthracene	63.4	260.00	3.27
CPRM001401	UG/KG	290.00	J	Fluoranthene	600	5100.00	0.06
CPRM001401	UG/KG	850.00	U	Fluorene	19	540.00	1.57
CPRM001401	UG/KG	850.00	U	Naphthalene	160	2100.00	0.40
CPRM001401	UG/KG	850.00	U	Phenanthrene	240	1500.00	0.57
CPRM001401	UG/KG	140.00	J	Pyrene	665	2600.00	0.05
				ERM Quotient Sum			13.98
CPRM001401				Mean ERM Quotient			0.56
CPRM001401				Mean ERM Quotient without ND			0.03
CPRM001501	MG/KG	10.70		Arsenic (As)	8.2	70.00	0.15
CPRM001501	MG/KG	0.61	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM001501	MG/KG	28.00	J	Chromium (Cr)	81	370.00	0.08
CPRM001501	MG/KG	23.20	J	Copper (Cu)	34	270.00	0.09
CPRM001501	MG/KG	17.00	J	Lead (Pb)	46.7	218.00	0.08
CPRM001501	MG/KG	0.09	U	Mercury (Hg)	0.15	0.71	0.13
CPRM001501	MG/KG	7.90	J	Nickel (Ni)	20.9	51.60	0.15
CPRM001501	MG/KG	1.20	U	Silver (Ag)	1	3.70	0.32
CPRM001501	MG/KG	54.10	J	Zinc (Zn)	150	410.00	0.13
CPRM001501	UG/KG	7.46	U	4,4'-DDE	2.2	27.00	0.28
CPRM001501	UG/KG	7.46	U	4,4'-DDT	1.58	46.10	0.16
CPRM001501	UG/KG	299.30	U	Total PCBs	22.7	180.00	1.66
CPRM001501	UG/KG	750.00	U	2-Methylnaphthalene	70	670.00	1.12
CPRM001501	UG/KG	750.00	U	Acenaphthene	16	500.00	1.50
CPRM001501	UG/KG	750.00	U	Acenaphthylene	44	640.00	1.17
CPRM001501	UG/KG	750.00	U	Anthracene	85.3	1100.00	0.68
CPRM001501	UG/KG	750.00	U	Benzo(a)anthracene	261	1600.00	0.47
CPRM001501	UG/KG	750.00	U	Benzo(a)pyrene	430	1600.00	0.47
CPRM001501	UG/KG	750.00	U	Chrysene	384	2800.00	0.27
CPRM001501	UG/KG	750.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.88
CPRM001501	UG/KG	750.00	U	Fluoranthene	600	5100.00	0.15
CPRM001501	UG/KG	750.00	U	Fluorene	19	540.00	1.39
CPRM001501	UG/KG	750.00	U	Naphthalene	160	2100.00	0.36
CPRM001501	UG/KG	750.00	U	Phenanthrene	240	1500.00	0.50
CPRM001501	UG/KG	84.00	J	Pyrene	665	2600.00	0.03
				ERM Quotient Sum			14.28
CPRM001501				Mean ERM Quotient			0.57
CPRM001501				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM001601	MG/KG	21.50		Arsenic (As)	8.2	70.00	0.31
CPRM001601	MG/KG	1.10	J	Cadmium (Cd)	1.2	9.60	0.11
CPRM001601	MG/KG	53.50		Chromium (Cr)	81	370.00	0.14
CPRM001601	MG/KG	32.40		Copper (Cu)	34	270.00	0.12
CPRM001601	MG/KG	28.80		Lead (Pb)	46.7	218.00	0.13
CPRM001601	MG/KG	0.18	U	Mercury (Hg)	0.15	0.71	0.25
CPRM001601	MG/KG	15.60	J	Nickel (Ni)	20.9	51.60	0.30
CPRM001601	MG/KG	2.40	U	Silver (Ag)	1	3.70	0.65
CPRM001601	MG/KG	116.00		Zinc (Zn)	150	410.00	0.28
CPRM001601	UG/KG	14.90	U	4,4'-DDE	2.2	27.00	0.55
CPRM001601	UG/KG	14.90	U	4,4'-DDT	1.58	46.10	0.32
CPRM001601	UG/KG	598.50	U	Total PCBs	22.7	180.00	3.33
CPRM001601	UG/KG	1500.00	U	2-Methylnaphthalene	70	670.00	2.24
CPRM001601	UG/KG	1500.00	U	Acenaphthene	16	500.00	3.00
CPRM001601	UG/KG	1500.00	U	Acenaphthylene	44	640.00	2.34
CPRM001601	UG/KG	1500.00	U	Anthracene	85.3	1100.00	1.36
CPRM001601	UG/KG	1500.00	U	Benzo(a)anthracene	261	1600.00	0.94
CPRM001601	UG/KG	1500.00	U	Benzo(a)pyrene	430	1600.00	0.94
CPRM001601	UG/KG	1500.00	U	Chrysene	384	2800.00	0.54
CPRM001601	UG/KG	1500.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.77
CPRM001601	UG/KG	1500.00	U	Fluoranthene	600	5100.00	0.29
CPRM001601	UG/KG	1500.00	U	Fluorene	19	540.00	2.78
CPRM001601	UG/KG	1500.00	U	Naphthalene	160	2100.00	0.71
CPRM001601	UG/KG	1500.00	U	Phenanthrene	240	1500.00	1.00
CPRM001601	UG/KG	1500.00	U	Pyrene	665	2600.00	0.58
				ERM Quotient Sum			29.00
CPRM001601				Mean ERM Quotient			1.16
CPRM001601				Mean ERM Quotient without ND			0.06
CPRM001701	MG/KG	16.60		Arsenic (As)	8.2	70.00	0.24
CPRM001701	MG/KG	1.40	J	Cadmium (Cd)	1.2	9.60	0.15
CPRM001701	MG/KG	51.20	J	Chromium (Cr)	81	370.00	0.14
CPRM001701	MG/KG	8.50	J	Copper (Cu)	34	270.00	0.03
CPRM001701	MG/KG	21.00	J	Lead (Pb)	46.7	218.00	0.10
CPRM001701	MG/KG	0.10	U	Mercury (Hg)	0.15	0.71	0.14
CPRM001701	MG/KG	14.10	J	Nickel (Ni)	20.9	51.60	0.27
CPRM001701	MG/KG	1.60	U	Silver (Ag)	1	3.70	0.43
CPRM001701	MG/KG	63.00	J	Zinc (Zn)	150	410.00	0.15
CPRM001701	UG/KG	9.19	U	4,4'-DDE	2.2	27.00	0.34
CPRM001701	UG/KG	9.19	U	4,4'-DDT	1.58	46.10	0.20
CPRM001701	UG/KG	369.20	U	Total PCBs	22.7	180.00	2.05
CPRM001701	UG/KG	920.00	UJ	2-Methylnaphthalene	70	670.00	1.37
CPRM001701	UG/KG	920.00	UJ	Acenaphthene	16	500.00	1.84
CPRM001701	UG/KG	920.00	UJ	Acenaphthylene	44	640.00	1.44
CPRM001701	UG/KG	920.00	UJ	Anthracene	85.3	1100.00	0.84
CPRM001701	UG/KG	920.00	UJ	Benzo(a)anthracene	261	1600.00	0.58
CPRM001701	UG/KG	920.00	UJ	Benzo(a)pyrene	430	1600.00	0.58
CPRM001701	UG/KG	920.00	UJ	Chrysene	384	2800.00	0.33
CPRM001701	UG/KG	920.00	UJ	Dibenz(a,h)anthracene	63.4	260.00	3.54
CPRM001701	UG/KG	920.00	UJ	Fluoranthene	600	5100.00	0.18
CPRM001701	UG/KG	920.00	UJ	Fluorene	19	540.00	1.70
CPRM001701	UG/KG	920.00	UJ	Naphthalene	160	2100.00	0.44
CPRM001701	UG/KG	920.00	UJ	Phenanthrene	240	1500.00	0.61
CPRM001701	UG/KG	920.00	UJ	Pyrene	665	2600.00	0.35
				ERM Quotient Sum			18.03
CPRM001701				Mean ERM Quotient			0.72
CPRM001701				Mean ERM Quotient without ND			0.04

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM001801	MG/KG	21.60		Arsenic (As)	8.2	70.00	0.31
CPRM001801	MG/KG	0.74	J	Cadmium (Cd)	1.2	9.60	0.08
CPRM001801	MG/KG	55.40		Chromium (Cr)	81	370.00	0.15
CPRM001801	MG/KG	26.10		Copper (Cu)	34	270.00	0.10
CPRM001801	MG/KG	25.70		Lead (Pb)	46.7	218.00	0.12
CPRM001801	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
CPRM001801	MG/KG	15.60	J	Nickel (Ni)	20.9	51.60	0.30
CPRM001801	MG/KG	2.30	U	Silver (Ag)	1	3.70	0.62
CPRM001801	MG/KG	106.00		Zinc (Zn)	150	410.00	0.26
CPRM001801	UG/KG	14.60	U	4,4'-DDE	2.2	27.00	0.54
CPRM001801	UG/KG	14.60	U	4,4'-DDT	1.58	46.10	0.32
CPRM001801	UG/KG	586.50	U	Total PCBs	22.7	180.00	3.26
CPRM001801	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM001801	UG/KG	1400.00	U	Acenaphthene	16	500.00	2.80
CPRM001801	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM001801	UG/KG	1400.00	U	Anthracene	85.3	1100.00	1.27
CPRM001801	UG/KG	1400.00	U	Benzo(a)anthracene	261	1600.00	0.88
CPRM001801	UG/KG	1400.00	U	Benzo(a)pyrene	430	1600.00	0.88
CPRM001801	UG/KG	1400.00	U	Chrysene	384	2800.00	0.50
CPRM001801	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM001801	UG/KG	1400.00	U	Fluoranthene	600	5100.00	0.27
CPRM001801	UG/KG	1400.00	U	Fluorene	19	540.00	2.59
CPRM001801	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM001801	UG/KG	1400.00	U	Phenanthrene	240	1500.00	0.93
CPRM001801	UG/KG	1400.00	U	Pyrene	665	2600.00	0.54
				ERM Quotient Sum			27.28
CPRM001801				Mean ERM Quotient			1.09
CPRM001801				Mean ERM Quotient without ND			0.05
CPRM001901	MG/KG	9.10		Arsenic (As)	8.2	70.00	0.13
CPRM001901	MG/KG	0.29	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM001901	MG/KG	13.70	J	Chromium (Cr)	81	370.00	0.04
CPRM001901	MG/KG	4.00	J	Copper (Cu)	34	270.00	0.01
CPRM001901	MG/KG	5.60		Lead (Pb)	46.7	218.00	0.03
CPRM001901	MG/KG	0.03	U	Mercury (Hg)	0.15	0.71	0.04
CPRM001901	MG/KG	3.80	J	Nickel (Ni)	20.9	51.60	0.07
CPRM001901	MG/KG	0.19	U	Silver (Ag)	1	3.70	0.05
CPRM001901	MG/KG	21.90	J	Zinc (Zn)	150	410.00	0.05
CPRM001901	UG/KG	4.06	U	4,4'-DDE	2.2	27.00	0.15
CPRM001901	UG/KG	4.06	U	4,4'-DDT	1.58	46.10	0.09
CPRM001901	UG/KG	163.00	U	Total PCBs	22.7	180.00	0.91
CPRM001901	UG/KG	410.00	U	2-Methylnaphthalene	70	670.00	0.61
CPRM001901	UG/KG	410.00	U	Acenaphthene	16	500.00	0.82
CPRM001901	UG/KG	410.00	U	Acenaphthylene	44	640.00	0.64
CPRM001901	UG/KG	410.00	U	Anthracene	85.3	1100.00	0.37
CPRM001901	UG/KG	410.00	U	Benzo(a)anthracene	261	1600.00	0.26
CPRM001901	UG/KG	410.00	U	Benzo(a)pyrene	430	1600.00	0.26
CPRM001901	UG/KG	410.00	U	Chrysene	384	2800.00	0.15
CPRM001901	UG/KG	410.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.58
CPRM001901	UG/KG	410.00	U	Fluoranthene	600	5100.00	0.08
CPRM001901	UG/KG	410.00	U	Fluorene	19	540.00	0.76
CPRM001901	UG/KG	410.00	U	Naphthalene	160	2100.00	0.20
CPRM001901	UG/KG	410.00	U	Phenanthrene	240	1500.00	0.27
CPRM001901	UG/KG	410.00	U	Pyrene	665	2600.00	0.16
				ERM Quotient Sum			7.75
CPRM001901				Mean ERM Quotient			0.31
CPRM001901				Mean ERM Quotient without ND			0.01

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM002001	MG/KG	4.80		Arsenic (As)	8.2	70.00	0.07
CPRM002001	MG/KG	0.20	J	Cadmium (Cd)	1.2	9.60	0.02
CPRM002001	MG/KG	8.80	J	Chromium (Cr)	81	370.00	0.02
CPRM002001	**MG/KG**	**330.00**	**J**	**Copper (Cu)**	**34**	**270.00**	**1.22**
CPRM002001	MG/KG	24.60	J	Lead (Pb)	46.7	218.00	0.11
CPRM002001	MG/KG	0.12		Mercury (Hg)	0.15	0.71	0.17
CPRM002001	MG/KG	2.50	J	Nickel (Ni)	20.9	51.60	0.05
CPRM002001	MG/KG	0.74	U	Silver (Ag)	1	3.70	0.20
CPRM002001	MG/KG	40.10	J	Zinc (Zn)	150	410.00	0.10
CPRM002001	UG/KG	4.76	U	4,4'-DDE	2.2	27.00	0.18
CPRM002001	UG/KG	4.76	U	4,4'-DDT	1.58	46.10	0.10
CPRM002001	UG/KG	191.10	U	Total PCBs	22.7	180.00	1.06
CPRM002001	UG/KG	480.00	U	2-Methylnaphthalene	70	670.00	0.72
CPRM002001	UG/KG	480.00	U	Acenaphthene	16	500.00	0.96
CPRM002001	UG/KG	480.00	U	Acenaphthylene	44	640.00	0.75
CPRM002001	UG/KG	480.00	U	Anthracene	85.3	1100.00	0.44
CPRM002001	UG/KG	220.00	J	Benzo(a)anthracene	261	1600.00	0.14
CPRM002001	UG/KG	220.00	J	Benzo(a)pyrene	430	1600.00	0.14
CPRM002001	UG/KG	310.00	J	Chrysene	384	2800.00	0.11
CPRM002001	UG/KG	480.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.85
CPRM002001	UG/KG	320.00	J	Fluoranthene	600	5100.00	0.06
CPRM002001	UG/KG	480.00	U	Fluorene	19	540.00	0.89
CPRM002001	UG/KG	480.00	U	Naphthalene	160	2100.00	0.23
CPRM002001	UG/KG	480.00	U	Phenanthrene	240	1500.00	0.32
CPRM002001	UG/KG	160.00	J	Pyrene	665	2600.00	0.06
				ERM Quotient Sum			9.96
CPRM002001				Mean ERM Quotient			0.40
CPRM002001				Mean ERM Quotient without ND			0.09
CPRM002101	MG/KG	19.10		Arsenic (As)	8.2	70.00	0.27
CPRM002101	MG/KG	0.79	J	Cadmium (Cd)	1.2	9.60	0.08
CPRM002101	MG/KG	36.20		Chromium (Cr)	81	370.00	0.10
CPRM002101	MG/KG	21.00	J	Copper (Cu)	34	270.00	0.08
CPRM002101	MG/KG	27.80		Lead (Pb)	46.7	218.00	0.13
CPRM002101	MG/KG	0.13	U	Mercury (Hg)	0.15	0.71	0.18
CPRM002101	MG/KG	9.70	J	Nickel (Ni)	20.9	51.60	0.19
CPRM002101	MG/KG	2.60	U	Silver (Ag)	1	3.70	0.70
CPRM002101	MG/KG	96.50		Zinc (Zn)	150	410.00	0.24
CPRM002101	UG/KG	3.30	U	4,4'-DDE	2.2	27.00	0.12
CPRM002101	UG/KG	3.30	U	4,4'-DDT	1.58	46.10	0.07
CPRM002101	UG/KG	132.50	U	Total PCBs	22.7	180.00	0.74
CPRM002101	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM002101	**UG/KG**	**730.00**	**J**	**Acenaphthene**	**16**	**500.00**	**1.46**
CPRM002101	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM002101	UG/KG	880.00	J	Anthracene	85.3	1100.00	0.80
CPRM002101	UG/KG	840.00	J	Benzo(a)anthracene	261	1600.00	0.53
CPRM002101	UG/KG	420.00	J	Benzo(a)pyrene	430	1600.00	0.26
CPRM002101	UG/KG	800.00	J	Chrysene	384	2800.00	0.29
CPRM002101	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM002101	UG/KG	2600.00		Fluoranthene	600	5100.00	0.51
CPRM002101	**UG/KG**	**680.00**	**J**	**Fluorene**	**19**	**540.00**	**1.26**
CPRM002101	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM002101	**UG/KG**	**1900.00**		**Phenanthrene**	**240**	**1500.00**	**1.27**
CPRM002101	UG/KG	1900.00		Pyrene	665	2600.00	0.73
				ERM Quotient Sum			20.33
CPRM002101				Mean ERM Quotient			0.81
CPRM002101				Mean ERM Quotient without ND			0.33

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM002201	MG/KG	20.10		Arsenic (As)	8.2	70.00	0.29
CPRM002201	MG/KG	0.47	J	Cadmium (Cd)	1.2	9.60	0.05
CPRM002201	MG/KG	52.20		Chromium (Cr)	81	370.00	0.14
CPRM002201	MG/KG	22.20		Copper (Cu)	34	270.00	0.08
CPRM002201	MG/KG	27.90		Lead (Pb)	46.7	218.00	0.13
CPRM002201	MG/KG	0.15	U	Mercury (Hg)	0.15	0.71	0.21
CPRM002201	MG/KG	15.20	J	Nickel (Ni)	20.9	51.60	0.29
CPRM002201	MG/KG	2.50	U	Silver (Ag)	1	3.70	0.68
CPRM002201	MG/KG	97.90		Zinc (Zn)	150	410.00	0.24
CPRM002201	UG/KG	3.30	U	4,4'-DDE	2.2	27.00	0.12
CPRM002201	UG/KG	3.30	U	4,4'-DDT	1.58	46.10	0.07
CPRM002201	UG/KG	132.50	U	Total PCBs	22.7	180.00	0.74
CPRM002201	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM002201	UG/KG	1400.00	U	Acenaphthene	16	500.00	2.80
CPRM002201	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM002201	UG/KG	230.00	J	Anthracene	85.3	1100.00	0.21
CPRM002201	UG/KG	170.00	J	Benzo(a)anthracene	261	1600.00	0.11
CPRM002201	UG/KG	1400.00	U	Benzo(a)pyrene	430	1600.00	0.88
CPRM002201	UG/KG	200.00	J	Chrysene	384	2800.00	0.07
CPRM002201	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM002201	UG/KG	460.00	J	Fluoranthene	600	5100.00	0.09
CPRM002201	UG/KG	1400.00	U	Fluorene	19	540.00	2.59
CPRM002201	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM002201	UG/KG	1400.00	U	Phenanthrene	240	1500.00	0.93
CPRM002201	UG/KG	250.00	J	Pyrene	665	2600.00	0.10
				ERM Quotient Sum			21.14
CPRM002201				Mean ERM Quotient			0.85
CPRM002201				Mean ERM Quotient without ND			0.07
CPRM002301	MG/KG	5.20		Arsenic (As)	8.2	70.00	0.07
CPRM002301	MG/KG	0.11	J	Cadmium (Cd)	1.2	9.60	0.01
CPRM002301	MG/KG	5.10	J	Chromium (Cr)	81	370.00	0.01
CPRM002301	MG/KG	7.60		Copper (Cu)	34	270.00	0.03
CPRM002301	MG/KG	2.90		Lead (Pb)	46.7	218.00	0.01
CPRM002301	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM002301	MG/KG	2.30	J	Nickel (Ni)	20.9	51.60	0.04
CPRM002301	MG/KG	0.19	J	Silver (Ag)	1	3.70	0.05
CPRM002301	MG/KG	17.00	J	Zinc (Zn)	150	410.00	0.04
CPRM002301	UG/KG	4.20	U	4,4'-DDE	2.2	27.00	0.16
CPRM002301	UG/KG	4.20	U	4,4'-DDT	1.58	46.10	0.09
CPRM002301	UG/KG	168.65	U	Total PCBs	22.7	180.00	0.94
CPRM002301	UG/KG	420.00	U	2-Methylnaphthalene	70	670.00	0.63
CPRM002301	UG/KG	420.00	U	Acenaphthene	16	500.00	0.84
CPRM002301	UG/KG	420.00	U	Acenaphthylene	44	640.00	0.66
CPRM002301	UG/KG	420.00	U	Anthracene	85.3	1100.00	0.38
CPRM002301	UG/KG	420.00	U	Benzo(a)anthracene	261	1600.00	0.26
CPRM002301	UG/KG	420.00	U	Benzo(a)pyrene	430	1600.00	0.26
CPRM002301	UG/KG	420.00	U	Chrysene	384	2800.00	0.15
CPRM002301	UG/KG	420.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.62
CPRM002301	UG/KG	420.00	U	Fluoranthene	600	5100.00	0.08
CPRM002301	UG/KG	420.00	U	Fluorene	19	540.00	0.78
CPRM002301	UG/KG	420.00	U	Naphthalene	160	2100.00	0.20
CPRM002301	UG/KG	420.00	U	Phenanthrene	240	1500.00	0.28
CPRM002301	UG/KG	420.00	U	Pyrene	665	2600.00	0.16
				ERM Quotient Sum			7.82
CPRM002301				Mean ERM Quotient			0.31
CPRM002301				Mean ERM Quotient without ND			0.02

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM002401	MG/KG	22.20		Arsenic (As)	8.2	70.00	0.32
CPRM002401	MG/KG	0.66	J	Cadmium (Cd)	1.2	9.60	0.07
CPRM002401	MG/KG	50.20		Chromium (Cr)	81	370.00	0.14
CPRM002401	MG/KG	25.60		Copper (Cu)	34	270.00	0.09
CPRM002401	MG/KG	24.70		Lead (Pb)	46.7	218.00	0.11
CPRM002401	MG/KG	0.15	U	Mercury (Hg)	0.15	0.71	0.21
CPRM002401	MG/KG	14.90	J	Nickel (Ni)	20.9	51.60	0.29
CPRM002401	MG/KG	2.60	U	Silver (Ag)	1	3.70	0.70
CPRM002401	MG/KG	146.00		Zinc (Zn)	150	410.00	0.36
CPRM002401	UG/KG	15.60	U	4,4'-DDE	2.2	27.00	0.58
CPRM002401	UG/KG	15.60	U	4,4'-DDT	1.58	46.10	0.34
CPRM002401	UG/KG	627.00	U	Total PCBs	22.7	180.00	3.48
CPRM002401	UG/KG	1600.00	U	2-Methylnaphthalene	70	670.00	2.39
CPRM002401	UG/KG	1600.00	U	Acenaphthene	16	500.00	3.20
CPRM002401	UG/KG	1600.00	U	Acenaphthylene	44	640.00	2.50
CPRM002401	UG/KG	1600.00	U	Anthracene	85.3	1100.00	1.45
CPRM002401	UG/KG	1600.00	U	Benzo(a)anthracene	261	1600.00	1.00
CPRM002401	UG/KG	1600.00	U	Benzo(a)pyrene	430	1600.00	1.00
CPRM002401	UG/KG	1600.00	U	Chrysene	384	2800.00	0.57
CPRM002401	UG/KG	1600.00	U	Dibenz(a,h)anthracene	63.4	260.00	6.15
CPRM002401	UG/KG	340.00	J	Fluoranthene	600	5100.00	0.07
CPRM002401	UG/KG	1600.00	U	Fluorene	19	540.00	2.96
CPRM002401	UG/KG	1600.00	U	Naphthalene	160	2100.00	0.76
CPRM002401	UG/KG	1600.00	U	Phenanthrene	240	1500.00	1.07
CPRM002401	UG/KG	290.00	J	Pyrene	665	2600.00	0.11
				ERM Quotient Sum			29.93
CPRM002401				Mean ERM Quotient			1.20
CPRM002401				Mean ERM Quotient without ND			0.06
CPRM002501	MG/KG	21.90		Arsenic (As)	8.2	70.00	0.31
CPRM002501	MG/KG	0.18	U	Cadmium (Cd)	1.2	9.60	0.02
CPRM002501	MG/KG	53.80		Chromium (Cr)	81	370.00	0.15
CPRM002501	MG/KG	20.90	J	Copper (Cu)	34	270.00	0.08
CPRM002501	MG/KG	25.20		Lead (Pb)	46.7	218.00	0.12
CPRM002501	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
CPRM002501	MG/KG	16.20	J	Nickel (Ni)	20.9	51.60	0.31
CPRM002501	MG/KG	2.60	U	Silver (Ag)	1	3.70	0.70
CPRM002501	MG/KG	92.50		Zinc (Zn)	150	410.00	0.23
CPRM002501	UG/KG	15.00	U	4,4'-DDE	2.2	27.00	0.56
CPRM002501	UG/KG	15.00	U	4,4'-DDT	1.58	46.10	0.33
CPRM002501	UG/KG	602.50	U	Total PCBs	22.7	180.00	3.35
CPRM002501	UG/KG	1500.00	U	2-Methylnaphthalene	70	670.00	2.24
CPRM002501	UG/KG	1500.00	U	Acenaphthene	16	500.00	3.00
CPRM002501	UG/KG	1500.00	U	Acenaphthylene	44	640.00	2.34
CPRM002501	UG/KG	210.00	J	Anthracene	85.3	1100.00	0.19
CPRM002501	UG/KG	1500.00	U	Benzo(a)anthracene	261	1600.00	0.94
CPRM002501	UG/KG	1500.00	U	Benzo(a)pyrene	430	1600.00	0.94
CPRM002501	UG/KG	270.00	J	Chrysene	384	2800.00	0.10
CPRM002501	UG/KG	1500.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.77
CPRM002501	UG/KG	440.00	J	Fluoranthene	600	5100.00	0.09
CPRM002501	UG/KG	1500.00	U	Fluorene	19	540.00	2.78
CPRM002501	UG/KG	1500.00	U	Naphthalene	160	2100.00	0.71
CPRM002501	UG/KG	1500.00	U	Phenanthrene	240	1500.00	1.00
CPRM002501	UG/KG	330.00	J	Pyrene	665	2600.00	0.13
				ERM Quotient Sum			26.60
CPRM002501				Mean ERM Quotient			1.06
CPRM002501				Mean ERM Quotient without ND			0.07

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM002601	MG/KG	1.40	J	Arsenic (As)	8.2	70.00	0.02
CPRM002601	MG/KG	0.27	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM002601	MG/KG	6.00	J	Chromium (Cr)	81	370.00	0.02
CPRM002601	MG/KG	30.70		Copper (Cu)	34	270.00	0.11
CPRM002601	MG/KG	5.10		Lead (Pb)	46.7	218.00	0.02
CPRM002601	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM002601	MG/KG	1.20	J	Nickel (Ni)	20.9	51.60	0.02
CPRM002601	MG/KG	0.85	J	Silver (Ag)	1	3.70	0.23
CPRM002601	MG/KG	6.10	U	Zinc (Zn)	150	410.00	0.01
CPRM002601	UG/KG	4.04	U	4,4'-DDE	2.2	27.00	0.15
CPRM002601	UG/KG	4.04	U	4,4'-DDT	1.58	46.10	0.09
CPRM002601	UG/KG	162.25	U	Total PCBs	22.7	180.00	0.90
CPRM002601	UG/KG	400.00	U	2-Methylnaphthalene	70	670.00	0.60
CPRM002601	UG/KG	400.00	U	Acenaphthene	16	500.00	0.80
CPRM002601	UG/KG	400.00	U	Acenaphthylene	44	640.00	0.63
CPRM002601	UG/KG	400.00	U	Anthracene	85.3	1100.00	0.36
CPRM002601	UG/KG	400.00	U	Benzo(a)anthracene	261	1600.00	0.25
CPRM002601	UG/KG	400.00	U	Benzo(a)pyrene	430	1600.00	0.25
CPRM002601	UG/KG	400.00	U	Chrysene	384	2800.00	0.14
CPRM002601	UG/KG	400.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.54
CPRM002601	UG/KG	400.00	U	Fluoranthene	600	5100.00	0.08
CPRM002601	UG/KG	400.00	U	Fluorene	19	540.00	0.74
CPRM002601	UG/KG	400.00	U	Naphthalene	160	2100.00	0.19
CPRM002601	UG/KG	400.00	U	Phenanthrene	240	1500.00	0.27
CPRM002601	UG/KG	400.00	U	Pyrene	665	2600.00	0.15
				ERM Quotient Sum			7.66
CPRM002601				Mean ERM Quotient			0.31
CPRM002601				Mean ERM Quotient without ND			0.02
CPRM002701	MG/KG	10.10		Arsenic (As)	8.2	70.00	0.14
CPRM002701	MG/KG	0.57	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM002701	MG/KG	30.00	J	Chromium (Cr)	81	370.00	0.08
CPRM002701	MG/KG	13.00	J	Copper (Cu)	34	270.00	0.05
CPRM002701	MG/KG	10.60	J	Lead (Pb)	46.7	218.00	0.05
CPRM002701	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
CPRM002701	MG/KG	7.40	J	Nickel (Ni)	20.9	51.60	0.14
CPRM002701	MG/KG	1.20	U	Silver (Ag)	1	3.70	0.32
CPRM002701	MG/KG	49.20	J	Zinc (Zn)	150	410.00	0.12
CPRM002701	UG/KG	7.26	U	4,4'-DDE	2.2	27.00	0.27
CPRM002701	UG/KG	7.26	U	4,4'-DDT	1.58	46.10	0.16
CPRM002701	UG/KG	291.30	U	Total PCBs	22.7	180.00	1.62
CPRM002701	UG/KG	720.00	U	2-Methylnaphthalene	70	670.00	1.07
CPRM002701	UG/KG	720.00	U	Acenaphthene	16	500.00	1.44
CPRM002701	UG/KG	720.00	U	Acenaphthylene	44	640.00	1.13
CPRM002701	UG/KG	720.00	U	Anthracene	85.3	1100.00	0.65
CPRM002701	UG/KG	720.00	U	Benzo(a)anthracene	261	1600.00	0.45
CPRM002701	UG/KG	720.00	U	Benzo(a)pyrene	430	1600.00	0.45
CPRM002701	UG/KG	720.00	U	Chrysene	384	2800.00	0.26
CPRM002701	UG/KG	720.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.77
CPRM002701	UG/KG	720.00	U	Fluoranthene	600	5100.00	0.14
CPRM002701	UG/KG	720.00	U	Fluorene	19	540.00	1.33
CPRM002701	UG/KG	720.00	U	Naphthalene	160	2100.00	0.34
CPRM002701	UG/KG	720.00	U	Phenanthrene	240	1500.00	0.48
CPRM002701	UG/KG	720.00	U	Pyrene	665	2600.00	0.28
				ERM Quotient Sum			13.91
CPRM002701				Mean ERM Quotient			0.56
CPRM002701				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM002801	MG/KG	2.00	J	Arsenic (As)	8.2	70.00	0.03
CPRM002801	MG/KG	0.09	J	Cadmium (Cd)	1.2	9.60	0.01
CPRM002801	MG/KG	4.40	J	Chromium (Cr)	81	370.00	0.01
CPRM002801	MG/KG	2.30	U	Copper (Cu)	34	270.00	0.01
CPRM002801	MG/KG	3.20	J	Lead (Pb)	46.7	218.00	0.01
CPRM002801	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM002801	MG/KG	1.40	J	Nickel (Ni)	20.9	51.60	0.03
CPRM002801	MG/KG	0.78	U	Silver (Ag)	1	3.70	0.21
CPRM002801	MG/KG	11.90	U	Zinc (Zn)	150	410.00	0.03
CPRM002801	UG/KG	4.53	U	4,4'-DDE	2.2	27.00	0.17
CPRM002801	UG/KG	4.53	U	4,4'-DDT	1.58	46.10	0.10
CPRM002801	UG/KG	181.90	U	Total PCBs	22.7	180.00	1.01
CPRM002801	UG/KG	450.00	U	2-Methylnaphthalene	70	670.00	0.67
CPRM002801	UG/KG	450.00	U	Acenaphthene	16	500.00	0.90
CPRM002801	UG/KG	450.00	U	Acenaphthylene	44	640.00	0.70
CPRM002801	UG/KG	450.00	U	Anthracene	85.3	1100.00	0.41
CPRM002801	UG/KG	450.00	U	Benzo(a)anthracene	261	1600.00	0.28
CPRM002801	UG/KG	450.00	U	Benzo(a)pyrene	430	1600.00	0.28
CPRM002801	UG/KG	450.00	U	Chrysene	384	2800.00	0.16
CPRM002801	UG/KG	450.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.73
CPRM002801	UG/KG	450.00	U	Fluoranthene	600	5100.00	0.09
CPRM002801	UG/KG	450.00	U	Fluorene	19	540.00	0.83
CPRM002801	UG/KG	450.00	U	Naphthalene	160	2100.00	0.21
CPRM002801	UG/KG	450.00	U	Phenanthrene	240	1500.00	0.30
CPRM002801	UG/KG	450.00	U	Pyrene	665	2600.00	0.17
				ERM Quotient Sum			8.42
CPRM002801				Mean ERM Quotient			0.34
CPRM002801				Mean ERM Quotient without ND			0.00
CPRM002901	MG/KG	21.70		Arsenic (As)	8.2	70.00	0.31
CPRM002901	MG/KG	0.65	J	Cadmium (Cd)	1.2	9.60	0.07
CPRM002901	MG/KG	55.60		Chromium (Cr)	81	370.00	0.15
CPRM002901	MG/KG	21.20		Copper (Cu)	34	270.00	0.08
CPRM002901	MG/KG	23.10		Lead (Pb)	46.7	218.00	0.11
CPRM002901	MG/KG	0.15	U	Mercury (Hg)	0.15	0.71	0.21
CPRM002901	MG/KG	15.80	J	Nickel (Ni)	20.9	51.60	0.31
CPRM002901	MG/KG	2.00	U	Silver (Ag)	1	3.70	0.54
CPRM002901	MG/KG	104.00		Zinc (Zn)	150	410.00	0.25
CPRM002901	UG/KG	13.50	U	4,4'-DDE	2.2	27.00	0.50
CPRM002901	UG/KG	13.50	U	4,4'-DDT	1.58	46.10	0.29
CPRM002901	UG/KG	542.00	U	Total PCBs	22.7	180.00	3.01
CPRM002901	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM002901	UG/KG	1400.00	U	Acenaphthene	16	500.00	2.80
CPRM002901	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM002901	UG/KG	220.00	J	Anthracene	85.3	1100.00	0.20
CPRM002901	UG/KG	140.00	J	Benzo(a)anthracene	261	1600.00	0.09
CPRM002901	UG/KG	1400.00	U	Benzo(a)pyrene	430	1600.00	0.88
CPRM002901	UG/KG	150.00	J	Chrysene	384	2800.00	0.05
CPRM002901	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM002901	UG/KG	220.00	J	Fluoranthene	600	5100.00	0.04
CPRM002901	UG/KG	1400.00	U	Fluorene	19	540.00	2.59
CPRM002901	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM002901	UG/KG	1400.00	U	Phenanthrene	240	1500.00	0.93
CPRM002901	UG/KG	170.00	J	Pyrene	665	2600.00	0.07
				ERM Quotient Sum			23.81
CPRM002901				Mean ERM Quotient			0.95
CPRM002901				Mean ERM Quotient without ND			0.07

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM003001	MG/KG	17.90		Arsenic (As)	8.2	70.00	0.26
CPRM003001	MG/KG	0.69	J	Cadmium (Cd)	1.2	9.60	0.07
CPRM003001	MG/KG	53.10		Chromium (Cr)	81	370.00	0.14
CPRM003001	MG/KG	22.10		Copper (Cu)	34	270.00	0.08
CPRM003001	MG/KG	26.30		Lead (Pb)	46.7	218.00	0.12
CPRM003001	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
CPRM003001	MG/KG	15.20	J	Nickel (Ni)	20.9	51.60	0.29
CPRM003001	MG/KG	2.10	U	Silver (Ag)	1	3.70	0.57
CPRM003001	MG/KG	99.50		Zinc (Zn)	150	410.00	0.24
CPRM003001	UG/KG	14.30	U	4,4'-DDE	2.2	27.00	0.53
CPRM003001	UG/KG	14.30	U	4,4'-DDT	1.58	46.10	0.31
CPRM003001	UG/KG	574.50	U	Total PCBs	22.7	180.00	3.19
CPRM003001	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM003001	UG/KG	300.00	J	Acenaphthene	16	500.00	0.60
CPRM003001	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM003001	UG/KG	190.00	J	Anthracene	85.3	1100.00	0.17
CPRM003001	UG/KG	1100.00	J	Benzo(a)anthracene	261	1600.00	0.69
CPRM003001	UG/KG	350.00	J	Benzo(a)pyrene	430	1600.00	0.22
CPRM003001	UG/KG	720.00	J	Chrysene	384	2800.00	0.26
CPRM003001	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM003001	UG/KG	2600.00		Fluoranthene	600	5100.00	0.51
CPRM003001	UG/KG	1400.00	U	Fluorene	19	540.00	2.59
CPRM003001	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM003001	UG/KG	580.00	J	Phenanthrene	240	1500.00	0.39
CPRM003001	UG/KG	2100.00		Pyrene	665	2600.00	0.81
				ERM Quotient Sum			22.61
CPRM003001				Mean ERM Quotient			0.90
CPRM003001				Mean ERM Quotient without ND			0.19
CPRM003101	MG/KG	5.50	J	Arsenic (As)	8.2	70.00	0.08
CPRM003101	MG/KG	0.31	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM003101	MG/KG	32.50	J	Chromium (Cr)	81	370.00	0.09
CPRM003101	MG/KG	7.50	J	Copper (Cu)	34	270.00	0.03
CPRM003101	MG/KG	0.91	J	Lead (Pb)	46.7	218.00	0.00
CPRM003101	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM003101	MG/KG	11.20	J	Nickel (Ni)	20.9	51.60	0.22
CPRM003101	MG/KG	0.26	U	Silver (Ag)	1	3.70	0.07
CPRM003101	MG/KG	29.60	J	Zinc (Zn)	150	410.00	0.07
CPRM003101	UG/KG	5.46	U	4,4'-DDE	2.2	27.00	0.20
CPRM003101	UG/KG	5.46	U	4,4'-DDT	1.58	46.10	0.12
CPRM003101	UG/KG	219.30	U	Total PCBs	22.7	180.00	1.22
CPRM003101	UG/KG	550.00	U	2-Methylnaphthalene	70	670.00	0.82
CPRM003101	UG/KG	550.00	U	Acenaphthene	16	500.00	1.10
CPRM003101	UG/KG	550.00	U	Acenaphthylene	44	640.00	0.86
CPRM003101	UG/KG	550.00	U	Anthracene	85.3	1100.00	0.50
CPRM003101	UG/KG	550.00	U	Benzo(a)anthracene	261	1600.00	0.34
CPRM003101	UG/KG	550.00	U	Benzo(a)pyrene	430	1600.00	0.34
CPRM003101	UG/KG	550.00	U	Chrysene	384	2800.00	0.20
CPRM003101	UG/KG	550.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.12
CPRM003101	UG/KG	550.00	U	Fluoranthene	600	5100.00	0.11
CPRM003101	UG/KG	550.00	U	Fluorene	19	540.00	1.02
CPRM003101	UG/KG	550.00	U	Naphthalene	160	2100.00	0.26
CPRM003101	UG/KG	550.00	U	Phenanthrene	240	1500.00	0.37
CPRM003101	UG/KG	550.00	U	Pyrene	665	2600.00	0.21
				ERM Quotient Sum			10.45
CPRM003101				Mean ERM Quotient			0.42
CPRM003101				Mean ERM Quotient without ND			0.02

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM003201	MG/KG	17.40		Arsenic (As)	8.2	70.00	0.25
CPRM003201	MG/KG	0.62	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM003201	MG/KG	44.80		Chromium (Cr)	81	370.00	0.12
CPRM003201	MG/KG	23.60		Copper (Cu)	34	270.00	0.09
CPRM003201	MG/KG	22.80		Lead (Pb)	46.7	218.00	0.10
CPRM003201	MG/KG	0.17	U	Mercury (Hg)	0.15	0.71	0.24
CPRM003201	MG/KG	13.40	J	Nickel (Ni)	20.9	51.60	0.26
CPRM003201	MG/KG	2.20	U	Silver (Ag)	1	3.70	0.59
CPRM003201	MG/KG	102.00		Zinc (Zn)	150	410.00	0.25
CPRM003201	UG/KG	14.40	U	4,4'-DDE	2.2	27.00	0.53
CPRM003201	UG/KG	14.40	U	4,4'-DDT	1.58	46.10	0.31
CPRM003201	UG/KG	578.50	U	Total PCBs	22.7	180.00	3.21
CPRM003201	UG/KG	1400.00	U	2-Methylnaphthalene	70	670.00	2.09
CPRM003201	UG/KG	1400.00	U	Acenaphthene	16	500.00	2.80
CPRM003201	UG/KG	1400.00	U	Acenaphthylene	44	640.00	2.19
CPRM003201	UG/KG	1400.00	U	Anthracene	85.3	1100.00	1.27
CPRM003201	UG/KG	180.00	J	Benzo(a)anthracene	261	1600.00	0.11
CPRM003201	UG/KG	1400.00	U	Benzo(a)pyrene	430	1600.00	0.88
CPRM003201	UG/KG	190.00	J	Chrysene	384	2800.00	0.07
CPRM003201	UG/KG	1400.00	U	Dibenz(a,h)anthracene	63.4	260.00	5.38
CPRM003201	UG/KG	1400.00	U	Fluoranthene	600	5100.00	0.27
CPRM003201	UG/KG	1400.00	U	Fluorene	19	540.00	2.59
CPRM003201	UG/KG	1400.00	U	Naphthalene	160	2100.00	0.67
CPRM003201	UG/KG	1400.00	U	Phenanthrene	240	1500.00	0.93
CPRM003201	UG/KG	150.00	J	Pyrene	665	2600.00	0.06
				ERM Quotient Sum			25.34
CPRM003201				Mean ERM Quotient			1.01
CPRM003201				Mean ERM Quotient without ND			0.05
CPRM003301	MG/KG	5.00		Arsenic (As)	8.2	70.00	0.07
CPRM003301	MG/KG	0.40	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM003301	MG/KG	35.50	J	Chromium (Cr)	81	370.00	0.10
CPRM003301	MG/KG	8.20		Copper (Cu)	34	270.00	0.03
CPRM003301	MG/KG	0.75	J	Lead (Pb)	46.7	218.00	0.00
CPRM003301	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM003301	MG/KG	11.80	J	Nickel (Ni)	20.9	51.60	0.23
CPRM003301	MG/KG	0.24	U	Silver (Ag)	1	3.70	0.06
CPRM003301	MG/KG	33.40	J	Zinc (Zn)	150	410.00	0.08
CPRM003301	UG/KG	5.29	U	4,4'-DDE	2.2	27.00	0.20
CPRM003301	UG/KG	5.29	U	4,4'-DDT	1.58	46.10	0.11
CPRM003301	UG/KG	212.20	U	Total PCBs	22.7	180.00	1.18
CPRM003301	UG/KG	530.00	U	2-Methylnaphthalene	70	670.00	0.79
CPRM003301	UG/KG	530.00	U	Acenaphthene	16	500.00	1.06
CPRM003301	UG/KG	530.00	U	Acenaphthylene	44	640.00	0.83
CPRM003301	UG/KG	530.00	U	Anthracene	85.3	1100.00	0.48
CPRM003301	UG/KG	530.00	U	Benzo(a)anthracene	261	1600.00	0.33
CPRM003301	UG/KG	530.00	U	Benzo(a)pyrene	430	1600.00	0.33
CPRM003301	UG/KG	530.00	U	Chrysene	384	2800.00	0.19
CPRM003301	UG/KG	530.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.04
CPRM003301	UG/KG	530.00	U	Fluoranthene	600	5100.00	0.10
CPRM003301	UG/KG	530.00	U	Fluorene	19	540.00	0.98
CPRM003301	UG/KG	530.00	U	Naphthalene	160	2100.00	0.25
CPRM003301	UG/KG	530.00	U	Phenanthrene	240	1500.00	0.35
CPRM003301	UG/KG	530.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			10.12
CPRM003301				Mean ERM Quotient			0.40
CPRM003301				Mean ERM Quotient without ND			0.02

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM003401	MG/KG	3.10		Arsenic (As)	8.2	70.00	0.04
CPRM003401	MG/KG	0.21	J	Cadmium (Cd)	1.2	9.60	0.02
CPRM003401	MG/KG	10.40	J	Chromium (Cr)	81	370.00	0.03
CPRM003401	MG/KG	3.20	U	Copper (Cu)	34	270.00	0.01
CPRM003401	MG/KG	6.90	J	Lead (Pb)	46.7	218.00	0.03
CPRM003401	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM003401	MG/KG	2.60	J	Nickel (Ni)	20.9	51.60	0.05
CPRM003401	MG/KG	0.75	U	Silver (Ag)	1	3.70	0.20
CPRM003401	MG/KG	18.40	U	Zinc (Zn)	150	410.00	0.04
CPRM003401	UG/KG	4.85	U	4,4'-DDE	2.2	27.00	0.18
CPRM003401	UG/KG	4.85	U	4,4'-DDT	1.58	46.10	0.11
CPRM003401	UG/KG	194.75	U	Total PCBs	22.7	180.00	1.08
CPRM003401	UG/KG	360.00	UJ	2-Methylnaphthalene	70	670.00	0.54
CPRM003401	UG/KG	360.00	UJ	Acenaphthene	16	500.00	0.72
CPRM003401	UG/KG	360.00	UJ	Acenaphthylene	44	640.00	0.56
CPRM003401	UG/KG	360.00	UJ	Anthracene	85.3	1100.00	0.33
CPRM003401	UG/KG	360.00	UJ	Benzo(a)anthracene	261	1600.00	0.23
CPRM003401	UG/KG	360.00	UJ	Benzo(a)pyrene	430	1600.00	0.23
CPRM003401	UG/KG	360.00	UJ	Chrysene	384	2800.00	0.13
CPRM003401	UG/KG	360.00	UJ	Dibenz(a,h)anthracene	63.4	260.00	1.38
CPRM003401	UG/KG	360.00	UJ	Fluoranthene	600	5100.00	0.07
CPRM003401	UG/KG	360.00	UJ	Fluorene	19	540.00	0.67
CPRM003401	UG/KG	360.00	UJ	Naphthalene	160	2100.00	0.17
CPRM003401	UG/KG	360.00	UJ	Phenanthrene	240	1500.00	0.24
CPRM003401	UG/KG	360.00	UJ	Pyrene	665	2600.00	0.14
				ERM Quotient Sum			7.27
CPRM003401				Mean ERM Quotient			0.29
CPRM003401				Mean ERM Quotient without ND			0.01
CPRM003501	MG/KG	4.10		Arsenic (As)	8.2	70.00	0.06
CPRM003501	MG/KG	0.20	U	Cadmium (Cd)	1.2	9.60	0.02
CPRM003501	MG/KG	14.50		Chromium (Cr)	81	370.00	0.04
CPRM003501	MG/KG	3.80	J	Copper (Cu)	34	270.00	0.01
CPRM003501	MG/KG	3.40		Lead (Pb)	46.7	218.00	0.02
CPRM003501	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
CPRM003501	MG/KG	4.40	J	Nickel (Ni)	20.9	51.60	0.09
CPRM003501	MG/KG	0.89	U	Silver (Ag)	1	3.70	0.24
CPRM003501	MG/KG	19.10	U	Zinc (Zn)	150	410.00	0.05
CPRM003501	UG/KG	5.18	U	4,4'-DDE	2.2	27.00	0.19
CPRM003501	UG/KG	5.18	U	4,4'-DDT	1.58	46.10	0.11
CPRM003501	UG/KG	207.90	U	Total PCBs	22.7	180.00	1.16
CPRM003501	UG/KG	520.00	U	2-Methylnaphthalene	70	670.00	0.78
CPRM003501	UG/KG	520.00	U	Acenaphthene	16	500.00	1.04
CPRM003501	UG/KG	520.00	U	Acenaphthylene	44	640.00	0.81
CPRM003501	UG/KG	520.00	U	Anthracene	85.3	1100.00	0.47
CPRM003501	UG/KG	520.00	U	Benzo(a)anthracene	261	1600.00	0.33
CPRM003501	UG/KG	520.00	U	Benzo(a)pyrene	430	1600.00	0.33
CPRM003501	UG/KG	520.00	U	Chrysene	384	2800.00	0.19
CPRM003501	UG/KG	520.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.00
CPRM003501	UG/KG	54.00	J	Fluoranthene	600	5100.00	0.01
CPRM003501	UG/KG	520.00	U	Fluorene	19	540.00	0.96
CPRM003501	UG/KG	520.00	U	Naphthalene	160	2100.00	0.25
CPRM003501	UG/KG	520.00	U	Phenanthrene	240	1500.00	0.35
CPRM003501	UG/KG	520.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			9.77
CPRM003501				Mean ERM Quotient			0.39
CPRM003501				Mean ERM Quotient without ND			0.01

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM003601	MG/KG	15.80		Arsenic (As)	8.2	70.00	0.23
CPRM003601	MG/KG	0.70	J	Cadmium (Cd)	1.2	9.60	0.07
CPRM003601	MG/KG	47.90		Chromium (Cr)	81	370.00	0.13
CPRM003601	MG/KG	28.40		Copper (Cu)	34	270.00	0.11
CPRM003601	MG/KG	24.60		Lead (Pb)	46.7	218.00	0.11
CPRM003601	MG/KG	0.11	U	Mercury (Hg)	0.15	0.71	0.15
CPRM003601	MG/KG	13.50	J	Nickel (Ni)	20.9	51.60	0.26
CPRM003601	MG/KG	1.70	U	Silver (Ag)	1	3.70	0.46
CPRM003601	MG/KG	92.20		Zinc (Zn)	150	410.00	0.22
CPRM003601	UG/KG	10.70	U	4,4'-DDE	2.2	27.00	0.40
CPRM003601	UG/KG	10.70	U	4,4'-DDT	1.58	46.10	0.23
CPRM003601	UG/KG	429.50	U	Total PCBs	22.7	180.00	2.39
CPRM003601	UG/KG	1100.00	U	2-Methylnaphthalene	70	670.00	1.64
CPRM003601	UG/KG	1100.00	U	Acenaphthene	16	500.00	2.20
CPRM003601	UG/KG	1100.00	U	Acenaphthylene	44	640.00	1.72
CPRM003601	UG/KG	1100.00	U	Anthracene	85.3	1100.00	1.00
CPRM003601	UG/KG	1100.00	U	Benzo(a)anthracene	261	1600.00	0.69
CPRM003601	UG/KG	1100.00	U	Benzo(a)pyrene	430	1600.00	0.69
CPRM003601	UG/KG	1100.00	U	Chrysene	384	2800.00	0.39
CPRM003601	UG/KG	1100.00	U	Dibenz(a,h)anthracene	63.4	260.00	4.23
CPRM003601	UG/KG	1100.00	U	Fluoranthene	600	5100.00	0.22
CPRM003601	UG/KG	1100.00	U	Fluorene	19	540.00	2.04
CPRM003601	UG/KG	1100.00	U	Naphthalene	160	2100.00	0.52
CPRM003601	UG/KG	1100.00	U	Phenanthrene	240	1500.00	0.73
CPRM003601	UG/KG	1100.00	U	Pyrene	665	2600.00	0.42
				ERM Quotient Sum			21.25
CPRM003601				Mean ERM Quotient			0.85
CPRM003601				Mean ERM Quotient without ND			0.05
CPRM003701	MG/KG	12.80		Arsenic (As)	8.2	70.00	0.18
CPRM003701	MG/KG	0.57	J	Cadmium (Cd)	1.2	9.60	0.06
CPRM003701	MG/KG	40.60		Chromium (Cr)	81	370.00	0.11
CPRM003701	MG/KG	10.30		Copper (Cu)	34	270.00	0.04
CPRM003701	MG/KG	9.30		Lead (Pb)	46.7	218.00	0.04
CPRM003701	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM003701	MG/KG	12.50	J	Nickel (Ni)	20.9	51.60	0.24
CPRM003701	MG/KG	0.98	U	Silver (Ag)	1	3.70	0.26
CPRM003701	MG/KG	50.80		Zinc (Zn)	150	410.00	0.12
CPRM003701	UG/KG	5.59	U	4,4'-DDE	2.2	27.00	0.21
CPRM003701	UG/KG	5.59	U	4,4'-DDT	1.58	46.10	0.12
CPRM003701	UG/KG	224.20	U	Total PCBs	22.7	180.00	1.25
CPRM003701	UG/KG	560.00	U	2-Methylnaphthalene	70	670.00	0.84
CPRM003701	UG/KG	560.00	U	Acenaphthene	16	500.00	1.12
CPRM003701	UG/KG	560.00	U	Acenaphthylene	44	640.00	0.88
CPRM003701	UG/KG	560.00	U	Anthracene	85.3	1100.00	0.51
CPRM003701	UG/KG	560.00	U	Benzo(a)anthracene	261	1600.00	0.35
CPRM003701	UG/KG	560.00	U	Benzo(a)pyrene	430	1600.00	0.35
CPRM003701	UG/KG	560.00	U	Chrysene	384	2800.00	0.20
CPRM003701	UG/KG	560.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.15
CPRM003701	UG/KG	560.00	U	Fluoranthene	600	5100.00	0.11
CPRM003701	UG/KG	560.00	U	Fluorene	19	540.00	1.04
CPRM003701	UG/KG	560.00	U	Naphthalene	160	2100.00	0.27
CPRM003701	UG/KG	560.00	U	Phenanthrene	240	1500.00	0.37
CPRM003701	UG/KG	560.00	U	Pyrene	665	2600.00	0.22
				ERM Quotient Sum			11.10
CPRM003701				Mean ERM Quotient			0.44
CPRM003701				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM003801	MG/KG	7.00		Arsenic (As)	8.2	70.00	0.10
CPRM003801	MG/KG	0.30	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM003801	MG/KG	25.30	J	Chromium (Cr)	81	370.00	0.07
CPRM003801	MG/KG	9.00		Copper (Cu)	34	270.00	0.03
CPRM003801	MG/KG	7.00		Lead (Pb)	46.7	218.00	0.03
CPRM003801	MG/KG	0.05	U	Mercury (Hg)	0.15	0.71	0.07
CPRM003801	MG/KG	7.20	J	Nickel (Ni)	20.9	51.60	0.14
CPRM003801	MG/KG	0.25	U	Silver (Ag)	1	3.70	0.07
CPRM003801	MG/KG	36.20	J	Zinc (Zn)	150	410.00	0.09
CPRM003801	UG/KG	5.43	U	4,4'-DDE	2.2	27.00	0.20
CPRM003801	UG/KG	5.43	U	4,4'-DDT	1.58	46.10	0.12
CPRM003801	UG/KG	217.90	U	Total PCBs	22.7	180.00	1.21
CPRM003801	UG/KG	540.00	U	2-Methylnaphthalene	70	670.00	0.81
CPRM003801	UG/KG	540.00	U	Acenaphthene	16	500.00	1.08
CPRM003801	UG/KG	540.00	U	Acenaphthylene	44	640.00	0.84
CPRM003801	UG/KG	120.00	J	Anthracene	85.3	1100.00	0.11
CPRM003801	UG/KG	150.00	J	Benzo(a)anthracene	261	1600.00	0.09
CPRM003801	UG/KG	540.00	U	Benzo(a)pyrene	430	1600.00	0.34
CPRM003801	UG/KG	140.00	J	Chrysene	384	2800.00	0.05
CPRM003801	UG/KG	540.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.08
CPRM003801	UG/KG	610.00		Fluoranthene	600	5100.00	0.12
CPRM003801	UG/KG	540.00	U	Fluorene	19	540.00	1.00
CPRM003801	UG/KG	540.00	U	Naphthalene	160	2100.00	0.26
CPRM003801	UG/KG	540.00	U	Phenanthrene	240	1500.00	0.36
CPRM003801	UG/KG	320.00	J	Pyrene	665	2600.00	0.12
				ERM Quotient Sum			9.42
CPRM003801				Mean ERM Quotient			0.38
CPRM003801				Mean ERM Quotient without ND			0.04
CPRM003901	MG/KG	10.90		Arsenic (As)	8.2	70.00	0.16
CPRM003901	MG/KG	0.84	J	Cadmium (Cd)	1.2	9.60	0.09
CPRM003901	MG/KG	47.00		Chromium (Cr)	81	370.00	0.13
CPRM003901	MG/KG	11.40		Copper (Cu)	34	270.00	0.04
CPRM003901	MG/KG	10.90		Lead (Pb)	46.7	218.00	0.05
CPRM003901	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
CPRM003901	MG/KG	15.30	J	Nickel (Ni)	20.9	51.60	0.30
CPRM003901	MG/KG	1.20	U	Silver (Ag)	1	3.70	0.32
CPRM003901	MG/KG	60.20		Zinc (Zn)	150	410.00	0.15
CPRM003901	UG/KG	7.13	U	4,4'-DDE	2.2	27.00	0.26
CPRM003901	UG/KG	7.13	U	4,4'-DDT	1.58	46.10	0.15
CPRM003901	UG/KG	286.40	U	Total PCBs	22.7	180.00	1.59
CPRM003901	UG/KG	720.00	U	2-Methylnaphthalene	70	670.00	1.07
CPRM003901	UG/KG	720.00	U	Acenaphthene	16	500.00	1.44
CPRM003901	UG/KG	720.00	U	Acenaphthylene	44	640.00	1.13
CPRM003901	UG/KG	720.00	U	Anthracene	85.3	1100.00	0.65
CPRM003901	UG/KG	720.00	U	Benzo(a)anthracene	261	1600.00	0.45
CPRM003901	UG/KG	720.00	U	Benzo(a)pyrene	430	1600.00	0.45
CPRM003901	UG/KG	720.00	U	Chrysene	384	2800.00	0.26
CPRM003901	UG/KG	720.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.77
CPRM003901	UG/KG	720.00	U	Fluoranthene	600	5100.00	0.14
CPRM003901	UG/KG	720.00	U	Fluorene	19	540.00	1.33
CPRM003901	UG/KG	720.00	U	Naphthalene	160	2100.00	0.34
CPRM003901	UG/KG	720.00	U	Phenanthrene	240	1500.00	0.48
CPRM003901	UG/KG	720.00	U	Pyrene	665	2600.00	0.28
				ERM Quotient Sum			14.15
CPRM003901				Mean ERM Quotient			0.57
CPRM003901				Mean ERM Quotient without ND			0.04

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM004001	MG/KG	9.00		Arsenic (As)	8.2	70.00	0.13
CPRM004001	MG/KG	0.76	J	Cadmium (Cd)	1.2	9.60	0.08
CPRM004001	MG/KG	49.10	J	Chromium (Cr)	81	370.00	0.13
CPRM004001	MG/KG	7.10	U	Copper (Cu)	34	270.00	0.03
CPRM004001	MG/KG	15.20	J	Lead (Pb)	46.7	218.00	0.07
CPRM004001	MG/KG	0.07	U	Mercury (Hg)	0.15	0.71	0.10
CPRM004001	MG/KG	13.10	J	Nickel (Ni)	20.9	51.60	0.25
CPRM004001	MG/KG	1.30	U	Silver (Ag)	1	3.70	0.35
CPRM004001	MG/KG	57.70	J	Zinc (Zn)	150	410.00	0.14
CPRM004001	UG/KG	7.44	U	4,4'-DDE	2.2	27.00	0.28
CPRM004001	UG/KG	7.44	U	4,4'-DDT	1.58	46.10	0.16
CPRM004001	UG/KG	298.70	U	Total PCBs	22.7	180.00	1.66
CPRM004001	UG/KG	750.00	U	2-Methylnaphthalene	70	670.00	1.12
CPRM004001	UG/KG	750.00	U	Acenaphthene	16	500.00	1.50
CPRM004001	UG/KG	750.00	U	Acenaphthylene	44	640.00	1.17
CPRM004001	UG/KG	750.00	U	Anthracene	85.3	1100.00	0.68
CPRM004001	UG/KG	750.00	U	Benzo(a)anthracene	261	1600.00	0.47
CPRM004001	UG/KG	750.00	U	Benzo(a)pyrene	430	1600.00	0.47
CPRM004001	UG/KG	750.00	U	Chrysene	384	2800.00	0.27
CPRM004001	UG/KG	750.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.88
CPRM004001	UG/KG	750.00	U	Fluoranthene	600	5100.00	0.15
CPRM004001	UG/KG	750.00	U	Fluorene	19	540.00	1.39
CPRM004001	UG/KG	750.00	U	Naphthalene	160	2100.00	0.36
CPRM004001	UG/KG	750.00	U	Phenanthrene	240	1500.00	0.50
CPRM004001	UG/KG	750.00	U	Pyrene	665	2600.00	0.29
				ERM Quotient Sum			14.62
CPRM004001				Mean ERM Quotient			0.58
CPRM004001				Mean ERM Quotient without ND			0.03
CPRM004101	MG/KG	7.20		Arsenic (As)	8.2	70.00	0.10
CPRM004101	MG/KG	0.24	J	Cadmium (Cd)	1.2	9.60	0.03
CPRM004101	MG/KG	25.00	J	Chromium (Cr)	81	370.00	0.07
CPRM004101	MG/KG	17.70		Copper (Cu)	34	270.00	0.07
CPRM004101	MG/KG	8.90		Lead (Pb)	46.7	218.00	0.04
CPRM004101	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
CPRM004101	MG/KG	6.90	J	Nickel (Ni)	20.9	51.60	0.13
CPRM004101	MG/KG	0.31	U	Silver (Ag)	1	3.70	0.08
CPRM004101	MG/KG	52.10	J	Zinc (Zn)	150	410.00	0.13
CPRM004101	UG/KG	6.42	U	4,4'-DDE	2.2	27.00	0.24
CPRM004101	UG/KG	6.42	U	4,4'-DDT	1.58	46.10	0.14
CPRM004101	UG/KG	257.60	U	Total PCBs	22.7	180.00	1.43
CPRM004101	UG/KG	650.00	U	2-Methylnaphthalene	70	670.00	0.97
CPRM004101	UG/KG	650.00	U	Acenaphthene	16	500.00	1.30
CPRM004101	UG/KG	650.00	U	Acenaphthylene	44	640.00	1.02
CPRM004101	UG/KG	650.00	U	Anthracene	85.3	1100.00	0.59
CPRM004101	UG/KG	650.00	U	Benzo(a)anthracene	261	1600.00	0.41
CPRM004101	UG/KG	650.00	U	Benzo(a)pyrene	430	1600.00	0.41
CPRM004101	UG/KG	650.00	U	Chrysene	384	2800.00	0.23
CPRM004101	UG/KG	650.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.50
CPRM004101	UG/KG	93.00	J	Fluoranthene	600	5100.00	0.02
CPRM004101	UG/KG	650.00	U	Fluorene	19	540.00	1.20
CPRM004101	UG/KG	650.00	U	Naphthalene	160	2100.00	0.31
CPRM004101	UG/KG	650.00	U	Phenanthrene	240	1500.00	0.43
CPRM004101	UG/KG	650.00	J	Pyrene	665	2600.00	0.25
				ERM Quotient Sum			12.18
CPRM004101				Mean ERM Quotient			0.49
CPRM004101				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM004201	MG/KG	13.90		Arsenic (As)	8.2	70.00	0.20
CPRM004201	MG/KG	0.39	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM004201	MG/KG	36.90	J	Chromium (Cr)	81	370.00	0.10
CPRM004201	MG/KG	17.50		Copper (Cu)	34	270.00	0.06
CPRM004201	MG/KG	23.90		Lead (Pb)	46.7	218.00	0.11
CPRM004201	MG/KG	0.09		Mercury (Hg)	0.15	0.71	0.13
CPRM004201	MG/KG	11.40	J	Nickel (Ni)	20.9	51.60	0.22
CPRM004201	MG/KG	0.37	U	Silver (Ag)	1	3.70	0.10
CPRM004201	MG/KG	91.40	J	Zinc (Zn)	150	410.00	0.22
CPRM004201	UG/KG	7.90	U	4,4'-DDE	2.2	27.00	0.29
CPRM004201	UG/KG	7.90	U	4,4'-DDT	1.58	46.10	0.17
CPRM004201	UG/KG	317.00	U	Total PCBs	22.7	180.00	1.76
CPRM004201	UG/KG	790.00	U	2-Methylnaphthalene	70	670.00	1.18
CPRM004201	UG/KG	790.00	U	Acenaphthene	16	500.00	1.58
CPRM004201	UG/KG	790.00	U	Acenaphthylene	44	640.00	1.23
CPRM004201	UG/KG	790.00	U	Anthracene	85.3	1100.00	0.72
CPRM004201	UG/KG	790.00	U	Benzo(a)anthracene	261	1600.00	0.49
CPRM004201	UG/KG	790.00	U	Benzo(a)pyrene	430	1600.00	0.49
CPRM004201	UG/KG	790.00	U	Chrysene	384	2800.00	0.28
CPRM004201	UG/KG	790.00	U	Dibenz(a,h)anthracene	63.4	260.00	3.04
CPRM004201	UG/KG	790.00	U	Fluoranthene	600	5100.00	0.15
CPRM004201	UG/KG	790.00	U	Fluorene	19	540.00	1.46
CPRM004201	UG/KG	790.00	U	Naphthalene	160	2100.00	0.38
CPRM004201	UG/KG	790.00	U	Phenanthrene	240	1500.00	0.53
CPRM004201	UG/KG	790.00	U	Pyrene	665	2600.00	0.30
				ERM Quotient Sum			15.25
CPRM004201				Mean ERM Quotient			0.61
CPRM004201				Mean ERM Quotient without ND			0.04
CPRM004301	MG/KG	9.70		Arsenic (As)	8.2	70.00	0.14
CPRM004301	MG/KG	0.42	J	Cadmium (Cd)	1.2	9.60	0.04
CPRM004301	MG/KG	35.00		Chromium (Cr)	81	370.00	0.09
CPRM004301	MG/KG	11.60		Copper (Cu)	34	270.00	0.04
CPRM004301	MG/KG	14.20		Lead (Pb)	46.7	218.00	0.07
CPRM004301	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
CPRM004301	MG/KG	12.80	J	Nickel (Ni)	20.9	51.60	0.25
CPRM004301	MG/KG	1.20	U	Silver (Ag)	1	3.70	0.32
CPRM004301	MG/KG	50.30		Zinc (Zn)	150	410.00	0.12
CPRM004301	UG/KG	6.75	U	4,4'-DDE	2.2	27.00	0.25
CPRM004301	UG/KG	6.75	U	4,4'-DDT	1.58	46.10	0.15
CPRM004301	UG/KG	271.00	U	Total PCBs	22.7	180.00	1.51
CPRM004301	UG/KG	670.00	U	2-Methylnaphthalene	70	670.00	1.00
CPRM004301	UG/KG	670.00	U	Acenaphthene	16	500.00	1.34
CPRM004301	UG/KG	670.00	U	Acenaphthylene	44	640.00	1.05
CPRM004301	UG/KG	670.00	U	Anthracene	85.3	1100.00	0.61
CPRM004301	UG/KG	670.00	U	Benzo(a)anthracene	261	1600.00	0.42
CPRM004301	UG/KG	670.00	U	Benzo(a)pyrene	430	1600.00	0.42
CPRM004301	UG/KG	670.00	U	Chrysene	384	2800.00	0.24
CPRM004301	UG/KG	670.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.58
CPRM004301	UG/KG	670.00	U	Fluoranthene	600	5100.00	0.13
CPRM004301	UG/KG	670.00	U	Fluorene	19	540.00	1.24
CPRM004301	UG/KG	670.00	U	Naphthalene	160	2100.00	0.32
CPRM004301	UG/KG	670.00	U	Phenanthrene	240	1500.00	0.45
CPRM004301	UG/KG	670.00	U	Pyrene	665	2600.00	0.26
				ERM Quotient Sum			13.14
CPRM004301				Mean ERM Quotient			0.53
CPRM004301				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM004501	MG/KG	8.90		Arsenic (As)	8.2	70.00	0.13
CPRM004501	MG/KG	0.51	J	Cadmium (Cd)	1.2	9.60	0.05
CPRM004501	MG/KG	33.60		Chromium (Cr)	81	370.00	0.09
CPRM004501	MG/KG	6.90		Copper (Cu)	34	270.00	0.03
CPRM004501	MG/KG	5.60		Lead (Pb)	46.7	218.00	0.03
CPRM004501	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
CPRM004501	MG/KG	13.10		Nickel (Ni)	20.9	51.60	0.25
CPRM004501	MG/KG	0.73	U	Silver (Ag)	1	3.70	0.20
CPRM004501	MG/KG	35.70		Zinc (Zn)	150	410.00	0.09
CPRM004501	UG/KG	5.06	U	4,4'-DDE	2.2	27.00	0.19
CPRM004501	UG/KG	5.06	U	4,4'-DDT	1.58	46.10	0.11
CPRM004501	UG/KG	203.30	U	Total PCBs	22.7	180.00	1.13
CPRM004501	UG/KG	510.00	U	2-Methylnaphthalene	70	670.00	0.76
CPRM004501	UG/KG	510.00	U	Acenaphthene	16	500.00	1.02
CPRM004501	UG/KG	510.00	U	Acenaphthylene	44	640.00	0.80
CPRM004501	UG/KG	510.00	U	Anthracene	85.3	1100.00	0.46
CPRM004501	UG/KG	510.00	U	Benzo(a)anthracene	261	1600.00	0.32
CPRM004501	UG/KG	510.00	U	Benzo(a)pyrene	430	1600.00	0.32
CPRM004501	UG/KG	510.00	U	Chrysene	384	2800.00	0.18
CPRM004501	UG/KG	510.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.96
CPRM004501	UG/KG	510.00	U	Fluoranthene	600	5100.00	0.10
CPRM004501	UG/KG	510.00	U	Fluorene	19	540.00	0.94
CPRM004501	UG/KG	510.00	U	Naphthalene	160	2100.00	0.24
CPRM004501	UG/KG	510.00	U	Phenanthrene	240	1500.00	0.34
CPRM004501	UG/KG	510.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			10.02
CPRM004501				Mean ERM Quotient			0.40
CPRM004501				Mean ERM Quotient without ND			0.03
CPRM004601	MG/KG	3.80		Arsenic (As)	8.2	70.00	0.05
CPRM004601	MG/KG	0.26	U	Cadmium (Cd)	1.2	9.60	0.03
CPRM004601	MG/KG	12.50		Chromium (Cr)	81	370.00	0.03
CPRM004601	MG/KG	3.60	J	Copper (Cu)	34	270.00	0.01
CPRM004601	MG/KG	5.00		Lead (Pb)	46.7	218.00	0.02
CPRM004601	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM004601	MG/KG	3.70	J	Nickel (Ni)	20.9	51.60	0.07
CPRM004601	MG/KG	0.90	U	Silver (Ag)	1	3.70	0.24
CPRM004601	MG/KG	32.00		Zinc (Zn)	150	410.00	0.08
CPRM004601	UG/KG	5.15	U	4,4'-DDE	2.2	27.00	0.19
CPRM004601	UG/KG	5.15	U	4,4'-DDT	1.58	46.10	0.11
CPRM004601	UG/KG	207.00	U	Total PCBs	22.7	180.00	1.15
CPRM004601	UG/KG	520.00	U	2-Methylnaphthalene	70	670.00	0.78
CPRM004601	UG/KG	520.00	U	Acenaphthene	16	500.00	1.04
CPRM004601	UG/KG	520.00	U	Acenaphthylene	44	640.00	0.81
CPRM004601	UG/KG	520.00	U	Anthracene	85.3	1100.00	0.47
CPRM004601	UG/KG	520.00	U	Benzo(a)anthracene	261	1600.00	0.33
CPRM004601	UG/KG	520.00	U	Benzo(a)pyrene	430	1600.00	0.33
CPRM004601	UG/KG	520.00	U	Chrysene	384	2800.00	0.19
CPRM004601	UG/KG	520.00	U	Dibenz(a,h)anthracene	63.4	260.00	2.00
CPRM004601	UG/KG	520.00	U	Fluoranthene	600	5100.00	0.10
CPRM004601	UG/KG	520.00	U	Fluorene	19	540.00	0.96
CPRM004601	UG/KG	520.00	U	Naphthalene	160	2100.00	0.25
CPRM004601	UG/KG	520.00	U	Phenanthrene	240	1500.00	0.35
CPRM004601	UG/KG	520.00	U	Pyrene	665	2600.00	0.20
				ERM Quotient Sum			9.85
CPRM004601				Mean ERM Quotient			0.39
CPRM004601				Mean ERM Quotient without ND			0.01

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM004701	MG/KG	2.40	J	Arsenic (As)	8.2	70.00	0.03
CPRM004701	MG/KG	0.16	J	Cadmium (Cd)	1.2	9.60	0.02
CPRM004701	MG/KG	8.40	J	Chromium (Cr)	81	370.00	0.02
CPRM004701	MG/KG	3.00	U	Copper (Cu)	34	270.00	0.01
CPRM004701	MG/KG	2.70	J	Lead (Pb)	46.7	218.00	0.01
CPRM004701	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM004701	MG/KG	2.40	J	Nickel (Ni)	20.9	51.60	0.05
CPRM004701	MG/KG	0.72	U	Silver (Ag)	1	3.70	0.19
CPRM004701	MG/KG	16.00	U	Zinc (Zn)	150	410.00	0.04
CPRM004701	UG/KG	4.44	U	4,4'-DDE	2.2	27.00	0.16
CPRM004701	UG/KG	4.44	U	4,4'-DDT	1.58	46.10	0.10
CPRM004701	UG/KG	178.25	U	Total PCBs	22.7	180.00	0.99
CPRM004701	UG/KG	450.00	U	2-Methylnaphthalene	70	670.00	0.67
CPRM004701	UG/KG	450.00	U	Acenaphthene	16	500.00	0.90
CPRM004701	UG/KG	450.00	U	Acenaphthylene	44	640.00	0.70
CPRM004701	UG/KG	450.00	U	Anthracene	85.3	1100.00	0.41
CPRM004701	UG/KG	450.00	U	Benzo(a)anthracene	261	1600.00	0.28
CPRM004701	UG/KG	53.00	J	Benzo(a)pyrene	430	1600.00	0.03
CPRM004701	UG/KG	450.00	U	Chrysene	384	2800.00	0.16
CPRM004701	UG/KG	450.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.73
CPRM004701	UG/KG	450.00	U	Fluoranthene	600	5100.00	0.09
CPRM004701	UG/KG	450.00	U	Fluorene	19	540.00	0.83
CPRM004701	UG/KG	450.00	U	Naphthalene	160	2100.00	0.21
CPRM004701	UG/KG	450.00	U	Phenanthrene	240	1500.00	0.30
CPRM004701	UG/KG	450.00	U	Pyrene	665	2600.00	0.17
				ERM Quotient Sum			8.18
CPRM004701				Mean ERM Quotient			0.33
CPRM004701				Mean ERM Quotient without ND			0.01
CPRM004801	MG/KG	7.80		Arsenic (As)	8.2	70.00	0.11
CPRM004801	MG/KG	0.06	U	Cadmium (Cd)	1.2	9.60	0.01
CPRM004801	MG/KG	28.60		Chromium (Cr)	81	370.00	0.08
CPRM004801	MG/KG	1.50	U	Copper (Cu)	34	270.00	0.01
CPRM004801	MG/KG	10.00		Lead (Pb)	46.7	218.00	0.05
CPRM004801	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM004801	MG/KG	4.60	J	Nickel (Ni)	20.9	51.60	0.09
CPRM004801	MG/KG	0.83	U	Silver (Ag)	1	3.70	0.22
CPRM004801	MG/KG	27.40		Zinc (Zn)	150	410.00	0.07
CPRM004801	UG/KG	4.73	U	4,4'-DDE	2.2	27.00	0.18
CPRM004801	UG/KG	4.73	U	4,4'-DDT	1.58	46.10	0.10
CPRM004801	UG/KG	189.90	U	Total PCBs	22.7	180.00	1.06
CPRM004801	UG/KG	470.00	U	2-Methylnaphthalene	70	670.00	0.70
CPRM004801	UG/KG	470.00	U	Acenaphthene	16	500.00	0.94
CPRM004801	UG/KG	470.00	U	Acenaphthylene	44	640.00	0.73
CPRM004801	UG/KG	470.00	U	Anthracene	85.3	1100.00	0.43
CPRM004801	UG/KG	470.00	U	Benzo(a)anthracene	261	1600.00	0.29
CPRM004801	UG/KG	470.00	U	Benzo(a)pyrene	430	1600.00	0.29
CPRM004801	UG/KG	470.00	U	Chrysene	384	2800.00	0.17
CPRM004801	UG/KG	470.00	U	Dibenz(a,h)anthracene	63.4	260.00	1.81
CPRM004801	UG/KG	470.00	U	Fluoranthene	600	5100.00	0.09
CPRM004801	UG/KG	470.00	U	Fluorene	19	540.00	0.87
CPRM004801	UG/KG	470.00	U	Naphthalene	160	2100.00	0.22
CPRM004801	UG/KG	470.00	U	Phenanthrene	240	1500.00	0.31
CPRM004801	UG/KG	470.00	U	Pyrene	665	2600.00	0.18
				ERM Quotient Sum			9.06
CPRM004801				Mean ERM Quotient			0.36
CPRM004801				Mean ERM Quotient without ND			0.02

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
CPRM004901	MG/KG	1.50	U	Arsenic (As)	8.2	70.00	0.02
CPRM004901	MG/KG	0.05	U	Cadmium (Cd)	1.2	9.60	0.01
CPRM004901	MG/KG	17.50		Chromium (Cr)	81	370.00	0.05
CPRM004901	MG/KG	5.00	J	Copper (Cu)	34	270.00	0.02
CPRM004901	MG/KG	2.80		Lead (Pb)	46.7	218.00	0.01
CPRM004901	MG/KG	0.04	U	Mercury (Hg)	0.15	0.71	0.06
CPRM004901	MG/KG	3.60	J	Nickel (Ni)	20.9	51.60	0.07
CPRM004901	MG/KG	0.26	J	Silver (Ag)	1	3.70	0.07
CPRM004901	MG/KG	12.20		Zinc (Zn)	150	410.00	0.03
				ERM Quotient Sum			16.12
CPRM004901				Mean ERM Quotient			0.64
CPRM004901				Mean ERM Quotient without ND			0.01
002M000101	MG/KG	4.40		Arsenic (As)	8.2	70	0.06
002M000101	MG/KG	1.20	U	Cadmium (Cd)	1.2	9.6	0.13
002M000101	MG/KG	22.70		Chromium (Cr)	81	370	0.06
002M000101	MG/KG	7.40		Copper (Cu)	34	270	0.03
002M000101	MG/KG	15.20		Lead (Pb)	46.7	218	0.07
002M000101	MG/KG	0.11	U	Mercury (Hg)	0.15	0.71	0.15
002M000101	MG/KG	8.30	J	Nickel (Ni)	20.9	51.6	0.16
002M000101	MG/KG	0.74	U	Silver (Ag)	1	3.7	0.20
002M000101	MG/KG	34.30		Zinc (Zn)	150	410	0.08
				ERM Quotient Sum			0.95
002M000101				Mean ERM Quotient			0.04
002M000101				Mean ERM Quotient without ND			0.02
002M000201	MG/KG	7.80		Arsenic (As)	8.2	70	0.11
002M000201	MG/KG	1.60	U	Cadmium (Cd)	1.2	9.6	0.17
002M000201	MG/KG	33.50		Chromium (Cr)	81	370	0.09
002M000201	MG/KG	44.50		Copper (Cu)	34	270	0.16
002M000201	MG/KG	26.40		Lead (Pb)	46.7	218	0.12
002M000201	MG/KG	0.16	U	Mercury (Hg)	0.15	0.71	0.23
002M000201	MG/KG	13.60		Nickel (Ni)	20.9	51.6	0.26
002M000201	MG/KG	0.95	U	Silver (Ag)	1	3.7	0.26
002M000201	MG/KG	57.10		Zinc (Zn)	150	410	0.14
				ERM Quotient Sum			1.54
002M000201				Mean ERM Quotient			0.06
002M000201				Mean ERM Quotient without ND			0.04
002M000301	MG/KG	19.60		Arsenic (As)	8.2	70	0.28
002M000301	MG/KG	7.20		Cadmium (Cd)	1.2	9.6	0.75
002M000301	MG/KG	56.40		Chromium (Cr)	81	370	0.15
002M000301	MG/KG	125.00		Copper (Cu)	34	270	0.46
002M000301	**MG/KG**	**1110.00**	**J**	**Lead (Pb)**	**46.7**	**218**	**5.09**
002M000301	**MG/KG**	**0.23**		**Mercury (Hg)**	**0.15**	**0.71**	**0.32**
002M000301	**MG/KG**	**29.40**		**Nickel (Ni)**	**20.9**	**51.6**	**0.57**
002M000301	MG/KG	0.59	U	Silver (Ag)	1	3.7	0.16
002M000301	**MG/KG**	**832.00**		**Zinc (Zn)**	**150**	**410**	**2.03**
				ERM Quotient Sum			9.82
002M000301				Mean ERM Quotient			0.39
002M000301				Mean ERM Quotient without ND			0.39

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
054M000101	MG/KG	3.70		Arsenic (As)	8.2	70	0.05
054M000101	MG/KG	0.30	J	Cadmium (Cd)	1.2	9.6	0.03
054M000101	MG/KG	28.40		Chromium (Cr)	81	370	0.08
054M000101	MG/KG	83.10		Copper (Cu)	34	270	0.31
054M000101	MG/KG	87.00	J	Lead (Pb)	46.7	218	0.40
054M000101	MG/KG	0.52		Mercury (Hg)	0.15	0.71	0.73
054M000101	MG/KG	19.70		Nickel (Ni)	20.9	51.6	0.38
054M000101	MG/KG	0.26	U	Silver (Ag)	1	3.7	0.07
054M000101	MG/KG	211.00	J	Zinc (Zn)	150	410	0.51
054M000101	UG/KG	220.00	J	2-Methylnaphthalene	70	670	0.33
054M000101	**UG/KG**	**640.00**	**J**	**Acenaphthene**	**16**	**500**	**1.28**
054M000101	UG/KG	850.00	U	Acenaphthylene	44	640	1.33
054M000101	**UG/KG**	**1400.00**		**Anthracene**	**85.3**	**1100**	**1.27**
054M000101	**UG/KG**	**2600.00**		**Benzo(a)anthracene**	**261**	**1600**	**1.63**
054M000101	**UG/KG**	**2200.00**		**Benzo(a)pyrene**	**430**	**1600**	**1.38**
054M000101	**UG/KG**	**2900.00**		**Chrysene**	**384**	**2800**	**1.04**
054M000101	**UG/KG**	**720.00**	**J**	**Dibenz(a,h)anthracene**	**63.4**	**260**	**2.77**
054M000101	**UG/KG**	**6700.00**		**Fluoranthene**	**600**	**5100**	**1.31**
054M000101	**UG/KG**	**760.00**	**J**	**Fluorene**	**19**	**540**	**1.41**
054M000101	UG/KG	590.00	J	Naphthalene	160	2100	0.28
054M000101	**UG/KG**	**6900.00**		**Phenanthrene**	**240**	**1500**	**4.60**
054M000101	**UG/KG**	**5600.00**		**Pyrene**	**665**	**2600**	**2.15**
				ERM Quotient Sum			23.34
054M000101				Mean ERM Quotient			0.93
054M000101				Mean ERM Quotient without ND			0.88

054M000201	MG/KG	21.20		Arsenic (As)	8.2	70	0.30
054M000201	MG/KG	0.25	U	Cadmium (Cd)	1.2	9.6	0.03
054M000201	MG/KG	34.20		Chromium (Cr)	81	370	0.09
054M000201	MG/KG	38.10		Copper (Cu)	34	270	0.14
054M000201	MG/KG	45.50	J	Lead (Pb)	46.7	218	0.21
054M000201	MG/KG	0.60		Mercury (Hg)	0.15	0.71	0.85
054M000201	MG/KG	12.90		Nickel (Ni)	20.9	51.6	0.25
054M000201	MG/KG	0.50	U	Silver (Ag)	1	3.7	0.14
054M000201	MG/KG	121.00	J	Zinc (Zn)	150	410	0.30
054M000201	UG/KG	1600.00	U	2-Methylnaphthalene	70	670	2.39
054M000201	UG/KG	1600.00	U	Acenaphthene	16	500	3.20
054M000201	UG/KG	1600.00	U	Acenaphthylene	44	640	2.50
054M000201	UG/KG	1600.00	U	Anthracene	85.3	1100	1.45
054M000201	UG/KG	1600.00	U	Benzo(a)anthracene	261	1600	1.00
054M000201	UG/KG	1600.00	U	Benzo(a)pyrene	430	1600	1.00
054M000201	UG/KG	1600.00	U	Chrysene	384	2800	0.57
054M000201	UG/KG	1600.00	U	Dibenz(a,h)anthracene	63.4	260	6.15
054M000201	UG/KG	250.00	J	Fluoranthene	600	5100	0.05
054M000201	UG/KG	1600.00	U	Fluorene	19	540	2.96
054M000201	UG/KG	1600.00	U	Naphthalene	160	2100	0.76
054M000201	UG/KG	1600.00	U	Phenanthrene	240	1500	1.07
054M000201	UG/KG	590.00	J	Pyrene	665	2600	0.23
				ERM Quotient Sum			25.63
054M000201				Mean ERM Quotient			1.03
054M000201				Mean ERM Quotient without ND			0.10

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
054M000301	MG/KG	5.90		Arsenic (As)	8.2	70	0.08
054M000301	MG/KG	0.38	J	Cadmium (Cd)	1.2	9.6	0.04
054M000301	MG/KG	34.40		Chromium (Cr)	81	370	0.09
054M000301	**MG/KG**	**427.00**		**Copper (Cu)**	**34**	**270**	**1.58**
054M000301	MG/KG	196.00	J	Lead (Pb)	46.7	218	0.90
054M000301	MG/KG	0.06		Mercury (Hg)	0.15	0.71	0.08
054M000301	MG/KG	42.40		Nickel (Ni)	20.9	51.6	0.82
054M000301	MG/KG	0.75	J	Silver (Ag)	1	3.7	0.20
054M000301	**MG/KG**	**1180.00**	**J**	**Zinc (Zn)**	**150**	**410**	**2.88**
054M000301	UG/KG	770.00	U	2-Methylnaphthalene	70	670	1.15
054M000301	UG/KG	770.00	U	Acenaphthene	16	500	1.54
054M000301	UG/KG	770.00	U	Acenaphthylene	44	640	1.20
054M000301	UG/KG	770.00	U	Anthracene	85.3	1100	0.70
054M000301	UG/KG	210.00	J	Benzo(a)anthracene	261	1600	0.13
054M000301	UG/KG	210.00	J	Benzo(a)pyrene	430	1600	0.13
054M000301	UG/KG	260.00	J	Chrysene	384	2800	0.09
054M000301	UG/KG	770.00	U	Dibenz(a,h)anthracene	63.4	260	2.96
054M000301	UG/KG	500.00	J	Fluoranthene	600	5100	0.10
054M000301	UG/KG	770.00	U	Fluorene	19	540	1.43
054M000301	UG/KG	770.00	U	Naphthalene	160	2100	0.37
054M000301	UG/KG	260.00	J	Phenanthrene	240	1500	0.17
054M000301	UG/KG	480.00	J	Pyrene	665	2600	0.18
				ERM Quotient Sum			16.84
054M000301				Mean ERM Quotient			0.67
054M000301				Mean ERM Quotient without ND			0.30
054M000401	MG/KG	4.20		Arsenic (As)	8.2	70	0.06
054M000401	MG/KG	0.45	J	Cadmium (Cd)	1.2	9.6	0.05
054M000401	MG/KG	40.40		Chromium (Cr)	81	370	0.11
054M000401	**MG/KG**	**355.00**		**Copper (Cu)**	**34**	**270**	**1.31**
054M000401	**MG/KG**	**482.00**	**J**	**Lead (Pb)**	**46.7**	**218**	**2.21**
054M000401	MG/KG	0.06		Mercury (Hg)	0.15	0.71	0.08
054M000401	MG/KG	35.70		Nickel (Ni)	20.9	51.6	0.69
054M000401	MG/KG	0.71	J	Silver (Ag)	1	3.7	0.19
054M000401	**MG/KG**	**1390.00**	**J**	**Zinc (Zn)**	**150**	**410**	**3.39**
054M000401	UG/KG	800.00	U	2-Methylnaphthalene	70	670	1.19
054M000401	UG/KG	800.00	U	Acenaphthene	16	500	1.60
054M000401	UG/KG	800.00	U	Acenaphthylene	44	640	1.25
054M000401	UG/KG	800.00	U	Anthracene	85.3	1100	0.73
054M000401	UG/KG	800.00	U	Benzo(a)anthracene	261	1600	0.50
054M000401	UG/KG	800.00	U	Benzo(a)pyrene	430	1600	0.50
054M000401	UG/KG	800.00	U	Chrysene	384	2800	0.29
054M000401	UG/KG	800.00	U	Dibenz(a,h)anthracene	63.4	260	3.08
054M000401	UG/KG	800.00	U	Fluoranthene	600	5100	0.16
054M000401	UG/KG	800.00	U	Fluorene	19	540	1.48
054M000401	UG/KG	800.00	U	Naphthalene	160	2100	0.38
054M000401	UG/KG	800.00	U	Phenanthrene	240	1500	0.53
054M000401	UG/KG	130.00	J	Pyrene	665	2600	0.05
				ERM Quotient Sum			19.84
054M000401				Mean ERM Quotient			0.79
054M000401				Mean ERM Quotient without ND			0.33

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
081M000101	MG/KG	18.70		Arsenic (As)	8.2	70	0.27
081M000101	MG/KG	0.44	U	Cadmium (Cd)	1.2	9.6	0.05
081M000101	MG/KG	36.70		Chromium (Cr)	81	370	0.10
081M000101	MG/KG	25.60		Copper (Cu)	34	270	0.09
081M000101	MG/KG	24.20		Lead (Pb)	46.7	218	0.11
081M000101	MG/KG	0.09	U	Mercury (Hg)	0.15	0.71	0.13
081M000101	MG/KG	11.40	J	Nickel (Ni)	20.9	51.6	0.22
081M000101	MG/KG	0.88	U	Silver (Ag)	1	3.7	0.24
081M000101	MG/KG	77.50		Zinc (Zn)	150	410	0.19
081M000101	UG/KG	11.00	U	4,4'-DDE	2.2	27	0.41
081M000101	UG/KG	11.00	U	4,4'-DDT	1.58	46.1	0.24
081M000101	UG/KG	640.00	U	Total PCBs	22.7	180	3.56
081M000101	UG/KG	2900.00	U	2-Methylnaphthalene	70	670	4.33
081M000101	UG/KG	2900.00	U	Acenaphthene	16	500	5.80
081M000101	UG/KG	2900.00	U	Acenaphthylene	44	640	4.53
081M000101	UG/KG	2900.00	U	Anthracene	85.3	100	29.00
081M000101	UG/KG	550.00	J	Benzo(a)anthracene	261	1600	0.34
081M000101	UG/KG	320.00	J	Benzo(a)pyrene	430	1600	0.20
081M000101	UG/KG	940.00	J	Chrysene	384	2800	0.34
081M000101	UG/KG	2900.00	U	Dibenz(a,h)anthracene	63.4	260	11.15
081M000101	UG/KG	1300.00	J	Fluoranthene	600	5100	0.25
081M000101	UG/KG	2900.00	U	Fluorene	19	540	5.37
081M000101	UG/KG	2900.00	U	Naphthalene	160	2100	1.38
081M000101	UG/KG	2900.00	U	Phenanthrene	240	1500	1.93
081M000101	UG/KG	1200.00	J	Pyrene	665	2600	0.46
				ERM Quotient Sum			70.69
081M000101				Mean ERM Quotient			2.83
081M000101				Mean ERM Quotient without ND			0.10
081M000201	MG/KG	15.60		Arsenic (As)	8.2	70	0.22
081M000201	MG/KG	0.45	U	Cadmium (Cd)	1.2	9.6	0.05
081M000201	MG/KG	31.90		Chromium (Cr)	81	370	0.09
081M000201	MG/KG	27.50		Copper (Cu)	34	270	0.10
081M000201	MG/KG	23.10		Lead (Pb)	46.7	218	0.11
081M000201	MG/KG	0.09	U	Mercury (Hg)	0.15	0.71	0.13
081M000201	MG/KG	10.50	J	Nickel (Ni)	20.9	51.6	0.20
081M000201	MG/KG	0.89	U	Silver (Ag)	1	3.7	0.24
081M000201	MG/KG	73.50		Zinc (Zn)	150	410	0.18
081M000201	UG/KG	10.00	UJ	4,4'-DDE	2.2	27	0.37
081M000201	UG/KG	10.00	UJ	4,4'-DDT	1.58	46.1	0.22
081M000201	UG/KG	630.00	UJ	Total PCBs	22.7	180	3.50
081M000201	UG/KG	2800.00	U	2-Methylnaphthalene	70	670	4.18
081M000201	UG/KG	2800.00	U	Acenaphthene	16	500	5.60
081M000201	UG/KG	2800.00	U	Acenaphthylene	44	640	4.38
081M000201	UG/KG	2800.00	U	Anthracene	85.3	100	28.00
081M000201	UG/KG	370.00	J	Benzo(a)anthracene	261	1600	0.23
081M000201	UG/KG	300.00	J	Benzo(a)pyrene	430	1600	0.19
081M000201	UG/KG	430.00	J	Chrysene	384	2800	0.15
081M000201	UG/KG	2800.00	U	Dibenz(a,h)anthracene	63.4	260	10.77
081M000201	UG/KG	780.00	J	Fluoranthene	600	5100	0.15
081M000201	UG/KG	2800.00	U	Fluorene	19	540	5.19
081M000201	UG/KG	2800.00	U	Naphthalene	160	2100	1.33
081M000201	UG/KG	2800.00	U	Phenanthrene	240	1500	1.87
081M000201	UG/KG	840.00	J	Pyrene	665	2600	0.32
				ERM Quotient Sum			67.76
081M000201				Mean ERM Quotient			2.71
081M000201				Mean ERM Quotient without ND			0.08

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
555M000101	MG/KG	9.00		Arsenic (As)	8.2	70	0.13
555M000101	MG/KG	3.60		Cadmium (Cd)	1.2	9.6	0.38
555M000101	MG/KG	177.00		Chromium (Cr)	81	370	0.48
555M000101	MG/KG	220.00		Copper (Cu)	34	270	0.81
555M000101	MG/KG	155.00		Lead (Pb)	46.7	218	0.71
555M000101	MG/KG	0.26		Mercury (Hg)	0.15	0.71	0.37
555M000101	MG/KG	28.70	J	Nickel (Ni)	20.9	51.6	0.56
555M000101	MG/KG	0.67	J	Silver (Ag)	1	3.7	0.18
555M000101	MG/KG	277.00		Zinc (Zn)	150	410	0.68
555M000101	**UG/KG**	**1457.00**		**Total PCBs**	**22.7**	**180**	**8.09**
				ERM Quotient Sum			12.38
555M000101				Mean ERM Quotient			0.50
555M000101				Mean ERM Quotient without ND			0.50
555M000201	MG/KG	7.90		Arsenic (As)	8.2	70	0.11
555M000201	MG/KG	0.67	J	Cadmium (Cd)	1.2	9.6	0.07
555M000201	MG/KG	64.60		Chromium (Cr)	81	370	0.17
555M000201	MG/KG	61.80		Copper (Cu)	34	270	0.23
555M000201	MG/KG	180.00		Lead (Pb)	46.7	218	0.83
555M000201	MG/KG	0.15		Mercury (Hg)	0.15	0.71	0.21
555M000201	MG/KG	11.40	J	Nickel (Ni)	20.9	51.6	0.22
555M000201	MG/KG	0.68	J	Silver (Ag)	1	3.7	0.18
555M000201	MG/KG	177.00		Zinc (Zn)	150	410	0.43
555M000201	**UG/KG**	**398.00**		**Total PCBs**	**22.7**	**180**	**2.21**
				ERM Quotient Sum			4.67
555M000201				Mean ERM Quotient			0.19
555M000201				Mean ERM Quotient without ND			0.19
556M000101	MG/KG	19.40		Arsenic (As)	8.2	70	0.28
556M000101	MG/KG	0.45	U	Cadmium (Cd)	1.2	9.6	0.05
556M000101	MG/KG	41.40		Chromium (Cr)	81	370	0.11
556M000101	MG/KG	24.60		Copper (Cu)	34	270	0.09
556M000101	MG/KG	28.20	J	Lead (Pb)	46.7	218	0.13
556M000101	MG/KG	0.09	U	Mercury (Hg)	0.15	0.71	0.13
556M000101	MG/KG	12.40	J	Nickel (Ni)	20.9	51.6	0.24
556M000101	MG/KG	0.91	U	Silver (Ag)	1	3.7	0.25
556M000101	MG/KG	91.50	J	Zinc (Zn)	150	410	0.22
556M000101	UG/KG	11.00	U	4,4'-DDE	2.2	27	0.41
556M000101	UG/KG	11.00	U	4,4'-DDT	1.58	46.1	0.24
556M000101	UG/KG	675.00	U	Total PCBs	22.7	180	3.75
556M000101	UG/KG	3000.00	U	2-Methylnaphthalene	70	670	4.48
556M000101	UG/KG	3000.00	U	Acenaphthene	16	500	6.00
556M000101	UG/KG	3000.00	U	Acenaphthylene	44	640	4.69
556M000101	UG/KG	3000.00	U	Anthracene	85.3	100	30.00
556M000101	UG/KG	3000.00	U	Benzo(a)anthracene	261	1600	1.88
556M000101	UG/KG	3000.00	U	Benzo(a)pyrene	430	1600	1.88
556M000101	UG/KG	350.00	J	Chrysene	384	2800	0.13
556M000101	UG/KG	3000.00	U	Dibenz(a,h)anthracene	63.4	260	11.54
556M000101	UG/KG	810.00	J	Fluoranthene	600	5100	0.16
556M000101	UG/KG	3000.00	U	Fluorene	19	540	5.56
556M000101	UG/KG	3000.00	U	Naphthalene	160	2100	1.43
556M000101	UG/KG	3000.00	U	Phenanthrene	240	1500	2.00
556M000101	UG/KG	690.00	J	Pyrene	665	2600	0.27
				ERM Quotient Sum			75.88
556M000101				Mean ERM Quotient			3.04
556M000101				Mean ERM Quotient without ND			0.06

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
556M000201	MG/KG	20.40		Arsenic (As)	8.2	70	0.29
556M000201	MG/KG	0.48	U	Cadmium (Cd)	1.2	9.6	0.05
556M000201	MG/KG	42.30		Chromium (Cr)	81	370	0.11
556M000201	MG/KG	39.10		Copper (Cu)	34	270	0.14
556M000201	MG/KG	26.70		Lead (Pb)	46.7	218	0.12
556M000201	MG/KG	0.10	U	Mercury (Hg)	0.15	0.71	0.14
556M000201	MG/KG	14.60	J	Nickel (Ni)	20.9	51.6	0.28
556M000201	MG/KG	0.96	U	Silver (Ag)	1	3.7	0.26
556M000201	MG/KG	76.90		Zinc (Zn)	150	410	0.19
556M000201	UG/KG	12.00	U	4,4'-DDE	2.2	27	0.44
556M000201	UG/KG	12.00	U	4,4'-DDT	1.58	46.1	0.26
556M000201	UG/KG	720.00	U	Total PCBs	22.7	180	4.00
556M000201	UG/KG	3100.00	U	2-Methylnaphthalene	70	670	4.63
556M000201	UG/KG	3100.00	U	Acenaphthene	16	500	6.20
556M000201	UG/KG	3100.00	U	Acenaphthylene	44	640	4.84
556M000201	UG/KG	3100.00	U	Anthracene	85.3	100	31.00
556M000201	UG/KG	3100.00	U	Benzo(a)anthracene	261	1600	1.94
556M000201	UG/KG	3100.00	U	Benzo(a)pyrene	430	1600	1.94
556M000201	UG/KG	3100.00	U	Chrysene	384	2800	1.11
556M000201	UG/KG	3100.00	U	Dibenz(a,h)anthracene	63.4	260	11.92
556M000201	UG/KG	3100.00	U	Fluoranthene	600	5100	0.61
556M000201	UG/KG	3100.00	U	Fluorene	19	540	5.74
556M000201	UG/KG	3100.00	U	Naphthalene	160	2100	1.48
556M000201	UG/KG	3100.00	U	Phenanthrene	240	1500	2.07
556M000201	UG/KG	3100.00	U	Pyrene	665	2600	1.19
				ERM Quotient Sum			80.96
556M000201				Mean ERM Quotient			3.24
556M000201				Mean ERM Quotient without ND			0.05
556M000301	MG/KG	18.70		Arsenic (As)	8.2	70	0.27
556M000301	MG/KG	0.48	U	Cadmium (Cd)	1.2	9.6	0.05
556M000301	MG/KG	35.60		Chromium (Cr)	81	370	0.10
556M000301	MG/KG	27.70		Copper (Cu)	34	270	0.10
556M000301	MG/KG	22.30		Lead (Pb)	46.7	218	0.10
556M000301	MG/KG	0.10	U	Mercury (Hg)	0.15	0.71	0.14
556M000301	MG/KG	11.00	J	Nickel (Ni)	20.9	51.6	0.21
556M000301	MG/KG	0.95	U	Silver (Ag)	1	3.7	0.26
556M000301	MG/KG	71.80		Zinc (Zn)	150	410	0.18
556M000301	UG/KG	12.00	U	4,4'-DDE	2.2	27	0.44
556M000301	UG/KG	12.00	U	4,4'-DDT	1.58	46.1	0.26
556M000301	UG/KG	720.00	U	Total PCBs	22.7	180	4.00
556M000301	UG/KG	3100.00	U	2-Methylnaphthalene	70	670	4.63
556M000301	UG/KG	3100.00	U	Acenaphthene	16	500	6.20
556M000301	UG/KG	3100.00	U	Acenaphthylene	44	640	4.84
556M000301	**UG/KG**	**410.00**	**J**	**Anthracene**	**85.3**	**100**	**4.10**
556M000301	UG/KG	1600.00	J	Benzo(a)anthracene	261	1600	1.00
556M000301	UG/KG	1500.00	J	Benzo(a)pyrene	430	1600	0.94
556M000301	UG/KG	2000.00	J	Chrysene	384	2800	0.71
556M000301	UG/KG	3100.00	U	Dibenz(a,h)anthracene	63.4	260	11.92
556M000301	UG/KG	2100.00	J	Fluoranthene	600	5100	0.41
556M000301	UG/KG	3100.00	U	Fluorene	19	540	5.74
556M000301	UG/KG	3100.00	U	Naphthalene	160	2100	1.48
556M000301	UG/KG	3100.00	U	Phenanthrene	240	1500	2.07
556M000301	UG/KG	1600.00	J	Pyrene	665	2600	0.62
				ERM Quotient Sum			50.77
556M000301				Mean ERM Quotient			2.03
556M000301				Mean ERM Quotient without ND			0.35

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
556M000401	MG/KG	10.90		Arsenic (As)	8.2	70	0.16
556M000401	MG/KG	0.67	J	Cadmium (Cd)	1.2	9.6	0.07
556M000401	MG/KG	23.60		Chromium (Cr)	81	370	0.06
556M000401	MG/KG	156.00		Copper (Cu)	34	270	0.58
556M000401	MG/KG	47.10		Lead (Pb)	46.7	218	0.22
556M000401	MG/KG	0.09		Mercury (Hg)	0.15	0.71	0.13
556M000401	MG/KG	9.00	J	Nickel (Ni)	20.9	51.6	0.17
556M000401	MG/KG	0.36	U	Silver (Ag)	1	3.7	0.10
556M000401	**MG/KG**	**443.00**		**Zinc (Zn)**	**150**	**410**	**1.08**
556M000401	UG/KG	5.70	UJ	4,4'-DDE	2.2	27	0.21
556M000401	UG/KG	5.70	UJ	4,4'-DDT	1.58	46.1	0.12
556M000401	UG/KG	337.50	UJ	Total PCBs	22.7	180	1.88
				ERM Quotient Sum			4.77
556M000401				Mean ERM Quotient			0.19
556M000401				Mean ERM Quotient without ND			0.10
556M000501	MG/KG	5.40		Arsenic (As)	8.2	70	0.08
556M000501	MG/KG	0.29	J	Cadmium (Cd)	1.2	9.6	0.03
556M000501	MG/KG	36.70		Chromium (Cr)	81	370	0.10
556M000501	**MG/KG**	**1930.00**		**Copper (Cu)**	**34**	**270**	**7.15**
556M000501	**MG/KG**	**220.00**		**Lead (Pb)**	**46.7**	**218**	**1.01**
556M000501	MG/KG	0.05		Mercury (Hg)	0.15	0.71	0.07
556M000501	MG/KG	32.60	J	Nickel (Ni)	20.9	51.6	0.63
556M000501	MG/KG	0.24	U	Silver (Ag)	1	3.7	0.06
556M000501	**MG/KG**	**774.00**		**Zinc (Zn)**	**150**	**410**	**1.89**
556M000501	UG/KG	7.60		4,4'-DDE	2.2	27	0.28
556M000501	UG/KG	3.20	U	4,4'-DDT	1.58	46.1	0.07
556M000501	UG/KG	194.50	U	Total PCBs	22.7	180	1.08
556M000501	UG/KG	1700.00	U	2-Methylnaphthalene	70	670	2.54
556M000501	UG/KG	260.00	J	Acenaphthene	16	500	0.52
556M000501	UG/KG	1700.00	U	Acenaphthylene	44	640	2.66
556M000501	**UG/KG**	**1200.00**	**J**	**Anthracene**	**85.3**	**100**	**12.00**
556M000501	**UG/KG**	**4300.00**		**Benzo(a)anthracene**	**261**	**1600**	**2.69**
556M000501	**UG/KG**	**3600.00**		**Benzo(a)pyrene**	**430**	**1600**	**2.25**
556M000501	**UG/KG**	**5600.00**		**Chrysene**	**384**	**2800**	**2.00**
556M000501	**UG/KG**	**820.00**	**J**	**Dibenz(a,h)anthracene**	**63.4**	**260**	**3.15**
556M000501	**UG/KG**	**14000.00**		**Fluoranthene**	**600**	**5100**	**2.75**
556M000501	UG/KG	1700.00	U	Fluorene	19	540	3.15
556M000501	UG/KG	1700.00	U	Naphthalene	160	2100	0.81
556M000501	**UG/KG**	**5700.00**		**Phenanthrene**	**240**	**1500**	**3.80**
556M000501	**UG/KG**	**10000.00**		**Pyrene**	**665**	**2600**	**3.85**
				ERM Quotient Sum			54.60
556M000501				Mean ERM Quotient			2.18
556M000501				Mean ERM Quotient without ND			1.77
556M000601	MG/KG	9.70		Arsenic (As)	8.2	70	0.14
556M000601	MG/KG	0.30	U	Cadmium (Cd)	1.2	9.6	0.03
556M000601	MG/KG	25.70		Chromium (Cr)	81	370	0.07
556M000601	MG/KG	25.50		Copper (Cu)	34	270	0.09
556M000601	MG/KG	41.40		Lead (Pb)	46.7	218	0.19
556M000601	MG/KG	0.06	U	Mercury (Hg)	0.15	0.71	0.08
556M000601	MG/KG	7.80	J	Nickel (Ni)	20.9	51.6	0.15
556M000601	MG/KG	0.60	U	Silver (Ag)	1	3.7	0.16
556M000601	MG/KG	70.60		Zinc (Zn)	150	410	0.17
556M000601	UG/KG	5.30	U	4,4'-DDE	2.2	27	0.20
556M000601	UG/KG	5.30	U	4,4'-DDT	1.58	46.1	0.11
556M000601	UG/KG	315.00	U	Total PCBs	22.7	180	1.75
				ERM Quotient Sum			3.15
556M000601				Mean ERM Quotient			0.13
556M000601				Mean ERM Quotient without ND			0.03

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
556M000701	MG/KG	9.10		Arsenic (As)	8.2	70	0.13
556M000701	MG/KG	0.41	U	Cadmium (Cd)	1.2	9.6	0.04
556M000701	MG/KG	20.90		Chromium (Cr)	81	370	0.06
556M000701	MG/KG	26.90		Copper (Cu)	34	270	0.10
556M000701	MG/KG	13.40		Lead (Pb)	46.7	218	0.06
556M000701	MG/KG	0.09		Mercury (Hg)	0.15	0.71	0.13
556M000701	MG/KG	7.30	J	Nickel (Ni)	20.9	51.6	0.14
556M000701	MG/KG	0.81	U	Silver (Ag)	1	3.7	0.22
556M000701	MG/KG	55.40		Zinc (Zn)	150	410	0.14
556M000701	UG/KG	10.00	U	4,4'-DDE	2.2	27	0.37
556M000701	UG/KG	10.00	U	4,4'-DDT	1.58	46.1	0.22
556M000701	UG/KG	595.00	U	Total PCBs	22.7	180	3.31
556M000701	UG/KG	2600.00	U	2-Methylnaphthalene	70	670	3.88
556M000701	**UG/KG**	**690.00**	**J**	**Acenaphthene**	**16**	**500**	**1.38**
556M000701	UG/KG	2600.00	U	Acenaphthylene	44	640	4.06
556M000701	**UG/KG**	**1200.00**	**J**	**Anthracene**	**85.3**	**100**	**12.00**
556M000701	**UG/KG**	**1800.00**	**J**	**Benzo(a)anthracene**	**261**	**1600**	**1.13**
556M000701	UG/KG	1500.00	J	Benzo(a)pyrene	430	1600	0.94
556M000701	UG/KG	1900.00	J	Chrysene	384	2800	0.68
556M000701	**UG/KG**	**360.00**	**J**	**Dibenz(a,h)anthracene**	**63.4**	**260**	**1.38**
556M000701	UG/KG	4600.00		Fluoranthene	600	5100	0.90
556M000701	UG/KG	520.00	J	Fluorene	19	540	0.96
556M000701	UG/KG	2600.00	U	Naphthalene	160	2100	1.24
556M000701	**UG/KG**	**2400.00**	**J**	**Phenanthrene**	**240**	**1500**	**1.60**
556M000701	**UG/KG**	**4400.00**		**Pyrene**	**665**	**2600**	**1.69**
				ERM Quotient Sum			36.75
556M000701				Mean ERM Quotient			1.47
556M000701				Mean ERM Quotient without ND			0.94
556M000801	MG/KG	17.80		Arsenic (As)	8.2	70	0.25
556M000801	MG/KG	0.41	U	Cadmium (Cd)	1.2	9.6	0.04
556M000801	MG/KG	41.10		Chromium (Cr)	81	370	0.11
556M000801	MG/KG	99.90		Copper (Cu)	34	270	0.37
556M000801	MG/KG	30.90		Lead (Pb)	46.7	218	0.14
556M000801	MG/KG	0.09		Mercury (Hg)	0.15	0.71	0.13
556M000801	MG/KG	25.50	J	Nickel (Ni)	20.9	51.6	0.49
556M000801	MG/KG	0.82	U	Silver (Ag)	1	3.7	0.22
556M000801	MG/KG	132.00		Zinc (Zn)	150	410	0.32
556M000801	UG/KG	10.00	UJ	4,4'-DDE	2.2	27	0.37
556M000801	UG/KG	10.00	UJ	4,4'-DDT	1.58	46.1	0.22
556M000801	UG/KG	630.00	UJ	Total PCBs	22.7	180	3.50
556M000801	UG/KG	2800.00	U	2-Methylnaphthalene	70	670	4.18
556M000801	UG/KG	2800.00	U	Acenaphthene	16	500	5.60
556M000801	UG/KG	2800.00	U	Acenaphthylene	44	640	4.38
556M000801	**UG/KG**	**1000.00**	**J**	**Anthracene**	**85.3**	**100**	**10.00**
556M000801	UG/KG	1300.00	J	Benzo(a)anthracene	261	1600	0.81
556M000801	UG/KG	970.00	J	Benzo(a)pyrene	430	1600	0.61
556M000801	UG/KG	1800.00	J	Chrysene	384	2800	0.64
556M000801	UG/KG	2800.00	U	Dibenz(a,h)anthracene	63.4	260	10.77
556M000801	UG/KG	3300.00		Fluoranthene	600	5100	0.65
556M000801	UG/KG	2800.00	U	Fluorene	19	540	5.19
556M000801	UG/KG	2800.00	U	Naphthalene	160	2100	1.33
556M000801	UG/KG	600.00	J	Phenanthrene	240	1500	0.40
556M000801	**UG/KG**	**3200.00**		**Pyrene**	**665**	**2600**	**1.23**
				ERM Quotient Sum			51.95
556M000801				Mean ERM Quotient			2.08
556M000801				Mean ERM Quotient without ND			0.65

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
556M000901	MG/KG	21.20		Arsenic (As)	8.2	70	0.30
556M000901	MG/KG	0.49	U	Cadmium (Cd)	1.2	9.6	0.05
556M000901	MG/KG	39.30		Chromium (Cr)	81	370	0.11
556M000901	MG/KG	25.60		Copper (Cu)	34	270	0.09
556M000901	MG/KG	26.30	J	Lead (Pb)	46.7	218	0.12
556M000901	MG/KG	0.10	U	Mercury (Hg)	0.15	0.71	0.14
556M000901	MG/KG	12.20	J	Nickel (Ni)	20.9	51.6	0.24
556M000901	MG/KG	0.99	U	Silver (Ag)	1	3.7	0.27
556M000901	MG/KG	79.60	J	Zinc (Zn)	150	410	0.19
556M000901	UG/KG	12.00	U	4,4'-DDE	2.2	27	0.44
556M000901	UG/KG	12.00	U	4,4'-DDT	1.58	46.1	0.26
556M000901	UG/KG	720.00	U	Total PCBs	22.7	180	4.00
556M000901	UG/KG	3100.00	U	2-Methylnaphthalene	70	670	4.63
556M000901	UG/KG	3100.00	U	Acenaphthene	16	500	6.20
556M000901	UG/KG	3100.00	U	Acenaphthylene	44	640	4.84
556M000901	UG/KG	3100.00	U	Anthracene	85.3	100	31.00
556M000901	UG/KG	3100.00	U	Benzo(a)anthracene	261	1600	1.94
556M000901	UG/KG	3100.00	U	Benzo(a)pyrene	430	1600	1.94
556M000901	UG/KG	3100.00	U	Chrysene	384	2800	1.11
556M000901	UG/KG	3100.00	U	Dibenz(a,h)anthracene	63.4	260	11.92
556M000901	UG/KG	3100.00	U	Fluoranthene	600	5100	0.61
556M000901	UG/KG	3100.00	U	Fluorene	19	540	5.74
556M000901	UG/KG	3100.00	U	Naphthalene	160	2100	1.48
556M000901	UG/KG	3100.00	U	Phenanthrene	240	1500	2.07
556M000901	UG/KG	470.00	J	Pyrene	665	2600	0.18
				ERM Quotient Sum			79.87
556M000901				Mean ERM Quotient			3.19
556M000901				Mean ERM Quotient without ND			0.05
695M000101	MG/KG	17.70		Arsenic (As)	8.2	70	0.25
695M000101	MG/KG	0.25	U	Cadmium (Cd)	1.2	9.6	0.03
695M000101	MG/KG	60.30		Chromium (Cr)	81	370	0.16
695M000101	MG/KG	9.60	J	Copper (Cu)	34	270	0.04
695M000101	MG/KG	14.80		Lead (Pb)	46.7	218	0.07
695M000101	MG/KG	0.09	U	Mercury (Hg)	0.15	0.71	0.13
695M000101	MG/KG	17.00	J	Nickel (Ni)	20.9	51.6	0.33
695M000101	MG/KG	0.67	U	Silver (Ag)	1	3.7	0.18
695M000101	MG/KG	64.50		Zinc (Zn)	150	410	0.16
695M000101	UG/KG	8.95	U	4,4'-DDE	2.2	27	0.33
695M000101	UG/KG	8.95	U	4,4'-DDT	1.58	46.1	0.19
695M000101	UG/KG	359.50	U	Total PCBs	22.7	180	2.00
695M000101	UG/KG	890.00	U	2-Methylnaphthalene	70	670	1.33
695M000101	UG/KG	890.00	U	Acenaphthene	16	500	1.78
695M000101	UG/KG	890.00	U	Acenaphthylene	44	640	1.39
695M000101	UG/KG	890.00	U	Anthracene	85.3	100	8.90
695M000101	UG/KG	890.00	U	Benzo(a)anthracene	261	1600	0.56
695M000101	UG/KG	890.00	U	Benzo(a)pyrene	430	1600	0.56
695M000101	UG/KG	890.00	U	Chrysene	384	2800	0.32
695M000101	UG/KG	890.00	U	Dibenz(a,h)anthracene	63.4	260	3.42
695M000101	UG/KG	890.00	U	Fluoranthene	600	5100	0.17
695M000101	UG/KG	890.00	U	Fluorene	19	540	1.65
695M000101	UG/KG	890.00	U	Naphthalene	160	2100	0.42
695M000101	UG/KG	890.00	U	Phenanthrene	240	1500	0.59
695M000101	UG/KG	890.00	U	Pyrene	665	2600	0.34
				ERM Quotient Sum			25.30
695M000101				Mean ERM Quotient			1.01
695M000101				Mean ERM Quotient without ND			0.04

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
695M000201	MG/KG	15.50		Arsenic (As)	8.2	70	0.22
695M000201	MG/KG	0.16	U	Cadmium (Cd)	1.2	9.6	0.02
695M000201	MG/KG	57.70		Chromium (Cr)	81	370	0.16
695M000201	MG/KG	9.10	J	Copper (Cu)	34	270	0.03
695M000201	MG/KG	13.90		Lead (Pb)	46.7	218	0.06
695M000201	MG/KG	0.08	U	Mercury (Hg)	0.15	0.71	0.11
695M000201	MG/KG	17.40	J	Nickel (Ni)	20.9	51.6	0.34
695M000201	MG/KG	0.66	U	Silver (Ag)	1	3.7	0.18
695M000201	MG/KG	53.50		Zinc (Zn)	150	410	0.13
695M000201	UG/KG	8.21	U	4,4'-DDE	2.2	27	0.30
695M000201	UG/KG	8.21	U	4,4'-DDT	1.58	46.1	0.18
695M000201	UG/KG	329.80	U	Total PCBs	22.7	180	1.83
695M000201	UG/KG	820.00	U	2-Methylnaphthalene	70	670	1.22
695M000201	UG/KG	820.00	U	Acenaphthene	16	500	1.64
695M000201	UG/KG	820.00	U	Acenaphthylene	44	640	1.28
695M000201	UG/KG	820.00	U	Anthracene	85.3	100	8.20
695M000201	UG/KG	820.00	U	Benzo(a)anthracene	261	1600	0.51
695M000201	UG/KG	820.00	U	Benzo(a)pyrene	430	1600	0.51
695M000201	UG/KG	820.00	U	Chrysene	384	2800	0.29
695M000201	UG/KG	820.00	U	Dibenz(a,h)anthracene	63.4	260	3.15
695M000201	UG/KG	820.00	U	Fluoranthene	600	5100	0.16
695M000201	UG/KG	820.00	U	Fluorene	19	540	1.52
695M000201	UG/KG	820.00	U	Naphthalene	160	2100	0.39
695M000201	UG/KG	820.00	U	Phenanthrene	240	1500	0.55
695M000201	UG/KG	820.00	U	Pyrene	665	2600	0.32
				ERM Quotient Sum			23.31
695M000201				Mean ERM Quotient			0.93
695M000201				Mean ERM Quotient without ND			0.04
699M0001E1	MG/KG	20.80		Arsenic (As)	8.2	70	0.30
699M0001E1	MG/KG	0.17	J	Cadmium (Cd)	1.2	9.6	0.02
699M0001E1	MG/KG	45.00		Chromium (Cr)	81	370	0.12
699M0001E1	MG/KG	41.10		Copper (Cu)	34	270	0.15
699M0001E1	MG/KG	77.50		Lead (Pb)	46.7	218	0.36
699M0001E1	MG/KG	0.35		Mercury (Hg)	0.15	0.71	0.49
699M0001E1	MG/KG	16.40		Nickel (Ni)	20.9	51.6	0.32
699M0001E1	MG/KG	0.37	U	Silver (Ag)	1	3.7	0.10
699M0001E1	MG/KG	189.00		Zinc (Zn)	150	410	0.46
				ERM Quotient Sum			2.32
699M0001E1				Mean ERM Quotient			0.09
699M0001E1				Mean ERM Quotient without ND			0.09
699M0002E1	MG/KG	5.30		Arsenic (As)	8.2	70	0.08
699M0002E1	MG/KG	0.40	J	Cadmium (Cd)	1.2	9.6	0.04
699M0002E1	MG/KG	230.00		Chromium (Cr)	81	370	0.62
699M0002E1	MG/KG	146.00		Copper (Cu)	34	270	0.54
699M0002E1	**MG/KG**	**515.00**		**Lead (Pb)**	**46.7**	**218**	**2.36**
699M0002E1	MG/KG	0.11		Mercury (Hg)	0.15	0.71	0.15
699M0002E1	**MG/KG**	**102.00**		**Nickel (Ni)**	**20.9**	**51.6**	**1.98**
699M0002E1	MG/KG	0.23	U	Silver (Ag)	1	3.7	0.06
699M0002E1	**MG/KG**	**1250.00**		**Zinc (Zn)**	**150**	**410**	**3.05**
				ERM Quotient Sum			8.88
699M0002E1				Mean ERM Quotient			0.36
699M0002E1				Mean ERM Quotient without ND			0.35

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
699M0003E1	MG/KG	15.60		Arsenic (As)	8.2	70	0.22
699M0003E1	MG/KG	0.21	J	Cadmium (Cd)	1.2	9.6	0.02
699M0003E1	MG/KG	48.10		Chromium (Cr)	81	370	0.13
699M0003E1	MG/KG	50.70		Copper (Cu)	34	270	0.19
699M0003E1	MG/KG	26.80		Lead (Pb)	46.7	218	0.12
699M0003E1	MG/KG	0.30		Mercury (Hg)	0.15	0.71	0.42
699M0003E1	MG/KG	13.70		Nickel (Ni)	20.9	51.6	0.27
699M0003E1	MG/KG	0.60	UJ	Silver (Ag)	1	3.7	0.16
699M0003E1	MG/KG	116.00		Zinc (Zn)	150	410	0.28
				ERM Quotient Sum			1.82
699M0003E1				Mean ERM Quotient			0.07
699M0003E1				Mean ERM Quotient without ND			0.07
699M0004E1	MG/KG	9.70		Arsenic (As)	8.2	70	0.14
699M0004E1	MG/KG	0.48	J	Cadmium (Cd)	1.2	9.6	0.05
699M0004E1	MG/KG	151.00		Chromium (Cr)	81	370	0.41
699M0004E1	MG/KG	164.00		Copper (Cu)	34	270	0.61
699M0004E1	**MG/KG**	**996.00**		**Lead (Pb)**	**46.7**	**218**	**4.57**
699M0004E1	MG/KG	0.12		Mercury (Hg)	0.15	0.71	0.17
699M0004E1	MG/KG	25.20		Nickel (Ni)	20.9	51.6	0.49
699M0004E1	MG/KG	0.37	J	Silver (Ag)	1	3.7	0.10
699M0004E1	MG/KG	341.00		Zinc (Zn)	150	410	0.83
				ERM Quotient Sum			7.36
699M0004E1				Mean ERM Quotient			0.29
699M0004E1				Mean ERM Quotient without ND			0.29
699M0007E1	MG/KG	20.30		Arsenic (As)	8.2	70	0.29
699M0007E1	MG/KG	0.22	U	Cadmium (Cd)	1.2	9.6	0.02
699M0007E1	MG/KG	50.30		Chromium (Cr)	81	370	0.14
699M0007E1	MG/KG	51.10		Copper (Cu)	34	270	0.19
699M0007E1	MG/KG	26.20		Lead (Pb)	46.7	218	0.12
699M0007E1	MG/KG	0.15		Mercury (Hg)	0.15	0.71	0.21
699M0007E1	MG/KG	15.70	J	Nickel (Ni)	20.9	51.6	0.30
699M0007E1	MG/KG	0.74	U	Silver (Ag)	1	3.7	0.20
699M0007E1	MG/KG	98.80		Zinc (Zn)	150	410	0.24
				ERM Quotient Sum			1.71
699M0007E1				Mean ERM Quotient			0.07
699M0007E1				Mean ERM Quotient without ND			0.06
699M0009E1	MG/KG	1.86		Arsenic (As)	8.2	70	0.03
699M0009E1	MG/KG	0.22	U	Cadmium (Cd)	1.2	9.6	0.02
699M0009E1	MG/KG	51.10		Chromium (Cr)	81	370	0.14
699M0009E1	MG/KG	25.80		Copper (Cu)	34	270	0.10
699M0009E1	MG/KG	24.40		Lead (Pb)	46.7	218	0.11
699M0009E1	MG/KG	0.31		Mercury (Hg)	0.15	0.71	0.44
699M0009E1	MG/KG	15.70	J	Nickel (Ni)	20.9	51.6	0.30
699M0009E1	MG/KG	0.74	UJ	Silver (Ag)	1	3.7	0.20
699M0009E1	MG/KG	81.20		Zinc (Zn)	150	410	0.20
				ERM Quotient Sum			1.53
699M0009E1				Mean ERM Quotient			0.06
699M0009E1				Mean ERM Quotient without ND			0.05

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
DMAM000901	MG/KG	10.60		Arsenic (As)	8.2	70	0.15
DMAM000901	MG/KG	0.08	U	Cadmium (Cd)	1.2	9.6	0.01
DMAM000901	MG/KG	39.20		Chromium (Cr)	81	370	0.11
DMAM000901	MG/KG	21.90		Copper (Cu)	34	270	0.08
DMAM000901	MG/KG	18.50		Lead (Pb)	46.7	218	0.08
DMAM000901	MG/KG	0.21	U	Mercury (Hg)	0.15	0.71	0.30
DMAM000901	MG/KG	11.80		Nickel (Ni)	20.9	51.6	0.23
DMAM000901	MG/KG	0.11	UJ	Silver (Ag)	1	3.7	0.03
DMAM000901	MG/KG	67.50	J	Zinc (Zn)	150	410	0.16
DMAM000901	UG/KG	36.00	U	4,4'-DDE	2.2	27	1.33
DMAM000901	UG/KG	36.00	U	4,4'-DDT	1.58	46.1	0.78
DMAM000901	UG/KG	735.00	U	Total PCBs	22.7	180	4.08
DMAM000901	UG/KG	1700.00	U	2-Methylnaphthalene	70	670	2.54
DMAM000901	UG/KG	1400.00	U	Acenaphthene	16	500	2.80
DMAM000901	UG/KG	1400.00	U	Acenaphthylene	44	640	2.19
DMAM000901	UG/KG	1500.00	U	Anthracene	85.3	100	15.00
DMAM000901	UG/KG	1400.00	U	Benzo(a)anthracene	261	1600	0.88
DMAM000901	UG/KG	1400.00	U	Benzo(a)pyrene	430	1600	0.88
DMAM000901	UG/KG	1100.00	U	Chrysene	384	2800	0.39
DMAM000901	UG/KG	890.00	U	Dibenz(a,h)anthracene	63.4	260	3.42
DMAM000901	UG/KG	1900.00	U	Fluoranthene	600	5100	0.37
DMAM000901	UG/KG	1400.00	U	Fluorene	19	540	2.59
DMAM000901	UG/KG	1400.00	U	Naphthalene	160	2100	0.67
DMAM000901	UG/KG	1300.00	U	Phenanthrene	240	1500	0.87
DMAM000901	UG/KG	79.00	J	Pyrene	665	2600	0.03
				ERM Quotient Sum			39.97
DMAM000901				Mean ERM Quotient			1.60
DMAM000901				Mean ERM Quotient without ND			0.03
S02M000501	mg/kg	5.10	J	Arsenic (As)	8.2	70	0.07
S02M000501	mg/kg	0.67	UJ	Cadmium (Cd)	1.2	9.6	0.07
S02M000501	mg/kg	6.60		Chromium (Cr)	81	370	0.02
S02M000501	mg/kg	3.30	U	Copper (Cu)	34	270	0.01
S02M000501	mg/kg	3.70		Lead (Pb)	46.7	218	0.02
S02M000501	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M000501	mg/kg	5.30	UJ	Nickel (Ni)	20.9	51.6	0.10
S02M000501	mg/kg	1.30	UJ	Silver (Ag)	1	3.7	0.35
S02M000501	mg/kg	5.80		Zinc (Zn)	150	410	0.01
				ERM Quotient Sum			0.67
S02M000501				Mean ERM Quotient			0.03
S02M000501				Mean ERM Quotient without ND			0.00
S02M000601	mg/kg	2.00	J	Arsenic (As)	8.2	70	0.03
S02M000601	mg/kg	0.68	UJ	Cadmium (Cd)	1.2	9.6	0.07
S02M000601	mg/kg	4.20		Chromium (Cr)	81	370	0.01
S02M000601	mg/kg	14.00		Copper (Cu)	34	270	0.05
S02M000601	mg/kg	14.00		Lead (Pb)	46.7	218	0.06
S02M000601	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M000601	mg/kg	5.50	UJ	Nickel (Ni)	20.9	51.6	0.11
S02M000601	mg/kg	1.40	UJ	Silver (Ag)	1	3.7	0.38
S02M000601	mg/kg	14.00		Zinc (Zn)	150	410	0.03
				ERM Quotient Sum			0.76
S02M000601				Mean ERM Quotient			0.03
S02M000601				Mean ERM Quotient without ND			0.01

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
S02M000701	mg/kg	1.30	UJ	Arsenic (As)	8.2	70	0.02
S02M000701	mg/kg	0.63	UJ	Cadmium (Cd)	1.2	9.6	0.07
S02M000701	mg/kg	5.40		Chromium (Cr)	81	370	0.01
S02M000701	mg/kg	4.10		Copper (Cu)	34	270	0.02
S02M000701	mg/kg	47.00		Lead (Pb)	46.7	218	0.22
S02M000701	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M000701	mg/kg	5.10	UJ	Nickel (Ni)	20.9	51.6	0.10
S02M000701	mg/kg	1.30	UJ	Silver (Ag)	1	3.7	0.35
S02M000701	mg/kg	17.00		Zinc (Zn)	150	410	0.04
				ERM Quotient Sum			0.84
S02M000701				Mean ERM Quotient			0.03
S02M000701				Mean ERM Quotient without ND			0.01
S02M000801	mg/kg	1.30	UJ	Arsenic (As)	8.2	70	0.02
S02M000801	mg/kg	0.66	UJ	Cadmium (Cd)	1.2	9.6	0.07
S02M000801	mg/kg	2.20		Chromium (Cr)	81	370	0.01
S02M000801	mg/kg	3.40		Copper (Cu)	34	270	0.01
S02M000801	mg/kg	6.40		Lead (Pb)	46.7	218	0.03
S02M000801	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M000801	mg/kg	5.30	UJ	Nickel (Ni)	20.9	51.6	0.10
S02M000801	mg/kg	1.30	UJ	Silver (Ag)	1	3.7	0.35
S02M000801	mg/kg	7.50		Zinc (Zn)	150	410	0.02
				ERM Quotient Sum			0.62
S02M000801				Mean ERM Quotient			0.02
S02M000801				Mean ERM Quotient without ND			0.00
S02M000901	mg/kg	1.20	UJ	Arsenic (As)	8.2	70	0.02
S02M000901	mg/kg	0.62	UJ	Cadmium (Cd)	1.2	9.6	0.06
S02M000901	mg/kg	2.30		Chromium (Cr)	81	370	0.01
S02M000901	mg/kg	5.90		Copper (Cu)	34	270	0.02
S02M000901	mg/kg	6.20		Lead (Pb)	46.7	218	0.03
S02M000901	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M000901	mg/kg	5.00	UJ	Nickel (Ni)	20.9	51.6	0.10
S02M000901	mg/kg	1.20	UJ	Silver (Ag)	1	3.7	0.32
S02M000901	mg/kg	15.00		Zinc (Zn)	150	410	0.04
				ERM Quotient Sum			0.61
S02M000901				Mean ERM Quotient			0.02
S02M000901				Mean ERM Quotient without ND			0.00

Cooper River
Sediment Mean ERM Quotient

SAMPLE ID	UNITS	RESULT	VQUAL	PARAMETER	ERL	ERM	ERM QUOTIENT
S02M001001	mg/kg	2.70	UJ	Arsenic (As)	8.2	70	0.04
S02M001001	mg/kg	0.69	UJ	Cadmium (Cd)	1.2	9.6	0.07
S02M001001	mg/kg	5.60		Chromium (Cr)	81	370	0.02
S02M001001	mg/kg	4.20		Copper (Cu)	34	270	0.02
S02M001001	mg/kg	7.90		Lead (Pb)	46.7	218	0.04
S02M001001	mg/kg	0.01	U	Mercury (Hg)	0.15	0.71	0.01
S02M001001	mg/kg	5.60	UJ	Nickel (Ni)	20.9	51.6	0.11
S02M001001	mg/kg	1.40	UJ	Silver (Ag)	1	3.7	0.38
S02M001001	mg/kg	21.00		Zinc (Zn)	150	410	0.05
				ERM Quotient Sum			0.73
S02M001001				Mean ERM Quotient			0.03
S02M001001				Mean ERM Quotient without ND			0.01
S02M001101	mg/kg	4.70	J	Arsenic (As)	8.2	70	0.07
S02M001101	mg/kg	1.30	UJ	Cadmium (Cd)	1.2	9.6	0.14
S02M001101	mg/kg	15.00		Chromium (Cr)	81	370	0.04
S02M001101	mg/kg	22.00		Copper (Cu)	34	270	0.08
S02M001101	mg/kg	17.00		Lead (Pb)	46.7	218	0.08
S02M001101	mg/kg	0.04		Mercury (Hg)	0.15	0.71	0.06
S02M001101	mg/kg	10.00	UJ	Nickel (Ni)	20.9	51.6	0.19
S02M001101	mg/kg	2.60	UJ	Silver (Ag)	1	3.7	0.70
S02M001101	mg/kg	37.00		Zinc (Zn)	150	410	0.09
				ERM Quotient Sum			1.45
S02M001101				Mean ERM Quotient			0.06
S02M001101				Mean ERM Quotient without ND			0.02

Notes:

ERL = Effects Range-Low
ERM = Effects Range-Median
J = Estimated Number
ND = Not Detected
U = Sample Quantitation Limit
VQUAL = Validation Qualifier

APPENDIX I

CH2MHILL TECHNICAL MEMORANDA

I.1 ZONE J TECHNICAL MEMORANDUM: EVALUATION OF POTENTIAL FOR CONTAMINANT RUNOFF FROM VARIOUS SWMUs AND AOCs VIA SHEET FLOW RUNOFF, CHARLESTON NAVAL COMPLEX

I.2 TECHNICAL MEMORANDUM: PROPOSED APPROACH FOR ADDRESSING DIOXIN (TEQ) IN SOILS AT THE CNC SITES.

APPENDIX I.1

ZONE J TECHNICAL MEMORANDUM: EVALUATION OF POTENTIAL FOR CONTAMINANT RUNOFF FROM VARIOUS SWMUs AND AOCs VIA SHEET FLOW RUNOFF, CHARLESTON NAVAL COMPLEX

Evaluation of Potential for Contaminant Runoff from Various SWMUs and AOCs Via Sheet Flow Runoff, Charleston Naval Complex

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Background and Purpose

The Charleston Naval Complex (CNC) Base Realignment and Closure Act (BRAC) Cleanup Team (BCT) is evaluating potential impacts to the water bodies in the vicinity of the CNC that may have been or are being caused by historical Navy-related operations at the CNC. Three water bodies adjacent to the CNC (Noisette Creek, Shipyard Creek, and the Cooper River) have been designated as Zone J for the purpose of the Resource Conservation and Recover Act (RCRA) Facility Investigation (RFI). The Navy/EnSafe Inc. (EnSafe) team is leading the overall Zone J RFI effort.

As part of the overall Zone J evaluation strategy, the Navy proposed to assess three potential migration scenarios through which a contaminant released from an upland site (solid waste management unit [SWMU] or area of concern [AOC]) at the CNC could migrate to Zone J. These three scenarios are as follows:

- Scenario 1: Transport to Zone J via a stormwater drainage pipeline.
- Scenario 2: Overland transport to Zone J via sheet flow (surface water runoff).
- Scenario 3: Transport to Zone J via groundwater-to-surface water discharge.

CH2M-Jones is providing support to the Navy/EnSafe team in their evaluation of Scenarios 2 and 3. This memorandum addresses Scenario 2: Overland transport to Zone J via sheet flow. This scenario applies to those portions of the CNC that are not served by the stormwater sewer system and contain SWMUs or AOCs.

The Navy/EnSafe team identified seven areas at the CNC to which Scenario 2 applies. Figure 1 shows the location of these areas.

This memorandum screens and evaluates surface soil samples in each of these seven areas to assess whether any chemicals in surface soil present an unacceptable risk to ecological receptors in the Zone J water bodies due to the potential migration via the Scenario 2 pathway (sheet flow runoff). The overall approach used for this screening is presented first, followed by an evaluation of each of the seven areas.

Tiered and Step-wise Evaluation Approach

No guidance is available for evaluating potential ecological impacts to water bodies from migration of surface soil via the sheet flow pathway. The existing guidance documents do not specify a methodology for evaluating the Scenario 2 pathway, other than qualitative discussions. CH2M-Jones developed a tiered evaluation process for this assessment by using a modified ecological risk assessment type of approach adapted to the Scenario 2 pathway. The first tier involves a two-step screening approach that compares analytical results of surface soil samples directly to sediment screening values and background or reference concentrations. Chemicals of potential concern (COPCs) that are retained after this initial screening step are considered further in the second tier evaluation. The second tier evaluation includes consideration of fate and transport factors and other aspects that influence whether surface soil could migrate via sheet flow so that potential impacts to the Zone J water bodies could occur. These evaluation processes are described in more detail in the following sections.

This evaluation process is considered conservative for several reasons. First, the surface soil is relatively stable at the site; no evidence of widespread and excessive surface soil erosion due to the Scenario 2 pathway has been observed at the areas of interest at the CNC. Secondly, soil particulates in surface water runoff tend to mix and dilute during migration and upon entry into surface water bodies, so the concentrations reaching the water bodies are expected to be lower than those measured in surface soil. In addition, significant sediment mixing within the water bodies, due to tidal forces and other factors such as dredging and the influx of sediments from other sources, provide for further attenuation and mixing of the sediments within the Zone J water bodies.

First Tier Evaluation – COPC Screening Process

Step 1 Screening

In Step 1 of the screening process, all analytical results for each surface soil sample within the areas of interest were compared to the U.S. Environmental Protection Agency (EPA) Region IV Sediment Screening Values (SSVs) and previously established CNC surface soil background or reference concentrations. Chemicals that exceeded either the SSV or background/reference concentrations were retained as COPCs. Chemicals that did not have an SSV were also retained as COPCs. Essential nutrients such as calcium, magnesium, potassium and sodium, which do not have screening criteria, were not included in the evaluation. Attachment A presents summary tables for this first screening step. Table A-1 in Attachment A contains all data for the samples and the screening values used. Table A-2 in Attachment A summarizes only the exceedances noted in Table A-1.

Step 2 Screening

In Step 2 of the screening process, average site concentrations of chemicals and secondary ecological screening values from sources typically recommended by EPA Region IV were considered. Specific sources for secondary screening values are specified in the footnotes of the tables in this memorandum. The sources include the consensus-based probable effect concentrations (PECs) (MacDonald et al., 2000b) and probable effects levels (PELs) presented by the Florida Department of Environmental Protection (FDEP). Effects range median (ERMs) were also considered (Long and Morgan 1990; Long et al. 1995). The final reference considered was the Dutch sediment screening values (MHSPE, 2000).

Hazard quotients (HQs) were calculated for each chemical, based on maximum and average concentrations. Four types of HQs were calculated to provide a range of comparisons to screening values. The HQs were based on maximum and average site detections compared to the primary and secondary screening values. The four HQs were calculated as follows:

- Primary Max. HQ = Maximum Concentration/Primary Screening Value (SSV)
- Primary Ave. HQ = Arithmetic Mean Concentration/Primary Screening Value (SSV)
- Secondary Max. HQ = Maximum Concentration/Secondary Screening Value
- Secondary Ave. HQ = Arithmetic Mean Concentration/Secondary Screening Value

An arithmetic average was calculated using all sample data for the particular area, specifically, the detected concentrations and one-half the detection limit for non-detects. If

the site average concentrations were equal to or less than the background or reference concentrations, the chemical was not retained as a COPC. If the resulting HQs were equal to or less than one, then the constituent was eliminated as a COPC. If an HQ was greater than one for a given constituent or if the concentrations exceeded background or reference concentrations, the COPCs were further assessed in the second tier evaluation.

Second Tier Evaluation – Fate and Transport Considerations

General Fate and Transport Concepts For Scenario 2

The pathway of concern for Scenario 2 is sheet flow runoff from SWMUs and AOCs that enters one of the Zone J water bodies. This runoff is considered a potential migration pathway for contamination primarily because of the potential for runoff to contain suspended solids derived from contaminated soil. The degree to which contaminated surface soil can become entrained in the sheet flow runoff and reach the Zone J water bodies must be accounted for, to some degree, in the evaluation of whether any surface soil chemicals of concern (COCs) exist for this pathway.

The degree to which surface soil can be eroded and contribute to the runoff pathway at a particular location is dependent on a variety of site-specific factors, including topography, soil type, climatological factors, and the nature of the surface cover present (such as pavement or vegetation). A complete discussion of these factors is beyond the scope of this memorandum; however, a few relevant points regarding some of these factors are presented below.

The presence of pavement over contaminated soil obviously reduces the potential for runoff to cause migration of contaminated soil. Vegetative cover also provides a significant stabilizing force that resists runoff erosional forces and reduces the amount of soil transported offsite in runoff. Even in areas where no vegetative cover is present, soil particulates may not be readily detached from the bulk soil matrix. The rainfall impact intensity or surface water velocity must be great enough to detach individual soil particles from the bulk soil. Forces resisting particle detachment are related to factors such as grain size, the angle of friction with surrounding grains, and the cohesive forces with which each grain adheres to the soil mass.

Climatological factors and precipitation patterns are also important in determining the degree to which surface soil contributes sediment to runoff. Not all rainfall events release sufficient precipitation to cause surface runoff. A significant portion of total precipitation does not become runoff; most precipitation is returned to the atmosphere via evaporation or evapotranspiration and some infiltrates into groundwater. Typically for unpaved areas, surface water runoff is expected to be on the order of 10 to 20 percent of total precipitation. Areas with flat topography or more permeable soils are in the low end of this range. For the Charleston area, which receives approximately 51 inches of rainfall per year, surface water runoff from unpaved areas at the CNC would be on the order of 5 to 10 inches per year, likely nearer the low end of this range due to its flat topography.

When a storm event provides adequate rainfall to cause surface runoff, suspended soil particles that are mobilized into the runoff are also subject to sedimentation forces. Some of the suspended soil particles may re-deposit in the soil prior to migrating offsite.

Because of these various factors that minimize the entrainment of surface soil particles into stormwater runoff, it is possible to have concentrations of chemicals in surface soil greater than SSVs without the surface soil posing a threat to Zone J ecological receptors.

The second tier evaluation of COPCs that were retained in the first tier screening considers factors that assess the degree to which surface soil at a particular surface soil location would likely contribute to the Scenario 2 pathway. These factors include the following:

- Type of surface cover present (i.e., pavement, vegetation);
- General topography;
- Magnitude of screening criteria exceedance;
- Frequency of detection;
- Geospatial distribution of contaminants and proximity to surface water bodies; and
- Relative potential contribution of sediment from the AOC compared to the overall sediment loads discharged into the water bodies from other sources.

This last factor, relative contribution of sediment from the site, is an important consideration since the sediments in surface runoff entering the Zone J water bodies become well mixed and dispersed by a variety of forces after entering the water bodies. Tidal currents, in

particular, redistribute sediments both during the discharge of runoff and during subsequent tidal cycles.

EnSafe presented the following information at a recent BCT meeting regarding the approximate sediment loads entering the various Zone J water bodies from various sources within the watersheds:

- Cooper River - 700,000 lb/yr (288 cubic yards)
- Noisette Creek - 890,000 lb/yr (366 cubic yards)
- Shipyard Creek - 580,000 lb/yr (239 cubic yards)

Because of the small size of the areas to which Scenario 2 applies in relation to the Zone J water body water sheds, the relative amount of sediment contributed in runoff from these sites is small. Where appropriate, order-of-magnitude estimates of the amount of sediment potentially present in the runoff from specific areas of interest can be developed, which can be compared to the overall sediment load from other sources or in the area to gauge the general degree of relative contribution of the area of interest.

Site by Site COPC Screening and Evaluation

Area 1 – SWMUs 1 and 2 Area, Zone A

Figure 2 shows the drainage area and the surface soil sample locations evaluated in the vicinity of SWMUs 1 and 2 for Scenario 2. Runoff from this area drains eastward into the Cooper River.

Site Status

Located in the northeast corner of Zone A, SWMU 2 consists of a former salvage bin and adjacent paved surface at the former Defense Reutilization Marketing Office (DRMO). The area was formerly used to store recovered lead from lead-acid submarine batteries from the mid-1960s until 1984. SWMU 1 is located completely within the SWMU 2 boundary, and the two sites have been investigated together.

SMWUs 1 and 2 have been the focus of several IMs, in which lead-impacted soil was excavated and removed from the site for offsite disposal. The site was remediated to a

condition appropriate for unrestricted land use and has been granted No Further Action (NFA) status. No soil COCs are identified for this area based on human exposure concerns.

Tier 1 Screening of Surface Soil Samples

The surface soil samples were previously analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, pesticides, polychlorinated biphenyls (PCBs) and cyanide during the RFI. Based on exceedances of the SSV and/or the Zone A maximum background concentration (as shown in Table A-1 in Attachment A), 13 metals were retained as COPCs and carried to Step 2.

Table 1 presents the results of the Step 2 screening. Aluminum, barium, beryllium, iron, manganese, selenium and vanadium do not have primary screening values (Region IV SSVs). Additionally, beryllium, iron, selenium and vanadium do not have secondary screening values. Therefore, the respective HQs were not be calculated for these chemicals.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for cadmium, copper, lead, nickel and zinc. Among these chemicals, the primary average HQ of 1.0 is not exceeded for cadmium, nickel and zinc, indicating that the average concentrations for these chemicals is below the primary screening values. These chemicals are therefore not considered COPCs. Chromium did not exceed the primary maximum HQ of 1.0, and is not considered a COPC.

Exceedances of the Secondary HQ of 1.0: Chemicals exceeding the primary maximum and average HQs of 1.0 are copper and lead. The secondary maximum HQs for these chemicals calculated using the secondary screening values also exceed 1.0. However, the secondary average HQs for these chemicals do not exceed 1.0, indicating that the overall contribution to offsite sediments will not be above the secondary screening values.

Exceedances of the Background: Although the maximum concentrations of all the chemicals for this area exceed the respective maximum Zone A background concentration, none of the average concentrations exceed the respective maximum Zone A background concentrations, indicating that the detected chemical concentrations are similar to background conditions and pose no more ecological risk than the background soils in this area of CNC.

Conclusions for Area 1

Based on the above observations, no COPCs are identified for this area after the Tier 1 screening. A Tier 2 evaluation was not required.

Area 2 – SWMU 42, Zone A

Figure 3 shows the drainage area and the surface soil sample locations evaluated at SWMU 42. Runoff flows towards the southwestern portion of this area and discharges into Noisette Creek.

Site Status

SWMU 42, a former asphalt plant, is located in the southwest corner of Zone A. The plant operated from 1947 until 1962 and has since been demolished. An IM was implemented at SWMU 42 to remove arsenic- and benzo(a)pyrene equivalent (BEQ)-contaminated soils to levels that would allow the site to be classified for unrestricted (residential) land use. Following completion of this IM and submittal of various RCRA documents, the site has been granted NFA status. No soil COCs are identified for this site based on human exposure concerns.

Tier 1 Screening of Surface Soil Samples

Surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide during the RFI. Among samples included in this evaluation, metals and SVOCs were retained as COPCs based on exceedances of either the SSV, the Zone A maximum background concentration for inorganics, or the CNC base-wide background reference concentrations for polycyclic aromatic hydrocarbons (PAHs) (as shown in Table A-1 in Attachment A). Based on this screening, 10 metals and 10 PAHs were retained as COPCs for further evaluation.

Inorganics Evaluation

Table 2 shows the COPCs retained after Step 1 and the comparison with screening values. Barium, beryllium, manganese, selenium and vanadium do not have primary screening values. Additionally, beryllium, selenium, and vanadium do not have secondary screening values. Therefore, the respective HQs were not calculated for these chemicals.

<u>Exceedances of the Primary HQ of 1.0:</u> Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for arsenic, copper, lead, mercury and zinc. Among these chemicals, the primary average HQ of 1.0 is not exceeded for zinc, indicating that the average concentrations for zinc are below the primary screening values. Therefore, zinc is not considered a COPC.

<u>Exceedances of the Secondary HQ of 1.0:</u> Chemicals exceeding the primary maximum and average HQs of 1.0 are arsenic, copper, lead and mercury. Among these, arsenic and lead exceed the secondary maximum HQ of 1.0. However, the secondary average HQs for these

chemicals do not exceed 1.0, indicating that the average concentrations of these chemicals do not exceed the secondary screening values.

Exceedances of the Background: The maximum concentrations of all the inorganic chemicals, except selenium, exceed the respective maximum Zone A background concentration. However, the average concentration only for lead exceeds the maximum Zone A background concentration, indicating that, with the exception of lead, the detected inorganic chemical concentrations are similar to background conditions and pose no more ecological risk than the background soils in this area of CNC. The secondary average HQ for lead does not exceed 1.0. Therefore, lead is not considered a COPC.

No inorganic chemicals have been identified as COPCs in this area based on the Tier 1 screening. A Tier 2 evaluation was not required for inorganic chemicals.

Organics Evaluation

Among the 10 organics identified as COPCs, benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-c,d)pyrene do not have primary or secondary screening values. Therefore, the respective HQs were not calculated for these chemicals and their concentrations were compared with the background concentrations.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, phenanthrene, and pyrene. Among these chemicals, the primary average HQ of 1.0 is not exceeded for dibenz(a,h)anthracene, indicating that the average concentrations for dibenz(a,h)anthracene are below the primary screening values. Therefore, dibenz(a,h)anthracene is not considered a COPC.

Exceedances of the Secondary HQ of 1.0: Chemicals exceeding the primary maximum and/or average HQs of 1.0 are benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, phenanthrene and pyrene. Among these, fluoranthene, phenanthrene and pyrene exceed the secondary maximum HQ of 1.0. However, the secondary average HQs for these chemicals do not exceed 1.0, indicating that the average concentrations of these chemicals do not exceed the secondary screening values.

Exceedances of the Background: For PAHs at CNC, the CNC BCT has agreed to use a value of 2 times the arithmetic mean for PAH concentrations from the base-wide grid samples. The arithmetic mean concentration calculations for these PAHs include non-detects at half the detection limit. The maximum concentrations of all the organic chemicals except

dibenz(a,h)anthracene exceed the respective maximum CNC sitewide reference concentration for PAHs. However, the average concentrations only for benzo(b)fluoranthene and fluoranthene exceed the CNC sitewide reference concentration for PAHs indicating that with the exception of these two chemicals, the other detected organic chemical concentrations are similar to background conditions, and pose no more ecological risk than the background soils in this area of CNC. Of these two chemicals, the secondary average HQ for fluoranthene does not exceed 1.0. Therefore, it is not considered a COPC.

Based on the Tier 1 screening, only benzo(b)fluoranthene is identified as a COPC.

Tier 2 Fate and Transport Evaluation

The average concentration for benzo(b)fluoranthene of 0.703 mg/kg is only slightly higher than the CNC base-wide reference concentration of 0.608 mg/kg. This average includes an elevated detection of 3.4 mg/kg of benzo(b)fluoranthene at A042SB010, which is approximately 45 feet from Noisette Creek but is approximately 110 feet from the location at which runoff discharges into the creek. The average calculation without this result included is 0.37 mg/kg, below the CNC base-wide reference concentration of 0.608 mg/kg.

The topography of the site where boring A042SB010 was installed is relatively flat. This sample location is located along the unpaved roadway that enters the southern portion of this site.

An area south of this boring location was excavated as part of an IM conducted by the Navy/CH2M-Jones team during 2001. The BEQ exposure concentration for this area was included in the *Corrective Measures Study Work Plan/Interim Measure Completion Report for SWMU 42/AOC 505, Zone A* (CH2M-Jones, 2002; see Figure 7-5) and was 1.287 mg/kg, which is below the CNC base-wide BEQ reference concentration for surface soil of 1.304 mg/kg.

Two surface soil samples (A042SB019 and A042SB043) are located downgradient of sample A042SB010, along the surface water runoff flowpath towards Noisette Creek. Concentrations of benzo(b)fluoranthene in these two samples are 0.25 J and 0.37 U mg/kg, respectively, indicating that benzo(b)fluoranthene is not migrating in this area towards the creek via surface water runoff. Thus the elevated detection of benzo(b)fluoranthene is limited to a single sample location and is not migrating.

Based on these observations and discussion, benzo(b)fluoranthene is not considered a COPC at this site.

Conclusions for Area 2

Based on the above observations, no COPCs are identified for this area.

Area 3 – SWMUs 21 and 54, Zone E

Figure 4 shows the drainage area and the surface soil sample locations evaluated in the vicinity of SWMUs 21 and 54. Runoff in this area flows into the Cooper River.

Site Status

SWMU 21, the Old Paint Storage Area, consists of a 20-foot by 180-foot concrete pad constructed in 1942 for welding operations. Beginning in 1973, the slab was used for storage of containerized paint wastes from ship repair and overhaul operations.

SWMU 54, the Former Abrasive Blasting Area, consists of the unpaved area around SWMU 21. The site was used for abrasive blasting of ship components and hull sections. Ship components, including anchor chains, were also painted in this area. SWMU 21 is located completely within the boundary of SWMU 54.

The RFI surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide. Several IMs have been performed at the site to remove blast media and surface and subsurface soil. The RFI has been completed, with no soil COCs identified for the industrial or unpaved land use scenario. Several metals in groundwater were retained as COCs and a CMS is being prepared to address these COCs.

Tier 1 Screening of Surface Soil Samples

As a result of the IMs for soil removal completed after the RFI field investigation, many of the surface soil sampling locations sampled during the RFI phase have been removed from the site. Therefore, only those surface soil samples collected after the IMs (which represent current site conditions) were evaluated for Scenario 2.

For samples included in this evaluation, six metals and seven SVOCs were retained as COPCs based on exceedances of either the SSV, the Zone E maximum background concentration for inorganics, or the CNC base-wide background reference concentrations for PAHs (as shown in Table A-1 in Attachment A).

Inorganics Evaluation

Table 3 shows the COPCs retained after Step 1 and the comparison with screening values. Beryllium does not have primary or secondary screening values. Therefore, the respective

HQs were not calculated for beryllium. Beryllium concentrations were compared with the maximum Zone E surface soil background concentrations.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for cadmium, lead, mercury and zinc. Among these chemicals, the primary average HQ of 1.0 is not exceeded for cadmium, indicating that the average concentration for cadmium is below the primary screening values. Therefore, cadmium is not considered a COPC. Antimony did not exceed the primary maximum HQ of 1.0 and is not considered a COPC.

Exceedances of the Secondary HQ of 1.0: Chemicals exceeding the primary maximum and average HQs of 1.0 are lead, mercury and zinc. Among these, lead and zinc exceed the secondary maximum HQ and the secondary average HQs of 1.0. Mercury does not exceed the secondary average HQ of 1.0 and is not considered a COPC.

Exceedances of the Background: The maximum concentrations of all the inorganic chemicals exceed the respective maximum Zone E background concentration. However, none of the average concentrations exceeds the respective maximum Zone E background concentration, indicating that detected inorganic chemical concentrations are similar to background conditions and pose no more ecological risk than the background soils in this area of CNC.

No inorganic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Organics Evaluation

Among the seven organics identified as COPCs, benzo(b)fluoranthene does not have primary or secondary screening values. Therefore, the respective HQs were not calculated for this chemical.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for the detected PAHs: benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, and pyrene. Among these chemicals, the primary average HQ of 1.0 is not exceeded for benzo(a)pyrene and phenanthrene, indicating that the average concentrations for these two chemicals are below the primary screening values. Therefore, benzo(a)pyrene and phenanthrene are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: Chemicals exceeding the primary maximum and average HQs of 1.0 are benzo(a)anthracene, chrysene, fluoranthene and pyrene. Among these, fluoranthene and pyrene exceed the secondary maximum HQ of 1.0. However, the

secondary average HQs for these chemicals do not exceed 1.0, indicating that the average concentrations of these chemicals do not exceed the secondary screening values. Benzo(b)fluoranthene has no secondary screening value and was compared with the CNC sitewide reference concentration.

Exceedances of the Background: The maximum concentrations of all the organic chemicals exceed the respective maximum CNC sitewide reference concentration for PAHs, but none of the average concentrations exceeds the CNC sitewide reference concentration for PAHs, indicating that the detected organic chemical concentrations are similar to background conditions and pose no more ecological risk than the background soils in this area of CNC.

No organic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Conclusions for Area 3

Based on the above observations, no COPCs are identified for this area after the Tier 1 screening. A Tier 2 evaluation is not required.

Area 4 – SWMU 9, Zone H

Figure 5 shows the drainage area and the surface soil sample locations evaluated in the vicinity of SWMU 9. The area of interest for the Scenario 2 pathway is located along the western (near SWMU 121) and southwestern landfill boundary. Runoff from this area flows into Shipyard Creek.

Site Status

SWMU 9 is the location of the old landfill. The SWMU 9 landfill was used for the disposal of industrial and domestic solid waste generated at the CNC from the 1930s until the early 1970s. The landfill contains primarily municipal, solid waste-type, as well as industrial solid wastes. The landfill was closed by placing a soil cover over the landfill area in the late 1970s.

The RFI has been completed at SWMU 9. A draft CMS has been submitted to SCDHEC, comments from SCDHEC have been received, and draft responses to these comments have been provided and discussed with SCDHEC. A revised CMS is being prepared.

Tier 1 Screening of Surface Soil Samples

The RFI surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide. Among samples included in this evaluation, metals, SVOCs and pesticides were retained as COPCs based on exceedances of the SSV, the Zone H maximum background concentration for inorganics, or the CNC base-wide background

reference concentrations for PAHs (as shown in Table A-1 in Attachment A). Based on this screening, 17 metals, 12 PAHs, 2 pesticides and 3 PCBs were retained as COPCs for further evaluation.

Inorganics Evaluation

Table 4 shows the COPCs retained from Step 1 and the comparison with screening values. Barium, beryllium, cadmium, cobalt, iron, nickel, selenium, thallium and vanadium do not have primary screening values. Beryllium, cadmium, cobalt, iron, selenium, thallium and vanadium do not have secondary screening values. Therefore, the respective HQs were not calculated for these chemicals, and concentrations of these chemicals were compared with the maximum Zone H surface soil background concentrations.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for arsenic, chromium, copper, lead, mercury and zinc. Among these chemicals, the primary average HQ only for arsenic and chromium is below 1.0, indicating that the average concentrations for these two metals chemicals is below the primary screening values. Therefore, arsenic and chromium are not considered COPCs. Antimony and silver did not exceed the primary maximum HQ of 1.0 and are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: Among the chemicals exceeding the primary maximum and/or average HQs of 1.0, barium, chromium, copper, lead, mercury and zinc exceed the secondary maximum HQ. Among these, copper, lead and zinc exceed the secondary average HQ of 1.0. Those without screening values were compared with the appropriate surface soil background concentrations.

Exceedances of the Background: The maximum concentrations of all the inorganic chemicals exceed the respective maximum Zone H background concentration. The average concentrations for several inorganic chemicals exceed the respective maximum Zone H background concentration as shown in Table 4. However, with the exception of beryllium, copper, lead, and zinc, the secondary average HQ for these chemicals do not exceed 1.0, and these chemicals are not considered COPCs.

Based on the Tier 1 screening, beryllium, copper, lead, and zinc are retained as COPCs.

Organics Evaluation

Among the 12 SVOCs, 2 pesticides, and 3 PCBs identified as COPCs from Step 1, benzo(b)fluoranthene does not have primary or secondary screening values. Therefore, the primary and secondary HQs were not calculated for this chemical.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 was exceeded for all chemicals. Benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(c,d)pyrene do not have primary or secondary screening values and were compared with the CNC base-wide PAH background average concentrations. The primary average HQ of 1.0 was exceeded for benzo(a)pyrene, chrysene, fluoranthene, phenanthrene, pyrene, gamma-chlordane, Aroclor 1248, Aroclor 1254, and Aroclor 1260. Those that did not exceed the primary average HQ of 1.0 are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: Benzo(a)anthracene, benzo(a)pyrene, fluoranthene, phenanthrene, pyrene, Aroclor 1254, and Aroclor 1260 exceed the secondary maximum HQ of 1.0. However, none of these chemicals exceeds the secondary average HQ of 1.0, and these chemicals are not considered COPCs.

Exceedances of the Background: For PAHs at CNC, the CNC BCT has agreed to use a value of 2 times the arithmetic mean for PAH concentrations from the base-wide grid samples. The arithmetic mean concentration calculations for these PAHs include non-detects at half the detection limit. In order to generate comparable reference concentrations for dieldrin and gamma-chlordane, this same process was followed, using the surface soil grid samples collected during the RFI. The maximum concentrations of PAHs exceed their respective CNC sitewide reference concentration. Of the PAHs , only the average benzo(b)fluoranthene concentration exceeds its CNC sitewide reference concentration. Therefore, it is retained as a COPC for this step.

Tier 2 Fate and Transport Evaluation

Four metals (beryllium, copper, lead, and zinc) were identified as COPCs after the Tier 1 screening. Benzo(b)fluoranthene was the only organic chemical identified as a COPC after the Tier 1 screening. These chemicals are further evaluated below.

Metals

The four metals identified as COPCs from the Tier 1 screening occur in surface soil samples in the vicinity of SWMU 121, in an area approximately 200-foot by 200-foot (about 1 acre). This area is relatively flat and unpaved, with sparse to moderate vegetative cover. Samples with elevated metals concentrations are located approximately 80 to 250 ft from Shipyard Creek. Given the flat topography and distance from the creek, sustained and significant rainfall events would be required to create conditions adequate for suspended solids transport in runoff via Scenario 2.

An order-of-magnitude estimate of the potential sediment load in runoff from this area can be estimated, using typical runoff values and factors. Assuming an annual runoff value of 10 inches per year (a conservatively high assumption, since the area is flat and unpaved) and a total suspended solids concentration of up to 200 mg/L (based on conservative literature values for runoff), the total sediment load that would be generated from this 1 acre area of interest would be approximately 450 lb/yr. By comparison, the total estimated sediment load to Shipyard Creek is 580,000 lb/yr. The estimated sediment load from the area of interest would be less than 0.1 percent (less than one-one thousandth) of the total sediment load entering Shipyard Creek. The sediment entering Shipyard Creek from the area of interest would be expected to experience a dilution on the order of several orders of magnitude after entering the creek.

Based on these considerations, the metal concentrations do not appear great enough to cause impacts to Shipyard Creek via the Scenario 2 pathway.

Organics

There is no primary or secondary screening value for benzo(b)fluoranthene. The average benzo(b)fluoranthene concentration in these samples is 0.62 mg/kg, only slightly above its CNC base-wide PAH reference concentration of 0.61 mg/kg, indicating that the detected organic chemical concentrations are similar to background conditions and pose no more ecological risk than the background soils in this area of CNC.

Based on these considerations, benzo(b)fluoranthene is not retained as a COPC.

Conclusions for Area 4

Based on the above observations, no COPCs are identified for this drainage basin after the Tier 2 evaluation.

Area 5 – SWMU 196, Zone H

Figure 6 shows the drainage area and the surface soil sample locations evaluated in the vicinity of SWMU 196. Runoff from this area flows into Shipyard Creek.

Site Status

SWMU 196 is located in the southern section of the former public works storage yard, which includes Building 1838. Building 1838 was constructed in 1979 and is currently being leased by the Commissioner of Public Works (CPW) of the City of Charleston, South Carolina, for miscellaneous equipment storage. This area was formerly tidal marsh land and has been

filled to its present elevation. The fill area drops off steeply to the east of the building toward Shipyard Creek.

The RFI has been generally completed at SWMU 196, although some additional evaluation of deep groundwater may be implemented. No soil COCs were identified for this site.

Tier 1 Screening of Surface Soil Samples

The RFI surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide. Among samples included in this evaluation, metals, SVOCs and pesticides were retained as COPCs based on exceedances of the SSV, the Zone H maximum background concentration for inorganics, or the CNC base-wide background reference concentrations for PAHs (as shown in Table A-1 in Attachment A). Based on this screening, 10 metals, 8 PAHs, 3 pesticides and 2 PCBs were retained as COPCs for further evaluation.

Inorganics Evaluation

Table 5 shows the COPCs and the comparison with screening values. Barium, cobalt, and vanadium do not have primary screening values. Cobalt, and vanadium do not have secondary screening values. Therefore, the respective HQs were not calculated for these chemicals, and concentrations of these chemicals were compared with the respective maximum Zone H surface soil background concentrations.

<u>Exceedances of the Primary HQ of 1.0:</u> Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for antimony, cadmium, copper, lead, nickel, silver and zinc. Among these chemicals, the primary average HQ of 1.0 is exceeded for copper, lead, nickel and zinc. The primary average HQ of 1.0 is not exceeded for antimony, cadmium and zinc, and these chemicals are not considered COPCs.

<u>Exceedances of the Secondary HQ of 1.0:</u> Among the chemicals exceeding the primary maximum and/or average HQs of 1.0, antimony, barium, lead, nickel and zinc exceed the secondary maximum HQ. None of the inorganic chemicals with primary and secondary screening values exceeds the secondary average HQ of 1.0. Those without primary or secondary screening values were compared with the appropriate surface soil background concentrations.

<u>Exceedances of the Background:</u> The maximum concentrations of all the inorganic chemicals exceed the respective maximum Zone H background concentration. The average concentrations exceeds the respective maximum Zone H background concentration for

antimony and copper. However, the secondary average HQ for antimony and copper do not exceed 1.0, and these chemicals are not considered COPCs.

No inorganic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Organics Evaluation

Among the eight PAHs, three pesticides and two PCBs identified initially as COPCs, benzo(b)fluoranthene and benzo(k)fluoranthene do not have primary or secondary screening values. Therefore, the primary and secondary HQs were not calculated for these chemicals.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 was exceeded for all chemicals. Benzo(b)fluoranthene and benzo(k)fluoranthene do not have primary or secondary screening values, and were compared with the CNC base-wide PAH background average concentrations. The primary average HQ of 1.0 was exceeded for alpha-chlordane, gamma-chlordane, PCB Aroclor 1254 and PCB Aroclor 1260. Those that did not exceed the primary or secondary average HQ of 1.0 are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: Chemicals exceeding the secondary maximum HQ of 1.0 are pyrene, alpha-chlordane, and gamma-chlordane. None of these exceeds the secondary average HQ of 1.0, and is therefore not considered a COPC.

Exceedances of the Background: For PAHs at CNC, the CNC BCT has agreed to use a value of 2 times the arithmetic mean for PAH concentrations from the base-wide grid samples as reference concentrations for PAHs and BEQs. The arithmetic mean concentration calculations for these PAHs include non-detects at half the detection limit. In order to generate comparable reference concentrations for alpha- and gamma-chlordane, this same process was followed, using the surface soil grid samples collected during the RFI. These calculated reference concentrations are included in Table 5. None of the maximum or average concentrations of the organic chemicals exceeds the respective CNC sitewide reference concentration for PAHs or pesticides.

No organic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Conclusions for Area 5

Based on the above observations, no COPCs are identified for this area after the Tier 1 screening. A Tier 2 evaluation is not required.

Area 6 – SWMU 177, Zone I

Figure 7 shows the drainage area and the surface soil sample locations evaluated in the vicinity of SWMU 177. Runoff from this area flows into the Cooper River.

Site Status

SWMU 177/RTC consisted of two adjacent buildings, both designated as Building RTC-4. The original RTC-4 was a 24-foot by 60-foot metal structure used to house heavy equipment, including backhoes and trackhoes. The designation RTC-4 was also given to the newer building, which was constructed next to the original RTC-4. The newer RTC-4 was used to store lawn mowers and other lawn maintenance equipment. This unit was designated as a SWMU due to oil spillage associated with operations at the two buildings. Visual inspections during the RFA identified several areas of stained soil and concrete in and around the two buildings. These buildings were both less than 50 feet from the Cooper River.

The RFI has been completed and the site has been granted NFA status. No COCs were identified for this site. Most of the site is paved and most of the samples evaluated for the Scenario 2 pathway are beneath pavement.

Tier 1 Screening of Surface Soil Samples

Surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide during the RFI. Among samples included in this evaluation, nine SVOCs and two pesticides were retained as COPCs based on exceedances of either the SSV or the CNC base-wide background reference concentrations for PAHs (as shown in Table A-1 in Attachment A). Based on this screening, nine PAHs and two pesticides were retained as COPCs for further evaluation.

Organics Evaluation

Table 6 shows the COPCs and the comparison with screening values. Among the nine PAHs and two pesticides identified initially as COPCs, benzo(b)fluoranthene and benzo(k)fluoranthene do not have primary or secondary screening values. Therefore, the primary and secondary HQs were not calculated for these chemicals.

<u>Exceedances of the Primary HQ of 1.0:</u> Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 was exceeded for benzo(a)anthracene, benzo(a)pyrene, chrysene, pyrene, alpha-chlordane and gamma-chlordane. Benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-c,d)pyrene do not have

primary or secondary screening values and were compared with the CNC base-wide PAH background average concentrations. The primary average HQ of 1.0 was exceeded for fluoranthene and pyrene. Those that did not exceed the primary or secondary average HQ of 1.0 are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: Pyrene, alpha-chlordane and gamma-chlordane are the only chemicals exceeding the secondary maximum HQ of 1.0. None of the organic chemicals exceeds the secondary average HQ of 1.0. Therefore, no organic chemicals are identified as COPCs.

Exceedances of the Background: For PAHs at CNC, the CNC BCT has agreed to use a value of 2 times the arithmetic mean for PAH concentrations from the base-wide grid samples as a background concentration. The arithmetic mean concentration calculations for these PAHs include non-detects at half the detection limit. None of the maximum or average concentrations of the organic chemicals exceeds the respective background concentration for PAHs.

No organic chemicals have been identified as COPCs in this area.

Conclusions for Area 6

Based on the above observations, no COPCs are identified for this area after the Tier 1 screening. A Tier 2 evaluation is not required.

Area 7 – AOC 690, Zone I

Figure 8 shows the drainage area and the surface soil sample locations evaluated in the vicinity of AOC 690. Runoff from this area flows into Shipyard Creek.

Site Status

AOC 690 consists of the network of roadways at the southern tip of CNC. Roads included in this AOC are West Road, Lunsford Loop, and a portion of Juneau Avenue. The roadside area along these dirt roads, totaling approximately 4,500 feet, are reported as possible locations where historical, unauthorized chemical dumping by ship personnel may have occurred. Shipyard Creek and an associated salt marsh are immediately adjacent to this AOC.

The RFI has been completed and the site has been granted NFA status. No COCs were identified for the site.

Tier 1 Screening of Surface Soil Samples

Surface soil samples were analyzed for VOCs, SVOCs, metals, herbicides, pesticides, PCBs and cyanide during the RFI. Among samples included in this evaluation, inorganics, SVOCs and pesticides were retained as COPCs based on exceedances of either the SSV or the CNC base-wide background reference concentrations for PAHs (as shown in Table A-1 in Attachment A). Based on this evaluation, 11 metals, 11 PAHs, and 3 pesticides were retained as COPCs for further evaluation.

Inorganics Evaluation

Table 7 shows the COPCs and the comparison with screening values. Barium, beryllium, manganese, selenium, and tin do not have primary screening values. Beryllium, selenium and tin do not have secondary screening values. Therefore, the respective HQs were not calculated for these chemicals, and concentrations of these chemicals were compared with the respective maximum Zone I surface soil background concentrations.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 is exceeded for arsenic, chromium, mercury, nickel and zinc. The primary average HQ of 1.0 is not exceeded for any of the inorganic chemicals. None of the inorganic chemicals is considered a COPC.

Exceedances of the Secondary HQ of 1.0: Among the chemicals exceeding the primary maximum and/or average HQs of 1.0, only chromium exceeds the secondary maximum HQ, but not the secondary average HQ of 1.0. None of the inorganic chemicals with primary and secondary screening values exceeds the secondary average HQ of 1.0. Those without primary or secondary screening values were compared with the appropriate surface soil background concentrations.

Exceedances of the Background: With the exception of barium and mercury, the maximum concentrations of all the inorganic chemicals exceed the respective maximum Zone I background concentration. The average concentration does not exceed the respective maximum Zone I background concentration for any of the inorganic chemicals.

No inorganic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Organics Evaluation

Among the 11 PAHs and 3 pesticides identified initially as COPCs, benzo(b)fluoranthene and benzo(k)fluoranthene do not have primary or secondary screening values. Dibenz(a,h)anthracene does not have secondary screening values. Therefore, the respective primary and/or secondary HQs cannot be calculated for these chemicals.

Exceedances of the Primary HQ of 1.0: Among those chemicals with a primary screening value, the primary maximum HQ of 1.0 was exceeded for all chemicals except chlordane and endrin. Benzo(b)fluoranthene and benzo(k)fluoranthene do not have primary or secondary screening values and were compared with the CNC base-wide PAH background average concentrations. The primary average HQ of 1.0 was exceeded for 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, naphthalene, phenanthrene, and pyrene. Those that did not exceed the primary or secondary average HQ of 1.0 are not considered COPCs.

Exceedances of the Secondary HQ of 1.0: 2-methylnaphthalene, fluoranthene, and pyrene exceed the secondary maximum HQ of 1.0. None of the organic chemicals exceeds the secondary average HQ of 1.0. Therefore, no organic chemicals are identified as COPCs.

Exceedances of the Background: None of the average concentrations of the organic chemicals exceeds the respective background concentration for PAHs, indicating that the concentrations of surface soil organic chemicals in this area are similar to background.

No organic chemicals have been identified as COPCs in this area after the Tier 1 screening.

Conclusions for Area 7

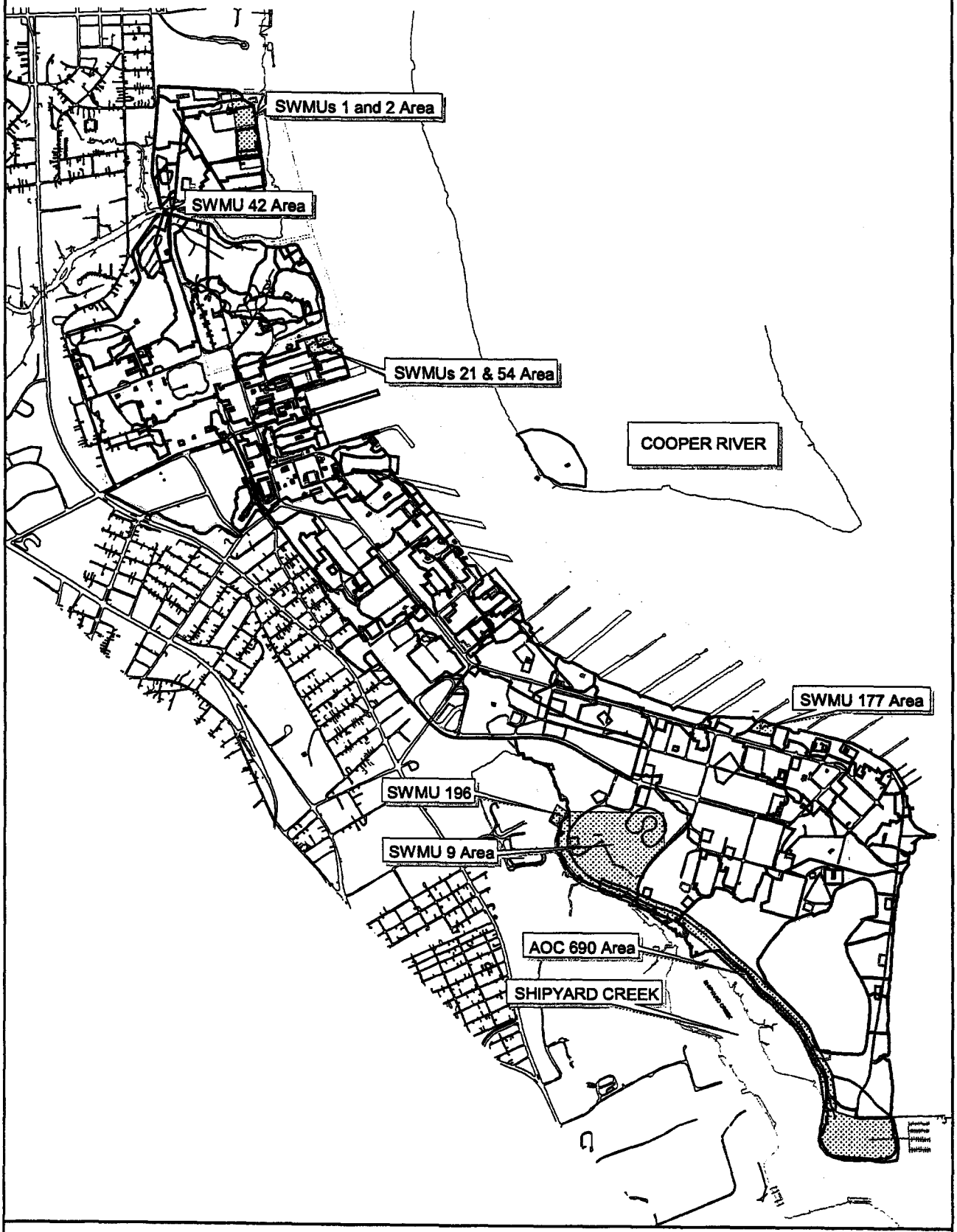
Based on the above observations, no COPCs are identified for this area after the Tier 1 screening. A Tier 2 evaluation is not required.

Summary and Conclusions

Seven areas of the CNC were identified as locations where stormwater sheet flow runoff could cause migration of contamination into the Zone J water bodies at the CNC. To assess the migration potential via the sheet flow pathway, surface soil samples in each of these areas were evaluated using a conservative two-tiered approach.

Based on the results of this evaluation, none of the seven areas evaluated for the Scenario 2 pathway have levels of contamination that are expected to cause unacceptable impacts to the Zone J water bodies via stormwater sheet flow runoff.

Figures



Zone J Drainage Basins

N

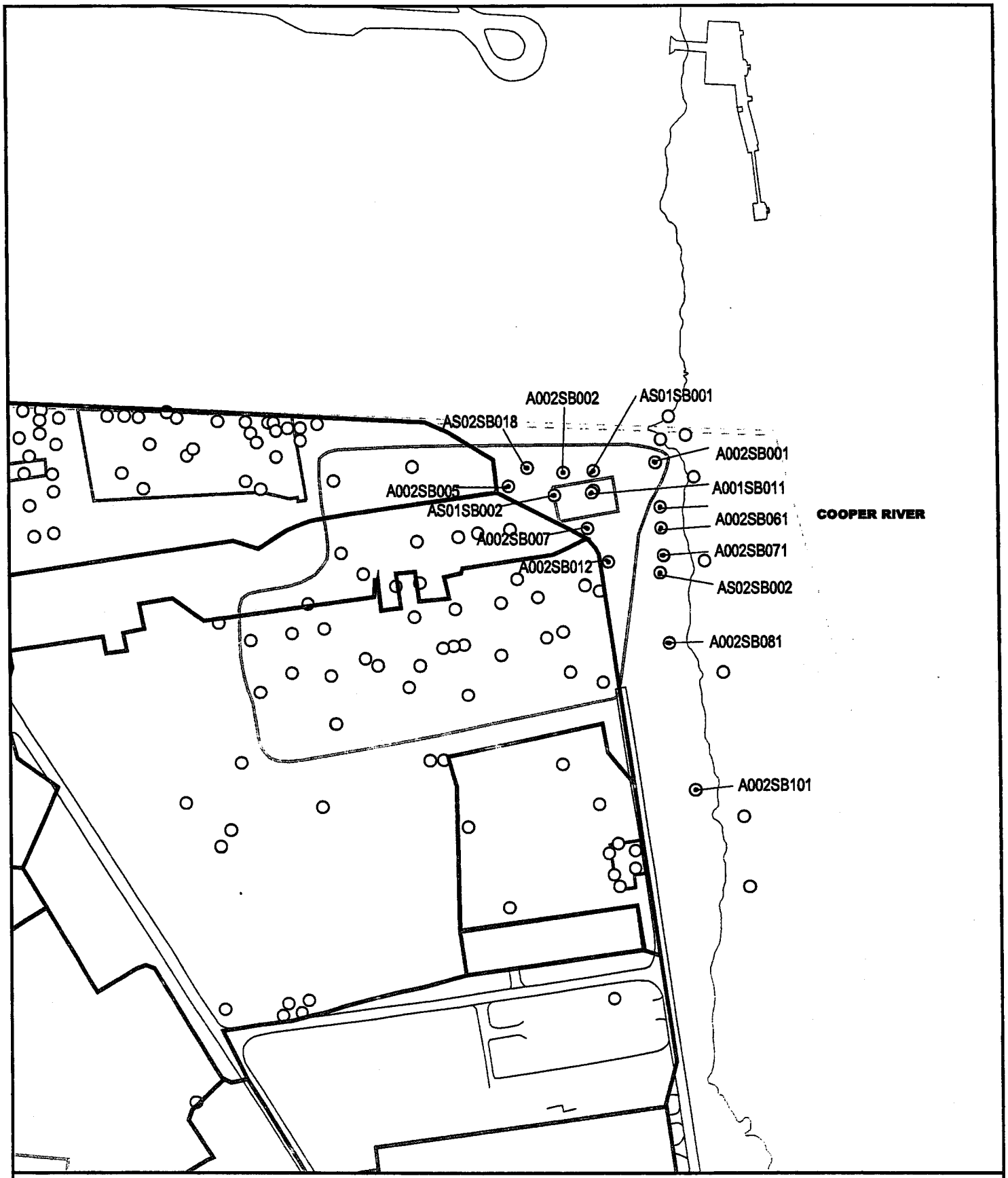
0 1000 2000 Feet

1 inch = 1513 feet

Figure 1
Zone J Drainage Basins
Chosen for Sediment Screening
Charleston Naval Complex

File Path: c:\16gis\cnc\cns-sgls.apr, Date: 11 Oct 2003 10:32, User: SNASK1, EGIS: Charleston Naval Complex - Figure 1 Map Title

CH2MHILL



Surface Soil Locations Selected For Screening
Zone J Drainage Basins
RFI Surface Soil Sample Location
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 200 400 Feet

1 inch = 252 feet

Figure 2
Soil Boring Locations Selected for Screening
SWMUs 1 and 2, Zone A
Charleston Naval Complex

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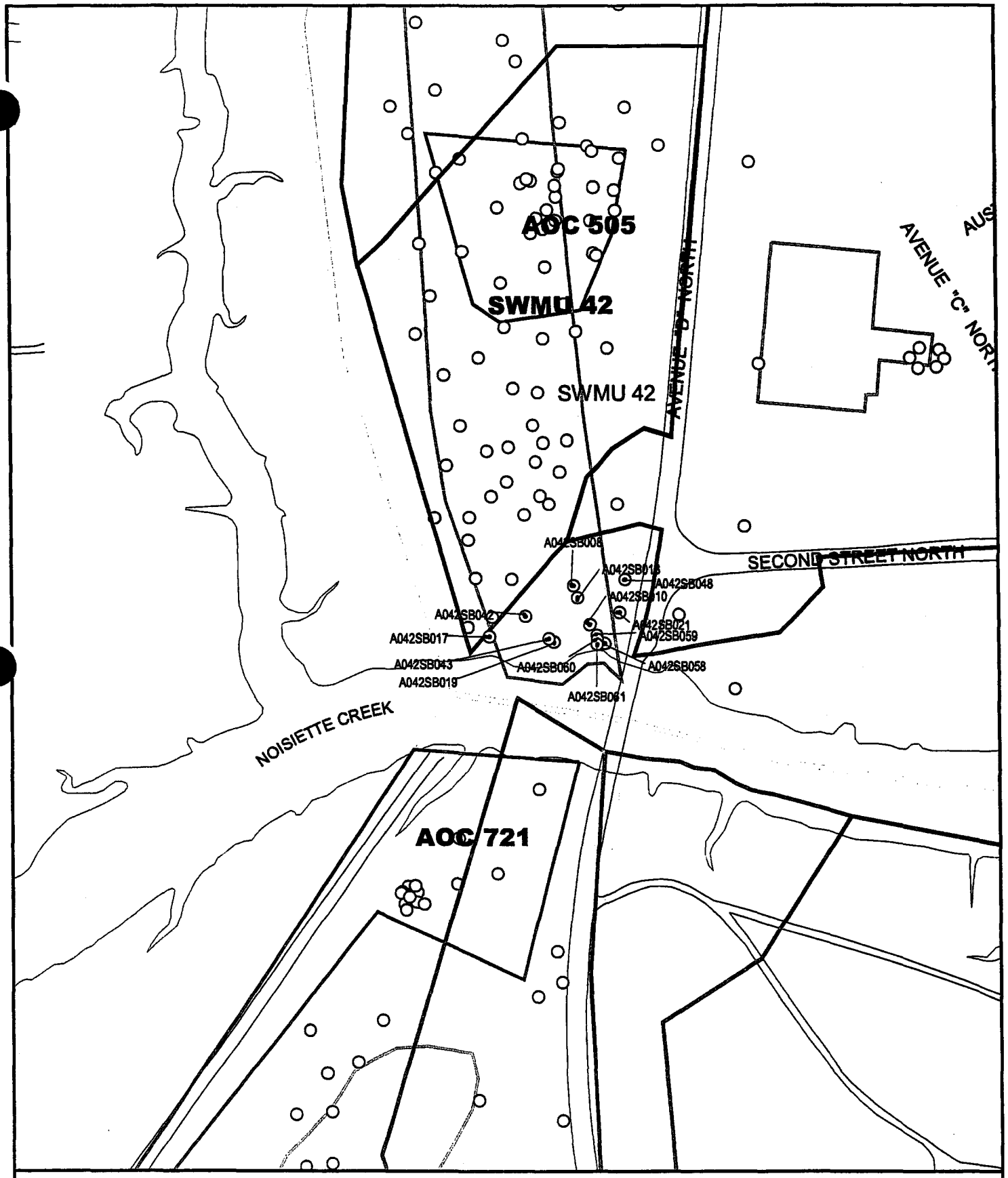
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 8:44, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 2 Soil Boring Locations Selected for Screening



Soil Sample Locations Chosen for Screening
Zone J Drainage Basins
Surface Soil
AOC Boundary
SWMU Boundary

N

0 100 200 Feet

1 inch = 119 feet

Figure 3
Surface Soil Samples Selected for Screening
SWMU 42, Zone A
Charleston Naval Complex

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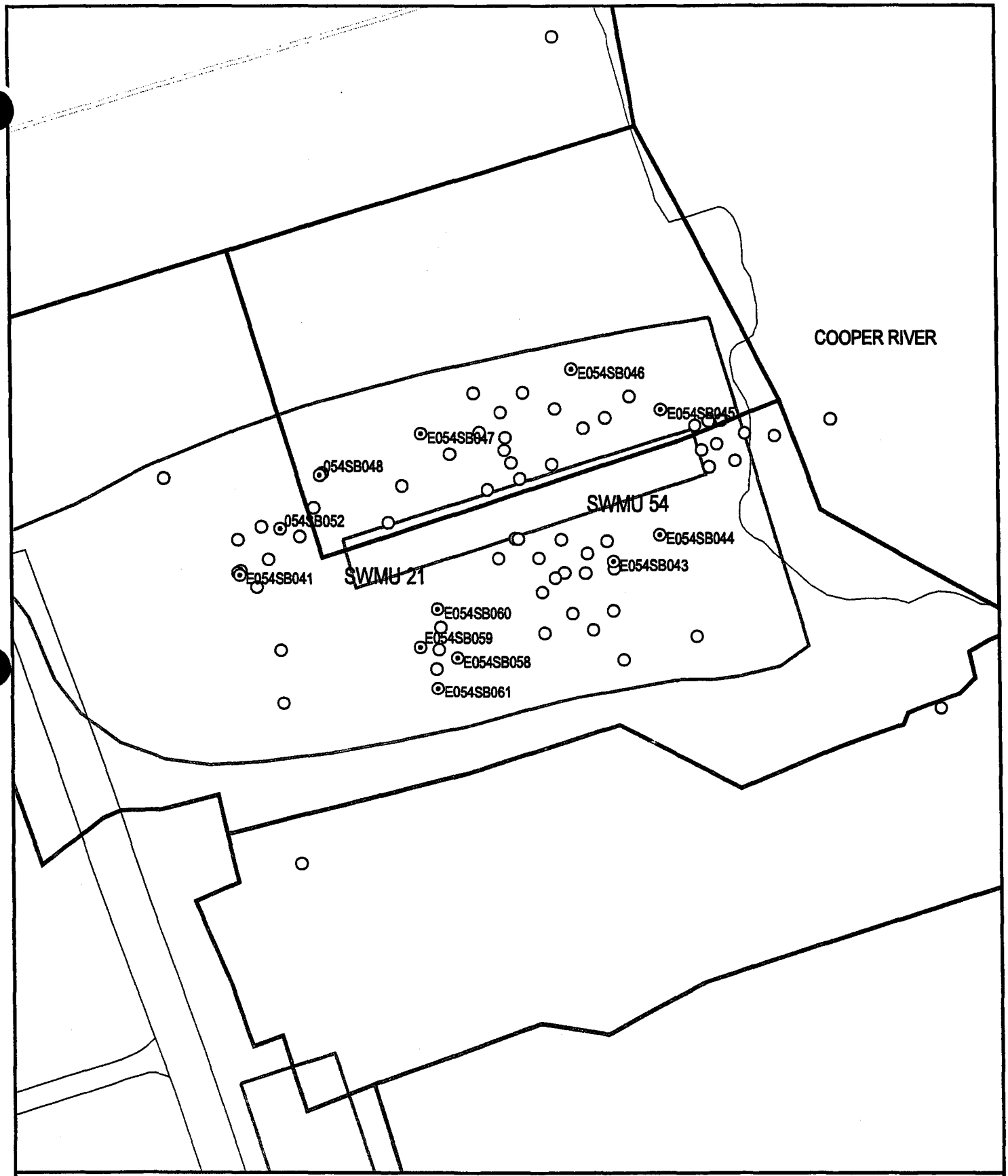
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 9:23, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 2 Surface Soil Samples Selected for Screening



Surface Soil Sample Locations Selected for Screening
Zone J Drainage Basins
Historic RFI Surface Soil Sample Location
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 50 100 Feet

1 inch = 66 feet

Figure 4
Soil Samples Selected for Screening
SWMUs 21 and 54, Zone E
Charleston Naval Complex

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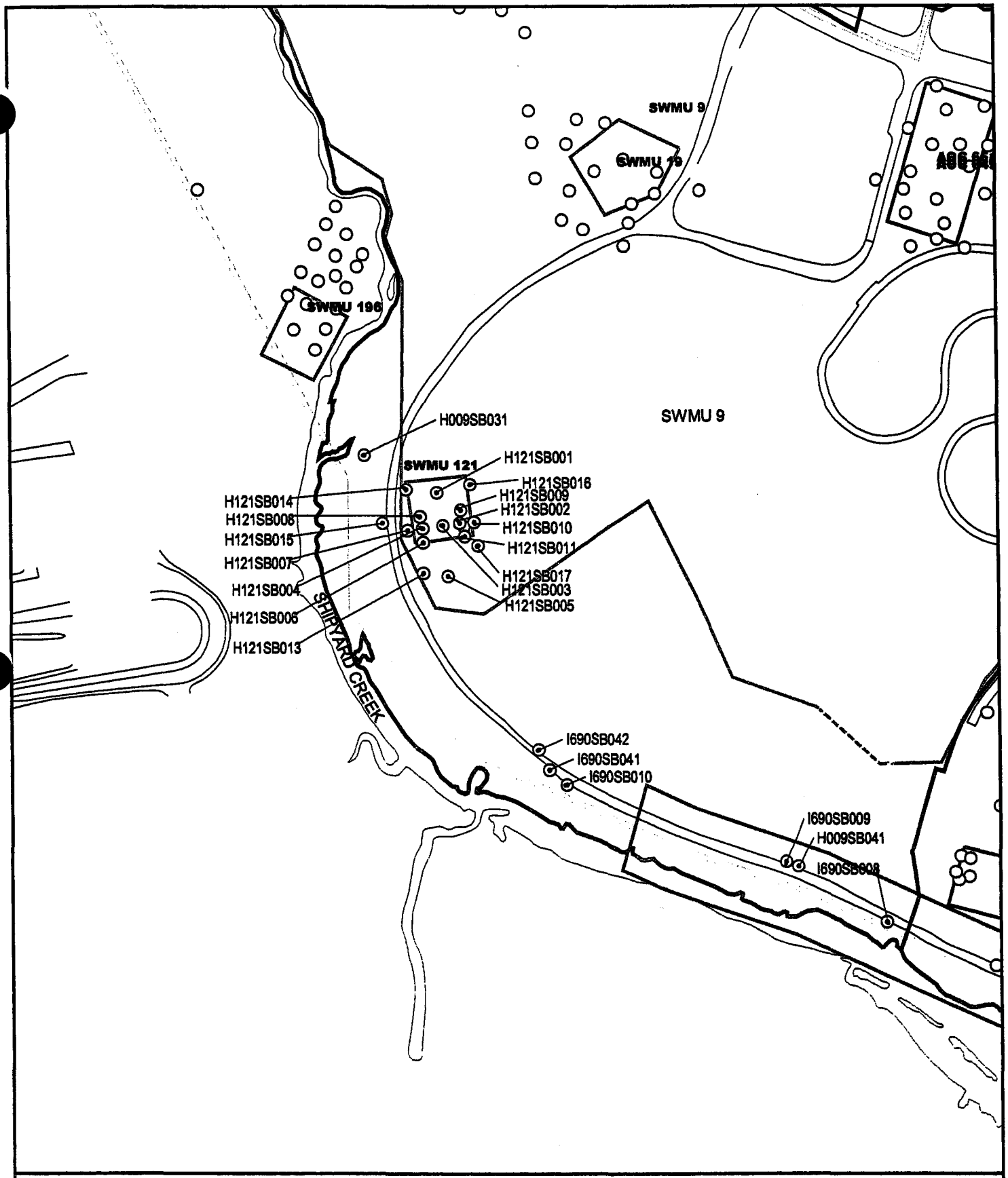
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 9:07, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 3 Soil Samples Selected for Screening



Surface Soil Sample Locations Selected for Screening
Zone J Drainage Basins
Historic RFI Surface Soil Sample Location
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 200 400 Feet

1 inch = 282 feet

Figure 5
Soil Samples Selected for Screening
SWMU 9, Zone H
Charleston Naval Complex

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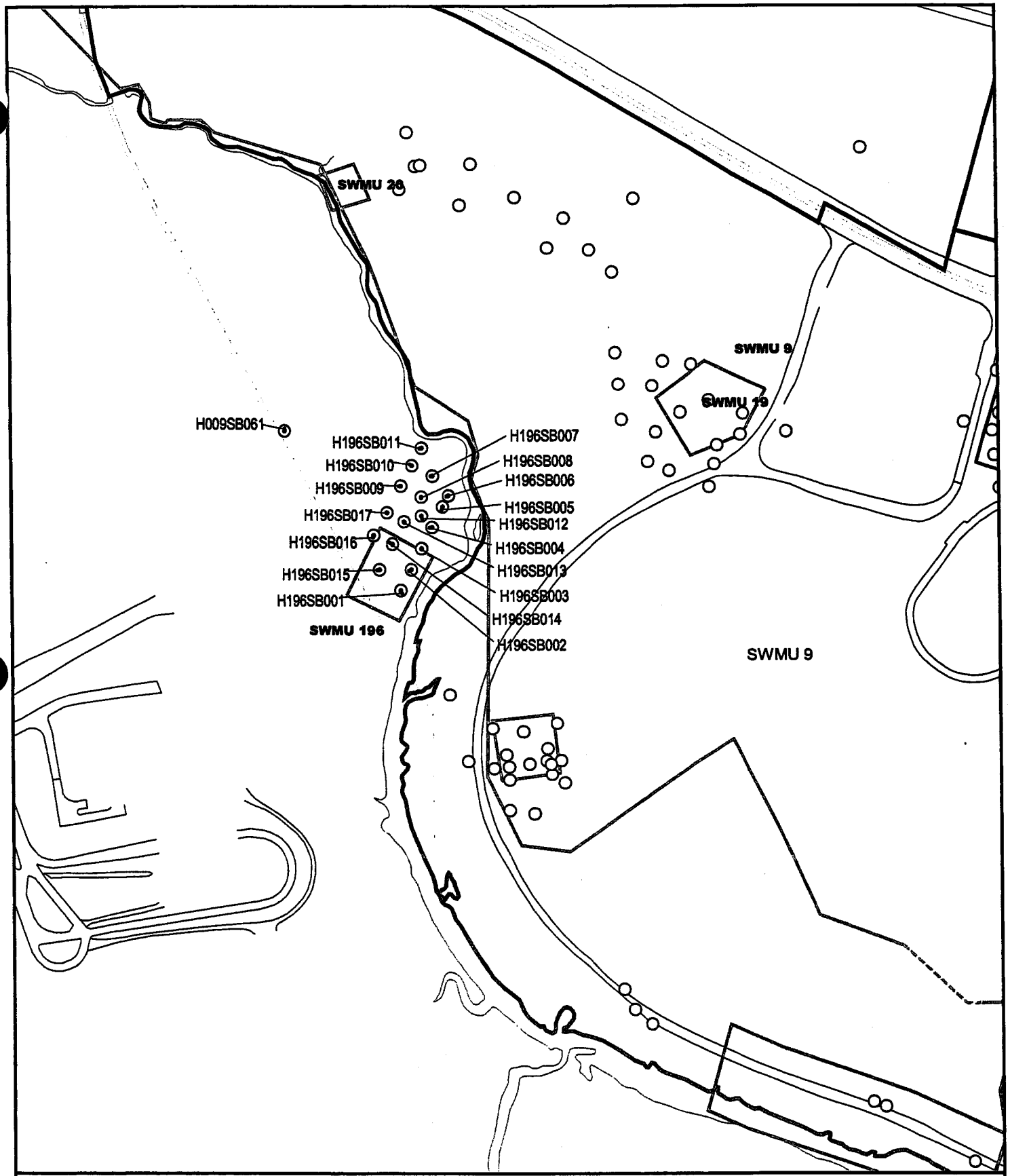
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 9:33, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 4 zone J



Surface Soil Sample Locations Selected for Screening
Zone J Drainage Basins
Historic RFI Surface Soil Sample Locations
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 200 400 Feet

1 inch = 282.538 feet

Figure 6
Soil Samples Selected for Screening
SWMU 196, Zone H
Charleston Naval Complex

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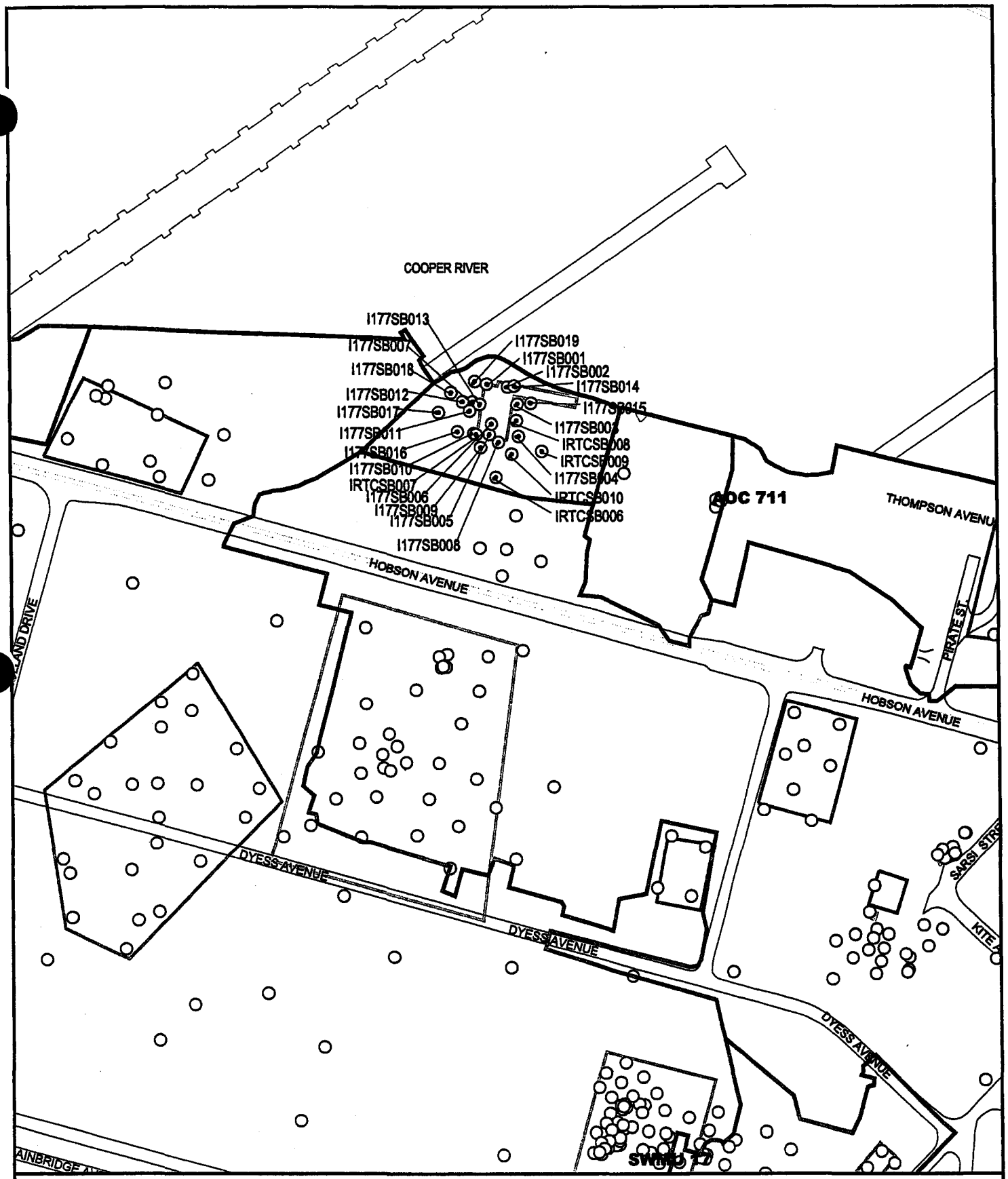
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 9:37, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 5 Map Title



Surface Soil Sample Locations Selected for Screening
Zone J Drainage Basins
Historic RFI Surface Soil Sample Location
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 200 400 Feet

1 inch = 129 feet

Figure 7
Soil Samples Selected for Screening
SWMU 177, Zone I
Charleston Naval Complex

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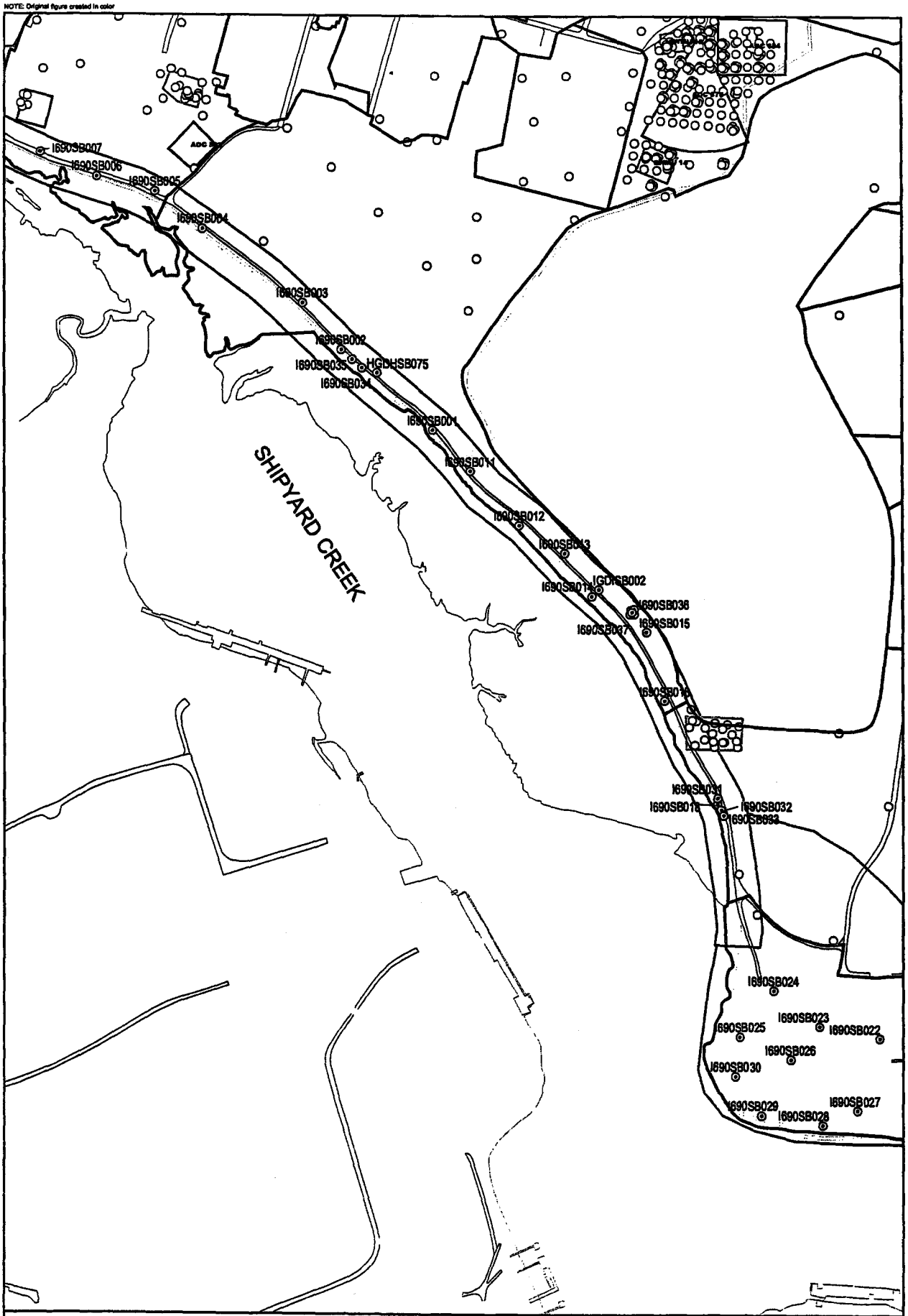
File Path: c:\18gis\cnc\cnc-egis.apr, Date: 11 Oct 2003 10:10, User: SNAIK1, EGIS: Charleston Naval Complex - Figure 8 Map Title

NOTE: Original figure created in color



Surface Soil Sample Locations Selected for Screening
Zone J Drainage Basin
Surface Soil
AOC Boundary
SWMU Boundary
Zone Boundary

N

0 300 600 Feet

1 inch = 371 feet

Figure 8
Soil Samples Selected for Screening
AOC 690, Zone I
Charleston Naval Complex

CH2MHILL

File Path: c:\18gsfchotone-egis.apr, Date: 13 Oct 2003 15:16, User: SNAIK1, EGIS: Charleston Naval Complex - Figure a-x Map Title

Attachment A

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Aluminum	A001SB001	001SB00101	10/10/1995	2730.000	mg/kg	=		3640	11800		
Barium	A001SB001	001SB00101	10/10/1995	9.000	mg/kg	J		6.5	46.5		
Calcium	A001SB001	001SB00101	10/10/1995	2990.000	mg/kg	=		797	78900		
Chromium, Total	A001SB001	001SB00101	10/10/1995	4.300	mg/kg	=	52.3	5.7	34.4		
Copper	A001SB001	001SB00101	10/10/1995	2.000	mg/kg	J	18.7	2.2	70.9		
Iron	A001SB001	001SB00101	10/10/1995	673.000	mg/kg	J		1530	15700		
Lead	A001SB001	001SB00101	10/10/1995	6.400	mg/kg	J	30.2	4.1	93.1		
Magnesium	A001SB001	001SB00101	10/10/1995	165.000	mg/kg	J		231	3150		
Manganese	A001SB001	001SB00101	10/10/1995	4.500	mg/kg	J		8.7	66.1		
Nickel	A001SB001	001SB00101	10/10/1995	3.500	mg/kg	J	15.9	3.2	15.4		
Sodium	A001SB001	001SB00101	10/10/1995	227.000	mg/kg	J		195	653		
Vanadium	A001SB001	001SB00101	10/10/1995	2.300	mg/kg	J		4.9	28.1		
Zinc	A001SB001	001SB00101	10/10/1995	349.000	mg/kg	J	124	4.5	168	X	X
Methyl ethyl ketone (2-Butanone)	A001SB001	001SB00101	10/10/1995	0.014	mg/kg	=					
Aluminum	A001SB011	001SB01101	10/06/1993	2500.000	mg/kg	=		3640	11800		
Barium	A001SB011	001SB01101	10/06/1993	7.000	mg/kg	=		6.5	46.5		
Calcium	A001SB011	001SB01101	10/06/1993	2900.000	mg/kg	=		797	78900		
Chromium, Total	A001SB011	001SB01101	10/06/1993	3.500	mg/kg	=	52.3	5.7	34.4		
Iron	A001SB011	001SB01101	10/06/1993	490.000	mg/kg	=		1530	15700		
Lead	A001SB011	001SB01101	10/06/1993	7.100	mg/kg	J	30.2	4.1	93.1		
Magnesium	A001SB011	001SB01101	10/06/1993	110.000	mg/kg	=		231	3150		
Manganese	A001SB011	001SB01101	10/06/1993	3.100	mg/kg	=		8.7	66.1		
Mercury	A001SB011	001SB01101	10/06/1993	0.033	mg/kg	J	0.13	0.12	0.3		
Vanadium	A001SB011	001SB01101	10/06/1993	1.600	mg/kg	=		4.9	28.1		
Zinc	A001SB011	001SB01101	10/06/1993	7.100	mg/kg	J	124	4.5	168		
Aluminum	A002S0051	002S005101	10/25/1993	2600.000	mg/kg	=		3640	11800		
Arsenic	A002S0051	002S005101	10/25/1993	5.100	mg/kg	J	7.24	1.7	30.1		
Barium	A002S0051	002S005101	10/25/1993	5.400	mg/kg	J		6.5	46.5		
Calcium	A002S0051	002S005101	10/25/1993	690.000	mg/kg	=		797	78900		
Chromium, Total	A002S0051	002S005101	10/25/1993	6.600	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002S0051	002S005101	10/25/1993	1.500	mg/kg	=		1.6	4.4		
Iron	A002S0051	002S005101	10/25/1993	3500.000	mg/kg	=		1530	15700		
Lead	A002S0051	002S005101	10/25/1993	3.700	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0051	002S005101	10/25/1993	650.000	mg/kg	=		231	3150		
Manganese	A002S0051	002S005101	10/25/1993	24.000	mg/kg	=		8.7	66.1		
Potassium	A002S0051	002S005101	10/25/1993	390.000	mg/kg	J		128	675		
Sodium	A002S0051	002S005101	10/25/1993	2300.000	mg/kg	J		195	653		X
Vanadium	A002S0051	002S005101	10/25/1993	10.000	mg/kg	=		4.9	28.1		
Zinc	A002S0051	002S005101	10/25/1993	5.800	mg/kg	=	124	4.5	168		
Aluminum	A002S0061	002S006101	10/25/1993	1000.000	mg/kg	=		3640	11800		
Arsenic	A002S0061	002S006101	10/25/1993	2.000	mg/kg	J	7.24	1.7	30.1		
Barium	A002S0061	002S006101	10/25/1993	16.000	mg/kg	J		6.5	46.5		
Calcium	A002S0061	002S006101	10/25/1993	4500.000	mg/kg	=		797	78900		
Chromium, Total	A002S0061	002S006101	10/25/1993	4.200	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0061	002S006101	10/25/1993	14.000	mg/kg	=	18.7	2.2	70.9		
Iron	A002S0061	002S006101	10/25/1993	2300.000	mg/kg	=		1530	15700		
Lead	A002S0061	002S006101	10/25/1993	14.000	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0061	002S006101	10/25/1993	500.000	mg/kg	=		231	3150		
Manganese	A002S0061	002S006101	10/25/1993	23.000	mg/kg	=		8.7	66.1		
Potassium	A002S0061	002S006101	10/25/1993	200.000	mg/kg	J		128	675		
Sodium	A002S0061	002S006101	10/25/1993	1900.000	mg/kg	J		195	653		X
Vanadium	A002S0061	002S006101	10/25/1993	3.900	mg/kg	=		4.9	28.1		
Zinc	A002S0061	002S006101	10/25/1993	14.000	mg/kg	=	124	4.5	168		
Aluminum	A002S0071	002S007101	10/25/1993	1300.000	mg/kg	=		3640	11800		
Barium	A002S0071	002S007101	10/25/1993	55.000	mg/kg	J		6.5	46.5		X
Calcium	A002S0071	002S007101	10/25/1993	7600.000	mg/kg	=		797	78900		
Chromium, Total	A002S0071	002S007101	10/25/1993	5.400	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0071	002S007101	10/25/1993	4.100	mg/kg	=	18.7	2.2	70.9		
Iron	A002S0071	002S007101	10/25/1993	4900.000	mg/kg	=		1530	15700		
Lead	A002S0071	002S007101	10/25/1993	47.000	mg/kg	=	30.2	4.1	93.1	X	
Magnesium	A002S0071	002S007101	10/25/1993	650.000	mg/kg	=		231	3150		
Manganese	A002S0071	002S007101	10/25/1993	19.000	mg/kg	=		8.7	66.1		
Potassium	A002S0071	002S007101	10/25/1993	160.000	mg/kg	J		128	675		
Sodium	A002S0071	002S007101	10/25/1993	1600.000	mg/kg	J		195	653		X
Vanadium	A002S0071	002S007101	10/25/1993	12.000	mg/kg	=		4.9	28.1		
Zinc	A002S0071	002S007101	10/25/1993	17.000	mg/kg	=	124	4.5	168		
Aluminum	A002S0081	002S008101	10/25/1993	560.000	mg/kg	=		3640	11800		
Barium	A002S0081	002S008101	10/25/1993	20.000	mg/kg	J		6.5	46.5		
Calcium	A002S0081	002S008101	10/25/1993	1900.000	mg/kg	=		797	78900		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Chromium, Total	A002S0081	002S008101	10/25/1993	2.200	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0081	002S008101	10/25/1993	3.400	mg/kg	=	18.7	2.2	70.9		
Iron	A002S0081	002S008101	10/25/1993	1100.000	mg/kg	=		1530	15700		
Lead	A002S0081	002S008101	10/25/1993	6.400	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0081	002S008101	10/25/1993	410.000	mg/kg	=		231	3150		
Manganese	A002S0081	002S008101	10/25/1993	9.200	mg/kg	=		8.7	66.1		
Potassium	A002S0081	002S008101	10/25/1993	160.000	mg/kg	J		128	675		
Sodium	A002S0081	002S008101	10/25/1993	2000.000	mg/kg	J		195	653		X
Vanadium	A002S0081	002S008101	10/25/1993	2.000	mg/kg	=		4.9	28.1		
Zinc	A002S0081	002S008101	10/25/1993	7.500	mg/kg	=	124	4.5	168		
Aluminum	A002S0091	002S009101	10/25/1993	620.000	mg/kg	=		3640	11800		
Barium	A002S0091	002S009101	10/25/1993	3.200	mg/kg	J		6.5	46.5		
Calcium	A002S0091	002S009101	10/25/1993	8500.000	mg/kg	=		797	78900		
Chromium, Total	A002S0091	002S009101	10/25/1993	2.300	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0091	002S009101	10/25/1993	5.900	mg/kg	=	18.7	2.2	70.9		
Iron	A002S0091	002S009101	10/25/1993	1300.000	mg/kg	=		1530	15700		
Lead	A002S0091	002S009101	10/25/1993	6.200	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0091	002S009101	10/25/1993	420.000	mg/kg	=		231	3150		
Manganese	A002S0091	002S009101	10/25/1993	11.000	mg/kg	=		8.7	66.1		
Potassium	A002S0091	002S009101	10/25/1993	140.000	mg/kg	J		128	675		
Sodium	A002S0091	002S009101	10/25/1993	1600.000	mg/kg	J		195	653		X
Vanadium	A002S0091	002S009101	10/25/1993	2.300	mg/kg	=		4.9	28.1		
Zinc	A002S0091	002S009101	10/25/1993	15.000	mg/kg	=	124	4.5	168		
Aluminum	A002S0101	002S010101	10/25/1993	1400.000	mg/kg	=		3640	11800		
Arsenic	A002S0101	002S010101	10/25/1993	2.700	mg/kg	J	7.24	1.7	30.1		
Barium	A002S0101	002S010101	10/25/1993	3.200	mg/kg	J		6.5	46.5		
Calcium	A002S0101	002S010101	10/25/1993	38000.000	mg/kg	=		797	78900		
Chromium, Total	A002S0101	002S010101	10/25/1993	5.600	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0101	002S010101	10/25/1993	4.200	mg/kg	=	18.7	2.2	70.9		
Iron	A002S0101	002S010101	10/25/1993	2200.000	mg/kg	=		1530	15700		
Lead	A002S0101	002S010101	10/25/1993	7.900	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0101	002S010101	10/25/1993	1100.000	mg/kg	=		231	3150		
Manganese	A002S0101	002S010101	10/25/1993	33.000	mg/kg	=		8.7	66.1		
Potassium	A002S0101	002S010101	10/25/1993	270.000	mg/kg	J		128	675		
Sodium	A002S0101	002S010101	10/25/1993	2700.000	mg/kg	J		195	653		X
Vanadium	A002S0101	002S010101	10/25/1993	4.500	mg/kg	=		4.9	28.1		
Zinc	A002S0101	002S010101	10/25/1993	21.000	mg/kg	=	124	4.5	168		
Aluminum	A002S0111	002S011101	10/25/1993	4600.000	mg/kg	=		3640	11800		
Arsenic	A002S0111	002S011101	10/25/1993	4.700	mg/kg	J	7.24	1.7	30.1		
Barium	A002S0111	002S011101	10/25/1993	10.000	mg/kg	J		6.5	46.5		
Calcium	A002S0111	002S011101	10/25/1993	14000.000	mg/kg	=		797	78900		
Chromium, Total	A002S0111	002S011101	10/25/1993	15.000	mg/kg	=	52.3	5.7	34.4		
Copper	A002S0111	002S011101	10/25/1993	22.000	mg/kg	=	18.7	2.2	70.9	X	
Iron	A002S0111	002S011101	10/25/1993	6300.000	mg/kg	=		1530	15700		
Lead	A002S0111	002S011101	10/25/1993	17.000	mg/kg	=	30.2	4.1	93.1		
Magnesium	A002S0111	002S011101	10/25/1993	2600.000	mg/kg	=		231	3150		
Manganese	A002S0111	002S011101	10/25/1993	41.000	mg/kg	=		8.7	66.1		
Mercury	A002S0111	002S011101	10/25/1993	0.036	mg/kg	=	0.13	0.12	0.3		
Potassium	A002S0111	002S011101	10/25/1993	960.000	mg/kg	J		128	675		X
Sodium	A002S0111	002S011101	10/25/1993	8900.000	mg/kg	J		195	653		X
Vanadium	A002S0111	002S011101	10/25/1993	13.000	mg/kg	=		4.9	28.1		
Zinc	A002S0111	002S011101	10/25/1993	37.000	mg/kg	=	124	4.5	168		
Aluminum	A002SB001	002SB00101	10/10/1995	7260.000	mg/kg	=		3640	11800		
Arsenic	A002SB001	002SB00101	10/10/1995	12.700	mg/kg	=	7.24	1.7	30.1	X	
Barium	A002SB001	002SB00101	10/10/1995	52.900	mg/kg	=		6.5	46.5		X
Beryllium	A002SB001	002SB00101	10/10/1995	0.280	mg/kg	J		0.32	0.32		
Cadmium	A002SB001	002SB00101	10/10/1995	2.400	mg/kg	=	1	2.8	2.8	X	
Calcium	A002SB001	002SB00101	10/10/1995	132000.000	mg/kg	=		797	78900		X
Chromium, Total	A002SB001	002SB00101	10/10/1995	26.500	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB001	002SB00101	10/10/1995	4.300	mg/kg	J		1.6	4.4		
Copper	A002SB001	002SB00101	10/10/1995	79.500	mg/kg	=	18.7	2.2	70.9	X	X
Iron	A002SB001	002SB00101	10/10/1995	10800.000	mg/kg	J		1530	15700		
Lead	A002SB001	002SB00101	10/10/1995	233.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	A002SB001	002SB00101	10/10/1995	2310.000	mg/kg	=		231	3150		
Manganese	A002SB001	002SB00101	10/10/1995	170.000	mg/kg	J		8.7	66.1		X
Mercury	A002SB001	002SB00101	10/10/1995	0.230	mg/kg	=	0.13	0.12	0.3	X	
Nickel	A002SB001	002SB00101	10/10/1995	21.200	mg/kg	=	15.9	3.2	15.4	X	X
Potassium	A002SB001	002SB00101	10/10/1995	556.000	mg/kg	J		128	675		
Sodium	A002SB001	002SB00101	10/10/1995	341.000	mg/kg	J		195	653		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Vanadium	A002SB001	002SB00101	10/10/1995	24.400	mg/kg	=		4.9	28.1		
Zinc	A002SB001	002SB00101	10/10/1995	227.000	mg/kg	J	124	4.5	168	X	X
Aluminum	A002SB002	002SB00201	10/10/1995	6810.000	mg/kg	=		3640	11800		
Arsenic	A002SB002	002SB00201	10/10/1995	3.700	mg/kg	=	7.24	1.7	30.1		
Barium	A002SB002	002SB00201	10/10/1995	14.400	mg/kg	J		6.5	46.5		
Calcium	A002SB002	002SB00201	10/10/1995	4280.000	mg/kg	=		797	78900		
Chromium, Total	A002SB002	002SB00201	10/10/1995	10.200	mg/kg	=	52.3	5.7	34.4		
Copper	A002SB002	002SB00201	10/10/1995	7.800	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB002	002SB00201	10/10/1995	4890.000	mg/kg	J		1530	15700		
Lead	A002SB002	002SB00201	10/10/1995	6.700	mg/kg	J	30.2	4.1	93.1		
Magnesium	A002SB002	002SB00201	10/10/1995	365.000	mg/kg	J		231	3150		
Manganese	A002SB002	002SB00201	10/10/1995	10.800	mg/kg	J		8.7	66.1		
Nickel	A002SB002	002SB00201	10/10/1995	18.700	mg/kg	=	15.9	3.2	15.4	X	X
Potassium	A002SB002	002SB00201	10/10/1995	176.000	mg/kg	J		128	675		
Selenium	A002SB002	002SB00201	10/10/1995	1.200	mg/kg	J		0.7	0.88		X
Sodium	A002SB002	002SB00201	10/10/1995	182.000	mg/kg	J		195	653		
Vanadium	A002SB002	002SB00201	10/10/1995	12.300	mg/kg	=		4.9	28.1		
Zinc	A002SB002	002SB00201	10/10/1995	20.600	mg/kg	J	124	4.5	168		
Aluminum	A002SB005	002SB00501	10/10/1995	10200.000	mg/kg	=		3640	11800		
Arsenic	A002SB005	002SB00501	10/10/1995	5.800	mg/kg	=	7.24	1.7	30.1		
Barium	A002SB005	002SB00501	10/10/1995	15.600	mg/kg	J		6.5	46.5		
Calcium	A002SB005	002SB00501	10/10/1995	5220.000	mg/kg	=		797	78900		
Chromium, Total	A002SB005	002SB00501	10/10/1995	12.000	mg/kg	=	52.3	5.7	34.4		
Copper	A002SB005	002SB00501	10/10/1995	8.500	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB005	002SB00501	10/10/1995	8470.000	mg/kg	J		1530	15700		
Lead	A002SB005	002SB00501	10/10/1995	8.000	mg/kg	J	30.2	4.1	93.1		
Magnesium	A002SB005	002SB00501	10/10/1995	513.000	mg/kg	J		231	3150		
Manganese	A002SB005	002SB00501	10/10/1995	14.400	mg/kg	J		8.7	66.1		
Potassium	A002SB005	002SB00501	10/10/1995	299.000	mg/kg	J		128	675		
Selenium	A002SB005	002SB00501	10/10/1995	1.100	mg/kg	J		0.7	0.88		X
Sodium	A002SB005	002SB00501	10/10/1995	317.000	mg/kg	J		195	653		
Vanadium	A002SB005	002SB00501	10/10/1995	17.300	mg/kg	=		4.9	28.1		
Zinc	A002SB005	002SB00501	10/10/1995	10.700	mg/kg	J	124	4.5	168		
Aluminum	A002SB006	002SB00601	10/10/1995	17400.000	mg/kg	=		3640	11800		X
Arsenic	A002SB006	002SB00601	10/10/1995	15.400	mg/kg	=	7.24	1.7	30.1	X	
Barium	A002SB006	002SB00601	10/10/1995	30.900	mg/kg	J		6.5	46.5		
Beryllium	A002SB006	002SB00601	10/10/1995	0.360	mg/kg	J		0.32	0.32		X
Calcium	A002SB006	002SB00601	10/10/1995	37300.000	mg/kg	=		797	78900		
Chromium, Total	A002SB006	002SB00601	10/10/1995	28.700	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB006	002SB00601	10/10/1995	1.900	mg/kg	J		1.6	4.4		
Copper	A002SB006	002SB00601	10/10/1995	26.900	mg/kg	=	18.7	2.2	70.9	X	
Iron	A002SB006	002SB00601	10/10/1995	16700.000	mg/kg	J		1530	15700		X
Lead	A002SB006	002SB00601	10/10/1995	36.700	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A002SB006	002SB00601	10/10/1995	2170.000	mg/kg	=		231	3150		
Manganese	A002SB006	002SB00601	10/10/1995	64.900	mg/kg	J		8.7	66.1		
Nickel	A002SB006	002SB00601	10/10/1995	15.100	mg/kg	=	15.9	3.2	15.4		
Potassium	A002SB006	002SB00601	10/10/1995	803.000	mg/kg	J		128	675		X
Selenium	A002SB006	002SB00601	10/10/1995	0.850	mg/kg	J		0.7	0.88		
Sodium	A002SB006	002SB00601	10/10/1995	451.000	mg/kg	J		195	653		
Vanadium	A002SB006	002SB00601	10/10/1995	35.400	mg/kg	=		4.9	28.1		X
Zinc	A002SB006	002SB00601	10/10/1995	120.000	mg/kg	J	124	4.5	168		
Aluminum	A002SB007	002SB00701	10/10/1995	5870.000	mg/kg	=		3640	11800		
Arsenic	A002SB007	002SB00701	10/10/1995	3.900	mg/kg	=	7.24	1.7	30.1		
Barium	A002SB007	002SB00701	10/10/1995	23.200	mg/kg	J		6.5	46.5		
Calcium	A002SB007	002SB00701	10/10/1995	51500.000	mg/kg	=		797	78900		
Chromium, Total	A002SB007	002SB00701	10/10/1995	12.400	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB007	002SB00701	10/10/1995	1.500	mg/kg	J		1.6	4.4		
Copper	A002SB007	002SB00701	10/10/1995	126.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	A002SB007	002SB00701	10/10/1995	8060.000	mg/kg	J		1530	15700		
Lead	A002SB007	002SB00701	10/10/1995	186.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	A002SB007	002SB00701	10/10/1995	873.000	mg/kg	J		231	3150		
Manganese	A002SB007	002SB00701	10/10/1995	68.000	mg/kg	J		8.7	66.1		X
Nickel	A002SB007	002SB00701	10/10/1995	8.400	mg/kg	=	15.9	3.2	15.4		
Potassium	A002SB007	002SB00701	10/10/1995	324.000	mg/kg	J		128	675		
Sodium	A002SB007	002SB00701	10/10/1995	227.000	mg/kg	J		195	653		
Vanadium	A002SB007	002SB00701	10/10/1995	20.000	mg/kg	=		4.9	28.1		
Zinc	A002SB007	002SB00701	10/10/1995	87.300	mg/kg	J	124	4.5	168		
Aluminum	A002SB012	002SB01201	10/10/1995	11600.000	mg/kg	=		3640	11800		
Arsenic	A002SB012	002SB01201	10/10/1995	5.600	mg/kg	=	7.24	1.7	30.1		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Barium	A002SB012	002SB01201	10/10/1995	15.700	mg/kg	J		6.5	46.5		
Calcium	A002SB012	002SB01201	10/10/1995	6770.000	mg/kg	=		797	78900		
Chromium, Total	A002SB012	002SB01201	10/10/1995	13.600	mg/kg	=	52.3	5.7	34.4		
Copper	A002SB012	002SB01201	10/10/1995	9.300	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB012	002SB01201	10/10/1995	10300.000	mg/kg	J		1530	15700		
Lead	A002SB012	002SB01201	10/10/1995	14.400	mg/kg	J	30.2	4.1	93.1		
Magnesium	A002SB012	002SB01201	10/10/1995	351.000	mg/kg	J		231	3150		
Manganese	A002SB012	002SB01201	10/10/1995	12.800	mg/kg	J		8.7	66.1		
Nickel	A002SB012	002SB01201	10/10/1995	4.100	mg/kg	J	15.9	3.2	15.4		
Potassium	A002SB012	002SB01201	10/10/1995	221.000	mg/kg	J		128	675		
Sodium	A002SB012	002SB01201	10/10/1995	210.000	mg/kg	J		195	653		
Vanadium	A002SB012	002SB01201	10/10/1995	20.000	mg/kg	=		4.9	28.1		
Zinc	A002SB012	002SB01201	10/10/1995	13.400	mg/kg	J	124	4.5	168		
Aluminum	A002SB061	002SB06101	10/06/1993	8200.000	mg/kg	=		3640	11800		
Arsenic	A002SB061	002SB06101	10/06/1993	3.900	mg/kg	=	7.24	1.7	30.1		
Barium	A002SB061	002SB06101	10/06/1993	22.000	mg/kg	=		6.5	46.5		
Cadmium	A002SB061	002SB06101	10/06/1993	0.800	mg/kg	=	1	2.8	2.8		
Calcium	A002SB061	002SB06101	10/06/1993	75000.000	mg/kg	=		797	78900		
Chromium, Total	A002SB061	002SB06101	10/06/1993	25.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB061	002SB06101	10/06/1993	1.400	mg/kg	=		1.6	4.4		
Copper	A002SB061	002SB06101	10/06/1993	13.000	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB061	002SB06101	10/06/1993	7100.000	mg/kg	=		1530	15700		
Lead	A002SB061	002SB06101	10/06/1993	44.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A002SB061	002SB06101	10/06/1993	2400.000	mg/kg	J		231	3150		
Manganese	A002SB061	002SB06101	10/06/1993	41.000	mg/kg	=		8.7	66.1		
Mercury	A002SB061	002SB06101	10/06/1993	0.040	mg/kg	=	0.13	0.12	0.3		
Nickel	A002SB061	002SB06101	10/06/1993	12.000	mg/kg	=	15.9	3.2	15.4		
Potassium	A002SB061	002SB06101	10/06/1993	470.000	mg/kg	=		128	675		
Sodium	A002SB061	002SB06101	10/06/1993	270.000	mg/kg	=		195	653		
Vanadium	A002SB061	002SB06101	10/06/1993	20.000	mg/kg	=		4.9	28.1		
Zinc	A002SB061	002SB06101	10/06/1993	61.000	mg/kg	=	124	4.5	168		
Aluminum	A002SB071	002SB07101	10/06/1993	5700.000	mg/kg	=		3640	11800		
Arsenic	A002SB071	002SB07101	10/06/1993	7.100	mg/kg	=	7.24	1.7	30.1		
Barium	A002SB071	002SB07101	10/06/1993	43.000	mg/kg	=		6.5	46.5		
Cadmium	A002SB071	002SB07101	10/06/1993	4.000	mg/kg	=	1	2.8	2.8	X	X
Calcium	A002SB071	002SB07101	10/06/1993	98000.000	mg/kg	=		797	78900		X
Chromium, Total	A002SB071	002SB07101	10/06/1993	29.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB071	002SB07101	10/06/1993	2.800	mg/kg	=		1.6	4.4		
Copper	A002SB071	002SB07101	10/06/1993	75.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	A002SB071	002SB07101	10/06/1993	8200.000	mg/kg	=		1530	15700		
Lead	A002SB071	002SB07101	10/06/1993	310.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	A002SB071	002SB07101	10/06/1993	1900.000	mg/kg	J		231	3150		
Manganese	A002SB071	002SB07101	10/06/1993	81.000	mg/kg	=		8.7	66.1		X
Mercury	A002SB071	002SB07101	10/06/1993	0.062	mg/kg	=	0.13	0.12	0.3		
Nickel	A002SB071	002SB07101	10/06/1993	18.000	mg/kg	=	15.9	3.2	15.4	X	X
Potassium	A002SB071	002SB07101	10/06/1993	500.000	mg/kg	=		128	675		
Sodium	A002SB071	002SB07101	10/06/1993	220.000	mg/kg	=		195	653		
Vanadium	A002SB071	002SB07101	10/06/1993	20.000	mg/kg	=		4.9	28.1		
Zinc	A002SB071	002SB07101	10/06/1993	290.000	mg/kg	=	124	4.5	168	X	X
Aluminum	A002SB081	002SB08101	10/06/1993	3000.000	mg/kg	=		3640	11800		
Arsenic	A002SB081	002SB08101	10/06/1993	8.400	mg/kg	=	7.24	1.7	30.1	X	
Barium	A002SB081	002SB08101	10/06/1993	22.000	mg/kg	=		6.5	46.5		
Cadmium	A002SB081	002SB08101	10/06/1993	0.760	mg/kg	=	1	2.8	2.8		
Calcium	A002SB081	002SB08101	10/06/1993	140000.000	mg/kg	=		797	78900		X
Chromium, Total	A002SB081	002SB08101	10/06/1993	18.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB081	002SB08101	10/06/1993	2.400	mg/kg	=		1.6	4.4		
Copper	A002SB081	002SB08101	10/06/1993	12.000	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB081	002SB08101	10/06/1993	5300.000	mg/kg	=		1530	15700		
Lead	A002SB081	002SB08101	10/06/1993	39.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A002SB081	002SB08101	10/06/1993	2100.000	mg/kg	J		231	3150		
Manganese	A002SB081	002SB08101	10/06/1993	140.000	mg/kg	=		8.7	66.1		X
Mercury	A002SB081	002SB08101	10/06/1993	0.030	mg/kg	=	0.13	0.12	0.3		
Nickel	A002SB081	002SB08101	10/06/1993	13.000	mg/kg	=	15.9	3.2	15.4		
Potassium	A002SB081	002SB08101	10/06/1993	260.000	mg/kg	=		128	675		
Sodium	A002SB081	002SB08101	10/06/1993	140.000	mg/kg	=		195	653		
Vanadium	A002SB081	002SB08101	10/06/1993	11.000	mg/kg	=		4.9	28.1		
Zinc	A002SB081	002SB08101	10/06/1993	41.000	mg/kg	=	124	4.5	168		
Aluminum	A002SB101	002SB10101	10/06/1993	8300.000	mg/kg	=		3640	11800		
Arsenic	A002SB101	002SB10101	10/06/1993	12.000	mg/kg	=	7.24	1.7	30.1	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Barium	A002SB101	002SB10101	10/06/1993	22.000	mg/kg	=		6.5	46.5		
Calcium	A002SB101	002SB10101	10/06/1993	110000.000	mg/kg	=		797	78900		X
Chromium, Total	A002SB101	002SB10101	10/06/1993	36.000	mg/kg	=	52.3	5.7	34.4		X
Cobalt	A002SB101	002SB10101	10/06/1993	1.900	mg/kg	=		1.6	4.4		
Copper	A002SB101	002SB10101	10/06/1993	17.000	mg/kg	=	18.7	2.2	70.9		
Iron	A002SB101	002SB10101	10/06/1993	7700.000	mg/kg	=		1530	15700		
Lead	A002SB101	002SB10101	10/06/1993	40.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A002SB101	002SB10101	10/06/1993	3500.000	mg/kg	J		231	3150		X
Manganese	A002SB101	002SB10101	10/06/1993	48.000	mg/kg	=		8.7	66.1		
Mercury	A002SB101	002SB10101	10/06/1993	0.043	mg/kg	=	0.13	0.12	0.3		
Nickel	A002SB101	002SB10101	10/06/1993	19.000	mg/kg	=	15.9	3.2	15.4	X	X
Potassium	A002SB101	002SB10101	10/06/1993	680.000	mg/kg	=		128	675		X
Sodium	A002SB101	002SB10101	10/06/1993	390.000	mg/kg	=		195	653		
Vanadium	A002SB101	002SB10101	10/06/1993	27.000	mg/kg	=		4.9	28.1		
Zinc	A002SB101	002SB10101	10/06/1993	72.000	mg/kg	=	124	4.5	168		
Aluminum	A002SB151	002SB15101	10/25/1993	3800.000	mg/kg	=		3640	11800		
Antimony	A002SB151	002SB15101	10/25/1993	8.500	mg/kg	J	12	NA	NA		
Arsenic	A002SB151	002SB15101	10/25/1993	6.900	mg/kg	J	7.24	1.7	30.1		
Barium	A002SB151	002SB15101	10/25/1993	45.000	mg/kg	J		6.5	46.5		
Cadmium	A002SB151	002SB15101	10/25/1993	3.200	mg/kg	J	1	2.8	2.8	X	X
Calcium	A002SB151	002SB15101	10/25/1993	58000.000	mg/kg	=		797	78900		
Chromium, Total	A002SB151	002SB15101	10/25/1993	29.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	A002SB151	002SB15101	10/25/1993	3.500	mg/kg	=		1.6	4.4		
Copper	A002SB151	002SB15101	10/25/1993	180.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	A002SB151	002SB15101	10/25/1993	17000.000	mg/kg	=		1530	15700		X
Lead	A002SB151	002SB15101	10/25/1993	1400.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	A002SB151	002SB15101	10/25/1993	1300.000	mg/kg	=		231	3150		
Manganese	A002SB151	002SB15101	10/25/1993	160.000	mg/kg	=		8.7	66.1		X
Mercury	A002SB151	002SB15101	10/25/1993	0.200	mg/kg	=	0.13	0.12	0.3	X	
Nickel	A002SB151	002SB15101	10/25/1993	29.000	mg/kg	J	15.9	3.2	15.4	X	X
Potassium	A002SB151	002SB15101	10/25/1993	320.000	mg/kg	J		128	675		
Sodium	A002SB151	002SB15101	10/25/1993	110.000	mg/kg	J		195	653		
Vanadium	A002SB151	002SB15101	10/25/1993	17.000	mg/kg	=		4.9	28.1		
Zinc	A002SB151	002SB15101	10/25/1993	490.000	mg/kg	=	124	4.5	168	X	X
Lead	A002SBC01	002SBC0101	03/29/1999	81.000	mg/kg	=	30.2	4.1	93.1	X	
Lead	A002SBC02	002SBC0201	03/29/1999	3980.000	mg/kg	=	30.2	4.1	93.1	X	X
Aluminum	A042SB008	042SB00801	10/06/1995	2550.000	mg/kg	=		3640	11800		
Arsenic	A042SB008	042SB00801	10/06/1995	1.100	mg/kg	J	7.24	1.7	30.1		
Barium	A042SB008	042SB00801	10/06/1995	12.500	mg/kg	J		6.5	46.5		
Calcium	A042SB008	042SB00801	10/06/1995	543.000	mg/kg	J		797	78900		
Chromium, Total	A042SB008	042SB00801	10/06/1995	3.500	mg/kg	=	52.3	5.7	34.4		
Copper	A042SB008	042SB00801	10/06/1995	2.900	mg/kg	J	18.7	2.2	70.9		
Iron	A042SB008	042SB00801	10/06/1995	2440.000	mg/kg	=		1530	15700		
Lead	A042SB008	042SB00801	10/06/1995	7.100	mg/kg	J	30.2	4.1	93.1		
Magnesium	A042SB008	042SB00801	10/06/1995	187.000	mg/kg	J		231	3150		
Manganese	A042SB008	042SB00801	10/06/1995	21.100	mg/kg	=		8.7	66.1		
Sodium	A042SB008	042SB00801	10/06/1995	183.000	mg/kg	J		195	653		
Vanadium	A042SB008	042SB00801	10/06/1995	5.700	mg/kg	J		4.9	28.1		
Zinc	A042SB008	042SB00801	10/06/1995	11.100	mg/kg	=	124	4.5	168		
p,p'-DDT	A042SB008	042SB00801	10/06/1995	0.019	mg/kg	=					
Aluminum	A042SB010	042SB01001	10/07/1995	9010.000	mg/kg	=		3640	11800		
Arsenic	A042SB010	042SB01001	10/07/1995	12.300	mg/kg	=	7.24	1.7	30.1	X	
Barium	A042SB010	042SB01001	10/07/1995	160.000	mg/kg	=		6.5	46.5		X
Beryllium	A042SB010	042SB01001	10/07/1995	0.380	mg/kg	J		0.32	0.32		X
Calcium	A042SB010	042SB01001	10/07/1995	7950.000	mg/kg	J		797	78900		
Chromium, Total	A042SB010	042SB01001	10/07/1995	29.200	mg/kg	J	52.3	5.7	34.4		
Cobalt	A042SB010	042SB01001	10/07/1995	2.800	mg/kg	J		1.6	4.4		
Copper	A042SB010	042SB01001	10/07/1995	121.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	A042SB010	042SB01001	10/07/1995	9260.000	mg/kg	J		1530	15700		
Lead	A042SB010	042SB01001	10/07/1995	339.000	mg/kg	=	30.2	4.1	93.1	X	X
Magnesium	A042SB010	042SB01001	10/07/1995	820.000	mg/kg	J		231	3150		
Manganese	A042SB010	042SB01001	10/07/1995	73.700	mg/kg	J		8.7	66.1		X
Mercury	A042SB010	042SB01001	10/07/1995	0.320	mg/kg	J	0.13	0.12	0.3	X	X
Nickel	A042SB010	042SB01001	10/07/1995	12.900	mg/kg	=	15.9	3.2	15.4		
Potassium	A042SB010	042SB01001	10/07/1995	380.000	mg/kg	J		128	675		
Selenium	A042SB010	042SB01001	10/07/1995	1.200	mg/kg	J		0.7	0.88		X
Sodium	A042SB010	042SB01001	10/07/1995	433.000	mg/kg	J		195	653		
Tin (Sn)	A042SB010	042SB01001	10/07/1995	28.500	mg/kg	J		NA	NA		
Vanadium	A042SB010	042SB01001	10/07/1995	39.900	mg/kg	=		4.9	28.1		X

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Zinc	A042SB010	042SB01001	10/07/1995	303.000	mg/kg	=	124	4.5	168	X	X
p,p'-DDD	A042SB010	042SB01001	10/07/1995	0.700	mg/kg	J					
p,p'-DDE	A042SB010	042SB01001	10/07/1995	2.500	mg/kg	J					
p,p'-DDT	A042SB010	042SB01001	10/07/1995	2.300	mg/kg	J					
Anthracene	A042SB010	042SB01001	10/07/1995	0.490	mg/kg	J	0.33			X	
Benzo(a)Anthracene	A042SB010	042SB01001	10/07/1995	1.100	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	A042SB010	042SB01001	10/07/1995	1.000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB010	042SB01001	10/07/1995	3.400	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	A042SB010	042SB01001	10/07/1995	0.750	mg/kg	J					
Carbazole	A042SB010	042SB01001	10/07/1995	0.430	mg/kg	J					
Chrysene	A042SB010	042SB01001	10/07/1995	2.400	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	A042SB010	042SB01001	10/07/1995	0.350	mg/kg	J	0.33		0.525	X	
Fluoranthene	A042SB010	042SB01001	10/07/1995	4.000	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB010	042SB01001	10/07/1995	0.850	mg/kg	J			0.525		X
Phenanthrene	A042SB010	042SB01001	10/07/1995	2.100	mg/kg	=	0.33			X	
Pyrene	A042SB010	042SB01001	10/07/1995	2.900	mg/kg	=	0.33			X	
BEQ	A042SB010	042SB01001	10/07/1995	1892.400	ug/kg	=			1.304		X
Aluminum	A042SB016	042SB01601	03/29/1996	2980.000	mg/kg	=		3640	11800		
Antimony	A042SB016	042SB01601	03/29/1996	0.390	mg/kg	J	12	NA	NA		
Arsenic	A042SB016	042SB01601	03/29/1996	28.200	mg/kg	=	7.24	1.7	30.1	X	
Barium	A042SB016	042SB01601	03/29/1996	12.000	mg/kg	=		6.5	46.5		
Beryllium	A042SB016	042SB01601	03/29/1996	0.170	mg/kg	J		0.32	0.32		
Cadmium	A042SB016	042SB01601	03/29/1996	0.060	mg/kg	J	1	2.8	2.8		
Calcium	A042SB016	042SB01601	03/29/1996	1870.000	mg/kg	J		797	78900		
Chromium, Total	A042SB016	042SB01601	03/29/1996	11.900	mg/kg	=	52.3	5.7	34.4		
Cobalt	A042SB016	042SB01601	03/29/1996	0.700	mg/kg	J		1.6	4.4		
Copper	A042SB016	042SB01601	03/29/1996	6.400	mg/kg	=	18.7	2.2	70.9		
Iron	A042SB016	042SB01601	03/29/1996	7100.000	mg/kg	=		1530	15700		
Lead	A042SB016	042SB01601	03/29/1996	39.200	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A042SB016	042SB01601	03/29/1996	281.000	mg/kg	=		231	3150		
Manganese	A042SB016	042SB01601	03/29/1996	20.000	mg/kg	=		8.7	66.1		
Mercury	A042SB016	042SB01601	03/29/1996	0.070	mg/kg	=	0.13	0.12	0.3		
Nickel	A042SB016	042SB01601	03/29/1996	1.900	mg/kg	J	15.9	3.2	15.4		
Potassium	A042SB016	042SB01601	03/29/1996	695.000	mg/kg	=		128	675		X
Sodium	A042SB016	042SB01601	03/29/1996	77.600	mg/kg	J		195	653		
Tin (Sn)	A042SB016	042SB01601	03/29/1996	1.400	mg/kg	J		NA	NA		
Vanadium	A042SB016	042SB01601	03/29/1996	15.600	mg/kg	=		4.9	28.1		
Zinc	A042SB016	042SB01601	03/29/1996	19.500	mg/kg	=	124	4.5	168		
Acenaphthylene	A042SB016	042SB01601	03/29/1996	0.170	mg/kg	J	0.33				
Anthracene	A042SB016	042SB01601	03/29/1996	0.200	mg/kg	J	0.33				
Benzo(a)Anthracene	A042SB016	042SB01601	03/29/1996	0.500	mg/kg	J	0.33		0.616	X	
Benzo(a)Pyrene	A042SB016	042SB01601	03/29/1996	0.640	mg/kg	J	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB016	042SB01601	03/29/1996	0.880	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	A042SB016	042SB01601	03/29/1996	0.490	mg/kg	J					
Benzo(k)Fluoranthene	A042SB016	042SB01601	03/29/1996	0.640	mg/kg	J			0.596		X
Chrysene	A042SB016	042SB01601	03/29/1996	0.680	mg/kg	J	0.33		0.62	X	X
Dibenz(a,h)anthracene	A042SB016	042SB01601	03/29/1996	0.240	mg/kg	J	0.33		0.525		
Di-n-butyl Phthalate	A042SB016	042SB01601	03/29/1996	0.200	mg/kg	J					
Fluoranthene	A042SB016	042SB01601	03/29/1996	0.620	mg/kg	J	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB016	042SB01601	03/29/1996	0.420	mg/kg	J			0.525		
Phenanthrene	A042SB016	042SB01601	03/29/1996	0.210	mg/kg	J	0.33				
Pyrene	A042SB016	042SB01601	03/29/1996	0.610	mg/kg	J	0.33			X	
BEQ	A042SB016	042SB01601	03/29/1996	1067.080	ug/kg	=			1.304		
Aluminum	A042SB017	042SB01701	03/29/1996	3850.000	mg/kg	=		3640	11800		
Antimony	A042SB017	042SB01701	03/29/1996	0.750	mg/kg	J	12	NA	NA		
Arsenic	A042SB017	042SB01701	03/29/1996	38.600	mg/kg	=	7.24	1.7	30.1	X	X
Barium	A042SB017	042SB01701	03/29/1996	28.600	mg/kg	=		6.5	46.5		
Beryllium	A042SB017	042SB01701	03/29/1996	0.230	mg/kg	J		0.32	0.32		
Cadmium	A042SB017	042SB01701	03/29/1996	0.320	mg/kg	J	1	2.8	2.8		
Calcium	A042SB017	042SB01701	03/29/1996	4450.000	mg/kg	J		797	78900		
Chromium, Total	A042SB017	042SB01701	03/29/1996	29.200	mg/kg	=	52.3	5.7	34.4		
Cobalt	A042SB017	042SB01701	03/29/1996	1.600	mg/kg	J		1.6	4.4		
Copper	A042SB017	042SB01701	03/29/1996	29.000	mg/kg	=	18.7	2.2	70.9	X	
Iron	A042SB017	042SB01701	03/29/1996	7740.000	mg/kg	=		1530	15700		
Lead	A042SB017	042SB01701	03/29/1996	86.500	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A042SB017	042SB01701	03/29/1996	302.000	mg/kg	=		231	3150		
Manganese	A042SB017	042SB01701	03/29/1996	81.500	mg/kg	=		8.7	66.1		X
Mercury	A042SB017	042SB01701	03/29/1996	0.130	mg/kg	=	0.13	0.12	0.3		
Nickel	A042SB017	042SB01701	03/29/1996	5.100	mg/kg	=	15.9	3.2	15.4		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Potassium	A042SB017	042SB01701	03/29/1996	952.000	mg/kg	=		128	675		X
Selenium	A042SB017	042SB01701	03/29/1996	0.490	mg/kg	J		0.7	0.88		
Sodium	A042SB017	042SB01701	03/29/1996	110.000	mg/kg	J		195	653		
Tin (Sn)	A042SB017	042SB01701	03/29/1996	3.600	mg/kg	J		NA	NA		
Vanadium	A042SB017	042SB01701	03/29/1996	13.400	mg/kg	=		4.9	28.1		
Zinc	A042SB017	042SB01701	03/29/1996	102.000	mg/kg	=	124	4.5	168		
Acenaphthylene	A042SB017	042SB01701	03/29/1996	0.200	mg/kg	J	0.33				
Anthracene	A042SB017	042SB01701	03/29/1996	0.250	mg/kg	J	0.33				
Benzo(a)Anthracene	A042SB017	042SB01701	03/29/1996	0.820	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	A042SB017	042SB01701	03/29/1996	1.100	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB017	042SB01701	03/29/1996	1.000	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	A042SB017	042SB01701	03/29/1996	1.300	mg/kg	=					
Benzo(k)Fluoranthene	A042SB017	042SB01701	03/29/1996	1.000	mg/kg	=			0.596		X
bis(2-Ethylhexyl) Phthalate	A042SB017	042SB01701	03/29/1996	0.090	mg/kg	J					
Chrysene	A042SB017	042SB01701	03/29/1996	0.950	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	A042SB017	042SB01701	03/29/1996	0.500	mg/kg	J	0.33		0.525	X	
Fluoranthene	A042SB017	042SB01701	03/29/1996	1.500	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB017	042SB01701	03/29/1996	0.900	mg/kg	=			0.525		X
Phenanthrene	A042SB017	042SB01701	03/29/1996	0.540	mg/kg	J	0.33			X	
Pyrene	A042SB017	042SB01701	03/29/1996	1.200	mg/kg	=	0.33			X	
BEQ	A042SB017	042SB01701	03/29/1996	1882.950	ug/kg	=			1.304		X
Aluminum	A042SB018	042SB01801	03/29/1996	1880.000	mg/kg	=		3640	11800		
Arsenic	A042SB018	042SB01801	03/29/1996	2.600	mg/kg	=	7.24	1.7	30.1		
Barium	A042SB018	042SB01801	03/29/1996	15.800	mg/kg	=		6.5	46.5		
Beryllium	A042SB018	042SB01801	03/29/1996	0.130	mg/kg	J		0.32	0.32		
Calcium	A042SB018	042SB01801	03/29/1996	267.000	mg/kg	J		797	78900		
Chromium, Total	A042SB018	042SB01801	03/29/1996	2.600	mg/kg	=	52.3	5.7	34.4		
Cobalt	A042SB018	042SB01801	03/29/1996	0.300	mg/kg	J		1.6	4.4		
Copper	A042SB018	042SB01801	03/29/1996	4.000	mg/kg	=	18.7	2.2	70.9		
Iron	A042SB018	042SB01801	03/29/1996	2830.000	mg/kg	=		1530	15700		
Lead	A042SB018	042SB01801	03/29/1996	44.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A042SB018	042SB01801	03/29/1996	99.800	mg/kg	=		231	3150		
Manganese	A042SB018	042SB01801	03/29/1996	18.500	mg/kg	=		8.7	66.1		
Nickel	A042SB018	042SB01801	03/29/1996	0.860	mg/kg	J	15.9	3.2	15.4		
Potassium	A042SB018	042SB01801	03/29/1996	236.000	mg/kg	J		128	675		
Selenium	A042SB018	042SB01801	03/29/1996	0.350	mg/kg	J		0.7	0.88		
Tin (Sn)	A042SB018	042SB01801	03/29/1996	0.790	mg/kg	J		NA	NA		
Vanadium	A042SB018	042SB01801	03/29/1996	4.200	mg/kg	=		4.9	28.1		
Zinc	A042SB018	042SB01801	03/29/1996	16.100	mg/kg	=	124	4.5	168		
Aluminum	A042SB019	042SB01901	03/29/1996	2250.000	mg/kg	=		3640	11800		
Antimony	A042SB019	042SB01901	03/29/1996	1.500	mg/kg	J	12	NA	NA		
Arsenic	A042SB019	042SB01901	03/29/1996	6.300	mg/kg	=	7.24	1.7	30.1		
Barium	A042SB019	042SB01901	03/29/1996	19.800	mg/kg	=		6.5	46.5		
Beryllium	A042SB019	042SB01901	03/29/1996	0.170	mg/kg	J		0.32	0.32		
Cadmium	A042SB019	042SB01901	03/29/1996	0.300	mg/kg	J	1	2.8	2.8		
Calcium	A042SB019	042SB01901	03/29/1996	7030.000	mg/kg	J		797	78900		
Chromium, Total	A042SB019	042SB01901	03/29/1996	18.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	A042SB019	042SB01901	03/29/1996	1.100	mg/kg	J		1.6	4.4		
Copper	A042SB019	042SB01901	03/29/1996	62.400	mg/kg	=	18.7	2.2	70.9	X	
Iron	A042SB019	042SB01901	03/29/1996	7590.000	mg/kg	=		1530	15700		
Lead	A042SB019	042SB01901	03/29/1996	128.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	A042SB019	042SB01901	03/29/1996	231.000	mg/kg	=		231	3150		
Manganese	A042SB019	042SB01901	03/29/1996	68.400	mg/kg	=		8.7	66.1		X
Mercury	A042SB019	042SB01901	03/29/1996	0.350	mg/kg	=	0.13	0.12	0.3	X	X
Nickel	A042SB019	042SB01901	03/29/1996	8.100	mg/kg	=	15.9	3.2	15.4		
Potassium	A042SB019	042SB01901	03/29/1996	484.000	mg/kg	J		128	675		
Selenium	A042SB019	042SB01901	03/29/1996	0.510	mg/kg	J		0.7	0.88		
Sodium	A042SB019	042SB01901	03/29/1996	93.800	mg/kg	J		195	653		
Tin (Sn)	A042SB019	042SB01901	03/29/1996	3.900	mg/kg	J		NA	NA		
Vanadium	A042SB019	042SB01901	03/29/1996	6.600	mg/kg	=		4.9	28.1		
Zinc	A042SB019	042SB01901	03/29/1996	110.000	mg/kg	=	124	4.5	168		
Benzo(a)Anthracene	A042SB019	042SB01901	03/29/1996	0.210	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	A042SB019	042SB01901	03/29/1996	0.230	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	A042SB019	042SB01901	03/29/1996	0.250	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	A042SB019	042SB01901	03/29/1996	0.200	mg/kg	J					
Benzo(k)Fluoranthene	A042SB019	042SB01901	03/29/1996	0.250	mg/kg	J			0.596		
Chrysene	A042SB019	042SB01901	03/29/1996	0.240	mg/kg	J	0.33		0.62		
Dibenz(a,h)anthracene	A042SB019	042SB01901	03/29/1996	0.080	mg/kg	J	0.33		0.525		
Fluoranthene	A042SB019	042SB01901	03/29/1996	0.360	mg/kg	J	0.33			X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Indeno(1,2,3-c,d)pyrene	A042SB019	042SB01901	03/29/1996	0.160	mg/kg	J			0.525		
Phenanthrene	A042SB019	042SB01901	03/29/1996	0.160	mg/kg	J	0.33				
Pyrene	A042SB019	042SB01901	03/29/1996	0.320	mg/kg	J	0.33				
BEQ	A042SB019	042SB01901	03/29/1996	374.740	ug/kg	=			1.304		
Aluminum	A042SB021	042SB02101	03/29/1996	2680.000	mg/kg	=		3640	11800		
Antimony	A042SB021	042SB02101	03/29/1996	0.800	mg/kg	J	12	NA	NA		
Arsenic	A042SB021	042SB02101	03/29/1996	25.400	mg/kg	=	7.24	1.7	30.1	X	
Barium	A042SB021	042SB02101	03/29/1996	19.000	mg/kg	=		6.5	46.5		
Beryllium	A042SB021	042SB02101	03/29/1996	0.130	mg/kg	J		0.32	0.32		
Cadmium	A042SB021	042SB02101	03/29/1996	0.220	mg/kg	J	1	2.8	2.8		
Calcium	A042SB021	042SB02101	03/29/1996	3120.000	mg/kg	J		797	78900		
Chromium, Total	A042SB021	042SB02101	03/29/1996	5.500	mg/kg	=	52.3	5.7	34.4		
Cobalt	A042SB021	042SB02101	03/29/1996	0.410	mg/kg	J		1.6	4.4		
Copper	A042SB021	042SB02101	03/29/1996	14.300	mg/kg	=	18.7	2.2	70.9		
Iron	A042SB021	042SB02101	03/29/1996	3460.000	mg/kg	=		1530	15700		
Lead	A042SB021	042SB02101	03/29/1996	34.400	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	A042SB021	042SB02101	03/29/1996	138.000	mg/kg	=		231	3150		
Manganese	A042SB021	042SB02101	03/29/1996	15.100	mg/kg	=		8.7	66.1		
Mercury	A042SB021	042SB02101	03/29/1996	0.080	mg/kg	=	0.13	0.12	0.3		
Nickel	A042SB021	042SB02101	03/29/1996	2.000	mg/kg	J	15.9	3.2	15.4		
Potassium	A042SB021	042SB02101	03/29/1996	432.000	mg/kg	J		128	675		
Sodium	A042SB021	042SB02101	03/29/1996	107.000	mg/kg	J		195	653		
Tin (Sn)	A042SB021	042SB02101	03/29/1996	5.700	mg/kg	J		NA	NA		
Vanadium	A042SB021	042SB02101	03/29/1996	6.200	mg/kg	=		4.9	28.1		
Zinc	A042SB021	042SB02101	03/29/1996	64.300	mg/kg	=	124	4.5	168		
Acenaphthylene	A042SB021	042SB02101	03/29/1996	0.160	mg/kg	J	0.33				
Benzo(a)Pyrene	A042SB021	042SB02101	03/29/1996	0.100	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	A042SB021	042SB02101	03/29/1996	0.090	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	A042SB021	042SB02101	03/29/1996	0.190	mg/kg	J					
Benzo(k)Fluoranthene	A042SB021	042SB02101	03/29/1996	0.096	mg/kg	J			0.596		
Chrysene	A042SB021	042SB02101	03/29/1996	0.091	mg/kg	J	0.33		0.62		
Di-n-butyl Phthalate	A042SB021	042SB02101	03/29/1996	0.110	mg/kg	J					
Indeno(1,2,3-c,d)pyrene	A042SB021	042SB02101	03/29/1996	0.140	mg/kg	J			0.525		
Pyrene	A042SB021	042SB02101	03/29/1996	0.100	mg/kg	J	0.33				
BEQ	A042SB021	042SB02101	03/29/1996	542.051	ug/kg	=			1.304		
Arsenic	A042SB042	042SB04201	10/14/1998	8.600	mg/kg	=	7.24	1.7	30.1	X	
Beryllium	A042SB042	042SB04201	10/14/1998	0.200	mg/kg	J		0.32	0.32		
Benzo(a)Anthracene	A042SB042	042SB04201	10/14/1998	0.240	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	A042SB042	042SB04201	10/14/1998	0.250	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	A042SB042	042SB04201	10/14/1998	0.290	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	A042SB042	042SB04201	10/14/1998	0.180	mg/kg	J					
Benzo(k)Fluoranthene	A042SB042	042SB04201	10/14/1998	0.180	mg/kg	J			0.596		
Chrysene	A042SB042	042SB04201	10/14/1998	0.290	mg/kg	J	0.33		0.62		
Fluoranthene	A042SB042	042SB04201	10/14/1998	0.510	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB042	042SB04201	10/14/1998	0.170	mg/kg	J			0.525		
Phenanthrene	A042SB042	042SB04201	10/14/1998	0.150	mg/kg	J	0.33				
Pyrene	A042SB042	042SB04201	10/14/1998	0.580	mg/kg	=	0.33			X	
BEQ	A042SB042	042SB04201	10/14/1998	507.090	ug/kg	=			1.304		
Arsenic	A042SB043	042SB04301	10/14/1998	3.000	mg/kg	=	7.24	1.7	30.1		
Beryllium	A042SB043	042SB04301	10/14/1998	0.170	mg/kg	J		0.32	0.32		
Arsenic	A042SB048	042SB04801	02/22/1999	2.100	mg/kg	=	7.24	1.7	30.1		
Arsenic	A042SB058	042SB05801	09/05/2001	7.530	mg/kg	J	7.24	1.7	30.1	X	
Arsenic	A042SB059	042SB05901	09/05/2001	9.270	mg/kg	J	7.24	1.7	30.1	X	
Arsenic	A042SB060	042SB06001	09/05/2001	9.860	mg/kg	J	7.24	1.7	30.1	X	
Arsenic	A042SB061	042SB06101	09/05/2001	27.400	mg/kg	J	7.24	1.7	30.1	X	
Aluminum	AS01SB001	S01SB00101	10/06/1993	2500.000	mg/kg	=		3640	11800		
Barium	AS01SB001	S01SB00101	10/06/1993	7.000	mg/kg	=		6.5	46.5		
Calcium	AS01SB001	S01SB00101	10/06/1993	2900.000	mg/kg	=		797	78900		
Chromium, Total	AS01SB001	S01SB00101	10/06/1993	3.500	mg/kg	=	52.3	5.7	34.4		
Iron	AS01SB001	S01SB00101	10/06/1993	490.000	mg/kg	=		1530	15700		
Lead	AS01SB001	S01SB00101	10/06/1993	7.100	mg/kg	J	30.2	4.1	93.1		
Magnesium	AS01SB001	S01SB00101	10/06/1993	110.000	mg/kg	=		231	3150		
Manganese	AS01SB001	S01SB00101	10/06/1993	3.100	mg/kg	=		8.7	66.1		
Mercury	AS01SB001	S01SB00101	10/06/1993	0.030	mg/kg	J	0.13	0.12	0.3		
Vanadium	AS01SB001	S01SB00101	10/06/1993	1.600	mg/kg	=		4.9	28.1		
Zinc	AS01SB001	S01SB00101	10/06/1993	7.100	mg/kg	J	124	4.5	168		
Aluminum	AS01SB002	S01SB00201	10/27/1993	7630.000	mg/kg	=		3640	11800		
Antimony	AS01SB002	S01SB00201	10/27/1993	17.500	mg/kg	J	12	NA	NA	X	
Arsenic	AS01SB002	S01SB00201	10/27/1993	9.400	mg/kg	=	7.24	1.7	30.1	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Barium	AS01SB002	S01SB00201	10/27/1993	98.400	mg/kg	=		6.5	46.5		X
Cadmium	AS01SB002	S01SB00201	10/27/1993	1.200	mg/kg	=	1	2.8	2.8	X	
Calcium	AS01SB002	S01SB00201	10/27/1993	38100.000	mg/kg	J		797	78900		
Chromium, Total	AS01SB002	S01SB00201	10/27/1993	38.700	mg/kg	=	52.3	5.7	34.4		X
Cobalt	AS01SB002	S01SB00201	10/27/1993	1.900	mg/kg	=		1.6	4.4		
Copper	AS01SB002	S01SB00201	10/27/1993	443.000	mg/kg	J	18.7	2.2	70.9	X	X
Iron	AS01SB002	S01SB00201	10/27/1993	8470.000	mg/kg	=		1530	15700		
Manganese	AS01SB002	S01SB00201	10/27/1993	109.000	mg/kg	J		8.7	66.1		X
Mercury	AS01SB002	S01SB00201	10/27/1993	14.800	mg/kg	J	0.13	0.12	0.3	X	X
Nickel	AS01SB002	S01SB00201	10/27/1993	9.000	mg/kg	=	15.9	3.2	15.4		
Potassium	AS01SB002	S01SB00201	10/27/1993	466.000	mg/kg	=		128	675		
Sodium	AS01SB002	S01SB00201	10/27/1993	252.000	mg/kg	=		195	653		
Vanadium	AS01SB002	S01SB00201	10/27/1993	55.000	mg/kg	=		4.9	28.1		X
Zinc	AS01SB002	S01SB00201	10/27/1993	369.000	mg/kg	=	124	4.5	168	X	X
p,p'-DDE	AS01SB002	S01SB00201	10/27/1993	0.004	mg/kg	=					
p,p'-DDT	AS01SB002	S01SB00201	10/27/1993	0.012	mg/kg	J					
Benzo(a)Anthracene	AS01SB002	S01SB00201	10/27/1993	0.120	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	AS01SB002	S01SB00201	10/27/1993	0.110	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	AS01SB002	S01SB00201	10/27/1993	0.150	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	AS01SB002	S01SB00201	10/27/1993	0.098	mg/kg	J					
Benzo(k)Fluoranthene	AS01SB002	S01SB00201	10/27/1993	0.067	mg/kg	J			0.596		
Chrysene	AS01SB002	S01SB00201	10/27/1993	0.140	mg/kg	J	0.33		0.62		
Fluoranthene	AS01SB002	S01SB00201	10/27/1993	0.240	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	AS01SB002	S01SB00201	10/27/1993	0.097	mg/kg	J			0.525		
Phenanthrene	AS01SB002	S01SB00201	10/27/1993	0.100	mg/kg	J	0.33				
Pyrene	AS01SB002	S01SB00201	10/27/1993	0.300	mg/kg	J	0.33				
BEQ	AS01SB002	S01SB00201	10/27/1993	337.510	ug/kg	=			1.304		
1,1,1-Trichloroethane	AS01SB002	S01SB00201	10/27/1993	0.003	mg/kg	J					
Acetone	AS01SB002	S01SB00201	10/27/1993	0.090	mg/kg	=					
Chlorobenzene	AS01SB002	S01SB00201	10/27/1993	0.029	mg/kg	=					
m+p Xylene	AS01SB002	S01SB00201	10/27/1993	0.003	mg/kg	J					
Methyl ethyl ketone (2-Butanone)	AS01SB002	S01SB00201	10/27/1993	0.003	mg/kg	J					
Methylene Chloride	AS01SB002	S01SB00201	10/27/1993	0.002	mg/kg	J					
Toluene	AS01SB002	S01SB00201	10/27/1993	0.003	mg/kg	J					
Aluminum	AS02SB002	S02SB00201	10/06/1993	6100.000	mg/kg	=		3640	11800		
Arsenic	AS02SB002	S02SB00201	10/06/1993	3.200	mg/kg	=	7.24	1.7	30.1		
Barium	AS02SB002	S02SB00201	10/06/1993	15.000	mg/kg	=		6.5	46.5		
Calcium	AS02SB002	S02SB00201	10/06/1993	92000.000	mg/kg	=		797	78900		X
Cobalt	AS02SB002	S02SB00201	10/06/1993	1.300	mg/kg	=		1.6	4.4		
Copper	AS02SB002	S02SB00201	10/06/1993	10.000	mg/kg	=	18.7	2.2	70.9		
Iron	AS02SB002	S02SB00201	10/06/1993	7200.000	mg/kg	=		1530	15700		
Lead	AS02SB002	S02SB00201	10/06/1993	31.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	AS02SB002	S02SB00201	10/06/1993	2800.000	mg/kg	J		231	3150		
Manganese	AS02SB002	S02SB00201	10/06/1993	34.000	mg/kg	=		8.7	66.1		
Mercury	AS02SB002	S02SB00201	10/06/1993	0.030	mg/kg	=	0.13	0.12	0.3		
Nickel	AS02SB002	S02SB00201	10/06/1993	13.000	mg/kg	=	15.9	3.2	15.4		
Potassium	AS02SB002	S02SB00201	10/06/1993	430.000	mg/kg	=		128	675		
Sodium	AS02SB002	S02SB00201	10/06/1993	320.000	mg/kg	=		195	653		
Vanadium	AS02SB002	S02SB00201	10/06/1993	19.000	mg/kg	=		4.9	28.1		
Zinc	AS02SB002	S02SB00201	10/06/1993	49.000	mg/kg	=	124	4.5	168		
Aluminum	AS02SB006	S02SB00601	10/06/1993	8200.000	mg/kg	=		3640	11800		
Arsenic	AS02SB006	S02SB00601	10/06/1993	3.900	mg/kg	=	7.24	1.7	30.1		
Barium	AS02SB006	S02SB00601	10/06/1993	22.000	mg/kg	=		6.5	46.5		
Cadmium	AS02SB006	S02SB00601	10/06/1993	0.800	mg/kg	=	1	2.8	2.8		
Calcium	AS02SB006	S02SB00601	10/06/1993	75000.000	mg/kg	=		797	78900		
Chromium, Total	AS02SB006	S02SB00601	10/06/1993	25.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	AS02SB006	S02SB00601	10/06/1993	1.400	mg/kg	=		1.6	4.4		
Copper	AS02SB006	S02SB00601	10/06/1993	13.000	mg/kg	=	18.7	2.2	70.9		
Iron	AS02SB006	S02SB00601	10/06/1993	7100.000	mg/kg	=		1530	15700		
Lead	AS02SB006	S02SB00601	10/06/1993	44.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	AS02SB006	S02SB00601	10/06/1993	2400.000	mg/kg	J		231	3150		
Manganese	AS02SB006	S02SB00601	10/06/1993	41.000	mg/kg	=		8.7	66.1		
Mercury	AS02SB006	S02SB00601	10/06/1993	0.040	mg/kg	=	0.13	0.12	0.3		
Nickel	AS02SB006	S02SB00601	10/06/1993	12.000	mg/kg	=	15.9	3.2	15.4		
Potassium	AS02SB006	S02SB00601	10/06/1993	470.000	mg/kg	=		128	675		
Sodium	AS02SB006	S02SB00601	10/06/1993	270.000	mg/kg	=		195	653		
Vanadium	AS02SB006	S02SB00601	10/06/1993	20.000	mg/kg	=		4.9	28.1		
Zinc	AS02SB006	S02SB00601	10/06/1993	61.000	mg/kg	=	124	4.5	168		
Aluminum	AS02SB007	S02SB00701	10/06/1993	5.700	mg/kg	=		3640	11800		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Arsenic	AS02SB007	S02SB00701	10/06/1993	0.007	mg/kg	=	7.24	1.7	30.1		
Barium	AS02SB007	S02SB00701	10/06/1993	0.043	mg/kg	=		6.5	46.5		
Cadmium	AS02SB007	S02SB00701	10/06/1993	0.004	mg/kg	=	1	2.8	2.8		
Calcium	AS02SB007	S02SB00701	10/06/1993	98.000	mg/kg	=		797	78900		
Chromium, Total	AS02SB007	S02SB00701	10/06/1993	0.029	mg/kg	=	52.3	5.7	34.4		
Cobalt	AS02SB007	S02SB00701	10/06/1993	0.003	mg/kg	=		1.6	4.4		
Copper	AS02SB007	S02SB00701	10/06/1993	0.075	mg/kg	=	18.7	2.2	70.9		
Iron	AS02SB007	S02SB00701	10/06/1993	8.200	mg/kg	=		1530	15700		
Lead	AS02SB007	S02SB00701	10/06/1993	0.310	mg/kg	J	30.2	4.1	93.1		
Magnesium	AS02SB007	S02SB00701	10/06/1993	1.900	mg/kg	J		231	3150		
Manganese	AS02SB007	S02SB00701	10/06/1993	0.081	mg/kg	=		8.7	66.1		
Mercury	AS02SB007	S02SB00701	10/06/1993	0.000	mg/kg	=	0.13	0.12	0.3		
Nickel	AS02SB007	S02SB00701	10/06/1993	0.018	mg/kg	=	15.9	3.2	15.4		
Potassium	AS02SB007	S02SB00701	10/06/1993	0.500	mg/kg	=		128	675		
Sodium	AS02SB007	S02SB00701	10/06/1993	0.220	mg/kg	=		195	653		
Vanadium	AS02SB007	S02SB00701	10/06/1993	0.020	mg/kg	=		4.9	28.1		
Zinc	AS02SB007	S02SB00701	10/06/1993	0.290	mg/kg	=	124	4.5	168		
Aluminum	AS02SB008	S02SB00801	10/06/1993	3.000	mg/kg	=		3640	11800		
Arsenic	AS02SB008	S02SB00801	10/06/1993	0.008	mg/kg	=	7.24	1.7	30.1		
Barium	AS02SB008	S02SB00801	10/06/1993	0.022	mg/kg	=		6.5	46.5		
Cadmium	AS02SB008	S02SB00801	10/06/1993	0.001	mg/kg	=	1	2.8	2.8		
Calcium	AS02SB008	S02SB00801	10/06/1993	140.000	mg/kg	=		797	78900		
Chromium, Total	AS02SB008	S02SB00801	10/06/1993	0.018	mg/kg	=	52.3	5.7	34.4		
Cobalt	AS02SB008	S02SB00801	10/06/1993	0.002	mg/kg	=		1.6	4.4		
Copper	AS02SB008	S02SB00801	10/06/1993	0.012	mg/kg	=	18.7	2.2	70.9		
Iron	AS02SB008	S02SB00801	10/06/1993	5.300	mg/kg	=		1530	15700		
Lead	AS02SB008	S02SB00801	10/06/1993	0.039	mg/kg	J	30.2	4.1	93.1		
Magnesium	AS02SB008	S02SB00801	10/06/1993	2.100	mg/kg	J		231	3150		
Manganese	AS02SB008	S02SB00801	10/06/1993	0.140	mg/kg	=		8.7	66.1		
Mercury	AS02SB008	S02SB00801	10/06/1993	0.000	mg/kg	=	0.13	0.12	0.3		
Nickel	AS02SB008	S02SB00801	10/06/1993	0.013	mg/kg	=	15.9	3.2	15.4		
Potassium	AS02SB008	S02SB00801	10/06/1993	0.260	mg/kg	=		128	675		
Sodium	AS02SB008	S02SB00801	10/06/1993	0.140	mg/kg	=		195	653		
Vanadium	AS02SB008	S02SB00801	10/06/1993	0.011	mg/kg	=		4.9	28.1		
Zinc	AS02SB008	S02SB00801	10/06/1993	0.041	mg/kg	=	124	4.5	168		
Aluminum	AS02SB010	S02SB01001	10/06/1993	8300.000	mg/kg	=		3640	11800		
Arsenic	AS02SB010	S02SB01001	10/06/1993	12.000	mg/kg	=	7.24	1.7	30.1	X	
Barium	AS02SB010	S02SB01001	10/06/1993	22.000	mg/kg	=		6.5	46.5		
Calcium	AS02SB010	S02SB01001	10/06/1993	110000.000	mg/kg	=		797	78900		X
Chromium, Total	AS02SB010	S02SB01001	10/06/1993	36.000	mg/kg	=	52.3	5.7	34.4		X
Cobalt	AS02SB010	S02SB01001	10/06/1993	1.900	mg/kg	=		1.6	4.4		
Copper	AS02SB010	S02SB01001	10/06/1993	17.000	mg/kg	=	18.7	2.2	70.9		
Iron	AS02SB010	S02SB01001	10/06/1993	7700.000	mg/kg	=		1530	15700		
Lead	AS02SB010	S02SB01001	10/06/1993	40.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	AS02SB010	S02SB01001	10/06/1993	3500.000	mg/kg	J		231	3150		X
Manganese	AS02SB010	S02SB01001	10/06/1993	48.000	mg/kg	=		8.7	66.1		
Mercury	AS02SB010	S02SB01001	10/06/1993	0.040	mg/kg	=	0.13	0.12	0.3		
Nickel	AS02SB010	S02SB01001	10/06/1993	19.000	mg/kg	=	15.9	3.2	15.4	X	X
Potassium	AS02SB010	S02SB01001	10/06/1993	680.000	mg/kg	=		128	675		X
Sodium	AS02SB010	S02SB01001	10/06/1993	390.000	mg/kg	=		195	653		
Vanadium	AS02SB010	S02SB01001	10/06/1993	27.000	mg/kg	=		4.9	28.1		
Zinc	AS02SB010	S02SB01001	10/06/1993	72.000	mg/kg	=	124	4.5	168		
Aluminum	AS02SB015	S02SB01501	10/25/1993	3800.000	mg/kg	=		3640	11800		
Antimony	AS02SB015	S02SB01501	10/25/1993	8.500	mg/kg	J	12	NA	NA		
Arsenic	AS02SB015	S02SB01501	10/25/1993	6.900	mg/kg	J	7.24	1.7	30.1		
Barium	AS02SB015	S02SB01501	10/25/1993	45.000	mg/kg	J		6.5	46.5		
Cadmium	AS02SB015	S02SB01501	10/25/1993	3.200	mg/kg	J	1	2.8	2.8	X	X
Calcium	AS02SB015	S02SB01501	10/25/1993	58000.000	mg/kg	=		797	78900		
Chromium, Total	AS02SB015	S02SB01501	10/25/1993	29.000	mg/kg	=	52.3	5.7	34.4		
Cobalt	AS02SB015	S02SB01501	10/25/1993	3.500	mg/kg	=		1.6	4.4		
Copper	AS02SB015	S02SB01501	10/25/1993	180.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	AS02SB015	S02SB01501	10/25/1993	17000.000	mg/kg	=		1530	15700		X
Lead	AS02SB015	S02SB01501	10/25/1993	1400.000	mg/kg	J	30.2	4.1	93.1	X	X
Magnesium	AS02SB015	S02SB01501	10/25/1993	1300.000	mg/kg	=		231	3150		
Manganese	AS02SB015	S02SB01501	10/25/1993	160.000	mg/kg	=		8.7	66.1		X
Mercury	AS02SB015	S02SB01501	10/25/1993	0.200	mg/kg	=	0.13	0.12	0.3	X	
Nickel	AS02SB015	S02SB01501	10/25/1993	29.000	mg/kg	J	15.9	3.2	15.4	X	X
Potassium	AS02SB015	S02SB01501	10/25/1993	320.000	mg/kg	J		128	675		
Sodium	AS02SB015	S02SB01501	10/25/1993	110.000	mg/kg	J		195	653		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Vanadium	AS02SB015	S02SB01501	10/25/1993	17.000	mg/kg	=		4.9	28.1		
Zinc	AS02SB015	S02SB01501	10/25/1993	490.000	mg/kg	=	124	4.5	168	X	X
Aluminum	AS02SB018	S02SB01801	10/26/1993	1500.000	mg/kg	=		3640	11800		
Antimony	AS02SB018	S02SB01801	10/26/1993	8.300	mg/kg	J	12	NA	NA		
Arsenic	AS02SB018	S02SB01801	10/26/1993	20.000	mg/kg	J	7.24	1.7	30.1	X	
Barium	AS02SB018	S02SB01801	10/26/1993	37.000	mg/kg	J		6.5	46.5		
Calcium	AS02SB018	S02SB01801	10/26/1993	68000.000	mg/kg	=		797	78900		
Chromium, Total	AS02SB018	S02SB01801	10/26/1993	8.200	mg/kg	=	52.3	5.7	34.4		
Cobalt	AS02SB018	S02SB01801	10/26/1993	3.300	mg/kg	=		1.6	4.4		
Copper	AS02SB018	S02SB01801	10/26/1993	100.000	mg/kg	=	18.7	2.2	70.9	X	X
Iron	AS02SB018	S02SB01801	10/26/1993	4700.000	mg/kg	=		1530	15700		
Lead	AS02SB018	S02SB01801	10/26/1993	85.000	mg/kg	J	30.2	4.1	93.1	X	
Magnesium	AS02SB018	S02SB01801	10/26/1993	800.000	mg/kg	=		231	3150		
Manganese	AS02SB018	S02SB01801	10/26/1993	55.000	mg/kg	=		8.7	66.1		
Mercury	AS02SB018	S02SB01801	10/26/1993	0.280	mg/kg	=	0.13	0.12	0.3	X	
Nickel	AS02SB018	S02SB01801	10/26/1993	9.800	mg/kg	J	15.9	3.2	15.4		
Potassium	AS02SB018	S02SB01801	10/26/1993	180.000	mg/kg	J		128	675		
Sodium	AS02SB018	S02SB01801	10/26/1993	94.000	mg/kg	J		195	653		
Vanadium	AS02SB018	S02SB01801	10/26/1993	9.000	mg/kg	=		4.9	28.1		
Zinc	AS02SB018	S02SB01801	10/26/1993	71.000	mg/kg	=	124	4.5	168		
Aluminum	E054SB041	054SB04101	09/17/2002	5330.000	mg/kg	=		261	20500		
Antimony	E054SB041	054SB04101	09/17/2002	5.900	mg/kg	J	12	0.5	7.4		
Arsenic	E054SB041	054SB04101	09/17/2002	5.190	mg/kg	=	7.24	0.95	67.5		
Barium	E054SB041	054SB04101	09/17/2002	88.300	mg/kg	J		1.8	1980		
Beryllium	E054SB041	054SB04101	09/17/2002	0.382	mg/kg	J		0.13	1.6		
Cadmium	E054SB041	054SB04101	09/17/2002	2.850	mg/kg	=	1	0.06	1.5	X	X
Calcium	E054SB041	054SB04101	09/17/2002	2580.000	mg/kg	=		167	182000		
Chromium, Total	E054SB041	054SB04101	09/17/2002	104.000	mg/kg	=	52.3	2.3	567	X	
Cobalt	E054SB041	054SB04101	09/17/2002	4.110	mg/kg	J		0.35	111		
Copper	E054SB041	054SB04101	09/17/2002	253.000	mg/kg	J	18.7	0.47	866	X	
Iron	E054SB041	054SB04101	09/17/2002	16800.000	mg/kg	J		1050	30600		
Lead	E054SB041	054SB04101	09/17/2002	673.000	mg/kg	J	30.2	1	400	X	X
Magnesium	E054SB041	054SB04101	09/17/2002	608.000	mg/kg	J		31	14800		
Manganese	E054SB041	054SB04101	09/17/2002	128.000	mg/kg	J		0.93	508		
Mercury	E054SB041	054SB04101	09/17/2002	2.740	mg/kg	=	0.13	0.03	2.7	X	X
Nickel	E054SB041	054SB04101	09/17/2002	21.700	mg/kg	=	15.9	0.6	71.5	X	
Potassium	E054SB041	054SB04101	09/17/2002	342.000	mg/kg	J		45.6	2620		
Selenium	E054SB041	054SB04101	09/17/2002	1.050	mg/kg	J		0.57	4		
Silver	E054SB041	054SB04101	09/17/2002	0.826	mg/kg	J	2	0.75	0.91		
Sodium	E054SB041	054SB04101	09/17/2002	73.800	mg/kg	J		11.9	28200		
Vanadium	E054SB041	054SB04101	09/17/2002	10.700	mg/kg	J		1.1	60.1		
Zinc	E054SB041	054SB04101	09/17/2002	1050.000	mg/kg	=	124	1.9	855	X	X
Acenaphthene	E054SB041	054SB04101	09/17/2002	0.026	mg/kg	J	0.33	#N/A			
Anthracene	E054SB041	054SB04101	09/17/2002	0.069	mg/kg	J	0.33				
Benzo(a)Anthracene	E054SB041	054SB04101	09/17/2002	0.292	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	E054SB041	054SB04101	09/17/2002	0.314	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	E054SB041	054SB04101	09/17/2002	0.445	mg/kg	=			0.608		
Benzo(g,h,i)Perylene	E054SB041	054SB04101	09/17/2002	0.138	mg/kg	J					
Carbazole	E054SB041	054SB04101	09/17/2002	0.027	mg/kg	J					
Chrysene	E054SB041	054SB04101	09/17/2002	0.296	mg/kg	J	0.33		0.62		
Fluoranthene	E054SB041	054SB04101	09/17/2002	0.541	mg/kg	=	0.33			X	
Fluorene	E054SB041	054SB04101	09/17/2002	0.021	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	E054SB041	054SB04101	09/17/2002	0.288	mg/kg	J			0.525		
Phenanthrene	E054SB041	054SB04101	09/17/2002	0.345	mg/kg	J	0.33			X	
Pyrene	E054SB041	054SB04101	09/17/2002	0.570	mg/kg	J	0.33			X	
BEQ	E054SB041	054SB04101	09/17/2002	605.161	ug/kg	=			1.304		
Aluminum	E054SB043	054SB04301	09/17/2002	9200.000	mg/kg	=		261	20500		
Arsenic	E054SB043	054SB04301	09/17/2002	4.840	mg/kg	=	7.24	0.95	67.5		
Barium	E054SB043	054SB04301	09/17/2002	43.100	mg/kg	J		1.8	1980		
Beryllium	E054SB043	054SB04301	09/17/2002	0.331	mg/kg	J		0.13	1.6		
Cadmium	E054SB043	054SB04301	09/17/2002	0.138	mg/kg	J	1	0.06	1.5		
Calcium	E054SB043	054SB04301	09/17/2002	6360.000	mg/kg	=		167	182000		
Chromium, Total	E054SB043	054SB04301	09/17/2002	19.400	mg/kg	=	52.3	2.3	567		
Cobalt	E054SB043	054SB04301	09/17/2002	1.710	mg/kg	J		0.35	111		
Copper	E054SB043	054SB04301	09/17/2002	84.900	mg/kg	J	18.7	0.47	866	X	
Iron	E054SB043	054SB04301	09/17/2002	10300.000	mg/kg	J		1050	30600		
Lead	E054SB043	054SB04301	09/17/2002	215.000	mg/kg	J	30.2	1	400	X	
Magnesium	E054SB043	054SB04301	09/17/2002	1180.000	mg/kg	J		31	14800		
Manganese	E054SB043	054SB04301	09/17/2002	64.500	mg/kg	J		0.93	508		

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Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Mercury	E054SB043	054SB04301	09/17/2002	0.271	mg/kg	=	0.13	0.03	2.7	X	
Nickel	E054SB043	054SB04301	09/17/2002	8.420	mg/kg	J	15.9	0.6	71.5		
Potassium	E054SB043	054SB04301	09/17/2002	528.000	mg/kg	J		45.6	2620		
Selenium	E054SB043	054SB04301	09/17/2002	0.502	mg/kg	J		0.57	4		
Sodium	E054SB043	054SB04301	09/17/2002	883.000	mg/kg	J		11.9	28200		
Vanadium	E054SB043	054SB04301	09/17/2002	16.100	mg/kg	=		1.1	60.1		
Zinc	E054SB043	054SB04301	09/17/2002	177.000	mg/kg	=	124	1.9	855	X	
Benzo(a)Pyrene	E054SB043	054SB04301	09/17/2002	0.057	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	E054SB043	054SB04301	09/17/2002	0.078	mg/kg	J			0.608		
Chrysene	E054SB043	054SB04301	09/17/2002	0.057	mg/kg	J	0.33		0.62		
Fluoranthene	E054SB043	054SB04301	09/17/2002	0.090	mg/kg	J	0.33				
Phenanthrene	E054SB043	054SB04301	09/17/2002	0.040	mg/kg	J	0.33				
Pyrene	E054SB043	054SB04301	09/17/2002	0.083	mg/kg	J	0.33				
BEQ	E054SB043	054SB04301	09/17/2002	312.867	ug/kg	=			1.304		
Acetone	E054SB043	054SB04301	09/17/2002	0.010	mg/kg	=					
Aluminum	E054SB044	054SB04401	09/17/2002	14600.000	mg/kg	=		261	20500		
Arsenic	E054SB044	054SB04401	09/17/2002	4.400	mg/kg	=	7.24	0.95	67.5		
Barium	E054SB044	054SB04401	09/17/2002	19.500	mg/kg	J		1.8	1980		
Calcium	E054SB044	054SB04401	09/17/2002	265.000	mg/kg	J		167	182000		
Chromium, Total	E054SB044	054SB04401	09/17/2002	13.000	mg/kg	=	52.3	2.3	567		
Cobalt	E054SB044	054SB04401	09/17/2002	0.619	mg/kg	J		0.35	111		
Copper	E054SB044	054SB04401	09/17/2002	1.920	mg/kg	J	18.7	0.47	866		
Iron	E054SB044	054SB04401	09/17/2002	12500.000	mg/kg	J		1050	30600		
Lead	E054SB044	054SB04401	09/17/2002	8.210	mg/kg	J	30.2	1	400		
Magnesium	E054SB044	054SB04401	09/17/2002	684.000	mg/kg	J		31	14800		
Manganese	E054SB044	054SB04401	09/17/2002	15.200	mg/kg	J		0.93	508		
Mercury	E054SB044	054SB04401	09/17/2002	0.065	mg/kg	J	0.13	0.03	2.7		
Nickel	E054SB044	054SB04401	09/17/2002	2.870	mg/kg	J	15.9	0.6	71.5		
Potassium	E054SB044	054SB04401	09/17/2002	463.000	mg/kg	J		45.6	2620		
Selenium	E054SB044	054SB04401	09/17/2002	0.926	mg/kg	J		0.57	4		
Sodium	E054SB044	054SB04401	09/17/2002	1130.000	mg/kg	J		11.9	28200		
Vanadium	E054SB044	054SB04401	09/17/2002	19.200	mg/kg	=		1.1	60.1		
Zinc	E054SB044	054SB04401	09/17/2002	11.900	mg/kg	=	124	1.9	855		
Acetone	E054SB044	054SB04401	09/17/2002	0.011	mg/kg	=					
Aluminum	E054SB045	054SB04501	09/17/2002	6980.000	mg/kg	=		261	20500		
Antimony	E054SB045	054SB04501	09/17/2002	10.900	mg/kg	J	12	0.5	7.4		X
Arsenic	E054SB045	054SB04501	09/17/2002	4.840	mg/kg	=	7.24	0.95	67.5		
Barium	E054SB045	054SB04501	09/17/2002	122.000	mg/kg	J		1.8	1980		
Beryllium	E054SB045	054SB04501	09/17/2002	7.490	mg/kg	=		0.13	1.6		X
Cadmium	E054SB045	054SB04501	09/17/2002	1.650	mg/kg	=	1	0.06	1.5	X	X
Calcium	E054SB045	054SB04501	09/17/2002	3720.000	mg/kg	=		167	182000		
Chromium, Total	E054SB045	054SB04501	09/17/2002	117.000	mg/kg	=	52.3	2.3	567	X	
Cobalt	E054SB045	054SB04501	09/17/2002	11.400	mg/kg	=		0.35	111		
Copper	E054SB045	054SB04501	09/17/2002	523.000	mg/kg	J	18.7	0.47	866	X	
Iron	E054SB045	054SB04501	09/17/2002	27300.000	mg/kg	J		1050	30600		
Lead	E054SB045	054SB04501	09/17/2002	643.000	mg/kg	J	30.2	1	400	X	X
Magnesium	E054SB045	054SB04501	09/17/2002	1120.000	mg/kg	J		31	14800		
Manganese	E054SB045	054SB04501	09/17/2002	244.000	mg/kg	J		0.93	508		
Mercury	E054SB045	054SB04501	09/17/2002	1.310	mg/kg	=	0.13	0.03	2.7	X	
Nickel	E054SB045	054SB04501	09/17/2002	26.400	mg/kg	=	15.9	0.6	71.5	X	
Potassium	E054SB045	054SB04501	09/17/2002	572.000	mg/kg	J		45.6	2620		
Selenium	E054SB045	054SB04501	09/17/2002	1.710	mg/kg	=		0.57	4		
Silver	E054SB045	054SB04501	09/17/2002	0.575	mg/kg	J	2	0.75	0.91		
Sodium	E054SB045	054SB04501	09/17/2002	813.000	mg/kg	J		11.9	28200		
Vanadium	E054SB045	054SB04501	09/17/2002	12.300	mg/kg	=		1.1	60.1		
Zinc	E054SB045	054SB04501	09/17/2002	2990.000	mg/kg	=	124	1.9	855	X	X
Benzo(a)Pyrene	E054SB045	054SB04501	09/17/2002	0.046	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	E054SB045	054SB04501	09/17/2002	0.095	mg/kg	J			0.608		
Di-n-butyl Phthalate	E054SB045	054SB04501	09/17/2002	0.132	mg/kg	J					
Phenanthrene	E054SB045	054SB04501	09/17/2002	0.038	mg/kg	J	0.33				
Pyrene	E054SB045	054SB04501	09/17/2002	0.082	mg/kg	J	0.33				
BEQ	E054SB045	054SB04501	09/17/2002	286.947	ug/kg	=			1.304		
Acetone	E054SB045	054SB04501	09/17/2002	0.006	mg/kg	J					
Toluene	E054SB045	054SB04501	09/17/2002	0.005	mg/kg	=					
Aluminum	E054SB046	054SB04601	09/17/2002	8530.000	mg/kg	=		261	20500		
Arsenic	E054SB046	054SB04601	09/17/2002	3.790	mg/kg	=	7.24	0.95	67.5		
Barium	E054SB046	054SB04601	09/17/2002	26.800	mg/kg	J		1.8	1980		
Beryllium	E054SB046	054SB04601	09/17/2002	0.320	mg/kg	J		0.13	1.6		
Cadmium	E054SB046	054SB04601	09/17/2002	0.338	mg/kg	J	1	0.06	1.5		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Calcium	E054SB046	054SB04601	09/17/2002	16500.000	mg/kg	=		167	182000		
Chromium, Total	E054SB046	054SB04601	09/17/2002	17.800	mg/kg	=	52.3	2.3	567		
Cobalt	E054SB046	054SB04601	09/17/2002	1.660	mg/kg	J		0.35	111		
Copper	E054SB046	054SB04601	09/17/2002	25.300	mg/kg	J	18.7	0.47	866	X	
Iron	E054SB046	054SB04601	09/17/2002	8120.000	mg/kg	J		1050	30600		
Lead	E054SB046	054SB04601	09/17/2002	118.000	mg/kg	J	30.2	1	400	X	
Magnesium	E054SB046	054SB04601	09/17/2002	919.000	mg/kg	J		31	14800		
Manganese	E054SB046	054SB04601	09/17/2002	50.300	mg/kg	J		0.93	508		
Mercury	E054SB046	054SB04601	09/17/2002	0.208	mg/kg	=	0.13	0.03	2.7	X	
Nickel	E054SB046	054SB04601	09/17/2002	5.280	mg/kg	J	15.9	0.6	71.5		
Potassium	E054SB046	054SB04601	09/17/2002	394.000	mg/kg	J		45.6	2620		
Sodium	E054SB046	054SB04601	09/17/2002	95.100	mg/kg	J		11.9	28200		
Vanadium	E054SB046	054SB04601	09/17/2002	13.300	mg/kg	=		1.1	60.1		
Zinc	E054SB046	054SB04601	09/17/2002	97.600	mg/kg	=	124	1.9	855		
Benzo(a)Pyrene	E054SB046	054SB04601	09/17/2002	0.021	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	E054SB046	054SB04601	09/17/2002	0.027	mg/kg	J			0.608		
Di-n-butyl Phthalate	E054SB046	054SB04601	09/17/2002	0.030	mg/kg	J					
Fluoranthene	E054SB046	054SB04601	09/17/2002	0.038	mg/kg	J	0.33				
Pyrene	E054SB046	054SB04601	09/17/2002	0.029	mg/kg	J	0.33				
BEQ	E054SB046	054SB04601	09/17/2002	248.155	ug/kg	=			1.304		
Aluminum	E054SB047	054SB04701	09/17/2002	8660.000	mg/kg	=		261	20500		
Antimony	E054SB047	054SB04701	09/17/2002	0.545	mg/kg	J	12	0.5	7.4		
Arsenic	E054SB047	054SB04701	09/17/2002	1.510	mg/kg	J	7.24	0.95	67.5		
Barium	E054SB047	054SB04701	09/17/2002	24.600	mg/kg	J		1.8	1980		
Beryllium	E054SB047	054SB04701	09/17/2002	0.256	mg/kg	J		0.13	1.6		
Calcium	E054SB047	054SB04701	09/17/2002	1870.000	mg/kg	=		167	182000		
Chromium, Total	E054SB047	054SB04701	09/17/2002	12.500	mg/kg	=	52.3	2.3	567		
Cobalt	E054SB047	054SB04701	09/17/2002	2.010	mg/kg	J		0.35	111		
Copper	E054SB047	054SB04701	09/17/2002	31.000	mg/kg	J	18.7	0.47	866	X	
Iron	E054SB047	054SB04701	09/17/2002	4850.000	mg/kg	J		1050	30600		
Lead	E054SB047	054SB04701	09/17/2002	47.400	mg/kg	J	30.2	1	400	X	
Magnesium	E054SB047	054SB04701	09/17/2002	405.000	mg/kg	J		31	14800		
Manganese	E054SB047	054SB04701	09/17/2002	26.100	mg/kg	J		0.93	508		
Mercury	E054SB047	054SB04701	09/17/2002	0.068	mg/kg	J	0.13	0.03	2.7		
Nickel	E054SB047	054SB04701	09/17/2002	5.990	mg/kg	J	15.9	0.6	71.5		
Potassium	E054SB047	054SB04701	09/17/2002	262.000	mg/kg	J		45.6	2620		
Selenium	E054SB047	054SB04701	09/17/2002	0.339	mg/kg	J		0.57	4		
Sodium	E054SB047	054SB04701	09/17/2002	60.500	mg/kg	J		11.9	28200		
Vanadium	E054SB047	054SB04701	09/17/2002	11.500	mg/kg	=		1.1	60.1		
Zinc	E054SB047	054SB04701	09/17/2002	189.000	mg/kg	=	124	1.9	855	X	
Antimony	E054SB048	054SB04801	09/16/2002	2.070	mg/kg	J	12	0.5	7.4		
Lead	E054SB048	054SB04801	09/16/2002	365.000	mg/kg	=	30.2	1	400	X	
Mercury	E054SB048	054SB04801	09/16/2002	0.214	mg/kg	J	0.13	0.03	2.7	X	
Antimony	E054SB049	054SB04901	09/16/2002	4.470	mg/kg	J	12	0.5	7.4		
Lead	E054SB049	054SB04901	09/16/2002	822.000	mg/kg	=	30.2	1	400	X	X
Mercury	E054SB049	054SB04901	09/16/2002	0.635	mg/kg	J	0.13	0.03	2.7	X	
Lead	E054SB050	054SB05001	09/16/2002	75.600	mg/kg	=	30.2	1	400	X	
Mercury	E054SB050	054SB05001	09/16/2002	0.174	mg/kg	J	0.13	0.03	2.7	X	
Lead	E054SB051	054SB05101	09/16/2002	110.000	mg/kg	=	30.2	1	400	X	
Mercury	E054SB051	054SB05101	09/16/2002	0.369	mg/kg	J	0.13	0.03	2.7	X	
Anthracene	E054SB058	054SB05801	12/20/2002	0.022	mg/kg	J	0.33				
Benzo(a)Anthracene	E054SB058	054SB05801	12/20/2002	0.193	mg/kg	=	0.33		0.616		
Benzo(a)Pyrene	E054SB058	054SB05801	12/20/2002	0.150	mg/kg	=	0.33		0.598		
Benzo(b)Fluoranthene	E054SB058	054SB05801	12/20/2002	0.324	mg/kg	=			0.608		
Benzo(g,h,i)Perylene	E054SB058	054SB05801	12/20/2002	0.082	mg/kg	=					
Chrysene	E054SB058	054SB05801	12/20/2002	0.185	mg/kg	=	0.33		0.62		
Fluoranthene	E054SB058	054SB05801	12/20/2002	0.389	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	E054SB058	054SB05801	12/20/2002	0.065	mg/kg	=			0.525		
Phenanthrene	E054SB058	054SB05801	12/20/2002	0.158	mg/kg	=	0.33				
Pyrene	E054SB058	054SB05801	12/20/2002	0.486	mg/kg	=	0.33			X	
BEQ	E054SB058	054SB05801	12/20/2002	226.080	ug/kg	=			1.304		
Benzo(a)Anthracene	E054SB059	054SB05901	12/20/2002	0.324	mg/kg	=	0.33		0.616		
Benzo(a)Pyrene	E054SB059	054SB05901	12/20/2002	0.334	mg/kg	=	0.33		0.598	X	
Benzo(b)Fluoranthene	E054SB059	054SB05901	12/20/2002	1.100	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	E054SB059	054SB05901	12/20/2002	0.190	mg/kg	=					
Chrysene	E054SB059	054SB05901	12/20/2002	0.330	mg/kg	=	0.33		0.62		
Fluoranthene	E054SB059	054SB05901	12/20/2002	0.491	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	E054SB059	054SB05901	12/20/2002	0.190	mg/kg	=			0.525		
Phenanthrene	E054SB059	054SB05901	12/20/2002	0.159	mg/kg	=	0.33				

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Pyrene	E054SB059	054SB05901	12/20/2002	0.741	mg/kg	=	0.33			X	
BEQ	E054SB059	054SB05901	12/20/2002	570.975	ug/kg	=			1.304		
Benzo(a)Anthracene	E054SB060	054SB06001	01/23/2003	0.102	mg/kg	=	0.33		0.616		
Benzo(a)Pyrene	E054SB060	054SB06001	01/23/2003	0.127	mg/kg	=	0.33		0.598		
Benzo(b)Fluoranthene	E054SB060	054SB06001	01/23/2003	0.230	mg/kg	=			0.608		
Benzo(g,h,i)Perylene	E054SB060	054SB06001	01/23/2003	0.097	mg/kg	=					
Chrysene	E054SB060	054SB06001	01/23/2003	0.143	mg/kg	=	0.33		0.62		
Fluoranthene	E054SB060	054SB06001	01/23/2003	0.142	mg/kg	=	0.33				
Indeno(1,2,3-c,d)pyrene	E054SB060	054SB06001	01/23/2003	0.090	mg/kg	=			0.525		
Phenanthrene	E054SB060	054SB06001	01/23/2003	0.026	mg/kg	J	0.33				
Pyrene	E054SB060	054SB06001	01/23/2003	0.229	mg/kg	=	0.33				
BEQ	E054SB060	054SB06001	01/23/2003	188.180	ug/kg	=			1.304		
Acenaphthene	E054SB061	054SB06101	01/23/2003	0.056	mg/kg	J	0.33	#N/A			
Anthracene	E054SB061	054SB06101	01/23/2003	0.215	mg/kg	=	0.33				
Benzo(a)Anthracene	E054SB061	054SB06101	01/23/2003	0.850	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	E054SB061	054SB06101	01/23/2003	0.659	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	E054SB061	054SB06101	01/23/2003	1.430	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	E054SB061	054SB06101	01/23/2003	0.306	mg/kg	=					
Chrysene	E054SB061	054SB06101	01/23/2003	0.906	mg/kg	=	0.33		0.62	X	X
Fluoranthene	E054SB061	054SB06101	01/23/2003	1.520	mg/kg	=	0.33			X	
Fluorene	E054SB061	054SB06101	01/23/2003	0.032	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	E054SB061	054SB06101	01/23/2003	0.293	mg/kg	=			0.525		
Phenanthrene	E054SB061	054SB06101	01/23/2003	1.140	mg/kg	=	0.33			X	
Pyrene	E054SB061	054SB06101	01/23/2003	1.650	mg/kg	=	0.33			X	
BEQ	E054SB061	054SB06101	01/23/2003	990.431	ug/kg	=			1.304		
Aluminum	ES21S0002	S21S000201	10/25/1993	3200.000	mg/kg	=		261	20500		
Arsenic	ES21S0002	S21S000201	10/25/1993	5.100	mg/kg	=	7.24	0.95	67.5		
Barium	ES21S0002	S21S000201	10/25/1993	62.000	mg/kg	=		1.8	1980		
Beryllium	ES21S0002	S21S000201	10/25/1993	1.600	mg/kg	=		0.13	1.6		
Cadmium	ES21S0002	S21S000201	10/25/1993	2.000	mg/kg	=	1	0.06	1.5	X	X
Calcium	ES21S0002	S21S000201	10/25/1993	58000.000	mg/kg	=		167	182000		
Chromium, Total	ES21S0002	S21S000201	10/25/1993	58.000	mg/kg	=	52.3	2.3	567	X	
Cobalt	ES21S0002	S21S000201	10/25/1993	19.000	mg/kg	=		0.35	111		
Copper	ES21S0002	S21S000201	10/25/1993	510.000	mg/kg	=	18.7	0.47	866	X	
Iron	ES21S0002	S21S000201	10/25/1993	3700.000	mg/kg	=		1050	30600		
Lead	ES21S0002	S21S000201	10/25/1993	280.000	mg/kg	=	30.2	1	400	X	
Magnesium	ES21S0002	S21S000201	10/25/1993	13000.000	mg/kg	=		31	14800		
Manganese	ES21S0002	S21S000201	10/25/1993	320.000	mg/kg	J		0.93	508		
Mercury	ES21S0002	S21S000201	10/25/1993	0.060	mg/kg	=	0.13	0.03	2.7		
Nickel	ES21S0002	S21S000201	10/25/1993	160.000	mg/kg	=	15.9	0.6	71.5	X	X
Potassium	ES21S0002	S21S000201	10/25/1993	540.000	mg/kg	=		45.6	2620		
Sodium	ES21S0002	S21S000201	10/25/1993	890.000	mg/kg	=		11.9	28200		
Vanadium	ES21S0002	S21S000201	10/25/1993	11.000	mg/kg	=		1.1	60.1		
Zinc	ES21S0002	S21S000201	10/25/1993	2100.000	mg/kg	=	124	1.9	855	X	X
Aluminum	ES21S0003	S21S000301	10/25/1993	1500.000	mg/kg	=		261	20500		
Antimony	ES21S0003	S21S000301	10/25/1993	22.000	mg/kg	J	12	0.5	7.4	X	X
Arsenic	ES21S0003	S21S000301	10/25/1993	3.300	mg/kg	=	7.24	0.95	67.5		
Barium	ES21S0003	S21S000301	10/25/1993	210.000	mg/kg	=		1.8	1980		
Cadmium	ES21S0003	S21S000301	10/25/1993	13.000	mg/kg	=	1	0.06	1.5	X	X
Calcium	ES21S0003	S21S000301	10/25/1993	13000.000	mg/kg	=		167	182000		
Chromium, Total	ES21S0003	S21S000301	10/25/1993	380.000	mg/kg	=	52.3	2.3	567	X	
Cobalt	ES21S0003	S21S000301	10/25/1993	15.000	mg/kg	=		0.35	111		
Copper	ES21S0003	S21S000301	10/25/1993	910.000	mg/kg	=	18.7	0.47	866	X	X
Iron	ES21S0003	S21S000301	10/25/1993	79000.000	mg/kg	=		1050	30600		X
Lead	ES21S0003	S21S000301	10/25/1993	450.000	mg/kg	=	30.2	1	400	X	X
Magnesium	ES21S0003	S21S000301	10/25/1993	4200.000	mg/kg	=		31	14800		
Manganese	ES21S0003	S21S000301	10/25/1993	780.000	mg/kg	J		0.93	508		X
Mercury	ES21S0003	S21S000301	10/25/1993	0.050	mg/kg	=	0.13	0.03	2.7		
Nickel	ES21S0003	S21S000301	10/25/1993	200.000	mg/kg	=	15.9	0.6	71.5	X	X
Potassium	ES21S0003	S21S000301	10/25/1993	220.000	mg/kg	=		45.6	2620		
Sodium	ES21S0003	S21S000301	10/25/1993	2100.000	mg/kg	=		11.9	28200		
Vanadium	ES21S0003	S21S000301	10/25/1993	14.000	mg/kg	=		1.1	60.1		
Zinc	ES21S0003	S21S000301	10/25/1993	1700.000	mg/kg	=	124	1.9	855	X	X
Aluminum	H009SB031	009SB03101	09/27/1993	4600.000	mg/kg	=		1090	32700		
Arsenic	H009SB031	009SB03101	09/27/1993	7.400	mg/kg	J	7.24	0.64	18.4	X	
Barium	H009SB031	009SB03101	09/27/1993	47.000	mg/kg	=		3.6	72.8		
Beryllium	H009SB031	009SB03101	09/27/1993	0.690	mg/kg	=		0.04	1.4		
Calcium	H009SB031	009SB03101	09/27/1993	7400.000	mg/kg	=		169	333000		
Chromium, Total	H009SB031	009SB03101	09/27/1993	26.000	mg/kg	J	52.3	3.4	114		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Cobalt	H009SB031	009SB03101	09/27/1993	7.000	mg/kg	=		0.49	7.9		
Copper	H009SB031	009SB03101	09/27/1993	660.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H009SB031	009SB03101	09/27/1993	15000.000	mg/kg	=		695	38800		
Lead	H009SB031	009SB03101	09/27/1993	92.000	mg/kg	J	30.2	1.8	172	X	
Magnesium	H009SB031	009SB03101	09/27/1993	2800.000	mg/kg	=		131	7850		
Manganese	H009SB031	009SB03101	09/27/1993	110.000	mg/kg	=		5.3	1200		
Mercury	H009SB031	009SB03101	09/27/1993	0.057	mg/kg	=	0.13	0.02	3.8		
Nickel	H009SB031	009SB03101	09/27/1993	79.000	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H009SB031	009SB03101	09/27/1993	550.000	mg/kg	J		65	2960		
Sodium	H009SB031	009SB03101	09/27/1993	200.000	mg/kg	=		10.2	1660		
Vanadium	H009SB031	009SB03101	09/27/1993	15.000	mg/kg	=		4.1	74.8		
Zinc	H009SB031	009SB03101	09/27/1993	520.000	mg/kg	=	124	5	431	X	X
2-Methylnaphthalene	H009SB031	009SB03101	09/27/1993	0.067	mg/kg	J	0.33				
Acenaphthene	H009SB031	009SB03101	09/27/1993	0.210	mg/kg	J	0.33				
Anthracene	H009SB031	009SB03101	09/27/1993	0.430	mg/kg	J	0.33			X	
Benzo(a)Anthracene	H009SB031	009SB03101	09/27/1993	1.500	mg/kg	J	0.33		0.616	X	X
Benzo(a)Pyrene	H009SB031	009SB03101	09/27/1993	1.400	mg/kg	J	0.33		0.598	X	X
Benzo(b)Fluoranthene	H009SB031	009SB03101	09/27/1993	2.100	mg/kg	J			0.608		X
Benzo(g,h,i)Perylene	H009SB031	009SB03101	09/27/1993	0.760	mg/kg	J					
Benzo(k)Fluoranthene	H009SB031	009SB03101	09/27/1993	0.690	mg/kg	J			0.596		X
Benzyl Butyl Phthalate	H009SB031	009SB03101	09/27/1993	1.500	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	H009SB031	009SB03101	09/27/1993	2.500	mg/kg	J					
Carbazole	H009SB031	009SB03101	09/27/1993	0.230	mg/kg	J					
Chrysene	H009SB031	009SB03101	09/27/1993	1.500	mg/kg	J	0.33		0.62	X	X
Dibenzofuran	H009SB031	009SB03101	09/27/1993	0.130	mg/kg	J					
Fluoranthene	H009SB031	009SB03101	09/27/1993	2.700	mg/kg	J	0.33			X	
Fluorene	H009SB031	009SB03101	09/27/1993	0.220	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H009SB031	009SB03101	09/27/1993	0.890	mg/kg	J			0.525		X
Naphthalene	H009SB031	009SB03101	09/27/1993	0.076	mg/kg	J	0.33				
Phenanthrene	H009SB031	009SB03101	09/27/1993	1.700	mg/kg	J	0.33			X	
Pyrene	H009SB031	009SB03101	09/27/1993	3.800	mg/kg	J	0.33			X	
BEQ	H009SB031	009SB03101	09/27/1993	2047.400	ug/kg	=			1.304		X
Acetone	H009SB031	009SB03101	09/27/1993	0.160	mg/kg	J					
Chlorobenzene	H009SB031	009SB03101	09/27/1993	0.015	mg/kg	J					
Xylenes, Total	H009SB031	009SB03101	09/27/1993	0.006	mg/kg	J					
Aluminum	H009SB041	009SB04101	09/28/1993	2100.000	mg/kg	=		1090	32700		
Arsenic	H009SB041	009SB04101	09/28/1993	2.100	mg/kg	J	7.24	0.64	18.4		
Barium	H009SB041	009SB04101	09/28/1993	15.000	mg/kg	=		3.6	72.8		
Calcium	H009SB041	009SB04101	09/28/1993	250000.000	mg/kg	=		169	333000		
Chromium, Total	H009SB041	009SB04101	09/28/1993	11.000	mg/kg	J	52.3	3.4	114		
Cobalt	H009SB041	009SB04101	09/28/1993	2.900	mg/kg	=		0.49	7.9		
Copper	H009SB041	009SB04101	09/28/1993	13.000	mg/kg	=	18.7	0.94	126		
Iron	H009SB041	009SB04101	09/28/1993	3800.000	mg/kg	=		695	38800		
Lead	H009SB041	009SB04101	09/28/1993	10.000	mg/kg	J	30.2	1.8	172		
Magnesium	H009SB041	009SB04101	09/28/1993	3700.000	mg/kg	=		131	7850		
Manganese	H009SB041	009SB04101	09/28/1993	220.000	mg/kg	=		5.3	1200		
Mercury	H009SB041	009SB04101	09/28/1993	0.014	mg/kg	=	0.13	0.02	3.8		
Nickel	H009SB041	009SB04101	09/28/1993	7.000	mg/kg	=	15.9	0.63	91.8		
Potassium	H009SB041	009SB04101	09/28/1993	500.000	mg/kg	=		65	2960		
Sodium	H009SB041	009SB04101	09/28/1993	780.000	mg/kg	=		10.2	1660		
Vanadium	H009SB041	009SB04101	09/28/1993	6.600	mg/kg	=		4.1	74.8		
Zinc	H009SB041	009SB04101	09/28/1993	27.000	mg/kg	=	124	5	431		
Benzo(b)Fluoranthene	H009SB041	009SB04101	09/28/1993	0.066	mg/kg	J			0.608		
Fluoranthene	H009SB041	009SB04101	09/28/1993	0.069	mg/kg	J	0.33				
Phenanthrene	H009SB041	009SB04101	09/28/1993	0.059	mg/kg	J	0.33				
Pyrene	H009SB041	009SB04101	09/28/1993	0.110	mg/kg	J	0.33				
BEQ	H009SB041	009SB04101	09/28/1993	415.635	ug/kg	=			1.304		
Chlorobenzene	H009SB041	009SB04101	09/28/1993	0.013	mg/kg	J					
Aluminum	H009SB061	009SB06101	09/29/1993	4000.000	mg/kg	=		1090	32700		
Arsenic	H009SB061	009SB06101	09/29/1993	9.100	mg/kg	J	7.24	0.64	18.4	X	
Barium	H009SB061	009SB06101	09/29/1993	79.000	mg/kg	=		3.6	72.8		X
Beryllium	H009SB061	009SB06101	09/29/1993	0.840	mg/kg	=		0.04	1.4		
Calcium	H009SB061	009SB06101	09/29/1993	11000.000	mg/kg	=		169	333000		
Chromium, Total	H009SB061	009SB06101	09/29/1993	19.000	mg/kg	J	52.3	3.4	114		
Cobalt	H009SB061	009SB06101	09/29/1993	4.900	mg/kg	=		0.49	7.9		
Copper	H009SB061	009SB06101	09/29/1993	570.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H009SB061	009SB06101	09/29/1993	12000.000	mg/kg	=		695	38800		
Lead	H009SB061	009SB06101	09/29/1993	110.000	mg/kg	J	30.2	1.8	172	X	
Magnesium	H009SB061	009SB06101	09/29/1993	530.000	mg/kg	=		131	7850		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Manganese	H009SB061	009SB06101	09/29/1993	61.000	mg/kg	=		5.3	1200		
Mercury	H009SB061	009SB06101	09/29/1993	0.140	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H009SB061	009SB06101	09/29/1993	27.000	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H009SB061	009SB06101	09/29/1993	460.000	mg/kg	J		65	2960		
Sodium	H009SB061	009SB06101	09/29/1993	97.000	mg/kg	=		10.2	1660		
Vanadium	H009SB061	009SB06101	09/29/1993	38.000	mg/kg	=		4.1	74.8		
Zinc	H009SB061	009SB06101	09/29/1993	270.000	mg/kg	=	124	5	431	X	
PCB-1260 (Arochlor 1260)	H009SB061	009SB06101	09/29/1993	0.230	mg/kg	J	0.033			X	
Dieldrin	H009SB061	009SB06101	09/29/1993	0.005	mg/kg	J	0.0033			X	
p,p'-DDE	H009SB061	009SB06101	09/29/1993	0.005	mg/kg	J					
Benzo(a)Pyrene	H009SB061	009SB06101	09/29/1993	0.058	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H009SB061	009SB06101	09/29/1993	0.100	mg/kg	J			0.608		
bis(2-Ethylhexyl) Phthalate	H009SB061	009SB06101	09/29/1993	0.120	mg/kg	J					
Chrysene	H009SB061	009SB06101	09/29/1993	0.110	mg/kg	J	0.33		0.62		
Fluoranthene	H009SB061	009SB06101	09/29/1993	0.270	mg/kg	J	0.33				
Phenanthrene	H009SB061	009SB06101	09/29/1993	0.091	mg/kg	J	0.33				
Pyrene	H009SB061	009SB06101	09/29/1993	0.290	mg/kg	J	0.33				
BEQ	H009SB061	009SB06101	09/29/1993	298.010	ug/kg	=			1.304		
Aluminum	H121SB001	121SB00101	08/26/1994	719.000	mg/kg	=		1090	32700		
Arsenic	H121SB001	121SB00101	08/26/1994	3.500	mg/kg	J	7.24	0.64	18.4		
Beryllium	H121SB001	121SB00101	08/26/1994	0.520	mg/kg	J		0.04	1.4		
Cadmium	H121SB001	121SB00101	08/26/1994	1.400	mg/kg	J	1	0.12	1.6	X	
Calcium	H121SB001	121SB00101	08/26/1994	313000.000	mg/kg	=		169	333000		
Chromium, Total	H121SB001	121SB00101	08/26/1994	8.900	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB001	121SB00101	08/26/1994	5.100	mg/kg	J		0.49	7.9		
Copper	H121SB001	121SB00101	08/26/1994	60.000	mg/kg	=	18.7	0.94	126	X	
Iron	H121SB001	121SB00101	08/26/1994	7670.000	mg/kg	=		695	38800		
Lead	H121SB001	121SB00101	08/26/1994	93.500	mg/kg	=	30.2	1.8	172	X	
Magnesium	H121SB001	121SB00101	08/26/1994	3380.000	mg/kg	=		131	7850		
Manganese	H121SB001	121SB00101	08/26/1994	326.000	mg/kg	=		5.3	1200		
Mercury	H121SB001	121SB00101	08/26/1994	0.110	mg/kg	=	0.13	0.02	3.8		
Nickel	H121SB001	121SB00101	08/26/1994	13.800	mg/kg	J	15.9	0.63	91.8		
Sodium	H121SB001	121SB00101	08/26/1994	196.000	mg/kg	J		10.2	1660		
Thallium	H121SB001	121SB00101	08/26/1994	2.700	mg/kg	J		0.12	1.1		X
Vanadium	H121SB001	121SB00101	08/26/1994	6.500	mg/kg	J		4.1	74.8		
Zinc	H121SB001	121SB00101	08/26/1994	305.000	mg/kg	=	124	5	431	X	
Cyanide	H121SB001	121SB00101	08/26/1994	9.900	mg/kg	=					
Acetone	H121SB001	121SB00101	08/26/1994	0.038	mg/kg	=					
Aluminum	H121SB002	121SB00201	08/26/1994	3300.000	mg/kg	=		1090	32700		
Antimony	H121SB002	121SB00201	08/26/1994	3.100	mg/kg	J	12	1.1	2.2		X
Arsenic	H121SB002	121SB00201	08/26/1994	5.200	mg/kg	=	7.24	0.64	18.4		
Barium	H121SB002	121SB00201	08/26/1994	89.800	mg/kg	=		3.6	72.8		X
Beryllium	H121SB002	121SB00201	08/26/1994	0.700	mg/kg	=		0.04	1.4		
Cadmium	H121SB002	121SB00201	08/26/1994	1.700	mg/kg	=	1	0.12	1.6	X	X
Calcium	H121SB002	121SB00201	08/26/1994	143000.000	mg/kg	=		169	333000		
Chromium, Total	H121SB002	121SB00201	08/26/1994	40.100	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB002	121SB00201	08/26/1994	7.500	mg/kg	=		0.49	7.9		
Copper	H121SB002	121SB00201	08/26/1994	388.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB002	121SB00201	08/26/1994	14300.000	mg/kg	=		695	38800		
Lead	H121SB002	121SB00201	08/26/1994	254.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB002	121SB00201	08/26/1994	1720.000	mg/kg	=		131	7850		
Manganese	H121SB002	121SB00201	08/26/1994	206.000	mg/kg	=		5.3	1200		
Mercury	H121SB002	121SB00201	08/26/1994	4.600	mg/kg	=	0.13	0.02	3.8	X	X
Nickel	H121SB002	121SB00201	08/26/1994	164.000	mg/kg	=	15.9	0.63	91.8	X	X
Selenium	H121SB002	121SB00201	08/26/1994	1.100	mg/kg	J		0.28	2.6		
Sodium	H121SB002	121SB00201	08/26/1994	204.000	mg/kg	J		10.2	1660		
Vanadium	H121SB002	121SB00201	08/26/1994	315.000	mg/kg	=		4.1	74.8		X
Zinc	H121SB002	121SB00201	08/26/1994	900.000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB002	121SB00201	08/26/1994	0.120	mg/kg	J	0.033			X	
Gamma-chlordane	H121SB002	121SB00201	08/26/1994	0.004	mg/kg	J	0.0017			X	
p,p'-DDT	H121SB002	121SB00201	08/26/1994	0.014	mg/kg	J					
Benzo(a)Anthracene	H121SB002	121SB00201	08/26/1994	0.110	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H121SB002	121SB00201	08/26/1994	0.095	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H121SB002	121SB00201	08/26/1994	0.130	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	H121SB002	121SB00201	08/26/1994	0.061	mg/kg	J					
Benzo(k)Fluoranthene	H121SB002	121SB00201	08/26/1994	0.089	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H121SB002	121SB00201	08/26/1994	0.062	mg/kg	J					
Chrysene	H121SB002	121SB00201	08/26/1994	0.120	mg/kg	J	0.33		0.62		
Fluoranthene	H121SB002	121SB00201	08/26/1994	0.210	mg/kg	J	0.33				

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Indeno(1,2,3-c,d)pyrene	H121SB002	121SB00201	08/26/1994	0.057	mg/kg	J			0.525		
Phenanthrene	H121SB002	121SB00201	08/26/1994	0.160	mg/kg	J	0.33				
Pyrene	H121SB002	121SB00201	08/26/1994	0.180	mg/kg	J	0.33				
BEQ	H121SB002	121SB00201	08/26/1994	330.710	ug/kg	=			1.304		
Acetone	H121SB002	121SB00201	08/26/1994	0.130	mg/kg	=					
Toluene	H121SB002	121SB00201	08/26/1994	0.004	mg/kg	J					
Aluminum	H121SB003	121SB00301	08/26/1994	4070.000	mg/kg	=		1090	32700		
Antimony	H121SB003	121SB00301	08/26/1994	4.900	mg/kg	J	12	1.1	2.2		X
Arsenic	H121SB003	121SB00301	08/26/1994	12.000	mg/kg	=	7.24	0.64	18.4	X	
Barium	H121SB003	121SB00301	08/26/1994	45.500	mg/kg	=		3.6	72.8		
Beryllium	H121SB003	121SB00301	08/26/1994	1.700	mg/kg	=		0.04	1.4		X
Cadmium	H121SB003	121SB00301	08/26/1994	0.630	mg/kg	=	1	0.12	1.6		
Calcium	H121SB003	121SB00301	08/26/1994	92400.000	mg/kg	=		169	333000		
Chromium, Total	H121SB003	121SB00301	08/26/1994	24.400	mg/kg	J	52.3	3.4	114		
Cobalt	H121SB003	121SB00301	08/26/1994	10.900	mg/kg	=		0.49	7.9		X
Copper	H121SB003	121SB00301	08/26/1994	455.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB003	121SB00301	08/26/1994	11900.000	mg/kg	=		695	38800		
Lead	H121SB003	121SB00301	08/26/1994	247.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB003	121SB00301	08/26/1994	1810.000	mg/kg	=		131	7850		
Manganese	H121SB003	121SB00301	08/26/1994	143.000	mg/kg	=		5.3	1200		
Mercury	H121SB003	121SB00301	08/26/1994	0.290	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB003	121SB00301	08/26/1994	113.000	mg/kg	=	15.9	0.63	91.8	X	X
Sodium	H121SB003	121SB00301	08/26/1994	370.000	mg/kg	=		10.2	1660		
Vanadium	H121SB003	121SB00301	08/26/1994	24.300	mg/kg	=		4.1	74.8		
Zinc	H121SB003	121SB00301	08/26/1994	1250.000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB003	121SB00301	08/26/1994	0.110	mg/kg	=	0.033			X	
p,p'-DDE	H121SB003	121SB00301	08/26/1994	0.003	mg/kg	J					
Pyrene	H121SB003	121SB00301	08/26/1994	0.093	mg/kg	J	0.33				
Acetone	H121SB003	121SB00301	08/26/1994	0.015	mg/kg	J					
Toluene	H121SB003	121SB00301	08/26/1994	0.013	mg/kg	=					
Aluminum	H121SB004	121SB00401	08/26/1994	9670.000	mg/kg	=		1090	32700		
Antimony	H121SB004	121SB00401	08/26/1994	2.800	mg/kg	J	12	1.1	2.2		X
Arsenic	H121SB004	121SB00401	08/26/1994	18.700	mg/kg	=	7.24	0.64	18.4	X	X
Barium	H121SB004	121SB00401	08/26/1994	184.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB004	121SB00401	08/26/1994	4.800	mg/kg	=		0.04	1.4		X
Cadmium	H121SB004	121SB00401	08/26/1994	0.820	mg/kg	=	1	0.12	1.6		
Calcium	H121SB004	121SB00401	08/26/1994	47600.000	mg/kg	=		169	333000		
Chromium, Total	H121SB004	121SB00401	08/26/1994	68.800	mg/kg	=	52.3	3.4	114	X	
Cobalt	H121SB004	121SB00401	08/26/1994	31.800	mg/kg	=		0.49	7.9		X
Copper	H121SB004	121SB00401	08/26/1994	1360.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB004	121SB00401	08/26/1994	30200.000	mg/kg	=		695	38800		
Lead	H121SB004	121SB00401	08/26/1994	814.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB004	121SB00401	08/26/1994	2490.000	mg/kg	=		131	7850		
Manganese	H121SB004	121SB00401	08/26/1994	341.000	mg/kg	=		5.3	1200		
Mercury	H121SB004	121SB00401	08/26/1994	0.960	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB004	121SB00401	08/26/1994	374.000	mg/kg	=	15.9	0.63	91.8	X	X
Sodium	H121SB004	121SB00401	08/26/1994	721.000	mg/kg	=		10.2	1660		
Vanadium	H121SB004	121SB00401	08/26/1994	76.300	mg/kg	=		4.1	74.8		X
Zinc	H121SB004	121SB00401	08/26/1994	4470.000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB004	121SB00401	08/26/1994	0.120	mg/kg	=	0.033			X	
p,p'-DDE	H121SB004	121SB00401	08/26/1994	0.003	mg/kg	J					
2-Methylnaphthalene	H121SB004	121SB00401	08/26/1994	0.470	mg/kg	=	0.33			X	
Benzo(a)Anthracene	H121SB004	121SB00401	08/26/1994	0.093	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H121SB004	121SB00401	08/26/1994	0.077	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H121SB004	121SB00401	08/26/1994	0.092	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H121SB004	121SB00401	08/26/1994	0.069	mg/kg	J			0.596		
Chrysene	H121SB004	121SB00401	08/26/1994	0.110	mg/kg	J	0.33		0.62		
Dibenzofuran	H121SB004	121SB00401	08/26/1994	0.089	mg/kg	J					
Fluoranthene	H121SB004	121SB00401	08/26/1994	0.140	mg/kg	J	0.33				
Naphthalene	H121SB004	121SB00401	08/26/1994	0.330	mg/kg	J	0.33				
Phenanthrene	H121SB004	121SB00401	08/26/1994	0.280	mg/kg	J	0.33				
Pyrene	H121SB004	121SB00401	08/26/1994	0.130	mg/kg	J	0.33				
BEQ	H121SB004	121SB00401	08/26/1994	316.300	ug/kg	=			1.304		
Acetone	H121SB004	121SB00401	08/26/1994	0.026	mg/kg	J					
Toluene	H121SB004	121SB00401	08/26/1994	0.006	mg/kg	=					
Aluminum	H121SB005	121SB00501	08/26/1994	3790.000	mg/kg	=		1090	32700		
Antimony	H121SB005	121SB00501	08/26/1994	7.300	mg/kg	J	12	1.1	2.2		X
Arsenic	H121SB005	121SB00501	08/26/1994	5.400	mg/kg	=	7.24	0.64	18.4		
Barium	H121SB005	121SB00501	08/26/1994	19.000	mg/kg	J		3.6	72.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Beryllium	H121SB005	121SB00501	08/26/1994	0.810	mg/kg	J		0.04	1.4		
Cadmium	H121SB005	121SB00501	08/26/1994	1.800	mg/kg	J	1	0.12	1.6	X	X
Calcium	H121SB005	121SB00501	08/26/1994	231000.000	mg/kg	=		169	333000		
Chromium, Total	H121SB005	121SB00501	08/26/1994	24.900	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB005	121SB00501	08/26/1994	7.900	mg/kg	J		0.49	7.9		
Copper	H121SB005	121SB00501	08/26/1994	460.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB005	121SB00501	08/26/1994	9660.000	mg/kg	=		695	38800		
Lead	H121SB005	121SB00501	08/26/1994	149.000	mg/kg	=	30.2	1.8	172	X	
Magnesium	H121SB005	121SB00501	08/26/1994	3300.000	mg/kg	=		131	7850		
Manganese	H121SB005	121SB00501	08/26/1994	293.000	mg/kg	=		5.3	1200		
Mercury	H121SB005	121SB00501	08/26/1994	0.270	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB005	121SB00501	08/26/1994	88.000	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H121SB005	121SB00501	08/26/1994	739.000	mg/kg	J		65	2960		
Sodium	H121SB005	121SB00501	08/26/1994	349.000	mg/kg	J		10.2	1660		
Vanadium	H121SB005	121SB00501	08/26/1994	32.600	mg/kg	=		4.1	74.8		
Zinc	H121SB005	121SB00501	08/26/1994	689.000	mg/kg	=	124	5	431	X	X
Endosulfan II	H121SB005	121SB00501	08/26/1994	0.024	mg/kg	=					
bis(2-Ethylhexyl) Phthalate	H121SB005	121SB00501	08/26/1994	1.000	mg/kg	J					
Xylenes, Total	H121SB005	121SB00501	08/26/1994	0.006	mg/kg	J					
Aluminum	H121SB006	121SB00601	01/16/1995	11300.000	mg/kg	=		1090	32700		
Arsenic	H121SB006	121SB00601	01/16/1995	9.000	mg/kg	=	7.24	0.64	18.4	X	
Barium	H121SB006	121SB00601	01/16/1995	155.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB006	121SB00601	01/16/1995	4.700	mg/kg	=		0.04	1.4		X
Cadmium	H121SB006	121SB00601	01/16/1995	0.700	mg/kg	=	1	0.12	1.6		
Calcium	H121SB006	121SB00601	01/16/1995	40800.000	mg/kg	=		169	333000		
Chromium, Total	H121SB006	121SB00601	01/16/1995	67.800	mg/kg	=	52.3	3.4	114	X	
Cobalt	H121SB006	121SB00601	01/16/1995	28.200	mg/kg	=		0.49	7.9		X
Copper	H121SB006	121SB00601	01/16/1995	1690.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB006	121SB00601	01/16/1995	34900.000	mg/kg	=		695	38800		
Lead	H121SB006	121SB00601	01/16/1995	837.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB006	121SB00601	01/16/1995	3020.000	mg/kg	=		131	7850		
Manganese	H121SB006	121SB00601	01/16/1995	332.000	mg/kg	=		5.3	1200		
Mercury	H121SB006	121SB00601	01/16/1995	0.850	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB006	121SB00601	01/16/1995	383.000	mg/kg	=	15.9	0.63	91.8	X	X
Potassium	H121SB006	121SB00601	01/16/1995	677.000	mg/kg	=		65	2960		
Selenium	H121SB006	121SB00601	01/16/1995	3.200	mg/kg	J		0.28	2.6		X
Sodium	H121SB006	121SB00601	01/16/1995	646.000	mg/kg	=		10.2	1660		
Vanadium	H121SB006	121SB00601	01/16/1995	93.800	mg/kg	=		4.1	74.8		X
Zinc	H121SB006	121SB00601	01/16/1995	4520.000	mg/kg	=	124	5	431	X	X
PCB-1254 (Arochlor 1254)	H121SB006	121SB00601	01/16/1995	0.140	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB006	121SB00601	01/16/1995	0.130	mg/kg	=	0.033			X	
Benzo(b)Fluoranthene	H121SB006	121SB00601	01/16/1995	0.130	mg/kg	J			0.608		
bis(2-Ethylhexyl) Phthalate	H121SB006	121SB00601	01/16/1995	0.140	mg/kg	J					
Fluoranthene	H121SB006	121SB00601	01/16/1995	0.120	mg/kg	J	0.33				
Phenanthrene	H121SB006	121SB00601	01/16/1995	0.085	mg/kg	J	0.33				
Pyrene	H121SB006	121SB00601	01/16/1995	0.100	mg/kg	J	0.33				
BEQ	H121SB006	121SB00601	01/16/1995	477.310	ug/kg	=			1.304		
Aluminum	H121SB007	121SB00701	01/13/1995	16000.000	mg/kg	=		1090	32700		
Arsenic	H121SB007	121SB00701	01/13/1995	6.200	mg/kg	=	7.24	0.64	18.4		
Barium	H121SB007	121SB00701	01/13/1995	407.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB007	121SB00701	01/13/1995	14.600	mg/kg	=		0.04	1.4		X
Calcium	H121SB007	121SB00701	01/13/1995	19700.000	mg/kg	=		169	333000		
Chromium, Total	H121SB007	121SB00701	01/13/1995	210.000	mg/kg	=	52.3	3.4	114	X	X
Cobalt	H121SB007	121SB00701	01/13/1995	97.200	mg/kg	=		0.49	7.9		X
Copper	H121SB007	121SB00701	01/13/1995	4060.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB007	121SB00701	01/13/1995	80800.000	mg/kg	=		695	38800		X
Lead	H121SB007	121SB00701	01/13/1995	2770.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB007	121SB00701	01/13/1995	4190.000	mg/kg	=		131	7850		
Manganese	H121SB007	121SB00701	01/13/1995	1020.000	mg/kg	=		5.3	1200		
Mercury	H121SB007	121SB00701	01/13/1995	3.300	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB007	121SB00701	01/13/1995	995.000	mg/kg	=	15.9	0.63	91.8	X	X
Potassium	H121SB007	121SB00701	01/13/1995	1130.000	mg/kg	=		65	2960		
Sodium	H121SB007	121SB00701	01/13/1995	1600.000	mg/kg	=		10.2	1660		
Vanadium	H121SB007	121SB00701	01/13/1995	470.000	mg/kg	=		4.1	74.8		X
Zinc	H121SB007	121SB00701	01/13/1995	15100.000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB007	121SB00701	01/13/1995	0.066	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB007	121SB00701	01/13/1995	0.210	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB007	121SB00701	01/13/1995	0.270	mg/kg	=	0.033			X	
Benzo(a)Pyrene	H121SB007	121SB00701	01/13/1995	0.100	mg/kg	J	0.33		0.598		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Benzo(b)Fluoranthene	H121SB007	121SB00701	01/13/1995	0.230	mg/kg	J			0.608		
bis(2-Ethylhexyl) Phthalate	H121SB007	121SB00701	01/13/1995	0.082	mg/kg	J					
Chrysene	H121SB007	121SB00701	01/13/1995	0.091	mg/kg	J	0.33		0.62		
Fluoranthene	H121SB007	121SB00701	01/13/1995	0.140	mg/kg	J	0.33				
Pyrene	H121SB007	121SB00701	01/13/1995	0.120	mg/kg	J	0.33				
BEQ	H121SB007	121SB00701	01/13/1995	359.041	ug/kg	=			1.304		
Aluminum	H121SB008	121SB00801	01/16/1995	1210.000	mg/kg	=		1090	32700		
Arsenic	H121SB008	121SB00801	01/16/1995	10.700	mg/kg	=	7.24	0.64	18.4	X	
Beryllium	H121SB008	121SB00801	01/16/1995	0.910	mg/kg	=		0.04	1.4		
Calcium	H121SB008	121SB00801	01/16/1995	6530.000	mg/kg	=		169	333000		
Chromium, Total	H121SB008	121SB00801	01/16/1995	7.800	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB008	121SB00801	01/16/1995	5.300	mg/kg	=		0.49	7.9		
Copper	H121SB008	121SB00801	01/16/1995	74.100	mg/kg	=	18.7	0.94	126	X	
Iron	H121SB008	121SB00801	01/16/1995	5510.000	mg/kg	=		695	38800		
Lead	H121SB008	121SB00801	01/16/1995	40.600	mg/kg	=	30.2	1.8	172	X	
Magnesium	H121SB008	121SB00801	01/16/1995	284.000	mg/kg	=		131	7850		
Manganese	H121SB008	121SB00801	01/16/1995	31.800	mg/kg	=		5.3	1200		
Mercury	H121SB008	121SB00801	01/16/1995	0.030	mg/kg	J	0.13	0.02	3.8		
Nickel	H121SB008	121SB00801	01/16/1995	27.100	mg/kg	=	15.9	0.63	91.8	X	
Selenium	H121SB008	121SB00801	01/16/1995	0.550	mg/kg	J		0.28	2.6		
Sodium	H121SB008	121SB00801	01/16/1995	64.200	mg/kg	J		10.2	1660		
Vanadium	H121SB008	121SB00801	01/16/1995	12.000	mg/kg	=		4.1	74.8		
Zinc	H121SB008	121SB00801	01/16/1995	253.000	mg/kg	=	124	5	431	X	
Aluminum	H121SB009	121SB00901	01/16/1995	6930.000	mg/kg	=		1090	32700		
Arsenic	H121SB009	121SB00901	01/16/1995	8.000	mg/kg	=	7.24	0.64	18.4	X	
Barium	H121SB009	121SB00901	01/16/1995	114.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB009	121SB00901	01/16/1995	3.200	mg/kg	=		0.04	1.4		X
Cadmium	H121SB009	121SB00901	01/16/1995	1.300	mg/kg	=	1	0.12	1.6	X	
Calcium	H121SB009	121SB00901	01/16/1995	36200.000	mg/kg	=		169	333000		
Chromium, Total	H121SB009	121SB00901	01/16/1995	48.800	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB009	121SB00901	01/16/1995	19.500	mg/kg	=		0.49	7.9		X
Copper	H121SB009	121SB00901	01/16/1995	984.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB009	121SB00901	01/16/1995	28000.000	mg/kg	=		695	38800		
Lead	H121SB009	121SB00901	01/16/1995	497.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB009	121SB00901	01/16/1995	1770.000	mg/kg	=		131	7850		
Manganese	H121SB009	121SB00901	01/16/1995	305.000	mg/kg	=		5.3	1200		
Mercury	H121SB009	121SB00901	01/16/1995	0.980	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB009	121SB00901	01/16/1995	217.000	mg/kg	=	15.9	0.63	91.8	X	X
Selenium	H121SB009	121SB00901	01/16/1995	2.100	mg/kg	J		0.28	2.6		
Sodium	H121SB009	121SB00901	01/16/1995	398.000	mg/kg	=		10.2	1660		
Vanadium	H121SB009	121SB00901	01/16/1995	60.300	mg/kg	=		4.1	74.8		
Zinc	H121SB009	121SB00901	01/16/1995	3170.000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB009	121SB00901	01/16/1995	0.140	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB009	121SB00901	01/16/1995	0.240	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB009	121SB00901	01/16/1995	0.330	mg/kg	=	0.033			X	
Anthracene	H121SB009	121SB00901	01/16/1995	0.100	mg/kg	J	0.33				
Benzo(a)Anthracene	H121SB009	121SB00901	01/16/1995	0.520	mg/kg	=	0.33		0.616	X	
Benzo(a)Pyrene	H121SB009	121SB00901	01/16/1995	0.540	mg/kg	=	0.33		0.598	X	
Benzo(b)Fluoranthene	H121SB009	121SB00901	01/16/1995	0.780	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H121SB009	121SB00901	01/16/1995	0.290	mg/kg	J					
Benzo(k)Fluoranthene	H121SB009	121SB00901	01/16/1995	0.310	mg/kg	J			0.596		
Benzyl Butyl Phthalate	H121SB009	121SB00901	01/16/1995	0.088	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	H121SB009	121SB00901	01/16/1995	0.140	mg/kg	J					
Chrysene	H121SB009	121SB00901	01/16/1995	0.560	mg/kg	=	0.33		0.62	X	
Dibenz(a,h)anthracene	H121SB009	121SB00901	01/16/1995	0.110	mg/kg	J	0.33		0.525		
Fluoranthene	H121SB009	121SB00901	01/16/1995	0.850	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB009	121SB00901	01/16/1995	0.290	mg/kg	J			0.525		
Phenanthrene	H121SB009	121SB00901	01/16/1995	0.290	mg/kg	J	0.33				
Pyrene	H121SB009	121SB00901	01/16/1995	0.750	mg/kg	=	0.33			X	
BEQ	H121SB009	121SB00901	01/16/1995	812.660	ug/kg	=			1.304		
Aluminum	H121SB010	121SB01001	01/16/1995	6950.000	mg/kg	=		1090	32700		
Arsenic	H121SB010	121SB01001	01/16/1995	7.400	mg/kg	J	7.24	0.64	18.4	X	
Barium	H121SB010	121SB01001	01/16/1995	530.000	mg/kg	J		3.6	72.8		X
Beryllium	H121SB010	121SB01001	01/16/1995	1.700	mg/kg	J		0.04	1.4		X
Cadmium	H121SB010	121SB01001	01/16/1995	0.850	mg/kg	=	1	0.12	1.6		
Calcium	H121SB010	121SB01001	01/16/1995	17500.000	mg/kg	J		169	333000		
Chromium, Total	H121SB010	121SB01001	01/16/1995	55.600	mg/kg	J	52.3	3.4	114	X	
Cobalt	H121SB010	121SB01001	01/16/1995	14.000	mg/kg	J		0.49	7.9		X
Copper	H121SB010	121SB01001	01/16/1995	585.000	mg/kg	J	18.7	0.94	126	X	X

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Iron	H121SB010	121SB01001	01/16/1995	15300.000	mg/kg	J		695	38800		
Lead	H121SB010	121SB01001	01/16/1995	420.000	mg/kg	J	30.2	1.8	172	X	X
Magnesium	H121SB010	121SB01001	01/16/1995	1310.000	mg/kg	=		131	7850		
Manganese	H121SB010	121SB01001	01/16/1995	124.000	mg/kg	J		5.3	1200		
Mercury	H121SB010	121SB01001	01/16/1995	1.100	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB010	121SB01001	01/16/1995	164.000	mg/kg	J	15.9	0.63	91.8	X	X
Selenium	H121SB010	121SB01001	01/16/1995	1.500	mg/kg	J		0.28	2.6		
Sodium	H121SB010	121SB01001	01/16/1995	287.000	mg/kg	J		10.2	1660		
Vanadium	H121SB010	121SB01001	01/16/1995	41.200	mg/kg	J		4.1	74.8		
Zinc	H121SB010	121SB01001	01/16/1995	1910.000	mg/kg	J	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB010	121SB01001	01/16/1995	0.100	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB010	121SB01001	01/16/1995	0.350	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB010	121SB01001	01/16/1995	0.430	mg/kg	=	0.033			X	
Anthracene	H121SB010	121SB01001	01/16/1995	0.100	mg/kg	J	0.33				
Benzo(a)Anthracene	H121SB010	121SB01001	01/16/1995	0.510	mg/kg	=	0.33		0.616	X	
Benzo(a)Pyrene	H121SB010	121SB01001	01/16/1995	0.620	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB010	121SB01001	01/16/1995	1.300	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H121SB010	121SB01001	01/16/1995	0.270	mg/kg	J					
Benzyl Butyl Phthalate	H121SB010	121SB01001	01/16/1995	0.290	mg/kg	J					
Chrysene	H121SB010	121SB01001	01/16/1995	0.600	mg/kg	=	0.33		0.62	X	
Dibenz(a,h)anthracene	H121SB010	121SB01001	01/16/1995	0.098	mg/kg	J	0.33		0.525		
Fluoranthene	H121SB010	121SB01001	01/16/1995	0.730	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB010	121SB01001	01/16/1995	0.280	mg/kg	J			0.525		
Phenanthrene	H121SB010	121SB01001	01/16/1995	0.310	mg/kg	J	0.33				
Pyrene	H121SB010	121SB01001	01/16/1995	0.690	mg/kg	=	0.33			X	
BEQ	H121SB010	121SB01001	01/16/1995	929.850	ug/kg	=			1.304		
Aluminum	H121SB011	121SB01101	01/16/1995	6510.000	mg/kg	=		1090	32700		
Arsenic	H121SB011	121SB01101	01/16/1995	8.800	mg/kg	=	7.24	0.64	18.4	X	
Barium	H121SB011	121SB01101	01/16/1995	164.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB011	121SB01101	01/16/1995	2.000	mg/kg	=		0.04	1.4		X
Cadmium	H121SB011	121SB01101	01/16/1995	1.300	mg/kg	=	1	0.12	1.6	X	
Calcium	H121SB011	121SB01101	01/16/1995	27200.000	mg/kg	=		169	333000		
Chromium, Total	H121SB011	121SB01101	01/16/1995	62.100	mg/kg	=	52.3	3.4	114	X	
Cobalt	H121SB011	121SB01101	01/16/1995	13.600	mg/kg	=		0.49	7.9		X
Copper	H121SB011	121SB01101	01/16/1995	762.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB011	121SB01101	01/16/1995	20100.000	mg/kg	=		695	38800		
Lead	H121SB011	121SB01101	01/16/1995	546.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB011	121SB01101	01/16/1995	1460.000	mg/kg	=		131	7850		
Manganese	H121SB011	121SB01101	01/16/1995	229.000	mg/kg	=		5.3	1200		
Mercury	H121SB011	121SB01101	01/16/1995	1.100	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H121SB011	121SB01101	01/16/1995	154.000	mg/kg	=	15.9	0.63	91.8	X	X
Selenium	H121SB011	121SB01101	01/16/1995	1.700	mg/kg	J		0.28	2.6		
Silver	H121SB011	121SB01101	01/16/1995	1.100	mg/kg	J	2	0.55	0.74		X
Sodium	H121SB011	121SB01101	01/16/1995	304.000	mg/kg	=		10.2	1660		
Vanadium	H121SB011	121SB01101	01/16/1995	119.000	mg/kg	=		4.1	74.8		X
Zinc	H121SB011	121SB01101	01/16/1995	2110.000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB011	121SB01101	01/16/1995	0.160	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB011	121SB01101	01/16/1995	0.320	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB011	121SB01101	01/16/1995	0.540	mg/kg	=	0.033			X	
Acenaphthene	H121SB011	121SB01101	01/16/1995	0.130	mg/kg	J	0.33				
Acenaphthylene	H121SB011	121SB01101	01/16/1995	0.160	mg/kg	J	0.33				
Anthracene	H121SB011	121SB01101	01/16/1995	0.610	mg/kg	=	0.33			X	
Benzo(a)Anthracene	H121SB011	121SB01101	01/16/1995	1.900	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H121SB011	121SB01101	01/16/1995	1.700	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB011	121SB01101	01/16/1995	2.700	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H121SB011	121SB01101	01/16/1995	0.780	mg/kg	=					
Benzo(k)Fluoranthene	H121SB011	121SB01101	01/16/1995	0.790	mg/kg	J			0.596		X
bis(2-Ethylhexyl) Phthalate	H121SB011	121SB01101	01/16/1995	0.120	mg/kg	J					
Chrysene	H121SB011	121SB01101	01/16/1995	2.000	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	H121SB011	121SB01101	01/16/1995	0.280	mg/kg	J	0.33		0.525		
Fluoranthene	H121SB011	121SB01101	01/16/1995	3.900	mg/kg	=	0.33			X	
Fluorene	H121SB011	121SB01101	01/16/1995	0.200	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H121SB011	121SB01101	01/16/1995	0.750	mg/kg	=			0.525		X
Phenanthrene	H121SB011	121SB01101	01/16/1995	2.200	mg/kg	=	0.33			X	
Pyrene	H121SB011	121SB01101	01/16/1995	3.400	mg/kg	=	0.33			X	
BEQ	H121SB011	121SB01101	01/16/1995	2524.900	ug/kg	=			1.304		X
Aluminum	H121SB013	121SB01301	03/22/1995	8250.000	mg/kg	J		1090	32700		
Barium	H121SB013	121SB01301	03/22/1995	58.100	mg/kg	=		3.6	72.8		
Beryllium	H121SB013	121SB01301	03/22/1995	0.760	mg/kg	=		0.04	1.4		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Cadmium	H121SB013	121SB01301	03/22/1995	0.680	mg/kg	J	1	0.12	1.6		
Calcium	H121SB013	121SB01301	03/22/1995	44200.000	mg/kg	J		169	333000		
Chromium, Total	H121SB013	121SB01301	03/22/1995	25.300	mg/kg	J	52.3	3.4	114		
Cobalt	H121SB013	121SB01301	03/22/1995	4.700	mg/kg	=		0.49	7.9		
Copper	H121SB013	121SB01301	03/22/1995	239.000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB013	121SB01301	03/22/1995	13900.000	mg/kg	J		695	38800		
Lead	H121SB013	121SB01301	03/22/1995	161.000	mg/kg	=	30.2	1.8	172	X	
Magnesium	H121SB013	121SB01301	03/22/1995	1220.000	mg/kg	=		131	7850		
Manganese	H121SB013	121SB01301	03/22/1995	107.000	mg/kg	J		5.3	1200		
Mercury	H121SB013	121SB01301	03/22/1995	0.290	mg/kg	J	0.13	0.02	3.8	X	
Nickel	H121SB013	121SB01301	03/22/1995	49.100	mg/kg	J	15.9	0.63	91.8	X	
Selenium	H121SB013	121SB01301	03/22/1995	0.470	mg/kg	J		0.28	2.6		
Silver	H121SB013	121SB01301	03/22/1995	0.450	mg/kg	J	2	0.55	0.74		
Sodium	H121SB013	121SB01301	03/22/1995	148.000	mg/kg	=		10.2	1660		
Vanadium	H121SB013	121SB01301	03/22/1995	30.000	mg/kg	=		4.1	74.8		
Zinc	H121SB013	121SB01301	03/22/1995	536.000	mg/kg	J	124	5	431	X	X
1,2,3,4,6,7,8-Heptachlorodibenzoft	H121SB013	121SB01301	03/22/1995	361.149	pg/g	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	H121SB013	121SB01301	03/22/1995	251.736	pg/g	J					
1,2,3,4,7,8,9-Heptachlorodibenzoft	H121SB013	121SB01301	03/22/1995	30.619	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzofura	H121SB013	121SB01301	03/22/1995	216.194	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzo-p-d	H121SB013	121SB01301	03/22/1995	12.118	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzofura	H121SB013	121SB01301	03/22/1995	70.845	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	H121SB013	121SB01301	03/22/1995	22.929	pg/g	J					
1,2,3,7,8,9-Hexachlorodibenzofura	H121SB013	121SB01301	03/22/1995	24.135	pg/g	J					
1,2,3,7,8,9-Hexachlorodibenzo-p-d	H121SB013	121SB01301	03/22/1995	37.760	pg/g	J					
1,2,3,7,8-Pentachlorodibenzofuran	H121SB013	121SB01301	03/22/1995	37.393	pg/g	J					
1,2,3,7,8-Pentachlorodibenzo-p-dic	H121SB013	121SB01301	03/22/1995	10.167	pg/g	J					
2,3,4,6,7,8-Hexachlorodibenzofura	H121SB013	121SB01301	03/22/1995	96.902	pg/g	J					
2,3,4,7,8-Pentachlorodibenzofuran	H121SB013	121SB01301	03/22/1995	70.881	pg/g	J					
2,3,7,8-Tetrachlorodibenzofuran	H121SB013	121SB01301	03/22/1995	123.379	pg/g	J					
2,3,7,8-Tetrachlorodibenzo-p-dioxi	H121SB013	121SB01301	03/22/1995	2.365	pg/g	J					
Octachlorodibenzofuran	H121SB013	121SB01301	03/22/1995	241.827	pg/g	J					
Octachlorodibenzo-p-dioxin	H121SB013	121SB01301	03/22/1995	1690.106	pg/g	J					
Total Hepta-Dioxins	H121SB013	121SB01301	03/22/1995	664.194	pg/g	J					
Total Hepta-Furans	H121SB013	121SB01301	03/22/1995	598.110	pg/g	J					
Total Hexa-Dioxins	H121SB013	121SB01301	03/22/1995	359.618	pg/g	J					
Total Hexa-Furans	H121SB013	121SB01301	03/22/1995	861.683	pg/g	J					
Total Penta-Dioxins	H121SB013	121SB01301	03/22/1995	114.553	pg/g	J					
Total Penta-Furans	H121SB013	121SB01301	03/22/1995	821.753	pg/g	J					
Total Tetra-Dioxins	H121SB013	121SB01301	03/22/1995	106.596	pg/g	J					
Total Tetra-Furans	H121SB013	121SB01301	03/22/1995	734.841	pg/g	J					
2-Methylnaphthalene	H121SB013	121SB01301	03/22/1995	0.110	mg/kg	J	0.33				
Acenaphthylene	H121SB013	121SB01301	03/22/1995	0.590	mg/kg	=	0.33			X	
Anthracene	H121SB013	121SB01301	03/22/1995	0.420	mg/kg	=	0.33			X	
Benzo(a)Anthracene	H121SB013	121SB01301	03/22/1995	1.600	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H121SB013	121SB01301	03/22/1995	1.400	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB013	121SB01301	03/22/1995	2.000	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H121SB013	121SB01301	03/22/1995	0.460	mg/kg	=					
Benzo(k)Fluoranthene	H121SB013	121SB01301	03/22/1995	2.200	mg/kg	J			0.596		X
bis(2-Ethylhexyl) Phthalate	H121SB013	121SB01301	03/22/1995	0.170	mg/kg	J					
Chrysene	H121SB013	121SB01301	03/22/1995	1.700	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	H121SB013	121SB01301	03/22/1995	0.270	mg/kg	J	0.33		0.525		
Fluoranthene	H121SB013	121SB01301	03/22/1995	1.500	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB013	121SB01301	03/22/1995	0.530	mg/kg	=			0.525		X
Phenanthrene	H121SB013	121SB01301	03/22/1995	0.440	mg/kg	=	0.33			X	
Pyrene	H121SB013	121SB01301	03/22/1995	2.300	mg/kg	=	0.33			X	
BEQ	H121SB013	121SB01301	03/22/1995	2106.700	ug/kg	=			1.304		X
Aluminum	H121SB014	121SB01401	03/22/1995	11900.000	mg/kg	J		1090	32700		
Barium	H121SB014	121SB01401	03/22/1995	142.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB014	121SB01401	03/22/1995	4.100	mg/kg	=		0.04	1.4		X
Cadmium	H121SB014	121SB01401	03/22/1995	2.500	mg/kg	J	1	0.12	1.6	X	X
Calcium	H121SB014	121SB01401	03/22/1995	8460.000	mg/kg	J		169	333000		
Chromium, Total	H121SB014	121SB01401	03/22/1995	51.800	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB014	121SB01401	03/22/1995	22.400	mg/kg	=		0.49	7.9		X
Copper	H121SB014	121SB01401	03/22/1995	883.000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB014	121SB01401	03/22/1995	67500.000	mg/kg	J		695	38800		X
Lead	H121SB014	121SB01401	03/22/1995	549.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB014	121SB01401	03/22/1995	1490.000	mg/kg	=		131	7850		
Manganese	H121SB014	121SB01401	03/22/1995	304.000	mg/kg	=		5.3	1200		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Mercury	H121SB014	121SB01401	03/22/1995	0.960	mg/kg	J	0.13	0.02	3.8	X	
Nickel	H121SB014	121SB01401	03/22/1995	259.000	mg/kg	J	15.9	0.63	91.8	X	X
Selenium	H121SB014	121SB01401	03/22/1995	0.410	mg/kg	J		0.28	2.6		
Silver	H121SB014	121SB01401	03/22/1995	1.200	mg/kg	J	2	0.55	0.74		X
Sodium	H121SB014	121SB01401	03/22/1995	314.000	mg/kg	=		10.2	1660		
Vanadium	H121SB014	121SB01401	03/22/1995	93.900	mg/kg	=		4.1	74.8		X
Zinc	H121SB014	121SB01401	03/22/1995	3840.000	mg/kg	=	124	5	431	X	X
1,2,3,4,6,7,8-Heptachlorodibenzofu	H121SB014	121SB01401	03/22/1995	442.936	pg/g	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	H121SB014	121SB01401	03/22/1995	805.329	pg/g	J					
1,2,3,4,7,8,9-Heptachlorodibenzofu	H121SB014	121SB01401	03/22/1995	24.646	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzofura	H121SB014	121SB01401	03/22/1995	263.501	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzo-p-d	H121SB014	121SB01401	03/22/1995	16.142	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzofura	H121SB014	121SB01401	03/22/1995	82.114	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	H121SB014	121SB01401	03/22/1995	43.495	pg/g	J					
1,2,3,7,8,9-Hexachlorodibenzo-p-d	H121SB014	121SB01401	03/22/1995	53.932	pg/g	J					
1,2,3,7,8-Pentachlorodibenzofuran	H121SB014	121SB01401	03/22/1995	49.801	pg/g	J					
1,2,3,7,8-Pentachlorodibenzo-p-dic	H121SB014	121SB01401	03/22/1995	17.766	pg/g	J					
2,3,4,6,7,8-Hexachlorodibenzofura	H121SB014	121SB01401	03/22/1995	106.955	pg/g	J					
2,3,4,7,8-Pentachlorodibenzofuran	H121SB014	121SB01401	03/22/1995	97.147	pg/g	J					
2,3,7,8-Tetrachlorodibenzofuran	H121SB014	121SB01401	03/22/1995	221.003	pg/g	J					
2,3,7,8-Tetrachlorodibenzo-p-dioxi	H121SB014	121SB01401	03/22/1995	4.522	pg/g	J					
Octachlorodibenzofuran	H121SB014	121SB01401	03/22/1995	499.945	pg/g	J					
Octachlorodibenzo-p-dioxin	H121SB014	121SB01401	03/22/1995	10329.215	pg/g	J					
Total Hepta-Dioxins	H121SB014	121SB01401	03/22/1995	1735.921	pg/g	J					
Total Hepta-Furans	H121SB014	121SB01401	03/22/1995	946.875	pg/g	J					
Total Hexa-Dioxins	H121SB014	121SB01401	03/22/1995	582.016	pg/g	J					
Total Hexa-Furans	H121SB014	121SB01401	03/22/1995	1140.725	pg/g	J					
Total Penta-Dioxins	H121SB014	121SB01401	03/22/1995	201.024	pg/g	J					
Total Penta-Furans	H121SB014	121SB01401	03/22/1995	1298.922	pg/g	J					
Total Tetra-Dioxins	H121SB014	121SB01401	03/22/1995	219.530	pg/g	J					
Total Tetra-Furans	H121SB014	121SB01401	03/22/1995	1243.051	pg/g	J					
PCB-1260 (Arochlor 1260)	H121SB014	121SB01401	03/22/1995	0.110	mg/kg	=	0.033			X	
Benzo(a)Pyrene	H121SB014	121SB01401	03/22/1995	0.100	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H121SB014	121SB01401	03/22/1995	0.120	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H121SB014	121SB01401	03/22/1995	0.092	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H121SB014	121SB01401	03/22/1995	0.590	mg/kg	J					
Chrysene	H121SB014	121SB01401	03/22/1995	0.087	mg/kg	J	0.33		0.62		
Fluoranthene	H121SB014	121SB01401	03/22/1995	0.160	mg/kg	J	0.33				
Pyrene	H121SB014	121SB01401	03/22/1995	0.140	mg/kg	J	0.33				
BEQ	H121SB014	121SB01401	03/22/1995	371.007	ug/kg	=			1.304		
Aluminum	H121SB015	121SB01501	03/22/1995	5770.000	mg/kg	J		1090	32700		
Barium	H121SB015	121SB01501	03/22/1995	58.300	mg/kg	=		3.6	72.8		
Beryllium	H121SB015	121SB01501	03/22/1995	1.400	mg/kg	=		0.04	1.4		
Calcium	H121SB015	121SB01501	03/22/1995	28900.000	mg/kg	J		169	333000		
Chromium, Total	H121SB015	121SB01501	03/22/1995	33.500	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB015	121SB01501	03/22/1995	11.800	mg/kg	=		0.49	7.9		X
Copper	H121SB015	121SB01501	03/22/1995	734.000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB015	121SB01501	03/22/1995	13700.000	mg/kg	J		695	38800		
Lead	H121SB015	121SB01501	03/22/1995	344.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB015	121SB01501	03/22/1995	1640.000	mg/kg	=		131	7850		
Manganese	H121SB015	121SB01501	03/22/1995	123.000	mg/kg	=		5.3	1200		
Mercury	H121SB015	121SB01501	03/22/1995	0.260	mg/kg	J	0.13	0.02	3.8	X	
Nickel	H121SB015	121SB01501	03/22/1995	127.000	mg/kg	J	15.9	0.63	91.8	X	X
Selenium	H121SB015	121SB01501	03/22/1995	0.720	mg/kg	J		0.28	2.6		
Silver	H121SB015	121SB01501	03/22/1995	0.570	mg/kg	J	2	0.55	0.74		
Sodium	H121SB015	121SB01501	03/22/1995	266.000	mg/kg	=		10.2	1660		
Vanadium	H121SB015	121SB01501	03/22/1995	26.500	mg/kg	=		4.1	74.8		
Zinc	H121SB015	121SB01501	03/22/1995	1600.000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB015	121SB01501	03/22/1995	0.120	mg/kg	=	0.033			X	
Anthracene	H121SB015	121SB01501	03/22/1995	0.110	mg/kg	J	0.33				
Benzo(a)Anthracene	H121SB015	121SB01501	03/22/1995	0.240	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H121SB015	121SB01501	03/22/1995	0.240	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H121SB015	121SB01501	03/22/1995	0.390	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H121SB015	121SB01501	03/22/1995	0.220	mg/kg	J			0.596		
Chrysene	H121SB015	121SB01501	03/22/1995	0.290	mg/kg	J	0.33		0.62		
Fluoranthene	H121SB015	121SB01501	03/22/1995	0.600	mg/kg	=	0.33			X	
Phenanthrene	H121SB015	121SB01501	03/22/1995	0.440	mg/kg	=	0.33			X	
Pyrene	H121SB015	121SB01501	03/22/1995	0.570	mg/kg	=	0.33			X	
BEQ	H121SB015	121SB01501	03/22/1995	530.990	ug/kg	=			1.304		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Aluminum	H121SB016	121SB01601	03/22/1995	6470.000	mg/kg	J		1090	32700		
Barium	H121SB016	121SB01601	03/22/1995	110.000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB016	121SB01601	03/22/1995	4.600	mg/kg	=		0.04	1.4		X
Cadmium	H121SB016	121SB01601	03/22/1995	1.700	mg/kg	J	1	0.12	1.6	X	X
Calcium	H121SB016	121SB01601	03/22/1995	11700.000	mg/kg	J		169	333000		
Chromium, Total	H121SB016	121SB01601	03/22/1995	77.000	mg/kg	=	52.3	3.4	114	X	
Cobalt	H121SB016	121SB01601	03/22/1995	19.900	mg/kg	=		0.49	7.9		X
Copper	H121SB016	121SB01601	03/22/1995	1090.000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB016	121SB01601	03/22/1995	57300.000	mg/kg	J		695	38800		X
Lead	H121SB016	121SB01601	03/22/1995	871.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H121SB016	121SB01601	03/22/1995	1500.000	mg/kg	=		131	7850		
Manganese	H121SB016	121SB01601	03/22/1995	293.000	mg/kg	=		5.3	1200		
Mercury	H121SB016	121SB01601	03/22/1995	1.400	mg/kg	J	0.13	0.02	3.8	X	
Nickel	H121SB016	121SB01601	03/22/1995	240.000	mg/kg	J	15.9	0.63	91.8	X	X
Selenium	H121SB016	121SB01601	03/22/1995	0.710	mg/kg	J		0.28	2.6		
Silver	H121SB016	121SB01601	03/22/1995	1.000	mg/kg	J	2	0.55	0.74		X
Sodium	H121SB016	121SB01601	03/22/1995	300.000	mg/kg	=		10.2	1660		
Vanadium	H121SB016	121SB01601	03/22/1995	38.500	mg/kg	=		4.1	74.8		
Zinc	H121SB016	121SB01601	03/22/1995	3180.000	mg/kg	=	124	5	431	X	X
1,2,3,4,6,7,8-Heptachlorodibenzofu	H121SB016	121SB01601	03/22/1995	549.691	pg/g	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	H121SB016	121SB01601	03/22/1995	839.968	pg/g	J					
1,2,3,4,7,8,9-Heptachlorodibenzofu	H121SB016	121SB01601	03/22/1995	33.594	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzofura	H121SB016	121SB01601	03/22/1995	333.296	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzofura	H121SB016	121SB01601	03/22/1995	105.393	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	H121SB016	121SB01601	03/22/1995	54.139	pg/g	J					
1,2,3,7,8,9-Hexachlorodibenzofura	H121SB016	121SB01601	03/22/1995	24.640	pg/g	J					
1,2,3,7,8,9-Hexachlorodibenzo-p-d	H121SB016	121SB01601	03/22/1995	80.889	pg/g	J					
1,2,3,7,8-Pentachlorodibenzofuran	H121SB016	121SB01601	03/22/1995	64.550	pg/g	J					
1,2,3,7,8-Pentachlorodibenzo-p-dic	H121SB016	121SB01601	03/22/1995	23.868	pg/g	J					
2,3,4,6,7,8-Hexachlorodibenzofura	H121SB016	121SB01601	03/22/1995	133.170	pg/g	J					
2,3,4,7,8-Pentachlorodibenzofuran	H121SB016	121SB01601	03/22/1995	111.559	pg/g	J					
2,3,7,8-Tetrachlorodibenzofuran	H121SB016	121SB01601	03/22/1995	265.775	pg/g	J					
Octachlorodibenzofuran	H121SB016	121SB01601	03/22/1995	558.654	pg/g	J					
Octachlorodibenzo-p-dioxin	H121SB016	121SB01601	03/22/1995	8767.234	pg/g	J					
Total Hepta-Dioxins	H121SB016	121SB01601	03/22/1995	1988.122	pg/g	J					
Total Hepta-Furans	H121SB016	121SB01601	03/22/1995	1076.802	pg/g	J					
Total Hexa-Dioxins	H121SB016	121SB01601	03/22/1995	805.121	pg/g	J					
Total Hexa-Furans	H121SB016	121SB01601	03/22/1995	1418.459	pg/g	J					
Total Penta-Dioxins	H121SB016	121SB01601	03/22/1995	207.141	pg/g	J					
Total Penta-Furans	H121SB016	121SB01601	03/22/1995	1359.323	pg/g	J					
Total Tetra-Dioxins	H121SB016	121SB01601	03/22/1995	261.085	pg/g	J					
Total Tetra-Furans	H121SB016	121SB01601	03/22/1995	1536.069	pg/g	J					
PCB-1254 (Arochlor 1254)	H121SB016	121SB01601	03/22/1995	4.300	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB016	121SB01601	03/22/1995	1.100	mg/kg	=	0.033			X	
Anthracene	H121SB016	121SB01601	03/22/1995	0.120	mg/kg	J	0.33				
Benzo(a)Anthracene	H121SB016	121SB01601	03/22/1995	0.570	mg/kg	J	0.33		0.616	X	
Benzo(a)Pyrene	H121SB016	121SB01601	03/22/1995	0.620	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB016	121SB01601	03/22/1995	1.000	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H121SB016	121SB01601	03/22/1995	0.220	mg/kg	J					
Benzo(k)Fluoranthene	H121SB016	121SB01601	03/22/1995	0.500	mg/kg	J			0.596		
Benzyl Butyl Phthalate	H121SB016	121SB01601	03/22/1995	0.150	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	H121SB016	121SB01601	03/22/1995	0.690	mg/kg	J					
Chrysene	H121SB016	121SB01601	03/22/1995	0.630	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	H121SB016	121SB01601	03/22/1995	0.100	mg/kg	J	0.33		0.525		
Fluoranthene	H121SB016	121SB01601	03/22/1995	1.100	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB016	121SB01601	03/22/1995	0.250	mg/kg	J			0.525		
Phenanthrene	H121SB016	121SB01601	03/22/1995	0.440	mg/kg	J	0.33			X	
Pyrene	H121SB016	121SB01601	03/22/1995	1.100	mg/kg	=	0.33			X	
BEQ	H121SB016	121SB01601	03/22/1995	907.630	ug/kg	=			1.304		
Aluminum	H121SB017	121SB01701	03/22/1995	1750.000	mg/kg	J		1090	32700		
Barium	H121SB017	121SB01701	03/22/1995	21.600	mg/kg	=		3.6	72.8		
Beryllium	H121SB017	121SB01701	03/22/1995	0.160	mg/kg	J		0.04	1.4		
Calcium	H121SB017	121SB01701	03/22/1995	7720.000	mg/kg	J		169	333000		
Chromium, Total	H121SB017	121SB01701	03/22/1995	17.200	mg/kg	=	52.3	3.4	114		
Cobalt	H121SB017	121SB01701	03/22/1995	1.000	mg/kg	J		0.49	7.9		
Iron	H121SB017	121SB01701	03/22/1995	2230.000	mg/kg	J		695	38800		
Lead	H121SB017	121SB01701	03/22/1995	75.300	mg/kg	=	30.2	1.8	172	X	
Magnesium	H121SB017	121SB01701	03/22/1995	309.000	mg/kg	=		131	7850		
Manganese	H121SB017	121SB01701	03/22/1995	20.700	mg/kg	=		5.3	1200		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Mercury	H121SB017	121SB01701	03/22/1995	0.050	mg/kg	J	0.13	0.02	3.8		
Nickel	H121SB017	121SB01701	03/22/1995	4.600	mg/kg	J	15.9	0.63	91.8		
Sodium	H121SB017	121SB01701	03/22/1995	39.000	mg/kg	J		10.2	1660		
Vanadium	H121SB017	121SB01701	03/22/1995	6.200	mg/kg	=		4.1	74.8		
Zinc	H121SB017	121SB01701	03/22/1995	79.000	mg/kg	=	124	5	431		
1,2,3,4,6,7,8-Heptachlorodibenzofu	H121SB017	121SB01701	03/22/1995	60.259	pg/g	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	H121SB017	121SB01701	03/22/1995	147.201	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzofura	H121SB017	121SB01701	03/22/1995	26.256	pg/g	J					
1,2,3,4,7,8-Hexachlorodibenzo-p-d	H121SB017	121SB01701	03/22/1995	4.497	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzofura	H121SB017	121SB01701	03/22/1995	8.339	pg/g	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	H121SB017	121SB01701	03/22/1995	10.116	pg/g	J					
1,2,3,7,8-Pentachlorodibenzofuran	H121SB017	121SB01701	03/22/1995	8.562	pg/g	J					
2,3,4,7,8-Pentachlorodibenzofuran	H121SB017	121SB01701	03/22/1995	5.612	pg/g	J					
2,3,7,8-Tetrachlorodibenzofuran	H121SB017	121SB01701	03/22/1995	12.201	pg/g	J					
Octachlorodibenzofuran	H121SB017	121SB01701	03/22/1995	145.593	pg/g	J					
Octachlorodibenzo-p-dioxin	H121SB017	121SB01701	03/22/1995	1295.938	pg/g	J					
Total Hepta-Dioxins	H121SB017	121SB01701	03/22/1995	369.353	pg/g	J					
Total Hepta-Furans	H121SB017	121SB01701	03/22/1995	113.535	pg/g	J					
Total Hexa-Dioxins	H121SB017	121SB01701	03/22/1995	106.515	pg/g	J					
Total Hexa-Furans	H121SB017	121SB01701	03/22/1995	131.149	pg/g	J					
Total Penta-Furans	H121SB017	121SB01701	03/22/1995	112.668	pg/g	J					
Total Tetra-Dioxins	H121SB017	121SB01701	03/22/1995	33.921	pg/g	J					
Total Tetra-Furans	H121SB017	121SB01701	03/22/1995	97.221	pg/g	J					
PCB-1260 (Arochlor 1260)	H121SB017	121SB01701	03/22/1995	0.170	mg/kg	=	0.033			X	
Nitrite (as N)	H121SB04A	121SB04A01	05/03/1995	1.200	mg/kg	=					
Nitrogen, Ammonia (as N)	H121SB04A	121SB04A01	05/03/1995	25.000	mg/kg	=					
Nitrogen, Nitrate (as N)	H121SB04A	121SB04A01	05/03/1995	1.200	mg/kg	=					
Phosphorus	H121SB04A	121SB04A01	05/03/1995	650.000	mg/kg	=					
Total Organic Carbon	H121SB04A	121SB04A01	05/03/1995	110000.000	mg/kg	=					
Aluminum	H196SB001	196SB00101	09/01/1999	7570.000	mg/kg	=		1090	32700		
Arsenic	H196SB001	196SB00101	09/01/1999	6.600	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB001	196SB00101	09/01/1999	20.700	mg/kg	=		3.6	72.8		
Beryllium	H196SB001	196SB00101	09/01/1999	0.250	mg/kg	J		0.04	1.4		
Calcium	H196SB001	196SB00101	09/01/1999	4520.000	mg/kg	J		169	333000		
Chromium, Total	H196SB001	196SB00101	09/01/1999	18.500	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB001	196SB00101	09/01/1999	0.870	mg/kg	J		0.49	7.9		
Copper	H196SB001	196SB00101	09/01/1999	2.300	mg/kg	J	18.7	0.94	126		
Iron	H196SB001	196SB00101	09/01/1999	19500.000	mg/kg	J		695	38800		
Lead	H196SB001	196SB00101	09/01/1999	8.300	mg/kg	=	30.2	1.8	172		
Magnesium	H196SB001	196SB00101	09/01/1999	961.000	mg/kg	=		131	7850		
Manganese	H196SB001	196SB00101	09/01/1999	18.700	mg/kg	=		5.3	1200		
Nickel	H196SB001	196SB00101	09/01/1999	1.700	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB001	196SB00101	09/01/1999	507.000	mg/kg	=		65	2960		
Sodium	H196SB001	196SB00101	09/01/1999	367.000	mg/kg	=		10.2	1660		
Vanadium	H196SB001	196SB00101	09/01/1999	21.700	mg/kg	=		4.1	74.8		
Zinc	H196SB001	196SB00101	09/01/1999	9.800	mg/kg	=	124	5	431		
Aluminum	H196SB002	196SB00201	09/01/1999	9040.000	mg/kg	=		1090	32700		
Arsenic	H196SB002	196SB00201	09/01/1999	3.400	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB002	196SB00201	09/01/1999	48.500	mg/kg	=		3.6	72.8		
Beryllium	H196SB002	196SB00201	09/01/1999	0.470	mg/kg	J		0.04	1.4		
Calcium	H196SB002	196SB00201	09/01/1999	1250.000	mg/kg	J		169	333000		
Chromium, Total	H196SB002	196SB00201	09/01/1999	10.800	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB002	196SB00201	09/01/1999	1.700	mg/kg	J		0.49	7.9		
Copper	H196SB002	196SB00201	09/01/1999	7.200	mg/kg	=	18.7	0.94	126		
Iron	H196SB002	196SB00201	09/01/1999	9270.000	mg/kg	J		695	38800		
Lead	H196SB002	196SB00201	09/01/1999	19.500	mg/kg	=	30.2	1.8	172		
Magnesium	H196SB002	196SB00201	09/01/1999	553.000	mg/kg	=		131	7850		
Manganese	H196SB002	196SB00201	09/01/1999	44.800	mg/kg	=		5.3	1200		
Mercury	H196SB002	196SB00201	09/01/1999	0.050	mg/kg	=	0.13	0.02	3.8		
Nickel	H196SB002	196SB00201	09/01/1999	4.700	mg/kg	=	15.9	0.63	91.8		
Potassium	H196SB002	196SB00201	09/01/1999	195.000	mg/kg	J		65	2960		
Sodium	H196SB002	196SB00201	09/01/1999	278.000	mg/kg	J		10.2	1660		
Vanadium	H196SB002	196SB00201	09/01/1999	12.800	mg/kg	=		4.1	74.8		
Zinc	H196SB002	196SB00201	09/01/1999	48.800	mg/kg	=	124	5	431		
1,4-Dichlorobenzene	H196SB002	196SB00201	09/01/1999	0.020	mg/kg	J					
Benzoic acid	H196SB002	196SB00201	09/01/1999	0.100	mg/kg	J					
Di-n-octylphthalate	H196SB002	196SB00201	09/01/1999	0.200	mg/kg	J					
Aluminum	H196SB003	196SB00301	09/01/1999	6520.000	mg/kg	=		1090	32700		
Antimony	H196SB003	196SB00301	09/01/1999	2.800	mg/kg	J	12	1.1	2.2		X

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Arsenic	H196SB003	196SB00301	09/01/1999	4.200	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB003	196SB00301	09/01/1999	33.900	mg/kg	=		3.6	72.8		
Beryllium	H196SB003	196SB00301	09/01/1999	0.350	mg/kg	J		0.04	1.4		
Cadmium	H196SB003	196SB00301	09/01/1999	0.340	mg/kg	J	1	0.12	1.6		
Calcium	H196SB003	196SB00301	09/01/1999	25700.000	mg/kg	J		169	333000		
Chromium, Total	H196SB003	196SB00301	09/01/1999	15.100	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB003	196SB00301	09/01/1999	3.500	mg/kg	=		0.49	7.9		
Copper	H196SB003	196SB00301	09/01/1999	154.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB003	196SB00301	09/01/1999	11800.000	mg/kg	J		695	38800		
Lead	H196SB003	196SB00301	09/01/1999	71.500	mg/kg	=	30.2	1.8	172	X	
Magnesium	H196SB003	196SB00301	09/01/1999	876.000	mg/kg	=		131	7850		
Manganese	H196SB003	196SB00301	09/01/1999	79.800	mg/kg	=		5.3	1200		
Mercury	H196SB003	196SB00301	09/01/1999	0.090	mg/kg	=	0.13	0.02	3.8		
Nickel	H196SB003	196SB00301	09/01/1999	102.000	mg/kg	=	15.9	0.63	91.8	X	X
Potassium	H196SB003	196SB00301	09/01/1999	229.000	mg/kg	J		65	2960		
Sodium	H196SB003	196SB00301	09/01/1999	330.000	mg/kg	J		10.2	1660		
Tin (Sn)	H196SB003	196SB00301	09/01/1999	24.700	mg/kg	=		NA	NA		
Vanadium	H196SB003	196SB00301	09/01/1999	17.400	mg/kg	=		4.1	74.8		
Zinc	H196SB003	196SB00301	09/01/1999	198.000	mg/kg	=	124	5	431	X	
PCB-1254 (Arochlor 1254)	H196SB003	196SB00301	09/01/1999	0.093	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB003	196SB00301	09/01/1999	0.053	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB003	196SB00301	09/01/1999	0.007	mg/kg	J	0.0017			X	
p,p'-DDE	H196SB003	196SB00301	09/01/1999	0.008	mg/kg	=					
p,p'-DDT	H196SB003	196SB00301	09/01/1999	0.017	mg/kg	J					
Benzo(g,h,i)Perylene	H196SB003	196SB00301	09/01/1999	0.021	mg/kg	J					
Benzoic acid	H196SB003	196SB00301	09/01/1999	0.100	mg/kg	J					
Fluoranthene	H196SB003	196SB00301	09/01/1999	0.019	mg/kg	J	0.33				
Pyrene	H196SB003	196SB00301	09/01/1999	0.019	mg/kg	J	0.33				
Methylene Chloride	H196SB003	196SB00301	09/01/1999	0.001	mg/kg	J					
Aluminum	H196SB004	196SB00401	09/01/1999	7250.000	mg/kg	=		1090	32700		
Antimony	H196SB004	196SB00401	09/01/1999	46.300	mg/kg	J	12	1.1	2.2	X	X
Arsenic	H196SB004	196SB00401	09/01/1999	9.900	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB004	196SB00401	09/01/1999	139.000	mg/kg	=		3.6	72.8		X
Beryllium	H196SB004	196SB00401	09/01/1999	0.610	mg/kg	=		0.04	1.4		
Cadmium	H196SB004	196SB00401	09/01/1999	2.500	mg/kg	J	1	0.12	1.6	X	X
Calcium	H196SB004	196SB00401	09/01/1999	21100.000	mg/kg	J		169	333000		
Chromium, Total	H196SB004	196SB00401	09/01/1999	53.100	mg/kg	=	52.3	3.4	114	X	
Cobalt	H196SB004	196SB00401	09/01/1999	10.000	mg/kg	=		0.49	7.9		X
Copper	H196SB004	196SB00401	09/01/1999	641.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB004	196SB00401	09/01/1999	13900.000	mg/kg	J		695	38800		
Lead	H196SB004	196SB00401	09/01/1999	734.000	mg/kg	=	30.2	1.8	172	X	X
Magnesium	H196SB004	196SB00401	09/01/1999	1020.000	mg/kg	=		131	7850		
Manganese	H196SB004	196SB00401	09/01/1999	111.000	mg/kg	=		5.3	1200		
Mercury	H196SB004	196SB00401	09/01/1999	0.940	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB004	196SB00401	09/01/1999	37.600	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H196SB004	196SB00401	09/01/1999	363.000	mg/kg	=		65	2960		
Selenium	H196SB004	196SB00401	09/01/1999	0.410	mg/kg	J		0.28	2.6		
Silver	H196SB004	196SB00401	09/01/1999	1.900	mg/kg	=	2	0.55	0.74		X
Sodium	H196SB004	196SB00401	09/01/1999	406.000	mg/kg	=		10.2	1660		
Tin (Sn)	H196SB004	196SB00401	09/01/1999	39.700	mg/kg	=		NA	NA		
Vanadium	H196SB004	196SB00401	09/01/1999	34.500	mg/kg	=		4.1	74.8		
Zinc	H196SB004	196SB00401	09/01/1999	1040.000	mg/kg	=	124	5	431	X	X
PCB-1254 (Arochlor 1254)	H196SB004	196SB00401	09/01/1999	0.260	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB004	196SB00401	09/01/1999	0.150	mg/kg	J	0.033			X	
Alpha-chlordane	H196SB004	196SB00401	09/01/1999	0.028	mg/kg	J	0.0017			X	
Gamma-chlordane	H196SB004	196SB00401	09/01/1999	0.034	mg/kg	=	0.0017			X	
p,p'-DDD	H196SB004	196SB00401	09/01/1999	0.009	mg/kg	J					
p,p'-DDE	H196SB004	196SB00401	09/01/1999	0.027	mg/kg	J					
1,4-Dichlorobenzene	H196SB004	196SB00401	09/01/1999	0.019	mg/kg	J					
Anthracene	H196SB004	196SB00401	09/01/1999	0.021	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB004	196SB00401	09/01/1999	0.120	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB004	196SB00401	09/01/1999	0.110	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB004	196SB00401	09/01/1999	0.120	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	H196SB004	196SB00401	09/01/1999	0.078	mg/kg	J					
Benzo(k)Fluoranthene	H196SB004	196SB00401	09/01/1999	0.110	mg/kg	J			0.596		
Benzoic acid	H196SB004	196SB00401	09/01/1999	0.110	mg/kg	J					
Chrysene	H196SB004	196SB00401	09/01/1999	0.190	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB004	196SB00401	09/01/1999	0.200	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H196SB004	196SB00401	09/01/1999	0.071	mg/kg	J			0.525		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Phenanthrene	H196SB004	196SB00401	09/01/1999	0.078	mg/kg	J	0.33				
Pyrene	H196SB004	196SB00401	09/01/1999	0.170	mg/kg	J	0.33				
BEQ	H196SB004	196SB00401	09/01/1999	332.390	ug/kg	=			1.304		
Methylene Chloride	H196SB004	196SB00401	09/01/1999	0.005	mg/kg	J					
Aluminum	H196SB005	196SB00501	09/01/1999	5870.000	mg/kg	=		1090	32700		
Antimony	H196SB005	196SB00501	09/01/1999	8.600	mg/kg	J	12	1.1	2.2		X
Arsenic	H196SB005	196SB00501	09/01/1999	11.200	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB005	196SB00501	09/01/1999	40.800	mg/kg	=		3.6	72.8		
Beryllium	H196SB005	196SB00501	09/01/1999	0.420	mg/kg	J		0.04	1.4		
Cadmium	H196SB005	196SB00501	09/01/1999	0.700	mg/kg	J	1	0.12	1.6		
Calcium	H196SB005	196SB00501	09/01/1999	52300.000	mg/kg	J		169	333000		
Chromium, Total	H196SB005	196SB00501	09/01/1999	31.100	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB005	196SB00501	09/01/1999	3.600	mg/kg	=		0.49	7.9		
Copper	H196SB005	196SB00501	09/01/1999	270.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB005	196SB00501	09/01/1999	8130.000	mg/kg	J		695	38800		
Lead	H196SB005	196SB00501	09/01/1999	152.000	mg/kg	=	30.2	1.8	172	X	
Magnesium	H196SB005	196SB00501	09/01/1999	1300.000	mg/kg	=		131	7850		
Manganese	H196SB005	196SB00501	09/01/1999	122.000	mg/kg	=		5.3	1200		
Mercury	H196SB005	196SB00501	09/01/1999	0.360	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB005	196SB00501	09/01/1999	21.600	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H196SB005	196SB00501	09/01/1999	366.000	mg/kg	=		65	2960		
Sodium	H196SB005	196SB00501	09/01/1999	330.000	mg/kg	=		10.2	1660		
Tin (Sn)	H196SB005	196SB00501	09/01/1999	36.500	mg/kg	=		NA	NA		
Vanadium	H196SB005	196SB00501	09/01/1999	137.000	mg/kg	=		4.1	74.8		X
Zinc	H196SB005	196SB00501	09/01/1999	311.000	mg/kg	=	124	5	431	X	
PCB-1254 (Arochlor 1254)	H196SB005	196SB00501	09/01/1999	0.100	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB005	196SB00501	09/01/1999	0.097	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB005	196SB00501	09/01/1999	0.005	mg/kg	J	0.0017			X	
p,p'-DDT	H196SB005	196SB00501	09/01/1999	0.018	mg/kg	J					
1,4-Dichlorobenzene	H196SB005	196SB00501	09/01/1999	0.018	mg/kg	J					
2,4-Dimethylphenol	H196SB005	196SB00501	09/01/1999	0.038	mg/kg	J					
4-Methylphenol (p-Cresol)	H196SB005	196SB00501	09/01/1999	0.022	mg/kg	J					
Acenaphthene	H196SB005	196SB00501	09/01/1999	0.023	mg/kg	J	0.33				
Acenaphthylene	H196SB005	196SB00501	09/01/1999	0.150	mg/kg	J	0.33				
Anthracene	H196SB005	196SB00501	09/01/1999	0.230	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB005	196SB00501	09/01/1999	0.380	mg/kg	=	0.33		0.616	X	
Benzo(a)Pyrene	H196SB005	196SB00501	09/01/1999	0.300	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB005	196SB00501	09/01/1999	0.640	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H196SB005	196SB00501	09/01/1999	0.250	mg/kg	J					
Benzo(k)Fluoranthene	H196SB005	196SB00501	09/01/1999	0.390	mg/kg	=			0.596		
Chrysene	H196SB005	196SB00501	09/01/1999	0.910	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	H196SB005	196SB00501	09/01/1999	0.094	mg/kg	J	0.33		0.525		
Di-n-butyl Phthalate	H196SB005	196SB00501	09/01/1999	0.020	mg/kg	J					
Fluoranthene	H196SB005	196SB00501	09/01/1999	2.000	mg/kg	=	0.33			X	
Fluorene	H196SB005	196SB00501	09/01/1999	0.034	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H196SB005	196SB00501	09/01/1999	0.230	mg/kg	J			0.525		
Phenanthrene	H196SB005	196SB00501	09/01/1999	0.660	mg/kg	=	0.33			X	
Pyrene	H196SB005	196SB00501	09/01/1999	1.400	mg/kg	=	0.33			X	
BEQ	H196SB005	196SB00501	09/01/1999	523.810	ug/kg	=			1.304		
Methylene Chloride	H196SB005	196SB00501	09/01/1999	0.002	mg/kg	J					
Aluminum	H196SB006	196SB00601	09/01/1999	7660.000	mg/kg	=		1090	32700		
Antimony	H196SB006	196SB00601	09/01/1999	1.400	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB006	196SB00601	09/01/1999	8.000	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB006	196SB00601	09/01/1999	37.300	mg/kg	=		3.6	72.8		
Beryllium	H196SB006	196SB00601	09/01/1999	0.510	mg/kg	J		0.04	1.4		
Cadmium	H196SB006	196SB00601	09/01/1999	0.540	mg/kg	J	1	0.12	1.6		
Calcium	H196SB006	196SB00601	09/01/1999	30500.000	mg/kg	J		169	333000		
Chromium, Total	H196SB006	196SB00601	09/01/1999	27.100	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB006	196SB00601	09/01/1999	3.500	mg/kg	=		0.49	7.9		
Copper	H196SB006	196SB00601	09/01/1999	226.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB006	196SB00601	09/01/1999	12600.000	mg/kg	J		695	38800		
Lead	H196SB006	196SB00601	09/01/1999	76.200	mg/kg	=	30.2	1.8	172	X	
Magnesium	H196SB006	196SB00601	09/01/1999	1210.000	mg/kg	=		131	7850		
Manganese	H196SB006	196SB00601	09/01/1999	107.000	mg/kg	=		5.3	1200		
Mercury	H196SB006	196SB00601	09/01/1999	0.270	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB006	196SB00601	09/01/1999	42.000	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H196SB006	196SB00601	09/01/1999	390.000	mg/kg	=		65	2960		
Sodium	H196SB006	196SB00601	09/01/1999	344.000	mg/kg	=		10.2	1660		
Vanadium	H196SB006	196SB00601	09/01/1999	39.300	mg/kg	=		4.1	74.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Zinc	H196SB006	196SB00601	09/01/1999	254.000	mg/kg	=	124	5	431	X	
PCB-1254 (Arochlor 1254)	H196SB006	196SB00601	09/01/1999	0.120	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB006	196SB00601	09/01/1999	0.120	mg/kg	J	0.033			X	
Acenaphthylene	H196SB006	196SB00601	09/01/1999	0.140	mg/kg	J	0.33				
Anthracene	H196SB006	196SB00601	09/01/1999	0.190	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB006	196SB00601	09/01/1999	1.000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H196SB006	196SB00601	09/01/1999	0.730	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H196SB006	196SB00601	09/01/1999	1.400	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	H196SB006	196SB00601	09/01/1999	0.490	mg/kg	=					
Benzo(k)Fluoranthene	H196SB006	196SB00601	09/01/1999	0.610	mg/kg	=			0.596		X
Benzoic acid	H196SB006	196SB00601	09/01/1999	0.110	mg/kg	J					
Chrysene	H196SB006	196SB00601	09/01/1999	1.600	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	H196SB006	196SB00601	09/01/1999	0.230	mg/kg	J	0.33		0.525		
Fluoranthene	H196SB006	196SB00601	09/01/1999	1.900	mg/kg	=	0.33			X	
Fluorene	H196SB006	196SB00601	09/01/1999	0.023	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H196SB006	196SB00601	09/01/1999	0.490	mg/kg	=			0.525		
Phenanthrene	H196SB006	196SB00601	09/01/1999	0.400	mg/kg	=	0.33			X	
Pyrene	H196SB006	196SB00601	09/01/1999	1.700	mg/kg	=	0.33			X	
BEQ	H196SB006	196SB00601	09/01/1999	1256.700	ug/kg	=			1.304		
Methylene Chloride	H196SB006	196SB00601	09/01/1999	0.001	mg/kg	J					
Aluminum	H196SB007	196SB00701	09/02/1999	8710.000	mg/kg	=		1090	32700		
Antimony	H196SB007	196SB00701	09/02/1999	0.760	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB007	196SB00701	09/02/1999	11.000	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB007	196SB00701	09/02/1999	34.300	mg/kg	J		3.6	72.8		
Beryllium	H196SB007	196SB00701	09/02/1999	0.550	mg/kg	J		0.04	1.4		
Cadmium	H196SB007	196SB00701	09/02/1999	0.470	mg/kg	J	1	0.12	1.6		
Calcium	H196SB007	196SB00701	09/02/1999	89200.000	mg/kg	J		169	333000		
Chromium, Total	H196SB007	196SB00701	09/02/1999	21.700	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB007	196SB00701	09/02/1999	3.400	mg/kg	J		0.49	7.9		
Copper	H196SB007	196SB00701	09/02/1999	151.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB007	196SB00701	09/02/1999	9520.000	mg/kg	J		695	38800		
Lead	H196SB007	196SB00701	09/02/1999	61.800	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB007	196SB00701	09/02/1999	2300.000	mg/kg	J		131	7850		
Manganese	H196SB007	196SB00701	09/02/1999	133.000	mg/kg	J		5.3	1200		
Mercury	H196SB007	196SB00701	09/02/1999	0.310	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB007	196SB00701	09/02/1999	70.300	mg/kg	J	15.9	0.63	91.8	X	
Potassium	H196SB007	196SB00701	09/02/1999	512.000	mg/kg	=		65	2960		
Sodium	H196SB007	196SB00701	09/02/1999	516.000	mg/kg	=		10.2	1660		
Vanadium	H196SB007	196SB00701	09/02/1999	22.000	mg/kg	J		4.1	74.8		
Zinc	H196SB007	196SB00701	09/02/1999	153.000	mg/kg	J	124	5	431	X	
PCB-1254 (Arochlor 1254)	H196SB007	196SB00701	09/02/1999	0.130	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB007	196SB00701	09/02/1999	0.130	mg/kg	=	0.033			X	
Benzo(a)Pyrene	H196SB007	196SB00701	09/02/1999	0.075	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB007	196SB00701	09/02/1999	0.120	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB007	196SB00701	09/02/1999	0.067	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H196SB007	196SB00701	09/02/1999	0.059	mg/kg	J					
Chrysene	H196SB007	196SB00701	09/02/1999	0.079	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB007	196SB00701	09/02/1999	0.076	mg/kg	J	0.33				
Phenanthrene	H196SB007	196SB00701	09/02/1999	0.028	mg/kg	J	0.33				
Pyrene	H196SB007	196SB00701	09/02/1999	0.140	mg/kg	J	0.33				
BEQ	H196SB007	196SB00701	09/02/1999	339.749	ug/kg	=			1.304		
Aluminum	H196SB008	196SB00801	09/02/1999	2740.000	mg/kg	=		1090	32700		
Antimony	H196SB008	196SB00801	09/02/1999	8.300	mg/kg	J	12	1.1	2.2		X
Arsenic	H196SB008	196SB00801	09/02/1999	8.500	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB008	196SB00801	09/02/1999	50.400	mg/kg	J		3.6	72.8		
Beryllium	H196SB008	196SB00801	09/02/1999	0.390	mg/kg	J		0.04	1.4		
Cadmium	H196SB008	196SB00801	09/02/1999	0.620	mg/kg	J	1	0.12	1.6		
Calcium	H196SB008	196SB00801	09/02/1999	164000.000	mg/kg	J		169	333000		
Chromium, Total	H196SB008	196SB00801	09/02/1999	19.900	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB008	196SB00801	09/02/1999	8.900	mg/kg	J		0.49	7.9		X
Copper	H196SB008	196SB00801	09/02/1999	127.000	mg/kg	=	18.7	0.94	126	X	X
Iron	H196SB008	196SB00801	09/02/1999	9580.000	mg/kg	J		695	38800		
Lead	H196SB008	196SB00801	09/02/1999	181.000	mg/kg	J	30.2	1.8	172	X	X
Magnesium	H196SB008	196SB00801	09/02/1999	2460.000	mg/kg	J		131	7850		
Manganese	H196SB008	196SB00801	09/02/1999	283.000	mg/kg	J		5.3	1200		
Mercury	H196SB008	196SB00801	09/02/1999	0.020	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB008	196SB00801	09/02/1999	21.100	mg/kg	J	15.9	0.63	91.8	X	
Potassium	H196SB008	196SB00801	09/02/1999	285.000	mg/kg	=		65	2960		
Sodium	H196SB008	196SB00801	09/02/1999	381.000	mg/kg	=		10.2	1660		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Tin (Sn)	H196SB008	196SB00801	09/02/1999	34.000	mg/kg	J		NA	NA		
Vanadium	H196SB008	196SB00801	09/02/1999	11.800	mg/kg	J		4.1	74.8		
Zinc	H196SB008	196SB00801	09/02/1999	250.000	mg/kg	J	124	5	431	X	
PCB-1254 (Arochlor 1254)	H196SB008	196SB00801	09/02/1999	0.120	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB008	196SB00801	09/02/1999	0.087	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB008	196SB00801	09/02/1999	0.004	mg/kg	J	0.0017			X	
p,p'-DDE	H196SB008	196SB00801	09/02/1999	0.009	mg/kg	J					
p,p'-DDT	H196SB008	196SB00801	09/02/1999	0.008	mg/kg	J					
Acenaphthylene	H196SB008	196SB00801	09/02/1999	0.022	mg/kg	J	0.33				
Anthracene	H196SB008	196SB00801	09/02/1999	0.028	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB008	196SB00801	09/02/1999	0.100	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB008	196SB00801	09/02/1999	0.160	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB008	196SB00801	09/02/1999	0.200	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	H196SB008	196SB00801	09/02/1999	0.058	mg/kg	J					
Benzo(k)Fluoranthene	H196SB008	196SB00801	09/02/1999	0.180	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H196SB008	196SB00801	09/02/1999	0.031	mg/kg	J					
Chrysene	H196SB008	196SB00801	09/02/1999	0.310	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB008	196SB00801	09/02/1999	0.570	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H196SB008	196SB00801	09/02/1999	0.061	mg/kg	J			0.525		
Phenanthrene	H196SB008	196SB00801	09/02/1999	0.089	mg/kg	J	0.33				
Pyrene	H196SB008	196SB00801	09/02/1999	0.530	mg/kg	=	0.33			X	
BEQ	H196SB008	196SB00801	09/02/1999	373.210	ug/kg	=			1.304		
Aluminum	H196SB009	196SB00901	09/02/1999	7930.000	mg/kg	=		1090	32700		
Antimony	H196SB009	196SB00901	09/02/1999	1.600	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB009	196SB00901	09/02/1999	5.600	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB009	196SB00901	09/02/1999	31.100	mg/kg	J		3.6	72.8		
Beryllium	H196SB009	196SB00901	09/02/1999	0.410	mg/kg	J		0.04	1.4		
Calcium	H196SB009	196SB00901	09/02/1999	20300.000	mg/kg	J		169	333000		
Chromium, Total	H196SB009	196SB00901	09/02/1999	15.700	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB009	196SB00901	09/02/1999	2.100	mg/kg	J		0.49	7.9		
Copper	H196SB009	196SB00901	09/02/1999	41.900	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB009	196SB00901	09/02/1999	10600.000	mg/kg	J		695	38800		
Lead	H196SB009	196SB00901	09/02/1999	42.800	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB009	196SB00901	09/02/1999	952.000	mg/kg	J		131	7850		
Manganese	H196SB009	196SB00901	09/02/1999	79.700	mg/kg	J		5.3	1200		
Mercury	H196SB009	196SB00901	09/02/1999	0.140	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB009	196SB00901	09/02/1999	8.000	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB009	196SB00901	09/02/1999	261.000	mg/kg	J		65	2960		
Selenium	H196SB009	196SB00901	09/02/1999	0.670	mg/kg	=		0.28	2.6		
Sodium	H196SB009	196SB00901	09/02/1999	396.000	mg/kg	=		10.2	1660		
Vanadium	H196SB009	196SB00901	09/02/1999	19.800	mg/kg	J		4.1	74.8		
Zinc	H196SB009	196SB00901	09/02/1999	107.000	mg/kg	J	124	5	431		
PCB-1254 (Arochlor 1254)	H196SB009	196SB00901	09/02/1999	0.150	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB009	196SB00901	09/02/1999	0.089	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB009	196SB00901	09/02/1999	0.004	mg/kg	J	0.0017			X	
p,p'-DDD	H196SB009	196SB00901	09/02/1999	0.006	mg/kg	J					
p,p'-DDE	H196SB009	196SB00901	09/02/1999	0.014	mg/kg	J					
p,p'-DDT	H196SB009	196SB00901	09/02/1999	0.006	mg/kg	J					
Benzo(b)Fluoranthene	H196SB009	196SB00901	09/02/1999	0.023	mg/kg	J			0.608		
bis(2-Ethylhexyl) Phthalate	H196SB009	196SB00901	09/02/1999	0.018	mg/kg	J					
Chrysene	H196SB009	196SB00901	09/02/1999	0.020	mg/kg	J	0.33		0.62		
BEQ	H196SB009	196SB00901	09/02/1999	389.070	ug/kg	=			1.304		
Aluminum	H196SB010	196SB01001	09/02/1999	2420.000	mg/kg	=		1090	32700		
Antimony	H196SB010	196SB01001	09/02/1999	0.370	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB010	196SB01001	09/02/1999	5.400	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB010	196SB01001	09/02/1999	10.900	mg/kg	J		3.6	72.8		
Beryllium	H196SB010	196SB01001	09/02/1999	0.320	mg/kg	J		0.04	1.4		
Cadmium	H196SB010	196SB01001	09/02/1999	0.490	mg/kg	J	1	0.12	1.6		
Calcium	H196SB010	196SB01001	09/02/1999	197000.000	mg/kg	J		169	333000		
Chromium, Total	H196SB010	196SB01001	09/02/1999	8.800	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB010	196SB01001	09/02/1999	3.500	mg/kg	J		0.49	7.9		
Copper	H196SB010	196SB01001	09/02/1999	26.200	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB010	196SB01001	09/02/1999	5470.000	mg/kg	J		695	38800		
Lead	H196SB010	196SB01001	09/02/1999	19.100	mg/kg	J	30.2	1.8	172		
Magnesium	H196SB010	196SB01001	09/02/1999	3050.000	mg/kg	J		131	7850		
Manganese	H196SB010	196SB01001	09/02/1999	332.000	mg/kg	J		5.3	1200		
Mercury	H196SB010	196SB01001	09/02/1999	0.120	mg/kg	=	0.13	0.02	3.8		
Nickel	H196SB010	196SB01001	09/02/1999	10.200	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB010	196SB01001	09/02/1999	395.000	mg/kg	=		65	2960		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Sodium	H196SB010	196SB01001	09/02/1999	382.000	mg/kg	=		10.2	1660		
Vanadium	H196SB010	196SB01001	09/02/1999	9.900	mg/kg	J		4.1	74.8		
Zinc	H196SB010	196SB01001	09/02/1999	79.500	mg/kg	J	124	5	431		
Cyanide	H196SB010	196SB01001	09/02/1999	1.700	mg/kg	=					
PCB-1260 (Arochlor 1260)	H196SB010	196SB01001	09/02/1999	0.040	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB010	196SB01001	09/02/1999	0.006	mg/kg	J	0.0017			X	
Heptachlor	H196SB010	196SB01001	09/02/1999	0.005	mg/kg	J					
p,p'-DDE	H196SB010	196SB01001	09/02/1999	0.005	mg/kg	J					
p,p'-DDT	H196SB010	196SB01001	09/02/1999	0.018	mg/kg	J					
Benzo(a)Pyrene	H196SB010	196SB01001	09/02/1999	0.046	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB010	196SB01001	09/02/1999	0.074	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB010	196SB01001	09/02/1999	0.064	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H196SB010	196SB01001	09/02/1999	0.055	mg/kg	J					
Chrysene	H196SB010	196SB01001	09/02/1999	0.068	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB010	196SB01001	09/02/1999	0.071	mg/kg	J	0.33				
Phenanthrene	H196SB010	196SB01001	09/02/1999	0.019	mg/kg	J	0.33				
Pyrene	H196SB010	196SB01001	09/02/1999	0.130	mg/kg	J	0.33				
BEQ	H196SB010	196SB01001	09/02/1999	276.108	ug/kg	=			1.304		
Aluminum	H196SB011	196SB01101	09/02/1999	15200.000	mg/kg	=		1090	32700		
Arsenic	H196SB011	196SB01101	09/02/1999	7.900	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB011	196SB01101	09/02/1999	44.200	mg/kg	J		3.6	72.8		
Beryllium	H196SB011	196SB01101	09/02/1999	0.690	mg/kg	=		0.04	1.4		
Calcium	H196SB011	196SB01101	09/02/1999	23500.000	mg/kg	J		169	333000		
Chromium, Total	H196SB011	196SB01101	09/02/1999	49.500	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB011	196SB01101	09/02/1999	3.600	mg/kg	J		0.49	7.9		
Copper	H196SB011	196SB01101	09/02/1999	24.900	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB011	196SB01101	09/02/1999	15200.000	mg/kg	J		695	38800		
Lead	H196SB011	196SB01101	09/02/1999	56.300	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB011	196SB01101	09/02/1999	2310.000	mg/kg	J		131	7850		
Manganese	H196SB011	196SB01101	09/02/1999	194.000	mg/kg	J		5.3	1200		
Mercury	H196SB011	196SB01101	09/02/1999	0.100	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB011	196SB01101	09/02/1999	12.100	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB011	196SB01101	09/02/1999	902.000	mg/kg	=		65	2960		
Selenium	H196SB011	196SB01101	09/02/1999	0.680	mg/kg	=		0.28	2.6		
Sodium	H196SB011	196SB01101	09/02/1999	430.000	mg/kg	=		10.2	1660		
Vanadium	H196SB011	196SB01101	09/02/1999	34.400	mg/kg	J		4.1	74.8		
Zinc	H196SB011	196SB01101	09/02/1999	95.300	mg/kg	J	124	5	431		
PCB-1254 (Arochlor 1254)	H196SB011	196SB01101	09/02/1999	0.110	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB011	196SB01101	09/02/1999	0.059	mg/kg	=	0.033			X	
Dieldrin	H196SB011	196SB01101	09/02/1999	0.004	mg/kg	J	0.0033			X	
Gamma-chlordane	H196SB011	196SB01101	09/02/1999	0.003	mg/kg	J	0.0017			X	
Heptachlor	H196SB011	196SB01101	09/02/1999	0.004	mg/kg	J					
Benzo(a)Anthracene	H196SB011	196SB01101	09/02/1999	0.028	mg/kg	J	0.33		0.616		
Benzyl Butyl Phthalate	H196SB011	196SB01101	09/02/1999	0.410	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	H196SB011	196SB01101	09/02/1999	0.072	mg/kg	J					
Chrysene	H196SB011	196SB01101	09/02/1999	0.057	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB011	196SB01101	09/02/1999	0.039	mg/kg	J	0.33				
Pyrene	H196SB011	196SB01101	09/02/1999	0.097	mg/kg	J	0.33				
BEQ	H196SB011	196SB01101	09/02/1999	433.807	ug/kg	=			1.304		
Aluminum	H196SB012	196SB01201	09/02/1999	6930.000	mg/kg	=		1090	32700		
Antimony	H196SB012	196SB01201	09/02/1999	2.300	mg/kg	J	12	1.1	2.2		X
Arsenic	H196SB012	196SB01201	09/02/1999	5.100	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB012	196SB01201	09/02/1999	69.300	mg/kg	J		3.6	72.8		
Beryllium	H196SB012	196SB01201	09/02/1999	0.500	mg/kg	J		0.04	1.4		
Cadmium	H196SB012	196SB01201	09/02/1999	0.380	mg/kg	J	1	0.12	1.6		
Calcium	H196SB012	196SB01201	09/02/1999	128000.000	mg/kg	J		169	333000		
Chromium, Total	H196SB012	196SB01201	09/02/1999	21.200	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB012	196SB01201	09/02/1999	3.300	mg/kg	J		0.49	7.9		
Copper	H196SB012	196SB01201	09/02/1999	116.000	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB012	196SB01201	09/02/1999	8930.000	mg/kg	J		695	38800		
Lead	H196SB012	196SB01201	09/02/1999	49.200	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB012	196SB01201	09/02/1999	2360.000	mg/kg	J		131	7850		
Manganese	H196SB012	196SB01201	09/02/1999	188.000	mg/kg	J		5.3	1200		
Mercury	H196SB012	196SB01201	09/02/1999	0.030	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB012	196SB01201	09/02/1999	11.700	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB012	196SB01201	09/02/1999	523.000	mg/kg	=		65	2960		
Sodium	H196SB012	196SB01201	09/02/1999	412.000	mg/kg	=		10.2	1660		
Vanadium	H196SB012	196SB01201	09/02/1999	19.000	mg/kg	J		4.1	74.8		
Zinc	H196SB012	196SB01201	09/02/1999	162.000	mg/kg	J	124	5	431	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
PCB-1260 (Arochlor 1260)	H196SB012	196SB01201	09/02/1999	0.055	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB012	196SB01201	09/02/1999	0.003	mg/kg	J	0.0017			X	
p,p'-DDD	H196SB012	196SB01201	09/02/1999	0.007	mg/kg	J					
p,p'-DDE	H196SB012	196SB01201	09/02/1999	0.007	mg/kg	J					
2-Methylnaphthalene	H196SB012	196SB01201	09/02/1999	0.025	mg/kg	J	0.33				
Acenaphthene	H196SB012	196SB01201	09/02/1999	0.024	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB012	196SB01201	09/02/1999	0.023	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB012	196SB01201	09/02/1999	0.028	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB012	196SB01201	09/02/1999	0.027	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB012	196SB01201	09/02/1999	0.030	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	H196SB012	196SB01201	09/02/1999	0.026	mg/kg	J					
Chrysene	H196SB012	196SB01201	09/02/1999	0.040	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB012	196SB01201	09/02/1999	0.027	mg/kg	J	0.33				
Naphthalene	H196SB012	196SB01201	09/02/1999	0.210	mg/kg	J	0.33				
Phenanthrene	H196SB012	196SB01201	09/02/1999	0.017	mg/kg	J	0.33				
Pyrene	H196SB012	196SB01201	09/02/1999	0.041	mg/kg	J	0.33				
BEQ	H196SB012	196SB01201	09/02/1999	214.840	ug/kg	=			1.304		
Aluminum	H196SB013	196SB01301	09/02/1999	10400.000	mg/kg	=		1090	32700		
Antimony	H196SB013	196SB01301	09/02/1999	7.600	mg/kg	J	12	1.1	2.2		X
Arsenic	H196SB013	196SB01301	09/02/1999	8.100	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB013	196SB01301	09/02/1999	43.900	mg/kg	J		3.6	72.8		
Beryllium	H196SB013	196SB01301	09/02/1999	0.460	mg/kg	J		0.04	1.4		
Cadmium	H196SB013	196SB01301	09/02/1999	0.350	mg/kg	J	1	0.12	1.6		
Calcium	H196SB013	196SB01301	09/02/1999	48600.000	mg/kg	J		169	333000		
Chromium, Total	H196SB013	196SB01301	09/02/1999	29.600	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB013	196SB01301	09/02/1999	2.700	mg/kg	J		0.49	7.9		
Copper	H196SB013	196SB01301	09/02/1999	99.400	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB013	196SB01301	09/02/1999	15600.000	mg/kg	J		695	38800		
Lead	H196SB013	196SB01301	09/02/1999	75.800	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB013	196SB01301	09/02/1999	1800.000	mg/kg	J		131	7850		
Manganese	H196SB013	196SB01301	09/02/1999	111.000	mg/kg	J		5.3	1200		
Mercury	H196SB013	196SB01301	09/02/1999	0.080	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB013	196SB01301	09/02/1999	11.100	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB013	196SB01301	09/02/1999	468.000	mg/kg	=		65	2960		
Sodium	H196SB013	196SB01301	09/02/1999	636.000	mg/kg	=		10.2	1660		
Tin (Sn)	H196SB013	196SB01301	09/02/1999	15.000	mg/kg	J		NA	NA		
Vanadium	H196SB013	196SB01301	09/02/1999	29.900	mg/kg	J		4.1	74.8		
Zinc	H196SB013	196SB01301	09/02/1999	199.000	mg/kg	J	124	5	431	X	
PCB-1260 (Arochlor 1260)	H196SB013	196SB01301	09/02/1999	0.150	mg/kg	J	0.033			X	
Endosulfan I	H196SB013	196SB01301	09/02/1999	0.019	mg/kg	=					
Gamma-chlordane	H196SB013	196SB01301	09/02/1999	0.005	mg/kg	=	0.0017			X	
p,p'-DDD	H196SB013	196SB01301	09/02/1999	0.020	mg/kg	J					
p,p'-DDE	H196SB013	196SB01301	09/02/1999	0.034	mg/kg	J					
Benzo(a)Anthracene	H196SB013	196SB01301	09/02/1999	0.024	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB013	196SB01301	09/02/1999	0.037	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB013	196SB01301	09/02/1999	0.060	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB013	196SB01301	09/02/1999	0.031	mg/kg	J			0.596		
Chrysene	H196SB013	196SB01301	09/02/1999	0.048	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB013	196SB01301	09/02/1999	0.028	mg/kg	J	0.33				
Pyrene	H196SB013	196SB01301	09/02/1999	0.075	mg/kg	J	0.33				
BEQ	H196SB013	196SB01301	09/02/1999	238.258	ug/kg	=			1.304		
Aluminum	H196SB014	196SB01401	09/02/1999	7580.000	mg/kg	=		1090	32700		
Antimony	H196SB014	196SB01401	09/02/1999	0.480	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB014	196SB01401	09/02/1999	4.700	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB014	196SB01401	09/02/1999	28.400	mg/kg	J		3.6	72.8		
Beryllium	H196SB014	196SB01401	09/02/1999	0.380	mg/kg	J		0.04	1.4		
Calcium	H196SB014	196SB01401	09/02/1999	35300.000	mg/kg	J		169	333000		
Chromium, Total	H196SB014	196SB01401	09/02/1999	15.200	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB014	196SB01401	09/02/1999	2.000	mg/kg	J		0.49	7.9		
Copper	H196SB014	196SB01401	09/02/1999	22.500	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB014	196SB01401	09/02/1999	10300.000	mg/kg	J		695	38800		
Lead	H196SB014	196SB01401	09/02/1999	56.900	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB014	196SB01401	09/02/1999	1230.000	mg/kg	J		131	7850		
Manganese	H196SB014	196SB01401	09/02/1999	71.400	mg/kg	J		5.3	1200		
Mercury	H196SB014	196SB01401	09/02/1999	0.040	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB014	196SB01401	09/02/1999	5.700	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB014	196SB01401	09/02/1999	277.000	mg/kg	=		65	2960		
Sodium	H196SB014	196SB01401	09/02/1999	402.000	mg/kg	=		10.2	1660		
Vanadium	H196SB014	196SB01401	09/02/1999	19.000	mg/kg	J		4.1	74.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Zinc	H196SB014	196SB01401	09/02/1999	56.200	mg/kg	J	124	5	431		
PCB-1260 (Arochlor 1260)	H196SB014	196SB01401	09/02/1999	0.068	mg/kg	=	0.033			X	
Benzo(a)Anthracene	H196SB014	196SB01401	09/02/1999	0.019	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB014	196SB01401	09/02/1999	0.024	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB014	196SB01401	09/02/1999	0.037	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB014	196SB01401	09/02/1999	0.028	mg/kg	J			0.596		
Chrysene	H196SB014	196SB01401	09/02/1999	0.034	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB014	196SB01401	09/02/1999	0.029	mg/kg	J	0.33				
Pyrene	H196SB014	196SB01401	09/02/1999	0.041	mg/kg	J	0.33				
BEQ	H196SB014	196SB01401	09/02/1999	233.414	ug/kg	=			1.304		
Acetone	H196SB014	196SB01401	09/02/1999	0.120	mg/kg	=					
Aluminum	H196SB015	196SB01501	09/02/1999	8220.000	mg/kg	=		1090	32700		
Antimony	H196SB015	196SB01501	09/02/1999	0.920	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB015	196SB01501	09/02/1999	5.700	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB015	196SB01501	09/02/1999	31.200	mg/kg	J		3.6	72.8		
Beryllium	H196SB015	196SB01501	09/02/1999	0.440	mg/kg	J		0.04	1.4		
Calcium	H196SB015	196SB01501	09/02/1999	66200.000	mg/kg	J		169	333000		
Chromium, Total	H196SB015	196SB01501	09/02/1999	19.400	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB015	196SB01501	09/02/1999	2.600	mg/kg	J		0.49	7.9		
Copper	H196SB015	196SB01501	09/02/1999	34.000	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB015	196SB01501	09/02/1999	10300.000	mg/kg	J		695	38800		
Lead	H196SB015	196SB01501	09/02/1999	32.400	mg/kg	J	30.2	1.8	172	X	
Magnesium	H196SB015	196SB01501	09/02/1999	1810.000	mg/kg	J		131	7850		
Manganese	H196SB015	196SB01501	09/02/1999	139.000	mg/kg	J		5.3	1200		
Mercury	H196SB015	196SB01501	09/02/1999	0.050	mg/kg	J	0.13	0.02	3.8		
Nickel	H196SB015	196SB01501	09/02/1999	7.400	mg/kg	J	15.9	0.63	91.8		
Potassium	H196SB015	196SB01501	09/02/1999	423.000	mg/kg	=		65	2960		
Sodium	H196SB015	196SB01501	09/02/1999	387.000	mg/kg	=		10.2	1660		
Vanadium	H196SB015	196SB01501	09/02/1999	21.100	mg/kg	J		4.1	74.8		
Zinc	H196SB015	196SB01501	09/02/1999	62.900	mg/kg	J	124	5	431		
PCB-1260 (Arochlor 1260)	H196SB015	196SB01501	09/02/1999	0.054	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB015	196SB01501	09/02/1999	0.006	mg/kg	J	0.0017			X	
p,p'-DDE	H196SB015	196SB01501	09/02/1999	0.010	mg/kg	J					
p,p'-DDT	H196SB015	196SB01501	09/02/1999	0.014	mg/kg	J					
Benzo(a)Anthracene	H196SB015	196SB01501	09/02/1999	0.022	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB015	196SB01501	09/02/1999	0.035	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB015	196SB01501	09/02/1999	0.042	mg/kg	J			0.608		
Benzo(k)Fluoranthene	H196SB015	196SB01501	09/02/1999	0.033	mg/kg	J			0.596		
Benzoic acid	H196SB015	196SB01501	09/02/1999	0.280	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	H196SB015	196SB01501	09/02/1999	0.022	mg/kg	J					
Chrysene	H196SB015	196SB01501	09/02/1999	0.034	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB015	196SB01501	09/02/1999	0.043	mg/kg	J	0.33				
Phenanthrene	H196SB015	196SB01501	09/02/1999	0.029	mg/kg	J	0.33				
Pyrene	H196SB015	196SB01501	09/02/1999	0.058	mg/kg	J	0.33				
BEQ	H196SB015	196SB01501	09/02/1999	250.764	ug/kg	=			1.304		
Chlorobenzene	H196SB015	196SB01501	09/02/1999	0.094	mg/kg	=					
Aluminum	H196SB016	196SB01601	09/03/1999	9160.000	mg/kg	=		1090	32700		
Antimony	H196SB016	196SB01601	09/03/1999	2.000	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB016	196SB01601	09/03/1999	5.900	mg/kg	=	7.24	0.64	18.4		
Barium	H196SB016	196SB01601	09/03/1999	34.300	mg/kg	=		3.6	72.8		
Beryllium	H196SB016	196SB01601	09/03/1999	0.380	mg/kg	J		0.04	1.4		
Calcium	H196SB016	196SB01601	09/03/1999	28500.000	mg/kg	=		169	333000		
Chromium, Total	H196SB016	196SB01601	09/03/1999	18.900	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB016	196SB01601	09/03/1999	2.000	mg/kg	J		0.49	7.9		
Copper	H196SB016	196SB01601	09/03/1999	105.000	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB016	196SB01601	09/03/1999	11700.000	mg/kg	=		695	38800		
Lead	H196SB016	196SB01601	09/03/1999	81.600	mg/kg	=	30.2	1.8	172	X	
Magnesium	H196SB016	196SB01601	09/03/1999	1320.000	mg/kg	=		131	7850		
Manganese	H196SB016	196SB01601	09/03/1999	82.600	mg/kg	=		5.3	1200		
Mercury	H196SB016	196SB01601	09/03/1999	0.290	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H196SB016	196SB01601	09/03/1999	6.800	mg/kg	=	15.9	0.63	91.8		
Potassium	H196SB016	196SB01601	09/03/1999	451.000	mg/kg	=		65	2960		
Selenium	H196SB016	196SB01601	09/03/1999	0.640	mg/kg	=		0.28	2.6		
Sodium	H196SB016	196SB01601	09/03/1999	759.000	mg/kg	=		10.2	1660		
Vanadium	H196SB016	196SB01601	09/03/1999	27.100	mg/kg	=		4.1	74.8		
Zinc	H196SB016	196SB01601	09/03/1999	97.000	mg/kg	=	124	5	431		
Heptachlor Epoxide	H196SB016	196SB01601	09/03/1999	0.006	mg/kg	J					
p,p'-DDD	H196SB016	196SB01601	09/03/1999	0.026	mg/kg	J					
p,p'-DDE	H196SB016	196SB01601	09/03/1999	0.045	mg/kg	J					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
p,p'-DDT	H196SB016	196SB01601	09/03/1999	0.014	mg/kg	J					
Anthracene	H196SB016	196SB01601	09/03/1999	0.025	mg/kg	J	0.33				
Benzo(a)Anthracene	H196SB016	196SB01601	09/03/1999	0.068	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	H196SB016	196SB01601	09/03/1999	0.057	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB016	196SB01601	09/03/1999	0.072	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	H196SB016	196SB01601	09/03/1999	0.037	mg/kg	J					
Benzo(k)Fluoranthene	H196SB016	196SB01601	09/03/1999	0.052	mg/kg	J			0.596		
Benzyl Butyl Phthalate	H196SB016	196SB01601	09/03/1999	0.160	mg/kg	J					
Chrysene	H196SB016	196SB01601	09/03/1999	0.077	mg/kg	J	0.33		0.62		
Di-n-octylphthalate	H196SB016	196SB01601	09/03/1999	0.200	mg/kg	J					
Fluoranthene	H196SB016	196SB01601	09/03/1999	0.180	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	H196SB016	196SB01601	09/03/1999	0.034	mg/kg	J			0.525		
Phenanthrene	H196SB016	196SB01601	09/03/1999	0.130	mg/kg	J	0.33				
Pyrene	H196SB016	196SB01601	09/03/1999	0.140	mg/kg	J	0.33				
BEQ	H196SB016	196SB01601	09/03/1999	259.997	ug/kg	=			1.304		
Aluminum	H196SB017	196SB01701	09/03/1999	8450.000	mg/kg	=		1090	32700		
Antimony	H196SB017	196SB01701	09/03/1999	1.200	mg/kg	J	12	1.1	2.2		
Arsenic	H196SB017	196SB01701	09/03/1999	8.900	mg/kg	=	7.24	0.64	18.4	X	
Barium	H196SB017	196SB01701	09/03/1999	27.800	mg/kg	=		3.6	72.8		
Beryllium	H196SB017	196SB01701	09/03/1999	0.340	mg/kg	J		0.04	1.4		
Calcium	H196SB017	196SB01701	09/03/1999	21800.000	mg/kg	=		169	333000		
Chromium, Total	H196SB017	196SB01701	09/03/1999	16.800	mg/kg	=	52.3	3.4	114		
Cobalt	H196SB017	196SB01701	09/03/1999	2.000	mg/kg	J		0.49	7.9		
Copper	H196SB017	196SB01701	09/03/1999	26.000	mg/kg	=	18.7	0.94	126	X	
Iron	H196SB017	196SB01701	09/03/1999	14500.000	mg/kg	=		695	38800		
Lead	H196SB017	196SB01701	09/03/1999	31.800	mg/kg	=	30.2	1.8	172	X	
Magnesium	H196SB017	196SB01701	09/03/1999	1120.000	mg/kg	=		131	7850		
Manganese	H196SB017	196SB01701	09/03/1999	87.000	mg/kg	=		5.3	1200		
Mercury	H196SB017	196SB01701	09/03/1999	0.130	mg/kg	=	0.13	0.02	3.8		
Nickel	H196SB017	196SB01701	09/03/1999	6.200	mg/kg	=	15.9	0.63	91.8		
Potassium	H196SB017	196SB01701	09/03/1999	319.000	mg/kg	=		65	2960		
Sodium	H196SB017	196SB01701	09/03/1999	451.000	mg/kg	=		10.2	1660		
Vanadium	H196SB017	196SB01701	09/03/1999	23.800	mg/kg	=		4.1	74.8		
Zinc	H196SB017	196SB01701	09/03/1999	63.400	mg/kg	=	124	5	431		
PCB-1260 (Arochlor 1260)	H196SB017	196SB01701	09/03/1999	0.120	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB017	196SB01701	09/03/1999	0.013	mg/kg	J	0.0017			X	
Heptachlor Epoxide	H196SB017	196SB01701	09/03/1999	0.007	mg/kg	J					
p,p'-DDD	H196SB017	196SB01701	09/03/1999	0.036	mg/kg	=					
p,p'-DDE	H196SB017	196SB01701	09/03/1999	0.083	mg/kg	=					
Benzo(a)Pyrene	H196SB017	196SB01701	09/03/1999	0.025	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	H196SB017	196SB01701	09/03/1999	0.057	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	H196SB017	196SB01701	09/03/1999	0.022	mg/kg	J					
Chrysene	H196SB017	196SB01701	09/03/1999	0.035	mg/kg	J	0.33		0.62		
Fluoranthene	H196SB017	196SB01701	09/03/1999	0.025	mg/kg	J	0.33				
Pyrene	H196SB017	196SB01701	09/03/1999	0.030	mg/kg	J	0.33				
BEQ	H196SB017	196SB01701	09/03/1999	260.635	ug/kg	=			1.304		
Aluminum	H654SB002	654SB00201	09/07/1994	3020.000	mg/kg	=		1090	32700		
Arsenic	H654SB002	654SB00201	09/07/1994	2.500	mg/kg	=	7.24	0.64	18.4		
Barium	H654SB002	654SB00201	09/07/1994	13.900	mg/kg	J		3.6	72.8		
Beryllium	H654SB002	654SB00201	09/07/1994	0.250	mg/kg	J		0.04	1.4		
Calcium	H654SB002	654SB00201	09/07/1994	23800.000	mg/kg	=		169	333000		
Chromium, Total	H654SB002	654SB00201	09/07/1994	11.000	mg/kg	=	52.3	3.4	114		
Cobalt	H654SB002	654SB00201	09/07/1994	1.100	mg/kg	J		0.49	7.9		
Copper	H654SB002	654SB00201	09/07/1994	1.600	mg/kg	J	18.7	0.94	126		
Iron	H654SB002	654SB00201	09/07/1994	3330.000	mg/kg	=		695	38800		
Magnesium	H654SB002	654SB00201	09/07/1994	496.000	mg/kg	J		131	7850		
Manganese	H654SB002	654SB00201	09/07/1994	22.700	mg/kg	=		5.3	1200		
Nickel	H654SB002	654SB00201	09/07/1994	2.400	mg/kg	J	15.9	0.63	91.8		
Potassium	H654SB002	654SB00201	09/07/1994	200.000	mg/kg	J		65	2960		
Sodium	H654SB002	654SB00201	09/07/1994	266.000	mg/kg	J		10.2	1660		
Vanadium	H654SB002	654SB00201	09/07/1994	7.500	mg/kg	=		4.1	74.8		
Zinc	H654SB002	654SB00201	09/07/1994	13.400	mg/kg	=	124	5	431		
Acetone	H654SB002	654SB00201	09/07/1994	0.052	mg/kg	=					
Methylene Chloride	H654SB002	654SB00201	09/07/1994	0.025	mg/kg	J					
Toluene	H654SB002	654SB00201	09/07/1994	0.004	mg/kg	J					
Aluminum	H654SB003	654SB00301	09/07/1994	2830.000	mg/kg	=		1090	32700		
Arsenic	H654SB003	654SB00301	09/07/1994	2.700	mg/kg	=	7.24	0.64	18.4		
Barium	H654SB003	654SB00301	09/07/1994	19.200	mg/kg	J		3.6	72.8		
Beryllium	H654SB003	654SB00301	09/07/1994	0.290	mg/kg	J		0.04	1.4		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Calcium	H654SB003	654SB00301	09/07/1994	19300.000	mg/kg	=		169	333000		
Chromium, Total	H654SB003	654SB00301	09/07/1994	14.700	mg/kg	=	52.3	3.4	114		
Cobalt	H654SB003	654SB00301	09/07/1994	1.100	mg/kg	J		0.49	7.9		
Copper	H654SB003	654SB00301	09/07/1994	2.200	mg/kg	J	18.7	0.94	126		
Iron	H654SB003	654SB00301	09/07/1994	3050.000	mg/kg	=		695	38800		
Magnesium	H654SB003	654SB00301	09/07/1994	684.000	mg/kg	=		131	7850		
Manganese	H654SB003	654SB00301	09/07/1994	23.800	mg/kg	=		5.3	1200		
Mercury	H654SB003	654SB00301	09/07/1994	0.230	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H654SB003	654SB00301	09/07/1994	2.800	mg/kg	J	15.9	0.63	91.8		
Potassium	H654SB003	654SB00301	09/07/1994	189.000	mg/kg	J		65	2960		
Sodium	H654SB003	654SB00301	09/07/1994	177.000	mg/kg	J		10.2	1660		
Vanadium	H654SB003	654SB00301	09/07/1994	7.500	mg/kg	=		4.1	74.8		
Zinc	H654SB003	654SB00301	09/07/1994	20.600	mg/kg	=	124	5	431		
Acetone	H654SB003	654SB00301	09/07/1994	0.077	mg/kg	=					
Toluene	H654SB003	654SB00301	09/07/1994	0.004	mg/kg	J					
Aluminum	H654SB005	654SB00501	09/07/1994	6890.000	mg/kg	=		1090	32700		
Arsenic	H654SB005	654SB00501	09/07/1994	7.700	mg/kg	=	7.24	0.64	18.4	X	
Barium	H654SB005	654SB00501	09/07/1994	38.700	mg/kg	=		3.6	72.8		
Beryllium	H654SB005	654SB00501	09/07/1994	0.390	mg/kg	J		0.04	1.4		
Cadmium	H654SB005	654SB00501	09/07/1994	0.560	mg/kg	J	1	0.12	1.6		
Calcium	H654SB005	654SB00501	09/07/1994	151000.000	mg/kg	=		169	333000		
Chromium, Total	H654SB005	654SB00501	09/07/1994	43.100	mg/kg	=	52.3	3.4	114		
Cobalt	H654SB005	654SB00501	09/07/1994	1.200	mg/kg	J		0.49	7.9		
Copper	H654SB005	654SB00501	09/07/1994	57.100	mg/kg	=	18.7	0.94	126	X	
Iron	H654SB005	654SB00501	09/07/1994	6050.000	mg/kg	=		695	38800		
Lead	H654SB005	654SB00501	09/07/1994	32.700	mg/kg	=	30.2	1.8	172	X	
Magnesium	H654SB005	654SB00501	09/07/1994	5720.000	mg/kg	=		131	7850		
Manganese	H654SB005	654SB00501	09/07/1994	54.300	mg/kg	=		5.3	1200		
Mercury	H654SB005	654SB00501	09/07/1994	0.110	mg/kg	=	0.13	0.02	3.8		
Nickel	H654SB005	654SB00501	09/07/1994	16.300	mg/kg	=	15.9	0.63	91.8	X	
Potassium	H654SB005	654SB00501	09/07/1994	996.000	mg/kg	=		65	2960		
Selenium	H654SB005	654SB00501	09/07/1994	1.200	mg/kg	J		0.28	2.6		
Sodium	H654SB005	654SB00501	09/07/1994	1680.000	mg/kg	=		10.2	1660		X
Vanadium	H654SB005	654SB00501	09/07/1994	24.000	mg/kg	=		4.1	74.8		
Zinc	H654SB005	654SB00501	09/07/1994	81.800	mg/kg	=	124	5	431		
Fluoranthene	H654SB005	654SB00501	09/07/1994	0.110	mg/kg	J	0.33				
Toluene	H654SB005	654SB00501	09/07/1994	0.010	mg/kg	J					
Aluminum	H654SB006	654SB00601	09/07/1994	6190.000	mg/kg	=		1090	32700		
Arsenic	H654SB006	654SB00601	09/07/1994	6.400	mg/kg	=	7 24	0.64	18.4		
Beryllium	H654SB006	654SB00601	09/07/1994	0.460	mg/kg	J		0.04	1.4		
Cadmium	H654SB006	654SB00601	09/07/1994	0.970	mg/kg	J	1	0.12	1.6		
Calcium	H654SB006	654SB00601	09/07/1994	185000.000	mg/kg	=		169	333000		
Chromium, Total	H654SB006	654SB00601	09/07/1994	46.500	mg/kg	=	52.3	3.4	114		
Cobalt	H654SB006	654SB00601	09/07/1994	1.500	mg/kg	J		0.49	7.9		
Copper	H654SB006	654SB00601	09/07/1994	13.200	mg/kg	=	18.7	0.94	126		
Iron	H654SB006	654SB00601	09/07/1994	5410.000	mg/kg	=		695	38800		
Magnesium	H654SB006	654SB00601	09/07/1994	7720.000	mg/kg	=		131	7850		
Manganese	H654SB006	654SB00601	09/07/1994	57.200	mg/kg	=		5.3	1200		
Mercury	H654SB006	654SB00601	09/07/1994	0.140	mg/kg	=	0.13	0.02	3.8	X	
Nickel	H654SB006	654SB00601	09/07/1994	17.600	mg/kg	J	15.9	0.63	91.8	X	
Potassium	H654SB006	654SB00601	09/07/1994	677.000	mg/kg	J		65	2960		
Sodium	H654SB006	654SB00601	09/07/1994	1610.000	mg/kg	J		10.2	1660		
Vanadium	H654SB006	654SB00601	09/07/1994	28.000	mg/kg	=		4.1	74.8		
Zinc	H654SB006	654SB00601	09/07/1994	79.700	mg/kg	=	124	5	431		
Benzo(b)Fluoranthene	H654SB006	654SB00601	09/07/1994	0.110	mg/kg	J			0.608		
Fluoranthene	H654SB006	654SB00601	09/07/1994	0.110	mg/kg	J	0.33				
BEQ	H654SB006	654SB00601	09/07/1994	519.530	ug/kg	=			1.304		
Toluene	H654SB006	654SB00601	09/07/1994	0.004	mg/kg	J					
Aluminum	H654SB007	654SB00701	09/07/1994	5410.000	mg/kg	=		1090	32700		
Arsenic	H654SB007	654SB00701	09/07/1994	6.100	mg/kg	J	7.24	0.64	18.4		
Beryllium	H654SB007	654SB00701	09/07/1994	0.490	mg/kg	J		0.04	1.4		
Calcium	H654SB007	654SB00701	09/07/1994	219000.000	mg/kg	=		169	333000		
Chromium, Total	H654SB007	654SB00701	09/07/1994	53.300	mg/kg	=	52.3	3.4	114	X	
Cobalt	H654SB007	654SB00701	09/07/1994	3.100	mg/kg	J		0.49	7.9		
Copper	H654SB007	654SB00701	09/07/1994	10.300	mg/kg	J	18.7	0.94	126		
Iron	H654SB007	654SB00701	09/07/1994	5510.000	mg/kg	J		695	38800		
Magnesium	H654SB007	654SB00701	09/07/1994	7290.000	mg/kg	=		131	7850		
Manganese	H654SB007	654SB00701	09/07/1994	46.700	mg/kg	=		5.3	1200		
Nickel	H654SB007	654SB00701	09/07/1994	17.900	mg/kg	J	15.9	0.63	91.8	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Potassium	H654SB007	654SB00701	09/07/1994	1140.000	mg/kg	J		65	2960		
Selenium	H654SB007	654SB00701	09/07/1994	2.600	mg/kg	J		0.28	2.6		
Sodium	H654SB007	654SB00701	09/07/1994	3570.000	mg/kg	=		10.2	1660		X
Vanadium	H654SB007	654SB00701	09/07/1994	29.400	mg/kg	=		4.1	74.8		
Zinc	H654SB007	654SB00701	09/07/1994	55.500	mg/kg	=	124	5	431		
Cyanide	H654SB007	654SB00701	09/07/1994	2.000	mg/kg	=					
Acetone	H654SB007	654SB00701	09/07/1994	4.000	mg/kg	J					
Chloride	H654SB05A	654SB05A01	05/09/1995	630.000	mg/kg	=					
Nitrogen, Ammonia (as N)	H654SB05A	654SB05A01	05/09/1995	25.000	mg/kg	=					
Phosphorus	H654SB05A	654SB05A01	05/09/1995	7300.000	mg/kg	=					
Total Organic Carbon	H654SB05A	654SB05A01	05/09/1995	26000.000	mg/kg	=					
Aluminum	HGDHSB074	GDHSB07401	10/21/1994	5000.000	mg/kg	=		1090	32700		
Arsenic	HGDHSB074	GDHSB07401	10/21/1994	5.900	mg/kg	=	7.24	0.64	18.4		
Barium	HGDHSB074	GDHSB07401	10/21/1994	28.600	mg/kg	J		3.6	72.8		
Beryllium	HGDHSB074	GDHSB07401	10/21/1994	0.540	mg/kg	J		0.04	1.4		
Calcium	HGDHSB074	GDHSB07401	10/21/1994	37900.000	mg/kg	=		169	333000		
Chromium, Total	HGDHSB074	GDHSB07401	10/21/1994	19.000	mg/kg	=	52.3	3.4	114		
Cobalt	HGDHSB074	GDHSB07401	10/21/1994	1.000	mg/kg	J		0.49	7.9		
Copper	HGDHSB074	GDHSB07401	10/21/1994	4.600	mg/kg	J	18.7	0.94	126		
Iron	HGDHSB074	GDHSB07401	10/21/1994	5130.000	mg/kg	=		695	38800		
Lead	HGDHSB074	GDHSB07401	10/21/1994	4.600	mg/kg	J	30.2	1.8	172		
Magnesium	HGDHSB074	GDHSB07401	10/21/1994	1340.000	mg/kg	J		131	7850		
Manganese	HGDHSB074	GDHSB07401	10/21/1994	55.800	mg/kg	J		5.3	1200		
Nickel	HGDHSB074	GDHSB07401	10/21/1994	6.600	mg/kg	J	15.9	0.63	91.8		
Potassium	HGDHSB074	GDHSB07401	10/21/1994	282.000	mg/kg	J		65	2960		
Sodium	HGDHSB074	GDHSB07401	10/21/1994	356.000	mg/kg	J		10.2	1660		
Vanadium	HGDHSB074	GDHSB07401	10/21/1994	14.800	mg/kg	=		4.1	74.8		
Zinc	HGDHSB074	GDHSB07401	10/21/1994	24.100	mg/kg	=	124	5	431		
Acetone	HGDHSB074	GDHSB07401	10/21/1994	0.106	mg/kg	J					
Aluminum	HGDHSB075	GDHSB07501	10/21/1994	8180.000	mg/kg	=		1090	32700		
Arsenic	HGDHSB075	GDHSB07501	10/21/1994	8.400	mg/kg	=	7.24	0.64	18.4	X	
Barium	HGDHSB075	GDHSB07501	10/21/1994	29.900	mg/kg	J		3.6	72.8		
Beryllium	HGDHSB075	GDHSB07501	10/21/1994	0.420	mg/kg	J		0.04	1.4		
Calcium	HGDHSB075	GDHSB07501	10/21/1994	94800.000	mg/kg	=		169	333000		
Chromium, Total	HGDHSB075	GDHSB07501	10/21/1994	63.500	mg/kg	=	52.3	3.4	114	X	
Cobalt	HGDHSB075	GDHSB07501	10/21/1994	2.500	mg/kg	J		0.49	7.9		
Copper	HGDHSB075	GDHSB07501	10/21/1994	126.000	mg/kg	=	18.7	0.94	126	X	
Iron	HGDHSB075	GDHSB07501	10/21/1994	8640.000	mg/kg	=		695	38800		
Lead	HGDHSB075	GDHSB07501	10/21/1994	89.700	mg/kg	=	30.2	1.8	172	X	
Magnesium	HGDHSB075	GDHSB07501	10/21/1994	2890.000	mg/kg	=		131	7850		
Manganese	HGDHSB075	GDHSB07501	10/21/1994	175.000	mg/kg	J		5.3	1200		
Nickel	HGDHSB075	GDHSB07501	10/21/1994	29.600	mg/kg	J	15.9	0.63	91.8	X	
Potassium	HGDHSB075	GDHSB07501	10/21/1994	779.000	mg/kg	J		65	2960		
Selenium	HGDHSB075	GDHSB07501	10/21/1994	1.600	mg/kg	=		0.28	2.6		
Sodium	HGDHSB075	GDHSB07501	10/21/1994	845.000	mg/kg	J		10.2	1660		
Vanadium	HGDHSB075	GDHSB07501	10/21/1994	30.800	mg/kg	=		4.1	74.8		
Zinc	HGDHSB075	GDHSB07501	10/21/1994	125.000	mg/kg	=	124	5	431	X	
PCB-1260 (Arochlor 1260)	HGDHSB075	GDHSB07501	10/21/1994	0.125	mg/kg	=	0.033			X	
Benzo(a)Anthracene	HGDHSB075	GDHSB07501	10/21/1994	0.048	mg/kg	J	0.33		0.616		
Benzo(b)Fluoranthene	HGDHSB075	GDHSB07501	10/21/1994	0.068	mg/kg	J			0.608		
Chrysene	HGDHSB075	GDHSB07501	10/21/1994	0.050	mg/kg	J	0.33		0.62		
Phenanthrene	HGDHSB075	GDHSB07501	10/21/1994	0.110	mg/kg	J	0.33				
Pyrene	HGDHSB075	GDHSB07501	10/21/1994	0.084	mg/kg	J	0.33				
BEQ	HGDHSB075	GDHSB07501	10/21/1994	448.650	ug/kg	=			1.304		
Acetone	HGDHSB075	GDHSB07501	10/21/1994	0.088	mg/kg	J					
Aluminum	HGDHSB089	GDHSB08901	11/30/1994	17400.000	mg/kg	=		1090	32700		
Barium	HGDHSB089	GDHSB08901	11/30/1994	32.100	mg/kg	=		3.6	72.8		
Beryllium	HGDHSB089	GDHSB08901	11/30/1994	0.820	mg/kg	=		0.04	1.4		
Calcium	HGDHSB089	GDHSB08901	11/30/1994	35000.000	mg/kg	=		169	333000		
Chromium, Total	HGDHSB089	GDHSB08901	11/30/1994	36.400	mg/kg	=	52.3	3.4	114		
Iron	HGDHSB089	GDHSB08901	11/30/1994	25500.000	mg/kg	=		695	38800		
Lead	HGDHSB089	GDHSB08901	11/30/1994	20.300	mg/kg	=	30.2	1.8	172		
Magnesium	HGDHSB089	GDHSB08901	11/30/1994	3810.000	mg/kg	=		131	7850		
Manganese	HGDHSB089	GDHSB08901	11/30/1994	448.000	mg/kg	=		5.3	1200		
Mercury	HGDHSB089	GDHSB08901	11/30/1994	0.090	mg/kg	=	0.13	0.02	3.8		
Nickel	HGDHSB089	GDHSB08901	11/30/1994	16.100	mg/kg	=	15.9	0.63	91.8	X	
Potassium	HGDHSB089	GDHSB08901	11/30/1994	1320.000	mg/kg	=		65	2960		
Sodium	HGDHSB089	GDHSB08901	11/30/1994	643.000	mg/kg	=		10.2	1660		
Vanadium	HGDHSB089	GDHSB08901	11/30/1994	45.900	mg/kg	=		4.1	74.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
PCB-1260 (Arochlor 1260)	HGDHSB089	GDHSB08901	11/30/1994	0.100	mg/kg	=	0.033			X	
Aluminum	I177SB001	177SB00101	06/07/1996	1880.000	mg/kg	=		3470	27400		
Arsenic	I177SB001	177SB00101	06/07/1996	3.900	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB001	177SB00101	06/07/1996	7.500	mg/kg	J		7.8	43.4		
Beryllium	I177SB001	177SB00101	06/07/1996	0.310	mg/kg	J		0.34	0.95		
Cadmium	I177SB001	177SB00101	06/07/1996	0.260	mg/kg	J	1	0.13	0.61		
Calcium	I177SB001	177SB00101	06/07/1996	138000.000	mg/kg	=		1670	59500		X
Chromium, Total	I177SB001	177SB00101	06/07/1996	7.000	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB001	177SB00101	06/07/1996	2.300	mg/kg	J		0.64	5.8		
Copper	I177SB001	177SB00101	06/07/1996	2.300	mg/kg	J	18.7	2.4	556		
Iron	I177SB001	177SB00101	06/07/1996	3590.000	mg/kg	=		1730	22700		
Lead	I177SB001	177SB00101	06/07/1996	4.900	mg/kg	=	30.2	5	203		
Magnesium	I177SB001	177SB00101	06/07/1996	1480.000	mg/kg	=		424	3820		
Manganese	I177SB001	177SB00101	06/07/1996	85.800	mg/kg	J		15.1	426		
Nickel	I177SB001	177SB00101	06/07/1996	5.000	mg/kg	=	15.9	1.5	18.1		
Potassium	I177SB001	177SB00101	06/07/1996	394.000	mg/kg	J		493	2730		
Sodium	I177SB001	177SB00101	06/07/1996	234.000	mg/kg	J		181	2030		
Tin (Sn)	I177SB001	177SB00101	06/07/1996	2.400	mg/kg	J		0.98	7.5		
Vanadium	I177SB001	177SB00101	06/07/1996	6.100	mg/kg	=		8.5	53.3		
Zinc	I177SB001	177SB00101	06/07/1996	16.200	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I177SB001	177SB00101	06/07/1996	5.270	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB001	177SB00101	06/07/1996	7.530	ng/kg	=					
Octachlorodibenzofuran	I177SB001	177SB00101	06/07/1996	4.450	ng/kg	J					
Octachlorodibenzo-p-dioxin	I177SB001	177SB00101	06/07/1996	73.900	ng/kg	=					
Total Hepta-Dioxins	I177SB001	177SB00101	06/07/1996	19.100	ng/kg	=					
Total Hepta-Furans	I177SB001	177SB00101	06/07/1996	3.270	ng/kg	J					
Total Hexa-Dioxins	I177SB001	177SB00101	06/07/1996	6.580	ng/kg	=					
Total Hexa-Furans	I177SB001	177SB00101	06/07/1996	1.260	ng/kg	=					
Total Tetra-Furans	I177SB001	177SB00101	06/07/1996	1.620	ng/kg	=					
Heptachlor Epoxide	I177SB001	177SB00101	06/07/1996	0.003	mg/kg	=					
p,p'-DDE	I177SB001	177SB00101	06/07/1996	0.037	mg/kg	=					
p,p'-DDT	I177SB001	177SB00101	06/07/1996	0.006	mg/kg	=					
Acetone	I177SB001	177SB00101	06/07/1996	0.018	mg/kg	J					
Methylene Chloride	I177SB001	177SB00101	06/07/1996	0.012	mg/kg	J					
Aluminum	I177SB002	177SB00201	06/07/1996	990.000	mg/kg	=		3470	27400		
Arsenic	I177SB002	177SB00201	06/07/1996	4.200	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB002	177SB00201	06/07/1996	5.300	mg/kg	J		7.8	43.4		
Beryllium	I177SB002	177SB00201	06/07/1996	0.250	mg/kg	J		0.34	0.95		
Cadmium	I177SB002	177SB00201	06/07/1996	0.360	mg/kg	J	1	0.13	0.61		
Calcium	I177SB002	177SB00201	06/07/1996	248000.000	mg/kg	=		1670	59500		X
Chromium, Total	I177SB002	177SB00201	06/07/1996	5.900	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB002	177SB00201	06/07/1996	2.700	mg/kg	J		0.64	5.8		
Copper	I177SB002	177SB00201	06/07/1996	2.000	mg/kg	J	18.7	2.4	556		
Iron	I177SB002	177SB00201	06/07/1996	2910.000	mg/kg	=		1730	22700		
Lead	I177SB002	177SB00201	06/07/1996	2.500	mg/kg	=	30.2	5	203		
Magnesium	I177SB002	177SB00201	06/07/1996	2150.000	mg/kg	=		424	3820		
Manganese	I177SB002	177SB00201	06/07/1996	111.000	mg/kg	J		15.1	426		
Nickel	I177SB002	177SB00201	06/07/1996	5.100	mg/kg	=	15.9	1.5	18.1		
Potassium	I177SB002	177SB00201	06/07/1996	391.000	mg/kg	J		493	2730		
Sodium	I177SB002	177SB00201	06/07/1996	270.000	mg/kg	J		181	2030		
Vanadium	I177SB002	177SB00201	06/07/1996	3.800	mg/kg	J		8.5	53.3		
Zinc	I177SB002	177SB00201	06/07/1996	14.000	mg/kg	=	124	5.9	150		
Cyanide	I177SB002	177SB00201	06/07/1996	0.220	mg/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzofu	I177SB002	177SB00201	06/07/1996	1.120	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB002	177SB00201	06/07/1996	2.970	ng/kg	=					
Octachlorodibenzofuran	I177SB002	177SB00201	06/07/1996	0.725	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB002	177SB00201	06/07/1996	30.900	ng/kg	=					
Total Hepta-Dioxins	I177SB002	177SB00201	06/07/1996	6.670	ng/kg	=					
Total Hexa-Dioxins	I177SB002	177SB00201	06/07/1996	1.060	ng/kg	=					
1,2-Dichloroethene (total)	I177SB002	177SB00201	06/07/1996	0.006	mg/kg	=					
Aluminum	I177SB003	177SB00301	06/07/1996	2420.000	mg/kg	=		3470	27400		
Arsenic	I177SB003	177SB00301	06/07/1996	4.200	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB003	177SB00301	06/07/1996	8.400	mg/kg	J		7.8	43.4		
Beryllium	I177SB003	177SB00301	06/07/1996	0.330	mg/kg	J		0.34	0.95		
Cadmium	I177SB003	177SB00301	06/07/1996	0.320	mg/kg	J	1	0.13	0.61		
Calcium	I177SB003	177SB00301	06/07/1996	123000.000	mg/kg	=		1670	59500		X
Chromium, Total	I177SB003	177SB00301	06/07/1996	9.200	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB003	177SB00301	06/07/1996	2.100	mg/kg	J		0.64	5.8		
Copper	I177SB003	177SB00301	06/07/1996	3.600	mg/kg	=	18.7	2.4	556		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Iron	I177SB003	177SB00301	06/07/1996	3740.000	mg/kg	=		1730	22700		
Lead	I177SB003	177SB00301	06/07/1996	8.500	mg/kg	=	30.2	5	203		
Magnesium	I177SB003	177SB00301	06/07/1996	1560.000	mg/kg	=		424	3820		
Manganese	I177SB003	177SB00301	06/07/1996	85.800	mg/kg	J		15.1	426		
Nickel	I177SB003	177SB00301	06/07/1996	5.500	mg/kg	=	15.9	1.5	18.1		
Potassium	I177SB003	177SB00301	06/07/1996	435.000	mg/kg	J		493	2730		
Sodium	I177SB003	177SB00301	06/07/1996	181.000	mg/kg	J		181	2030		
Vanadium	I177SB003	177SB00301	06/07/1996	7.700	mg/kg	=		8.5	53.3		
Zinc	I177SB003	177SB00301	06/07/1996	36.200	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I177SB003	177SB00301	06/07/1996	6.460	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB003	177SB00301	06/07/1996	28.400	ng/kg	=					
Octachlorodibenzofuran	I177SB003	177SB00301	06/07/1996	8.360	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB003	177SB00301	06/07/1996	239.000	ng/kg	=					
Total Hepta-Dioxins	I177SB003	177SB00301	06/07/1996	66.400	ng/kg	=					
Total Hepta-Furans	I177SB003	177SB00301	06/07/1996	6.460	ng/kg	=					
Total Hexa-Dioxins	I177SB003	177SB00301	06/07/1996	12.100	ng/kg	=					
Total Hexa-Furans	I177SB003	177SB00301	06/07/1996	5.240	ng/kg	=					
Alpha-chlordane	I177SB003	177SB00301	06/07/1996	0.003	mg/kg	J	0.0017			X	
Gamma-chlordane	I177SB003	177SB00301	06/07/1996	0.008	mg/kg	=	0.0017			X	
Heptachlor Epoxide	I177SB003	177SB00301	06/07/1996	0.003	mg/kg	=					
p,p'-DDE	I177SB003	177SB00301	06/07/1996	0.078	mg/kg	=					
p,p'-DDT	I177SB003	177SB00301	06/07/1996	0.011	mg/kg	J					
Methylene Chloride	I177SB003	177SB00301	06/07/1996	0.007	mg/kg	=					
Aluminum	I177SB004	177SB00401	06/07/1996	1080.000	mg/kg	=		3470	27400		
Arsenic	I177SB004	177SB00401	06/07/1996	1.300	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB004	177SB00401	06/07/1996	5.500	mg/kg	J		7.8	43.4		
Beryllium	I177SB004	177SB00401	06/07/1996	0.170	mg/kg	J		0.34	0.95		
Calcium	I177SB004	177SB00401	06/07/1996	24200.000	mg/kg	=		1670	59500		
Chromium, Total	I177SB004	177SB00401	06/07/1996	3.300	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB004	177SB00401	06/07/1996	0.590	mg/kg	J		0.64	5.8		
Copper	I177SB004	177SB00401	06/07/1996	1.100	mg/kg	J	18.7	2.4	556		
Iron	I177SB004	177SB00401	06/07/1996	1640.000	mg/kg	=		1730	22700		
Lead	I177SB004	177SB00401	06/07/1996	3.200	mg/kg	=	30.2	5	203		
Magnesium	I177SB004	177SB00401	06/07/1996	341.000	mg/kg	J		424	3820		
Manganese	I177SB004	177SB00401	06/07/1996	32.300	mg/kg	J		15.1	426		
Nickel	I177SB004	177SB00401	06/07/1996	1.100	mg/kg	J	15.9	1.5	18.1		
Sodium	I177SB004	177SB00401	06/07/1996	78.900	mg/kg	J		181	2030		
Vanadium	I177SB004	177SB00401	06/07/1996	3.100	mg/kg	J		8.5	53.3		
Zinc	I177SB004	177SB00401	06/07/1996	8.200	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I177SB004	177SB00401	06/07/1996	1.390	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB004	177SB00401	06/07/1996	6.260	ng/kg	=					
Octachlorodibenzofuran	I177SB004	177SB00401	06/07/1996	1.040	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB004	177SB00401	06/07/1996	61.500	ng/kg	=					
Total Hepta-Dioxins	I177SB004	177SB00401	06/07/1996	17.900	ng/kg	=					
Total Hepta-Furans	I177SB004	177SB00401	06/07/1996	3.230	ng/kg	=					
Total Hexa-Dioxins	I177SB004	177SB00401	06/07/1996	7.500	ng/kg	=					
Total Hexa-Furans	I177SB004	177SB00401	06/07/1996	0.404	ng/kg	=					
Total Penta-Furans	I177SB004	177SB00401	06/07/1996	0.354	ng/kg	=					
p,p'-DDE	I177SB004	177SB00401	06/07/1996	0.004	mg/kg	=					
Aluminum	I177SB005	177SB00501	06/07/1996	2300.000	mg/kg	=		3470	27400		
Arsenic	I177SB005	177SB00501	06/07/1996	5.200	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB005	177SB00501	06/07/1996	8.600	mg/kg	J		7.8	43.4		
Beryllium	I177SB005	177SB00501	06/07/1996	0.340	mg/kg	J		0.34	0.95		
Cadmium	I177SB005	177SB00501	06/07/1996	0.440	mg/kg	J	1	0.13	0.61		
Calcium	I177SB005	177SB00501	06/07/1996	225000.000	mg/kg	=		1670	59500		X
Chromium, Total	I177SB005	177SB00501	06/07/1996	12.300	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB005	177SB00501	06/07/1996	3.000	mg/kg	J		0.64	5.8		
Copper	I177SB005	177SB00501	06/07/1996	4.400	mg/kg	=	18.7	2.4	556		
Iron	I177SB005	177SB00501	06/07/1996	4780.000	mg/kg	=		1730	22700		
Lead	I177SB005	177SB00501	06/07/1996	7.000	mg/kg	=	30.2	5	203		
Magnesium	I177SB005	177SB00501	06/07/1996	2770.000	mg/kg	=		424	3820		
Manganese	I177SB005	177SB00501	06/07/1996	118.000	mg/kg	J		15.1	426		
Nickel	I177SB005	177SB00501	06/07/1996	7.600	mg/kg	=	15.9	1.5	18.1		
Potassium	I177SB005	177SB00501	06/07/1996	621.000	mg/kg	=		493	2730		
Sodium	I177SB005	177SB00501	06/07/1996	296.000	mg/kg	J		181	2030		
Vanadium	I177SB005	177SB00501	06/07/1996	9.500	mg/kg	=		8.5	53.3		
Zinc	I177SB005	177SB00501	06/07/1996	36.900	mg/kg	=	124	5.9	150		
Cyanide	I177SB005	177SB00501	06/07/1996	0.240	mg/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzofu	I177SB005	177SB00501	06/07/1996	30.700	ng/kg	=					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB005	177SB00501	06/07/1996	46.500	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzo-p-d	I177SB005	177SB00501	06/07/1996	0.615	ng/kg	J					
1,2,3,6,7,8-Hexachlorodibenzofura	I177SB005	177SB00501	06/07/1996	0.785	ng/kg	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	I177SB005	177SB00501	06/07/1996	2.210	ng/kg	=					
1,2,3,7,8,9-Hexachlorodibenzo-p-d	I177SB005	177SB00501	06/07/1996	1.580	ng/kg	=					
2,3,4,6,7,8-Hexachlorodibenzofura	I177SB005	177SB00501	06/07/1996	1.000	ng/kg	=					
Octachlorodibenzofuran	I177SB005	177SB00501	06/07/1996	7.830	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB005	177SB00501	06/07/1996	276.000	ng/kg	=					
Total Hepta-Dioxins	I177SB005	177SB00501	06/07/1996	105.000	ng/kg	=					
Total Hepta-Furans	I177SB005	177SB00501	06/07/1996	47.800	ng/kg	=					
Total Hexa-Dioxins	I177SB005	177SB00501	06/07/1996	38.700	ng/kg	=					
Total Hexa-Furans	I177SB005	177SB00501	06/07/1996	25.500	ng/kg	=					
Total Penta-Dioxins	I177SB005	177SB00501	06/07/1996	1.400	ng/kg	=					
Total Penta-Furans	I177SB005	177SB00501	06/07/1996	5.830	ng/kg	=					
Total Tetra-Dioxins	I177SB005	177SB00501	06/07/1996	1.680	ng/kg	=					
p,p'-DDE	I177SB005	177SB00501	06/07/1996	0.072	mg/kg	=					
p,p'-DDT	I177SB005	177SB00501	06/07/1996	0.033	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	I177SB005	177SB00501	06/07/1996	0.045	mg/kg	J					
Di-n-butyl Phthalate	I177SB005	177SB00501	06/07/1996	0.039	mg/kg	J					
Hydrocarbons as DRO (Diesel)	I177SB005	177SB00501	06/07/1996	39.600	mg/kg	=					
1,1-Dichloroethene	I177SB005	177SB00501	06/07/1996	0.002	mg/kg	J					
Acetone	I177SB005	177SB00501	06/07/1996	0.160	mg/kg	=					
Trichloroethylene (TCE)	I177SB005	177SB00501	06/07/1996	0.003	mg/kg	J					
Aluminum	I177SB006	177SB00601	06/10/1996	2430.000	mg/kg	=		3470	27400		
Arsenic	I177SB006	177SB00601	06/10/1996	2.500	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB006	177SB00601	06/10/1996	5.400	mg/kg	J		7.8	43.4		
Beryllium	I177SB006	177SB00601	06/10/1996	0.190	mg/kg	J		0.34	0.95		
Calcium	I177SB006	177SB00601	06/10/1996	2880.000	mg/kg	=		1670	59500		
Chromium, Total	I177SB006	177SB00601	06/10/1996	4.600	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB006	177SB00601	06/10/1996	1.200	mg/kg	J		0.64	5.8		
Copper	I177SB006	177SB00601	06/10/1996	1.400	mg/kg	J	18.7	2.4	556		
Iron	I177SB006	177SB00601	06/10/1996	3000.000	mg/kg	=		1730	22700		
Lead	I177SB006	177SB00601	06/10/1996	2.700	mg/kg	=	30.2	5	203		
Magnesium	I177SB006	177SB00601	06/10/1996	298.000	mg/kg	J		424	3820		
Manganese	I177SB006	177SB00601	06/10/1996	22.200	mg/kg	J		15.1	426		
Nickel	I177SB006	177SB00601	06/10/1996	1.200	mg/kg	J	15.9	1.5	18.1		
Potassium	I177SB006	177SB00601	06/10/1996	168.000	mg/kg	J		493	2730		
Sodium	I177SB006	177SB00601	06/10/1996	231.000	mg/kg	J		181	2030		
Vanadium	I177SB006	177SB00601	06/10/1996	5.700	mg/kg	=		8.5	53.3		
Zinc	I177SB006	177SB00601	06/10/1996	8.300	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB006	177SB00601	06/10/1996	3.840	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB006	177SB00601	06/10/1996	35.800	ng/kg	=					
Total Hepta-Dioxins	I177SB006	177SB00601	06/10/1996	12.200	ng/kg	=					
Total Hexa-Dioxins	I177SB006	177SB00601	06/10/1996	6.660	ng/kg	=					
p,p'-DDT	I177SB006	177SB00601	06/10/1996	0.003	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	I177SB006	177SB00601	06/10/1996	0.100	mg/kg	J					
Hydrocarbons as GRO (Gasoline)	I177SB006	177SB00601	06/10/1996	0.021	mg/kg	J					
Trichloroethylene (TCE)	I177SB006	177SB00601	06/10/1996	0.003	mg/kg	J					
Aluminum	I177SB007	177SB00701	06/07/1996	4580.000	mg/kg	=		3470	27400		
Arsenic	I177SB007	177SB00701	06/07/1996	1.400	mg/kg	=	7.24	0.46	19.7		
Barium	I177SB007	177SB00701	06/07/1996	5.300	mg/kg	J		7.8	43.4		
Beryllium	I177SB007	177SB00701	06/07/1996	0.160	mg/kg	J		0.34	0.95		
Calcium	I177SB007	177SB00701	06/07/1996	9840.000	mg/kg	=		1670	59500		
Chromium, Total	I177SB007	177SB00701	06/07/1996	5.800	mg/kg	=	52.3	7.5	53.7		
Cobalt	I177SB007	177SB00701	06/07/1996	0.560	mg/kg	J		0.64	5.8		
Copper	I177SB007	177SB00701	06/07/1996	3.200	mg/kg	=	18.7	2.4	556		
Iron	I177SB007	177SB00701	06/07/1996	1490.000	mg/kg	=		1730	22700		
Lead	I177SB007	177SB00701	06/07/1996	5.900	mg/kg	=	30.2	5	203		
Magnesium	I177SB007	177SB00701	06/07/1996	261.000	mg/kg	J		424	3820		
Manganese	I177SB007	177SB00701	06/07/1996	12.200	mg/kg	J		15.1	426		
Nickel	I177SB007	177SB00701	06/07/1996	1.500	mg/kg	J	15.9	1.5	18.1		
Sodium	I177SB007	177SB00701	06/07/1996	66.300	mg/kg	J		181	2030		
Vanadium	I177SB007	177SB00701	06/07/1996	4.500	mg/kg	J		8.5	53.3		
Zinc	I177SB007	177SB00701	06/07/1996	18.200	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I177SB007	177SB00701	06/07/1996	1.600	ng/kg	=					
Octachlorodibenzofuran	I177SB007	177SB00701	06/07/1996	0.470	ng/kg	=					
Octachlorodibenzo-p-dioxin	I177SB007	177SB00701	06/07/1996	12.100	ng/kg	=					
Total Hepta-Dioxins	I177SB007	177SB00701	06/07/1996	3.460	ng/kg	=					
p,p'-DDE	I177SB007	177SB00701	06/07/1996	0.006	mg/kg	=					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
p,p'-DDT	I177SB007	177SB00701	06/07/1996	0.004	mg/kg	=					
bis(2-Ethylhexyl) Phthalate	I177SB007	177SB00701	06/07/1996	0.770	mg/kg	=					
Trichloroethylene (TCE)	I177SB007	177SB00701	06/07/1996	0.002	mg/kg	J					
Acenaphthene	I177SB010	177SB01001	04/03/1998	0.057	mg/kg	J	0.33				
Anthracene	I177SB010	177SB01001	04/03/1998	0.140	mg/kg	J	0.33				
Benzo(a)Anthracene	I177SB010	177SB01001	04/03/1998	0.910	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I177SB010	177SB01001	04/03/1998	1.000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	I177SB010	177SB01001	04/03/1998	1.000	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	I177SB010	177SB01001	04/03/1998	0.650	mg/kg	=					
Benzo(k)Fluoranthene	I177SB010	177SB01001	04/03/1998	1.100	mg/kg	=			0.596		X
bis(2-Ethylhexyl) Phthalate	I177SB010	177SB01001	04/03/1998	0.230	mg/kg	J					
Chrysene	I177SB010	177SB01001	04/03/1998	1.000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	I177SB010	177SB01001	04/03/1998	1.400	mg/kg	J	0.33			X	
Indeno(1,2,3-c,d)pyrene	I177SB010	177SB01001	04/03/1998	0.710	mg/kg	=			0.525		X
Phenanthrene	I177SB010	177SB01001	04/03/1998	0.790	mg/kg	=	0.33			X	
Pyrene	I177SB010	177SB01001	04/03/1998	1.700	mg/kg	=	0.33			X	
BEQ	I177SB010	177SB01001	04/03/1998	1459.000	ug/kg	=			1.304		X
Benzene	I177SB010	177SB01001	04/03/1998	0.001	mg/kg	J					
Ethylbenzene	I177SB010	177SB01001	04/03/1998	0.002	mg/kg	J					
Toluene	I177SB010	177SB01001	04/03/1998	0.002	mg/kg	J					
Xylenes, Total	I177SB010	177SB01001	04/03/1998	0.008	mg/kg	=					
Ethylbenzene	I177SB011	177SB01101	04/03/1998	0.001	mg/kg	J					
Anthracene	I177SB012	177SB01201	04/03/1998	0.037	mg/kg	J	0.33				
Benzo(a)Anthracene	I177SB012	177SB01201	04/03/1998	0.080	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I177SB012	177SB01201	04/03/1998	0.075	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I177SB012	177SB01201	04/03/1998	0.097	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I177SB012	177SB01201	04/03/1998	0.050	mg/kg	J			0.596		
Chrysene	I177SB012	177SB01201	04/03/1998	0.088	mg/kg	J	0.33		0.62		
Fluoranthene	I177SB012	177SB01201	04/03/1998	0.200	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	I177SB012	177SB01201	04/03/1998	0.052	mg/kg	J			0.525		
Phenanthrene	I177SB012	177SB01201	04/03/1998	0.160	mg/kg	J	0.33				
Pyrene	I177SB012	177SB01201	04/03/1998	0.140	mg/kg	J	0.33				
BEQ	I177SB012	177SB01201	04/03/1998	283.488	ug/kg	=			1.304		
Ethylbenzene	I177SB012	177SB01201	04/03/1998	0.001	mg/kg	J					
Toluene	I177SB012	177SB01201	04/03/1998	0.001	mg/kg	J					
Xylenes, Total	I177SB012	177SB01201	04/03/1998	0.006	mg/kg	J					
Benzo(a)Pyrene	I177SB013	177SB01301	04/03/1998	0.015	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I177SB013	177SB01301	04/03/1998	0.026	mg/kg	J			0.608		
Chrysene	I177SB013	177SB01301	04/03/1998	0.019	mg/kg	J	0.33		0.62		
Fluoranthene	I177SB013	177SB01301	04/03/1998	0.033	mg/kg	J	0.33				
Pyrene	I177SB013	177SB01301	04/03/1998	0.022	mg/kg	J	0.33				
BEQ	I177SB013	177SB01301	04/03/1998	241.469	ug/kg	=			1.304		
Ethylbenzene	I177SB013	177SB01301	04/03/1998	0.001	mg/kg	J					
Toluene	I177SB013	177SB01301	04/03/1998	0.001	mg/kg	J					
Xylenes, Total	I177SB013	177SB01301	04/03/1998	0.007	mg/kg	=					
Benzo(b)Fluoranthene	I177SB014	177SB01401	04/03/1998	0.024	mg/kg	J			0.608		
Benzyl Butyl Phthalate	I177SB014	177SB01401	04/03/1998	0.033	mg/kg	J					
Chrysene	I177SB014	177SB01401	04/03/1998	0.017	mg/kg	J	0.33		0.62		
Fluoranthene	I177SB014	177SB01401	04/03/1998	0.026	mg/kg	J	0.33				
Pyrene	I177SB014	177SB01401	04/03/1998	0.018	mg/kg	J	0.33				
BEQ	I177SB014	177SB01401	04/03/1998	411.267	ug/kg	=			1.304		
Ethylbenzene	I177SB014	177SB01401	04/03/1998	0.001	mg/kg	J					
Xylenes, Total	I177SB014	177SB01401	04/03/1998	0.004	mg/kg	J					
Xylenes, Total	I177SB015	177SB01501	04/03/1998	0.005	mg/kg	J					
Benzo(b)Fluoranthene	I177SB016	177SB01601	06/17/1998	0.041	mg/kg	J			0.608		
Benzyl Butyl Phthalate	I177SB016	177SB01601	06/17/1998	0.079	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	I177SB016	177SB01601	06/17/1998	0.110	mg/kg	J					
Fluoranthene	I177SB016	177SB01601	06/17/1998	0.043	mg/kg	J	0.33				
Pyrene	I177SB016	177SB01601	06/17/1998	0.037	mg/kg	J	0.33				
BEQ	I177SB016	177SB01601	06/17/1998	402.080	ug/kg	=			1.304		
1,1,2,2-Tetrachloroethane	I177SB017	177SB01701	06/17/1998	0.002	mg/kg	J					
2-Hexanone	I177SB017	177SB01701	06/17/1998	0.006	mg/kg	J					
Methyl ethyl ketone (2-Butanone)	I177SB017	177SB01701	06/17/1998	0.003	mg/kg	J					
Methyl isobutyl ketone (4-Methyl-2-	I177SB017	177SB01701	06/17/1998	0.006	mg/kg	J					
Trichloroethylene (TCE)	I177SB017	177SB01701	06/17/1998	0.002	mg/kg	J					
Benzo(a)Anthracene	I177SB018	177SB01801	06/17/1998	0.043	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I177SB018	177SB01801	06/17/1998	0.053	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I177SB018	177SB01801	06/17/1998	0.071	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	I177SB018	177SB01801	06/17/1998	0.054	mg/kg	J					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Benzo(k)Fluoranthene	I177SB018	177SB01801	06/17/1998	0.048	mg/kg	J			0.596		
Benzoic acid	I177SB018	177SB01801	06/17/1998	0.220	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	I177SB018	177SB01801	06/17/1998	0.049	mg/kg	J					
Chrysene	I177SB018	177SB01801	06/17/1998	0.050	mg/kg	J	0.33		0.62		
Fluoranthene	I177SB018	177SB01801	06/17/1998	0.085	mg/kg	J	0.33				
Pyrene	I177SB018	177SB01801	06/17/1998	0.073	mg/kg	J	0.33				
BEQ	I177SB018	177SB01801	06/17/1998	273.930	ug/kg	=			1.304		
Benzoic acid	I177SB019	177SB01901	06/17/1998	1.200	mg/kg	J					
Aluminum	I690SB001	690SB00101	12/14/1994	5130.000	mg/kg	=		3470	27400		
Arsenic	I690SB001	690SB00101	12/14/1994	7.500	mg/kg	J	7.24	0.46	19.7	X	
Calcium	I690SB001	690SB00101	12/14/1994	121000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB001	690SB00101	12/14/1994	22.500	mg/kg	=	52.3	7.5	53.7		
Copper	I690SB001	690SB00101	12/14/1994	87.600	mg/kg	J	18.7	2.4	556	X	
Iron	I690SB001	690SB00101	12/14/1994	6900.000	mg/kg	=		1730	22700		
Lead	I690SB001	690SB00101	12/14/1994	27.600	mg/kg	=	30.2	5	203		
Magnesium	I690SB001	690SB00101	12/14/1994	2400.000	mg/kg	J		424	3820		
Manganese	I690SB001	690SB00101	12/14/1994	143.000	mg/kg	J		15.1	426		
Mercury	I690SB001	690SB00101	12/14/1994	0.060	mg/kg	J	0.13	0.13	0.47		
Nickel	I690SB001	690SB00101	12/14/1994	11.200	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB001	690SB00101	12/14/1994	805.000	mg/kg	J		493	2730		
Selenium	I690SB001	690SB00101	12/14/1994	0.340	mg/kg	J		0.5	1.1		
Sodium	I690SB001	690SB00101	12/14/1994	241.000	mg/kg	J		181	2030		
Vanadium	I690SB001	690SB00101	12/14/1994	15.500	mg/kg	=		8.5	53.3		
Zinc	I690SB001	690SB00101	12/14/1994	65.500	mg/kg	=	124	5.9	150		
bis(2-Ethylhexyl) Phthalate	I690SB001	690SB00101	12/14/1994	0.130	mg/kg	J					
Fluoranthene	I690SB001	690SB00101	12/14/1994	0.095	mg/kg	J	0.33				
Toluene	I690SB001	690SB00101	12/14/1994	0.004	mg/kg	J					
Trichloroethylene (TCE)	I690SB001	690SB00101	12/14/1994	0.004	mg/kg	J					
Aluminum	I690SB002	690SB00201	12/14/1994	2490.000	mg/kg	=		3470	27400		
Arsenic	I690SB002	690SB00201	12/14/1994	26.300	mg/kg	=	7.24	0.46	19.7	X	X
Calcium	I690SB002	690SB00201	12/14/1994	39300.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB002	690SB00201	12/14/1994	18.000	mg/kg	=	52.3	7.5	53.7		
Copper	I690SB002	690SB00201	12/14/1994	34.800	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB002	690SB00201	12/14/1994	3820.000	mg/kg	=		1730	22700		
Lead	I690SB002	690SB00201	12/14/1994	28.700	mg/kg	=	30.2	5	203		
Magnesium	I690SB002	690SB00201	12/14/1994	1290.000	mg/kg	=		424	3820		
Manganese	I690SB002	690SB00201	12/14/1994	36.900	mg/kg	=		15.1	426		
Mercury	I690SB002	690SB00201	12/14/1994	0.050	mg/kg	J	0.13	0.13	0.47		
Nickel	I690SB002	690SB00201	12/14/1994	10.900	mg/kg	=	15.9	1.5	18.1		
Selenium	I690SB002	690SB00201	12/14/1994	0.550	mg/kg	J		0.5	1.1		
Sodium	I690SB002	690SB00201	12/14/1994	209.000	mg/kg	=		181	2030		
Vanadium	I690SB002	690SB00201	12/14/1994	11.700	mg/kg	=		8.5	53.3		
Zinc	I690SB002	690SB00201	12/14/1994	52.800	mg/kg	=	124	5.9	150		
2-Methylnaphthalene	I690SB002	690SB00201	12/14/1994	0.280	mg/kg	J	0.33				
Naphthalene	I690SB002	690SB00201	12/14/1994	0.140	mg/kg	J	0.33				
Phenanthrene	I690SB002	690SB00201	12/14/1994	0.170	mg/kg	J	0.33				
Benzene	I690SB002	690SB00201	12/14/1994	0.003	mg/kg	J					
Tetrachloroethylene (PCE)	I690SB002	690SB00201	12/14/1994	0.004	mg/kg	J					
Toluene	I690SB002	690SB00201	12/14/1994	0.015	mg/kg	J					
Trichloroethylene (TCE)	I690SB002	690SB00201	12/14/1994	0.014	mg/kg	J					
Aluminum	I690SB003	690SB00301	12/16/1994	920.000	mg/kg	=		3470	27400		
Arsenic	I690SB003	690SB00301	12/16/1994	1.700	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB003	690SB00301	12/16/1994	337000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB003	690SB00301	12/16/1994	7.700	mg/kg	=	52.3	7.5	53.7		
Iron	I690SB003	690SB00301	12/16/1994	2480.000	mg/kg	=		1730	22700		
Magnesium	I690SB003	690SB00301	12/16/1994	5470.000	mg/kg	=		424	3820		X
Manganese	I690SB003	690SB00301	12/16/1994	199.000	mg/kg	=		15.1	426		
Potassium	I690SB003	690SB00301	12/16/1994	520.000	mg/kg	J		493	2730		
Selenium	I690SB003	690SB00301	12/16/1994	0.110	mg/kg	J		0.5	1.1		
Sodium	I690SB003	690SB00301	12/16/1994	186.000	mg/kg	=		181	2030		
Acetone	I690SB003	690SB00301	12/16/1994	0.044	mg/kg	J					
Methylene Chloride	I690SB003	690SB00301	12/16/1994	0.014	mg/kg	J					
Aluminum	I690SB004	690SB00401	12/16/1994	8880.000	mg/kg	=		3470	27400		
Arsenic	I690SB004	690SB00401	12/16/1994	11.200	mg/kg	=	7.24	0.46	19.7	X	
Calcium	I690SB004	690SB00401	12/16/1994	101000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB004	690SB00401	12/16/1994	25.700	mg/kg	=	52.3	7.5	53.7		
Copper	I690SB004	690SB00401	12/16/1994	46.500	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB004	690SB00401	12/16/1994	14700.000	mg/kg	=		1730	22700		
Lead	I690SB004	690SB00401	12/16/1994	30.700	mg/kg	=	30.2	5	203	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Magnesium	I690SB004	690SB00401	12/16/1994	2880.000	mg/kg	=		424	3820		
Manganese	I690SB004	690SB00401	12/16/1994	245.000	mg/kg	=		15.1	426		
Mercury	I690SB004	690SB00401	12/16/1994	0.040	mg/kg	J	0.13	0.13	0.47		
Nickel	I690SB004	690SB00401	12/16/1994	12.900	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB004	690SB00401	12/16/1994	1500.000	mg/kg	=		493	2730		
Selenium	I690SB004	690SB00401	12/16/1994	0.270	mg/kg	J		0.5	1.1		
Sodium	I690SB004	690SB00401	12/16/1994	288.000	mg/kg	J		181	2030		
Vanadium	I690SB004	690SB00401	12/16/1994	26.900	mg/kg	=		8.5	53.3		
Zinc	I690SB004	690SB00401	12/16/1994	107.000	mg/kg	=	124	5.9	150		
Benzo(b)Fluoranthene	I690SB004	690SB00401	12/16/1994	0.086	mg/kg	J			0.608		
Fluoranthene	I690SB004	690SB00401	12/16/1994	0.100	mg/kg	J	0.33				
Pyrene	I690SB004	690SB00401	12/16/1994	0.110	mg/kg	J	0.33				
BEQ	I690SB004	690SB00401	12/16/1994	439.745	ug/kg	=			1.304		
Toluene	I690SB004	690SB00401	12/16/1994	0.002	mg/kg	J					
Trichloroethylene (TCE)	I690SB004	690SB00401	12/16/1994	0.005	mg/kg	J					
Aluminum	I690SB005	690SB00501	12/16/1994	3660.000	mg/kg	=		3470	27400		
Arsenic	I690SB005	690SB00501	12/16/1994	5.800	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB005	690SB00501	12/16/1994	187000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB005	690SB00501	12/16/1994	**132.000**	mg/kg	=	52.3	7.5	53.7	X	X
Copper	I690SB005	690SB00501	12/16/1994	87.300	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB005	690SB00501	12/16/1994	7910.000	mg/kg	=		1730	22700		
Lead	I690SB005	690SB00501	12/16/1994	94.100	mg/kg	=	30.2	5	203	X	
Magnesium	I690SB005	690SB00501	12/16/1994	3650.000	mg/kg	=		424	3820		
Manganese	I690SB005	690SB00501	12/16/1994	162.000	mg/kg	=		15.1	426		
Mercury	I690SB005	690SB00501	12/16/1994	0.070	mg/kg	J	0.13	0.13	0.47		
Nickel	I690SB005	690SB00501	12/16/1994	15.600	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB005	690SB00501	12/16/1994	924.000	mg/kg	J		493	2730		
Selenium	I690SB005	690SB00501	12/16/1994	0.270	mg/kg	J		0.5	1.1		
Sodium	I690SB005	690SB00501	12/16/1994	1270.000	mg/kg	=		181	2030		
Vanadium	I690SB005	690SB00501	12/16/1994	12.600	mg/kg	=		8.5	53.3		
Zinc	I690SB005	690SB00501	12/16/1994	146.000	mg/kg	=	124	5.9	150	X	
PCB-1260 (Arochlor 1260)	I690SB005	690SB00501	12/16/1994	**0.039**	mg/kg	J	0.033			X	
Acetone	I690SB005	690SB00501	12/16/1994	0.870	mg/kg	J					
Chloromethane	I690SB005	690SB00501	12/16/1994	0.060	mg/kg	J					
Methylene Chloride	I690SB005	690SB00501	12/16/1994	0.067	mg/kg	J					
Aluminum	I690SB006	690SB00601	12/16/1994	6680.000	mg/kg	=		3470	27400		
Arsenic	I690SB006	690SB00601	12/16/1994	2.100	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB006	690SB00601	12/16/1994	45400.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB006	690SB00601	12/16/1994	21.200	mg/kg	=	52.3	7.5	53.7		
Iron	I690SB006	690SB00601	12/16/1994	3500.000	mg/kg	=		1730	22700		
Lead	I690SB006	690SB00601	12/16/1994	24.900	mg/kg	=	30.2	5	203		
Magnesium	I690SB006	690SB00601	12/16/1994	1870.000	mg/kg	=		424	3820		
Manganese	I690SB006	690SB00601	12/16/1994	62.700	mg/kg	=		15.1	426		
Mercury	I690SB006	690SB00601	12/16/1994	0.050	mg/kg	J	0.13	0.13	0.47		
Selenium	I690SB006	690SB00601	12/16/1994	0.290	mg/kg	J		0.5	1.1		
Sodium	I690SB006	690SB00601	12/16/1994	1450.000	mg/kg	=		181	2030		
Vanadium	I690SB006	690SB00601	12/16/1994	8.900	mg/kg	=		8.5	53.3		
Zinc	I690SB006	690SB00601	12/16/1994	45.700	mg/kg	=	124	5.9	150		
p,p'-DDE	I690SB006	690SB00601	12/16/1994	0.016	mg/kg	=					
Benzoic acid	I690SB006	690SB00601	12/16/1994	25.000	mg/kg	=					
Acetone	I690SB006	690SB00601	12/16/1994	0.060	mg/kg	J					
Toluene	I690SB006	690SB00601	12/16/1994	0.004	mg/kg	J					
Trichloroethylene (TCE)	I690SB006	690SB00601	12/16/1994	0.008	mg/kg	J					
Aluminum	I690SB007	690SB00701	12/16/1994	4980.000	mg/kg	=		3470	27400		
Arsenic	I690SB007	690SB00701	12/16/1994	2.200	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB007	690SB00701	12/16/1994	68900.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB007	690SB00701	12/16/1994	9.500	mg/kg	=	52.3	7.5	53.7		
Iron	I690SB007	690SB00701	12/16/1994	3350.000	mg/kg	=		1730	22700		
Lead	I690SB007	690SB00701	12/16/1994	9.000	mg/kg	=	30.2	5	203		
Magnesium	I690SB007	690SB00701	12/16/1994	1380.000	mg/kg	=		424	3820		
Manganese	I690SB007	690SB00701	12/16/1994	58.600	mg/kg	=		15.1	426		
Mercury	I690SB007	690SB00701	12/16/1994	0.050	mg/kg	J	0.13	0.13	0.47		
Selenium	I690SB007	690SB00701	12/16/1994	0.160	mg/kg	J		0.5	1.1		
Sodium	I690SB007	690SB00701	12/16/1994	1250.000	mg/kg	=		181	2030		
PCB-1260 (Arochlor 1260)	I690SB007	690SB00701	12/16/1994	**0.058**	mg/kg	=	0.033			X	
Acenaphthene	I690SB007	690SB00701	12/16/1994	0.210	mg/kg	J	0.33				
Anthracene	I690SB007	690SB00701	12/16/1994	**0.340**	mg/kg	J	0.33			X	
Benzo(a)Anthracene	I690SB007	690SB00701	12/16/1994	**0.690**	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB007	690SB00701	12/16/1994	**0.570**	mg/kg	=	0.33		0.598	X	

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Benzo(b)Fluoranthene	I690SB007	690SB00701	12/16/1994	0.690	mg/kg	=			0.608		X
Benzo(g,h,i)Perylene	I690SB007	690SB00701	12/16/1994	0.240	mg/kg	J					
Benzo(k)Fluoranthene	I690SB007	690SB00701	12/16/1994	0.400	mg/kg	J			0.596		
Chrysene	I690SB007	690SB00701	12/16/1994	0.650	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	I690SB007	690SB00701	12/16/1994	0.120	mg/kg	J	0.33		0.525		
Fluoranthene	I690SB007	690SB00701	12/16/1994	1.500	mg/kg	=	0.33			X	
Fluorene	I690SB007	690SB00701	12/16/1994	0.160	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	I690SB007	690SB00701	12/16/1994	0.260	mg/kg	J			0.525		
Phenanthrene	I690SB007	690SB00701	12/16/1994	1.300	mg/kg	=	0.33			X	
Pyrene	I690SB007	690SB00701	12/16/1994	1.200	mg/kg	=	0.33			X	
BEQ	I690SB007	690SB00701	12/16/1994	858.650	ug/kg	=			1.304		
Aluminum	I690SB008	690SB00801	12/16/1994	1580.000	mg/kg	=		3470	27400		
Arsenic	I690SB008	690SB00801	12/16/1994	4.700	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB008	690SB00801	12/16/1994	303000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB008	690SB00801	12/16/1994	11.900	mg/kg	=	52.3	7.5	53.7		
Copper	I690SB008	690SB00801	12/16/1994	24.200	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB008	690SB00801	12/16/1994	3010.000	mg/kg	=		1730	22700		
Lead	I690SB008	690SB00801	12/16/1994	12.900	mg/kg	=	30.2	5	203		
Magnesium	I690SB008	690SB00801	12/16/1994	3710.000	mg/kg	=		424	3820		
Manganese	I690SB008	690SB00801	12/16/1994	203.000	mg/kg	=		15.1	426		
Nickel	I690SB008	690SB00801	12/16/1994	10.200	mg/kg	=	15.9	1.5	18.1		
Sodium	I690SB008	690SB00801	12/16/1994	1030.000	mg/kg	=		181	2030		
Zinc	I690SB008	690SB00801	12/16/1994	45.500	mg/kg	=	124	5.9	150		
Gamma-chlordane	I690SB008	690SB00801	12/16/1994	0.004	mg/kg	J	0.0017			X	
p,p'-DDE	I690SB008	690SB00801	12/16/1994	0.003	mg/kg	J					
Aluminum	I690SB009	690SB00901	12/16/1994	2950.000	mg/kg	=		3470	27400		
Arsenic	I690SB009	690SB00901	12/16/1994	3.600	mg/kg	=	7.24	0.46	19.7		
Calcium	I690SB009	690SB00901	12/16/1994	198000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB009	690SB00901	12/16/1994	66.200	mg/kg	=	52.3	7.5	53.7	X	X
Iron	I690SB009	690SB00901	12/16/1994	4490.000	mg/kg	=		1730	22700		
Lead	I690SB009	690SB00901	12/16/1994	33.700	mg/kg	=	30.2	5	203	X	
Magnesium	I690SB009	690SB00901	12/16/1994	4140.000	mg/kg	=		424	3820		X
Manganese	I690SB009	690SB00901	12/16/1994	147.000	mg/kg	=		15.1	426		
Potassium	I690SB009	690SB00901	12/16/1994	644.000	mg/kg	J		493	2730		
Selenium	I690SB009	690SB00901	12/16/1994	0.170	mg/kg	J		0.5	1.1		
Sodium	I690SB009	690SB00901	12/16/1994	1630.000	mg/kg	=		181	2030		
Vanadium	I690SB009	690SB00901	12/16/1994	9.600	mg/kg	=		8.5	53.3		
Zinc	I690SB009	690SB00901	12/16/1994	76.200	mg/kg	=	124	5.9	150		
Petroleum Hydrocarbons, TPH	I690SB009	690SB00901	12/16/1994	140.000	mg/kg	=					
Aluminum	I690SB010	690SB01001	12/16/1994	6270.000	mg/kg	=		3470	27400		
Arsenic	I690SB010	690SB01001	12/16/1994	7.400	mg/kg	=	7.24	0.46	19.7	X	
Calcium	I690SB010	690SB01001	12/16/1994	158000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB010	690SB01001	12/16/1994	48.000	mg/kg	=	52.3	7.5	53.7		
Copper	I690SB010	690SB01001	12/16/1994	321.000	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB010	690SB01001	12/16/1994	22700.000	mg/kg	=		1730	22700		
Lead	I690SB010	690SB01001	12/16/1994	118.000	mg/kg	=	30.2	5	203	X	
Magnesium	I690SB010	690SB01001	12/16/1994	5230.000	mg/kg	=		424	3820		X
Manganese	I690SB010	690SB01001	12/16/1994	135.000	mg/kg	=		15.1	426		
Mercury	I690SB010	690SB01001	12/16/1994	0.550	mg/kg	=	0.13	0.13	0.47	X	X
Nickel	I690SB010	690SB01001	12/16/1994	62.300	mg/kg	=	15.9	1.5	18.1	X	X
Potassium	I690SB010	690SB01001	12/16/1994	981.000	mg/kg	J		493	2730		
Selenium	I690SB010	690SB01001	12/16/1994	0.810	mg/kg	J		0.5	1.1		
Sodium	I690SB010	690SB01001	12/16/1994	2300.000	mg/kg	=		181	2030		X
Vanadium	I690SB010	690SB01001	12/16/1994	24.100	mg/kg	=		8.5	53.3		
Zinc	I690SB010	690SB01001	12/16/1994	252.000	mg/kg	=	124	5.9	150	X	X
PCB-1260 (Arochlor 1260)	I690SB010	690SB01001	12/16/1994	0.095	mg/kg	=	0.033			X	
p,p'-DDE	I690SB010	690SB01001	12/16/1994	0.003	mg/kg	J					
Benzo(a)Anthracene	I690SB010	690SB01001	12/16/1994	0.250	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I690SB010	690SB01001	12/16/1994	0.240	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB010	690SB01001	12/16/1994	0.480	mg/kg	=			0.608		
Benzo(k)Fluoranthene	I690SB010	690SB01001	12/16/1994	0.410	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB010	690SB01001	12/16/1994	1.200	mg/kg	=					
Chrysene	I690SB010	690SB01001	12/16/1994	0.530	mg/kg	=	0.33		0.62	X	
Fluoranthene	I690SB010	690SB01001	12/16/1994	0.240	mg/kg	J	0.33				
Pyrene	I690SB010	690SB01001	12/16/1994	0.300	mg/kg	J	0.33				
BEQ	I690SB010	690SB01001	12/16/1994	576.130	ug/kg	=			1.304		
Petroleum Hydrocarbons, TPH	I690SB010	690SB01001	12/16/1994	820.000	mg/kg	=					
Acetone	I690SB010	690SB01001	12/16/1994	1.500	mg/kg	J					
Methylene Chloride	I690SB010	690SB01001	12/16/1994	0.062	mg/kg	J					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Toluene	I690SB010	690SB01001	12/16/1994	0.010	mg/kg	J					
Aluminum	I690SB011	690SB01101c	02/08/1995	12700.000	mg/kg	J		3470	27400		
Arsenic	I690SB011	690SB01101c	02/08/1995	6.700	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB011	690SB01101c	02/08/1995	23.200	mg/kg	J		7.8	43.4		
Calcium	I690SB011	690SB01101c	02/08/1995	58200.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB011	690SB01101c	02/08/1995	36.400	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB011	690SB01101c	02/08/1995	3.000	mg/kg	J		0.64	5.8		
Copper	I690SB011	690SB01101c	02/08/1995	37.100	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB011	690SB01101c	02/08/1995	11200.000	mg/kg	J		1730	22700		
Lead	I690SB011	690SB01101c	02/08/1995	35.800	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB011	690SB01101c	02/08/1995	3010.000	mg/kg	J		424	3820		
Manganese	I690SB011	690SB01101c	02/08/1995	178.000	mg/kg	J		15.1	426		
Nickel	I690SB011	690SB01101c	02/08/1995	14.400	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB011	690SB01101c	02/08/1995	1520.000	mg/kg	=		493	2730		
Tin (Sn)	I690SB011	690SB01101c	02/08/1995	10.300	mg/kg	J		0.98	7.5		X
Vanadium	I690SB011	690SB01101c	02/08/1995	25.200	mg/kg	J		8.5	53.3		
Zinc	I690SB011	690SB01101c	02/08/1995	59.400	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB011	690SB01101d	03/07/1995	3.922	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB011	690SB01101d	03/07/1995	14.141	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB011	690SB01101d	03/07/1995	1.014	ng/kg	J					
Octachlorodibenzofuran	I690SB011	690SB01101d	03/07/1995	4.931	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB011	690SB01101d	03/07/1995	166.961	ng/kg	=					
Total Hepta-Dioxins	I690SB011	690SB01101d	03/07/1995	40.636	ng/kg	=					
Total Hepta-Furans	I690SB011	690SB01101d	03/07/1995	10.276	ng/kg	=					
Total Hexa-Furans	I690SB011	690SB01101d	03/07/1995	5.580	ng/kg	=					
Chloride	I690SB011	690SB01101a	09/06/1995	510.000	mg/kg	=					
Nitrate-Nitrite-N	I690SB011	690SB01101a	09/06/1995	4.540	mg/kg	=					
Nitrogen, Ammonia (as N)	I690SB011	690SB01101a	09/06/1995	10.100	mg/kg	=					
Phosphorus	I690SB011	690SB01101a	09/06/1995	22.700	mg/kg	=					
Total Organic Carbon	I690SB011	690SB01101a	09/06/1995	15868.000	mg/kg	=					
Aldrin	I690SB011	690SB01101c	02/08/1995	0.003	mg/kg	J					
Gamma BHC (Lindane)	I690SB011	690SB01101c	02/08/1995	0.001	mg/kg	J					
Heptachlor	I690SB011	690SB01101c	02/08/1995	0.001	mg/kg	J					
Methoxychlor	I690SB011	690SB01101c	02/08/1995	0.003	mg/kg	J					
p,p'-DDD	I690SB011	690SB01101c	02/08/1995	0.014	mg/kg	=					
1-Methyl naphthalene	I690SB011	690SB01101c	02/08/1995	0.047	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	I690SB011	690SB01101c	02/08/1995	0.044	mg/kg	J					
Pyrene	I690SB011	690SB01101c	02/08/1995	0.044	mg/kg	J	0.33				
Aluminum	I690SB012	690SB01201a	02/08/1995	7660.000	mg/kg	J		3470	27400		
Arsenic	I690SB012	690SB01201a	02/08/1995	9.800	mg/kg	J	7.24	0.46	19.7	X	
Barium	I690SB012	690SB01201a	02/08/1995	22.700	mg/kg	J		7.8	43.4		
Calcium	I690SB012	690SB01201a	02/08/1995	22200.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB012	690SB01201a	02/08/1995	19.700	mg/kg	J	52.3	7.5	53.7		
Copper	I690SB012	690SB01201a	02/08/1995	16.100	mg/kg	=	18.7	2.4	556		
Iron	I690SB012	690SB01201a	02/08/1995	9730.000	mg/kg	J		1730	22700		
Lead	I690SB012	690SB01201a	02/08/1995	17.600	mg/kg	J	30.2	5	203		
Magnesium	I690SB012	690SB01201a	02/08/1995	2080.000	mg/kg	J		424	3820		
Manganese	I690SB012	690SB01201a	02/08/1995	60.400	mg/kg	J		15.1	426		
Mercury	I690SB012	690SB01201a	02/08/1995	0.230	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB012	690SB01201a	02/08/1995	6.600	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB012	690SB01201a	02/08/1995	876.000	mg/kg	J		493	2730		
Selenium	I690SB012	690SB01201a	02/08/1995	1.000	mg/kg	J		0.5	1.1		
Tin (Sn)	I690SB012	690SB01201a	02/08/1995	1.000	mg/kg	J		0.98	7.5		
Vanadium	I690SB012	690SB01201a	02/08/1995	21.300	mg/kg	J		8.5	53.3		
Zinc	I690SB012	690SB01201a	02/08/1995	38.900	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB012	690SB01201b	03/07/1995	1.235	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB012	690SB01201b	03/07/1995	11.039	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB012	690SB01201b	03/07/1995	0.720	ng/kg	J					
Octachlorodibenzofuran	I690SB012	690SB01201b	03/07/1995	1.113	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB012	690SB01201b	03/07/1995	260.579	ng/kg	=					
Total Hepta-Dioxins	I690SB012	690SB01201b	03/07/1995	41.461	ng/kg	=					
Total Hepta-Furans	I690SB012	690SB01201b	03/07/1995	1.163	ng/kg	=					
Total Hexa-Dioxins	I690SB012	690SB01201b	03/07/1995	28.732	ng/kg	=					
Total Penta-Furans	I690SB012	690SB01201b	03/07/1995	2.149	ng/kg	=					
Benzo(a)Pyrene	I690SB012	690SB01201a	02/08/1995	0.065	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB012	690SB01201a	02/08/1995	0.120	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB012	690SB01201a	02/08/1995	0.130	mg/kg	J			0.596		
Chrysene	I690SB012	690SB01201a	02/08/1995	0.053	mg/kg	J	0.33		0.62		
Fluoranthene	I690SB012	690SB01201a	02/08/1995	0.049	mg/kg	J	0.33				

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Pyrene	I690SB012	690SB01201a	02/08/1995	0.051	mg/kg	J	0.33				
BEQ	I690SB012	690SB01201a	02/08/1995	417.853	ug/kg	=			1.304		
Aluminum	I690SB013	690SB01301a	02/08/1995	22400.000	mg/kg	J		3470	27400		
Arsenic	I690SB013	690SB01301a	02/08/1995	9.200	mg/kg	J	7.24	0.46	19.7	X	
Barium	I690SB013	690SB01301a	02/08/1995	33.100	mg/kg	J		7.8	43.4		
Calcium	I690SB013	690SB01301a	02/08/1995	27900.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB013	690SB01301a	02/08/1995	55.900	mg/kg	J	52.3	7.5	53.7	X	X
Cobalt	I690SB013	690SB01301a	02/08/1995	4.600	mg/kg	J		0.64	5.8		
Copper	I690SB013	690SB01301a	02/08/1995	32.500	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB013	690SB01301a	02/08/1995	18800.000	mg/kg	J		1730	22700		
Lead	I690SB013	690SB01301a	02/08/1995	32.000	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB013	690SB01301a	02/08/1995	3320.000	mg/kg	J		424	3820		
Manganese	I690SB013	690SB01301a	02/08/1995	289.000	mg/kg	J		15.1	426		
Mercury	I690SB013	690SB01301a	02/08/1995	0.170	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB013	690SB01301a	02/08/1995	15.500	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB013	690SB01301a	02/C8/1995	2040.000	mg/kg	J		493	2730		
Selenium	I690SB013	690SB01301a	02/08/1995	1.100	mg/kg	J		0.5	1.1		
Vanadium	I690SB013	690SB01301a	02/08/1995	47.700	mg/kg	J		8.5	53.3		
Zinc	I690SB013	690SB01301a	02/08/1995	69.600	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB013	690SB01301b	03/07/1995	9.623	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB013	690SB01301b	03/07/1995	71.613	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB013	690SB01301b	03/07/1995	2.618	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB013	690SB01301b	03/07/1995	3.013	ng/kg	J					
Octachlorodibenzofuran	I690SB013	690SB01301b	03/07/1995	19.685	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB013	690SB01301b	03/07/1995	817.968	ng/kg	=					
Total Hepta-Dioxins	I690SB013	690SB01301b	03/07/1995	271.092	ng/kg	=					
Total Hepta-Furans	I690SB013	690SB01301b	03/07/1995	24.847	ng/kg	=					
Total Hexa-Dioxins	I690SB013	690SB01301b	03/07/1995	49.438	ng/kg	=					
Total Hexa-Furans	I690SB013	690SB01301b	03/07/1995	10.584	ng/kg	=					
Total Penta-Furans	I690SB013	690SB01301b	03/07/1995	5.186	ng/kg	=					
Total Tetra-Dioxins	I690SB013	690SB01301b	03/07/1995	3.955	ng/kg	=					
Aldrin	I690SB013	690SB01301a	02/08/1995	0.002	mg/kg	=					
Beta BHC (Beta Hexachlorocycloh	I690SB013	690SB01301a	02/08/1995	0.002	mg/kg	=					
Endosulfan I	I690SB013	690SB01301a	02/08/1995	0.002	mg/kg	J					
Di-n-butyl Phthalate	I690SB013	690SB01301a	02/08/1995	0.057	mg/kg	J					
Aluminum	I690SB014	690SB01401a	02/08/1995	13100.000	mg/kg	J		3470	27400		
Arsenic	I690SB014	690SB01401a	02/08/1995	6.400	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB014	690SB01401a	02/08/1995	28.000	mg/kg	J		7.8	43.4		
Calcium	I690SB014	690SB01401a	02/08/1995	36900.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB014	690SB01401a	02/08/1995	31.400	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB014	690SB01401a	02/08/1995	2.800	mg/kg	J		0.64	5.8		
Copper	I690SB014	690SB01401a	02/08/1995	20.400	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB014	690SB01401a	02/08/1995	10300.000	mg/kg	J		1730	22700		
Lead	I690SB014	690SB01401a	02/08/1995	20.800	mg/kg	J	30.2	5	203		
Magnesium	I690SB014	690SB01401a	02/08/1995	2560.000	mg/kg	J		424	3820		
Manganese	I690SB014	690SB01401a	02/08/1995	111.000	mg/kg	J		15.1	426		
Mercury	I690SB014	690SB01401a	02/08/1995	0.300	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB014	690SB01401a	02/08/1995	11.000	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB014	690SB01401a	02/08/1995	1610.000	mg/kg	J		493	2730		
Selenium	I690SB014	690SB01401a	02/08/1995	1.200	mg/kg	J		0.5	1.1		X
Vanadium	I690SB014	690SB01401a	02/08/1995	27.900	mg/kg	J		8.5	53.3		
Zinc	I690SB014	690SB01401a	02/08/1995	66.300	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB014	690SB01401b	03/07/1995	2.851	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB014	690SB01401b	03/07/1995	29.497	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB014	690SB01401b	03/07/1995	1.729	ng/kg	=					
Octachlorodibenzofuran	I690SB014	690SB01401b	03/07/1995	4.080	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB014	690SB01401b	03/07/1995	343.255	ng/kg	=					
Total Hepta-Dioxins	I690SB014	690SB01401b	03/07/1995	93.936	ng/kg	=					
Total Hepta-Furans	I690SB014	690SB01401b	03/07/1995	7.039	ng/kg	=					
Total Hexa-Dioxins	I690SB014	690SB01401b	03/07/1995	30.759	ng/kg	=					
Total Hexa-Furans	I690SB014	690SB01401b	03/07/1995	5.408	ng/kg	=					
Heptachlor Epoxide	I690SB014	690SB01401a	02/08/1995	0.001	mg/kg	J					
Benzo(a)Pyrene	I690SB014	690SB01401a	02/08/1995	0.047	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB014	690SB01401a	02/08/1995	0.096	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB014	690SB01401a	02/08/1995	0.100	mg/kg	J			0.596		
Chrysene	I690SB014	690SB01401a	02/08/1995	0.056	mg/kg	J	0.33		0.62		
Di-n-butyl Phthalate	I690SB014	690SB01401a	02/08/1995	0.052	mg/kg	J					
Fluoranthene	I690SB014	690SB01401a	02/08/1995	0.054	mg/kg	J	0.33				
Pyrene	I690SB014	690SB01401a	02/08/1995	0.050	mg/kg	J	0.33				

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
BEQ	I690SB014	690SB01401a	02/08/1995	411.156	ug/kg	=			1.304		
Aluminum	I690SB015	690SB01501a	02/08/1995	12800.000	mg/kg	J		3470	27400		
Arsenic	I690SB015	690SB01501a	02/08/1995	8.600	mg/kg	J	7.24	0.46	19.7	X	
Barium	I690SB015	690SB01501a	02/08/1995	40.800	mg/kg	J		7.8	43.4		
Calcium	I690SB015	690SB01501a	02/08/1995	11000.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB015	690SB01501a	02/08/1995	33.000	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB015	690SB01501a	02/08/1995	4.100	mg/kg	J		0.64	5.8		
Copper	I690SB015	690SB01501a	02/08/1995	19.900	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB015	690SB01501a	02/08/1995	14800.000	mg/kg	J		1730	22700		
Lead	I690SB015	690SB01501a	02/08/1995	164.000	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB015	690SB01501a	02/08/1995	2050.000	mg/kg	J		424	3820		
Manganese	I690SB015	690SB01501a	02/08/1995	225.000	mg/kg	J		15.1	426		
Mercury	I690SB015	690SB01501a	02/08/1995	0.160	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB015	690SB01501a	02/08/1995	11.200	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB015	690SB01501a	02/08/1995	1270.000	mg/kg	J		493	2730		
Selenium	I690SB015	690SB01501a	02/08/1995	0.980	mg/kg	J		0.5	1.1		
Vanadium	I690SB015	690SB01501a	02/08/1995	34.100	mg/kg	J		8.5	53.3		
Zinc	I690SB015	690SB01501a	02/08/1995	48.400	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB015	690SB01501b	03/07/1995	1.386	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB015	690SB01501b	03/07/1995	7.309	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB015	690SB01501b	03/07/1995	1.089	ng/kg	J					
Octachlorodibenzofuran	I690SB015	690SB01501b	03/07/1995	2.570	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB015	690SB01501b	03/07/1995	69.905	ng/kg	=					
Total Hepta-Dioxins	I690SB015	690SB01501b	03/07/1995	25.519	ng/kg	=					
Total Hepta-Furans	I690SB015	690SB01501b	03/07/1995	1.386	ng/kg	=					
Total Hexa-Dioxins	I690SB015	690SB01501b	03/07/1995	4.582	ng/kg	=					
Endosulfan II	I690SB015	690SB01501a	02/08/1995	0.007	mg/kg	J					
1-Methyl naphthalene	I690SB015	690SB01501a	02/08/1995	0.058	mg/kg	J					
Benzo(a)Anthracene	I690SB015	690SB01501a	02/08/1995	0.066	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I690SB015	690SB01501a	02/08/1995	0.058	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB015	690SB01501a	02/08/1995	0.120	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB015	690SB01501a	02/08/1995	0.130	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB015	690SB01501a	02/08/1995	0.057	mg/kg	J					
Chrysene	I690SB015	690SB01501a	02/08/1995	0.093	mg/kg	J	0.33		0.62		
Di-n-butyl Phthalate	I690SB015	690SB01501a	02/08/1995	0.055	mg/kg	J					
Fluoranthene	I690SB015	690SB01501a	02/08/1995	0.110	mg/kg	J	0.33				
Phenanthrene	I690SB015	690SB01501a	02/08/1995	0.063	mg/kg	J	0.33				
Pyrene	I690SB015	690SB01501a	02/08/1995	0.084	mg/kg	J	0.33				
BEQ	I690SB015	690SB01501a	02/08/1995	409.993	ug/kg	=			1.304		
Acetone	I690SB015	690SB01501a	02/08/1995	0.038	mg/kg	J					
Aluminum	I690SB016	690SB01601a	02/09/1995	5850.000	mg/kg	J		3470	27400		
Arsenic	I690SB016	690SB01601a	02/09/1995	1.900	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB016	690SB01601a	02/09/1995	17.100	mg/kg	J		7.8	43.4		
Calcium	I690SB016	690SB01601a	02/09/1995	16700.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB016	690SB01601a	02/09/1995	131.000	mg/kg	J	52.3	7.5	53.7	X	X
Copper	I690SB016	690SB01601a	02/09/1995	35.800	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB016	690SB01601a	02/09/1995	3840.000	mg/kg	J		1730	22700		
Lead	I690SB016	690SB01601a	02/09/1995	28.000	mg/kg	J	30.2	5	203		
Magnesium	I690SB016	690SB01601a	02/09/1995	3240.000	mg/kg	J		424	3820		
Manganese	I690SB016	690SB01601a	02/09/1995	54.400	mg/kg	J		15.1	426		
Mercury	I690SB016	690SB01601a	02/09/1995	0.150	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB016	690SB01601a	02/09/1995	7.500	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB016	690SB01601a	02/09/1995	414.000	mg/kg	J		493	2730		
Selenium	I690SB016	690SB01601a	02/09/1995	0.480	mg/kg	J		0.5	1.1		
Vanadium	I690SB016	690SB01601a	02/09/1995	12.100	mg/kg	J		8.5	53.3		
Zinc	I690SB016	690SB01601a	02/09/1995	43.200	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB016	690SB01601b	03/07/1995	2.388	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB016	690SB01601b	03/07/1995	9.461	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB016	690SB01601b	03/07/1995	0.652	ng/kg	J					
Octachlorodibenzofuran	I690SB016	690SB01601b	03/07/1995	2.188	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB016	690SB01601b	03/07/1995	71.283	ng/kg	=					
Total Hepta-Dioxins	I690SB016	690SB01601b	03/07/1995	25.580	ng/kg	=					
Total Hepta-Furans	I690SB016	690SB01601b	03/07/1995	3.316	ng/kg	=					
Total Hexa-Furans	I690SB016	690SB01601b	03/07/1995	2.290	ng/kg	=					
Total Penta-Furans	I690SB016	690SB01601b	03/07/1995	3.449	ng/kg	=					
PCB-1260 (Arochlor 1260)	I690SB016	690SB01601a	02/09/1995	0.095	mg/kg	=	0.033			X	
Benzo(b)Fluoranthene	I690SB016	690SB01601a	02/09/1995	0.042	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB016	690SB01601a	02/09/1995	0.044	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB016	690SB01601a	02/09/1995	0.076	mg/kg	J					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
BEQ	I690SB016	690SB01601a	02/09/1995	666.935	ug/kg	=			1.304		
Propionitrile	I690SB016	690SB01601a	02/09/1995	0.660	mg/kg	J					
Aluminum	I690SB017	690SB01701b	02/09/1995	3560.000	mg/kg	J		3470	27400		
Arsenic	I690SB017	690SB01701b	02/09/1995	3.600	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB017	690SB01701b	02/09/1995	10.400	mg/kg	J		7.8	43.4		
Calcium	I690SB017	690SB01701b	02/09/1995	188000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB017	690SB01701b	02/09/1995	33.400	mg/kg	J	52.3	7.5	53.7		
Copper	I690SB017	690SB01701b	02/09/1995	15.200	mg/kg	=	18.7	2.4	556		
Iron	I690SB017	690SB01701b	02/09/1995	2580.000	mg/kg	J		1730	22700		
Lead	I690SB017	690SB01701b	02/09/1995	7.200	mg/kg	J	30.2	5	203		
Magnesium	I690SB017	690SB01701b	02/09/1995	3810.000	mg/kg	J		424	3820		
Manganese	I690SB017	690SB01701b	02/09/1995	25.800	mg/kg	J		15.1	426		
Nickel	I690SB017	690SB01701b	02/09/1995	14.300	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB017	690SB01701b	02/09/1995	1370.000	mg/kg	J		493	2730		
Selenium	I690SB017	690SB01701b	02/09/1995	1.600	mg/kg	J		0.5	1.1		X
Vanadium	I690SB017	690SB01701b	02/09/1995	21.400	mg/kg	J		8.5	53.3		
Zinc	I690SB017	690SB01701b	02/09/1995	32.100	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB017	690SB01701a	03/07/1995	4.200	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB017	690SB01701a	03/07/1995	11.994	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB017	690SB01701a	03/07/1995	1.203	ng/kg	J					
Octachlorodibenzofuran	I690SB017	690SB01701a	03/07/1995	5.220	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB017	690SB01701a	03/07/1995	94.934	ng/kg	=					
Total Hepta-Dioxins	I690SB017	690SB01701a	03/07/1995	30.447	ng/kg	=					
Total Hepta-Furans	I690SB017	690SB01701a	03/07/1995	4.200	ng/kg	=					
Total Hexa-Furans	I690SB017	690SB01701a	03/07/1995	2.673	ng/kg	=					
Di-n-butyl Phthalate	I690SB017	690SB01701b	02/09/1995	0.051	mg/kg	J					
Fluoranthene	I690SB017	690SB01701b	02/09/1995	0.018	mg/kg	J	0.33				
Phenanthrene	I690SB017	690SB01701b	02/09/1995	0.012	mg/kg	J	0.33				
Toluene	I690SB017	690SB01701b	02/09/1995	0.002	mg/kg	J					
Aluminum	I690SB018	690SB01801a	02/09/1995	4580.000	mg/kg	J		3470	27400		
Arsenic	I690SB018	690SB01801a	02/09/1995	10.700	mg/kg	J	7.24	0.46	19.7	X	
Barium	I690SB018	690SB01801a	02/09/1995	39.900	mg/kg	J		7.8	43.4		
Calcium	I690SB018	690SB01801a	02/09/1995	57100.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB018	690SB01801a	02/09/1995	29.400	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB018	690SB01801a	02/09/1995	2.900	mg/kg	J		0.64	5.8		
Copper	I690SB018	690SB01801a	02/09/1995	74.400	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB018	690SB01801a	02/09/1995	5670.000	mg/kg	J		1730	22700		
Lead	I690SB018	690SB01801a	02/09/1995	37.000	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB018	690SB01801a	02/09/1995	2420.000	mg/kg	J		424	3820		
Manganese	I690SB018	690SB01801a	02/09/1995	76.300	mg/kg	J		15.1	426		
Mercury	I690SB018	690SB01801a	02/09/1995	0.160	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB018	690SB01801a	02/09/1995	17.800	mg/kg	J	15.9	1.5	18.1	X	
Potassium	I690SB018	690SB01801a	02/09/1995	1080.000	mg/kg	J		493	2730		
Selenium	I690SB018	690SB01801a	02/09/1995	1.300	mg/kg	J		0.5	1.1		X
Vanadium	I690SB018	690SB01801a	02/09/1995	18.900	mg/kg	J		8.5	53.3		
Zinc	I690SB018	690SB01801a	02/09/1995	63.600	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB018	690SB01801b	03/07/1995	16.722	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB018	690SB01801b	03/07/1995	53.714	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB018	690SB01801b	03/07/1995	2.745	ng/kg	J					
1,2,3,6,7,8-Hexachlorodibenzo-p-d	I690SB018	690SB01801b	03/07/1995	1.990	ng/kg	=					
2,3,7,8-Tetrachlorodibenzofuran	I690SB018	690SB01801b	03/07/1995	3.553	ng/kg	=					
Octachlorodibenzofuran	I690SB018	690SB01801b	03/07/1995	20.654	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB018	690SB01801b	03/07/1995	409.380	ng/kg	=					
Total Hepta-Dioxins	I690SB018	690SB01801b	03/07/1995	128.148	ng/kg	=					
Total Hepta-Furans	I690SB018	690SB01801b	03/07/1995	16.722	ng/kg	=					
Total Hexa-Dioxins	I690SB018	690SB01801b	03/07/1995	1.990	ng/kg	=					
Total Hexa-Furans	I690SB018	690SB01801b	03/07/1995	20.754	ng/kg	=					
Total Penta-Furans	I690SB018	690SB01801b	03/07/1995	14.228	ng/kg	=					
Total Tetra-Furans	I690SB018	690SB01801b	03/07/1995	3.553	ng/kg	=					
Chloride	I690SB018	690SB01801c	09/06/1995	120.000	mg/kg	=					
Nitrate-Nitrite-N	I690SB018	690SB01801c	09/06/1995	2.560	mg/kg	=					
Phosphorus	I690SB018	690SB01801c	09/06/1995	5.100	mg/kg	=					
Total Organic Carbon	I690SB018	690SB01801c	09/06/1995	45268.000	mg/kg	=					
Endosulfan I	I690SB018	690SB01801a	02/09/1995	0.033	mg/kg	J					
Endrin	I690SB018	690SB01801a	02/09/1995	0.006	mg/kg	J	0.0033			X	
Heptachlor	I690SB018	690SB01801a	02/09/1995	0.002	mg/kg	J					
Methoxychlor	I690SB018	690SB01801a	02/09/1995	0.075	mg/kg	J					
1-Methyl naphthalene	I690SB018	690SB01801a	02/09/1995	0.170	mg/kg	J					
2-Methylnaphthalene	I690SB018	690SB01801a	02/09/1995	0.100	mg/kg	J	0.33				

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Anthracene	I690SB018	690SB01801a	02/09/1995	0.110	mg/kg	J	0.33				
Benzo(a)Anthracene	I690SB018	690SB01801a	02/09/1995	1.500	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB018	690SB01801a	02/09/1995	1.200	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.400	mg/kg	J			0.608		X
Benzo(g,h,i)Perylene	I690SB018	690SB01801a	02/09/1995	0.430	mg/kg	J					
Benzo(k)Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.600	mg/kg	J			0.596		X
bis(2-Ethylhexyl) Phthalate	I690SB018	690SB01801a	02/09/1995	0.240	mg/kg	J					
Chrysene	I690SB018	690SB01801a	02/09/1995	1.600	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	I690SB018	690SB01801a	02/09/1995	0.130	mg/kg	J	0.33		0.525		
Dibenzofuran	I690SB018	690SB01801a	02/09/1995	0.050	mg/kg	J					
Di-n-butyl Phthalate	I690SB018	690SB01801a	02/09/1995	0.047	mg/kg	J					
Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.600	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	I690SB018	690SB01801a	02/09/1995	0.410	mg/kg	J			0.525		
Naphthalene	I690SB018	690SB01801a	02/09/1995	0.093	mg/kg	J	0.33				
Phenanthrene	I690SB018	690SB01801a	02/09/1995	0.950	mg/kg	=	0.33			X	
Pyrene	I690SB018	690SB01801a	02/09/1995	2.200	mg/kg	=	0.33			X	
BEQ	I690SB018	690SB01801a	02/09/1995	1788.600	ug/kg	=			1.304		X
Aluminum	I690SB019	690SB01901a	02/09/1995	4090.000	mg/kg	J		3470	27400		
Arsenic	I690SB019	690SB01901a	02/09/1995	1.300	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB019	690SB01901a	02/09/1995	203.000	mg/kg	J		7.8	43.4		X
Calcium	I690SB019	690SB01901a	02/09/1995	15300.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB019	690SB01901a	02/09/1995	42.700	mg/kg	J	52.3	7.5	53.7		
Copper	I690SB019	690SB01901a	02/09/1995	90.700	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB019	690SB01901a	02/09/1995	9060.000	mg/kg	J		1730	22700		
Lead	I690SB019	690SB01901a	02/09/1995	44.700	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB019	690SB01901a	02/09/1995	939.000	mg/kg	J		424	3820		
Manganese	I690SB019	690SB01901a	02/09/1995	82.200	mg/kg	J		15.1	426		
Mercury	I690SB019	690SB01901a	02/09/1995	0.390	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB019	690SB01901a	02/09/1995	19.300	mg/kg	J	15.9	1.5	18.1	X	X
Potassium	I690SB019	690SB01901a	02/09/1995	325.000	mg/kg	J		493	2730		
Selenium	I690SB019	690SB01901a	02/09/1995	0.630	mg/kg	J		0.5	1.1		
Tin (Sn)	I690SB019	690SB01901a	02/09/1995	10.400	mg/kg	J		0.98	7.5		X
Vanadium	I690SB019	690SB01901a	02/09/1995	38.900	mg/kg	J		8.5	53.3		
Zinc	I690SB019	690SB01901a	02/09/1995	162.000	mg/kg	J	124	5.9	150	X	X
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB019	690SB01901b	03/07/1995	6.575	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB019	690SB01901b	03/07/1995	20.811	ng/kg	=					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB019	690SB01901b	03/07/1995	1.231	ng/kg	J					
Octachlorodibenzofuran	I690SB019	690SB01901b	03/07/1995	8.456	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB019	690SB01901b	03/07/1995	138.593	ng/kg	=					
Total Hepta-Dioxins	I690SB019	690SB01901b	03/07/1995	54.664	ng/kg	=					
Total Hepta-Furans	I690SB019	690SB01901b	03/07/1995	7.231	ng/kg	=					
Total Hexa-Furans	I690SB019	690SB01901b	03/07/1995	4.560	ng/kg	=					
Total Penta-Furans	I690SB019	690SB01901b	03/07/1995	2.755	ng/kg	=					
PCB-1260 (Arochlor 1260)	I690SB019	690SB01901a	02/09/1995	0.087	mg/kg	=	0.033			X	
Endosulfan I	I690SB019	690SB01901a	02/09/1995	0.002	mg/kg	J					
p,p'-DDE	I690SB019	690SB01901a	02/09/1995	0.010	mg/kg	=					
Benzo(b)Fluoranthene	I690SB019	690SB01901a	02/09/1995	0.054	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB019	690SB01901a	02/09/1995	0.058	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB019	690SB01901a	02/09/1995	0.270	mg/kg	J					
Di-n-butyl Phthalate	I690SB019	690SB01901a	02/09/1995	0.045	mg/kg	J					
Fluoranthene	I690SB019	690SB01901a	02/09/1995	0.047	mg/kg	J	0.33				
Pyrene	I690SB019	690SB01901a	02/09/1995	0.047	mg/kg	J	0.33				
BEQ	I690SB019	690SB01901a	02/09/1995	789.330	ug/kg	=			1.304		
Aluminum	I690SB020	690SB02001a	02/09/1995	6830.000	mg/kg	J		3470	27400		
Arsenic	I690SB020	690SB02001a	02/09/1995	11.800	mg/kg	J	7.24	0.46	19.7	X	
Barium	I690SB020	690SB02001a	02/09/1995	37.100	mg/kg	J		7.8	43.4		
Calcium	I690SB020	690SB02001a	02/09/1995	43300.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB020	690SB02001a	02/09/1995	26.500	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB020	690SB02001a	02/09/1995	2.600	mg/kg	J		0.64	5.8		
Copper	I690SB020	690SB02001a	02/09/1995	18.500	mg/kg	=	18.7	2.4	556		
Iron	I690SB020	690SB02001a	02/09/1995	6070.000	mg/kg	J		1730	22700		
Lead	I690SB020	690SB02001a	02/09/1995	20.800	mg/kg	J	30.2	5	203		
Magnesium	I690SB020	690SB02001a	02/09/1995	3770.000	mg/kg	J		424	3820		
Manganese	I690SB020	690SB02001a	02/09/1995	77.500	mg/kg	J		15.1	426		
Nickel	I690SB020	690SB02001a	02/09/1995	13.100	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB020	690SB02001a	02/09/1995	1020.000	mg/kg	J		493	2730		
Selenium	I690SB020	690SB02001a	02/09/1995	1.200	mg/kg	J		0.5	1.1		X
Vanadium	I690SB020	690SB02001a	02/09/1995	20.800	mg/kg	J		8.5	53.3		
Zinc	I690SB020	690SB02001a	02/09/1995	36.800	mg/kg	J	124	5.9	150		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Dibutyltin	I690SB020	690SB02001b	03/07/1995	0.007	mg/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB020	690SB02001b	03/07/1995	1.332	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB020	690SB02001b	03/07/1995	6.514	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB020	690SB02001b	03/07/1995	1.268	ng/kg	J					
Octachlorodibenzofuran	I690SB020	690SB02001b	03/07/1995	1.256	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB020	690SB02001b	03/07/1995	58.435	ng/kg	=					
Total Hepta-Dioxins	I690SB020	690SB02001b	03/07/1995	19.329	ng/kg	=					
Total Hepta-Furans	I690SB020	690SB02001b	03/07/1995	2.154	ng/kg	=					
Total Hexa-Furans	I690SB020	690SB02001b	03/07/1995	1.624	ng/kg	=					
Heptachlor Epoxide	I690SB020	690SB02001a	02/09/1995	0.002	mg/kg	J					
p,p'-DDE	I690SB020	690SB02001a	02/09/1995	0.012	mg/kg	=					
1-Methyl naphthalene	I690SB020	690SB02001a	02/09/1995	0.290	mg/kg	J					
2-Methylnaphthalene	I690SB020	690SB02001a	02/09/1995	0.190	mg/kg	J	0.33				
4-Aminobiphenyl	I690SB020	690SB02001a	02/09/1995	0.060	mg/kg	J					
Acetophenone	I690SB020	690SB02001a	02/09/1995	0.051	mg/kg	J					
Benzo(a)Anthracene	I690SB020	690SB02001a	02/09/1995	0.046	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I690SB020	690SB02001a	02/09/1995	0.047	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB020	690SB02001a	02/09/1995	0.084	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB020	690SB02001a	02/09/1995	0.089	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB020	690SB02001a	02/09/1995	0.160	mg/kg	J					
Chrysene	I690SB020	690SB02001a	02/09/1995	0.091	mg/kg	J	0.33		0.62		
Dibenzofuran	I690SB020	690SB02001a	02/09/1995	0.060	mg/kg	J					
Fluoranthene	I690SB020	690SB02001a	02/09/1995	0.055	mg/kg	J	0.33				
Naphthalene	I690SB020	690SB02001a	02/09/1995	0.160	mg/kg	J	0.33				
Phenanthrene	I690SB020	690SB02001a	02/09/1995	0.130	mg/kg	J	0.33				
Pyrene	I690SB020	690SB02001a	02/09/1995	0.075	mg/kg	J	0.33				
BEQ	I690SB020	690SB02001a	02/09/1995	387.481	ug/kg	=			1.304		
Aluminum	I690SB021	690SB02101b	02/09/1995	5810.000	mg/kg	J		3470	27400		
Arsenic	I690SB021	690SB02101b	02/09/1995	6.700	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB021	690SB02101b	02/09/1995	20.500	mg/kg	J		7.8	43.4		
Cadmium	I690SB021	690SB02101b	02/09/1995	1.000	mg/kg	=	1	0.13	0.61		X
Calcium	I690SB021	690SB02101b	02/09/1995	107000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB021	690SB02101b	02/09/1995	19.300	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB021	690SB02101b	02/09/1995	1.900	mg/kg	J		0.64	5.8		
Copper	I690SB021	690SB02101b	02/09/1995	23.000	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB021	690SB02101b	02/09/1995	6260.000	mg/kg	J		1730	22700		
Lead	I690SB021	690SB02101b	02/09/1995	173.000	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB021	690SB02101b	02/09/1995	1870.000	mg/kg	J		424	3820		
Manganese	I690SB021	690SB02101b	02/09/1995	113.000	mg/kg	J		15.1	426		
Mercury	I690SB021	690SB02101b	02/09/1995	0.230	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB021	690SB02101b	02/09/1995	10.700	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB021	690SB02101b	02/09/1995	846.000	mg/kg	J		493	2730		
Tin (Sn)	I690SB021	690SB02101b	02/09/1995	0.960	mg/kg	J		0.98	7.5		
Vanadium	I690SB021	690SB02101b	02/09/1995	14.100	mg/kg	J		8.5	53.3		
Zinc	I690SB021	690SB02101b	02/09/1995	60.100	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB021	690SB02101a	03/09/1995	6.727	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB021	690SB02101a	03/09/1995	23.085	ng/kg	=					
Octachlorodibenzofuran	I690SB021	690SB02101a	03/09/1995	18.454	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB021	690SB02101a	03/09/1995	285.492	ng/kg	J					
Total Hepta-Dioxins	I690SB021	690SB02101a	03/09/1995	66.194	ng/kg	=					
Total Hepta-Furans	I690SB021	690SB02101a	03/09/1995	11.305	ng/kg	=					
Total Hexa-Furans	I690SB021	690SB02101a	03/09/1995	7.547	ng/kg	=					
PCB-1260 (Arochlor 1260)	I690SB021	690SB02101b	02/09/1995	0.170	mg/kg	=	0.033			X	
Beta BHC (Beta Hexachlorocycloh	I690SB021	690SB02101b	02/09/1995	0.003	mg/kg	J					
p,p'-DDD	I690SB021	690SB02101b	02/09/1995	0.026	mg/kg	J					
p,p'-DDE	I690SB021	690SB02101b	02/09/1995	0.060	mg/kg	=					
Benzo(b)Fluoranthene	I690SB021	690SB02101b	02/09/1995	0.068	mg/kg	J			0.608		
Benzo(k)Fluoranthene	I690SB021	690SB02101b	02/09/1995	0.072	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	I690SB021	690SB02101b	02/09/1995	0.150	mg/kg	J					
Chrysene	I690SB021	690SB02101b	02/09/1995	0.046	mg/kg	J	0.33		0.62		
Di-n-butyl Phthalate	I690SB021	690SB02101b	02/09/1995	0.041	mg/kg	J					
BEQ	I690SB021	690SB02101b	02/09/1995	702.066	ug/kg	=			1.304		
Aluminum	I690SB022	690SB02201b	02/13/1995	3350.000	mg/kg	=		3470	27400		
Antimony	I690SB022	690SB02201b	02/13/1995	0.280	mg/kg	J	12	NA	NA		
Barium	I690SB022	690SB02201b	02/13/1995	9.000	mg/kg	J		7.8	43.4		
Calcium	I690SB022	690SB02201b	02/13/1995	6190.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB022	690SB02201b	02/13/1995	6.500	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB022	690SB02201b	02/13/1995	0.480	mg/kg	J		0.64	5.8		
Copper	I690SB022	690SB02201b	02/13/1995	2.100	mg/kg	J	18.7	2.4	556		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Iron	I690SB022	690SB02201b	02/13/1995	1900.000	mg/kg	J		1730	22700		
Lead	I690SB022	690SB02201b	02/13/1995	8.000	mg/kg	J	30.2	5	203		
Magnesium	I690SB022	690SB02201b	02/13/1995	203.000	mg/kg	J		424	3820		
Manganese	I690SB022	690SB02201b	02/13/1995	14.000	mg/kg	=		15.1	426		
Nickel	I690SB022	690SB02201b	02/13/1995	1.400	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB022	690SB02201b	02/13/1995	167.000	mg/kg	J		493	2730		
Vanadium	I690SB022	690SB02201b	02/13/1995	5.500	mg/kg	=		8.5	53.3		
Zinc	I690SB022	690SB02201b	02/13/1995	14.000	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB022	690SB02201a	03/08/1995	2.840	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB022	690SB02201a	03/08/1995	17.807	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB022	690SB02201a	03/08/1995	0.789	ng/kg	J					
Octachlorodibenzofuran	I690SB022	690SB02201a	03/08/1995	7.059	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB022	690SB02201a	03/08/1995	184.790	ng/kg	J					
Total Hepta-Dioxins	I690SB022	690SB02201a	03/08/1995	49.110	ng/kg	=					
Total Hepta-Furans	I690SB022	690SB02201a	03/08/1995	11.454	ng/kg	=					
Total Hexa-Dioxins	I690SB022	690SB02201a	03/08/1995	6.117	ng/kg	=					
Chlordane	I690SB022	690SB02201b	02/13/1995	0.008	mg/kg	=	0.0017			X	
Endrin Aldehyde	I690SB022	690SB02201b	02/13/1995	0.002	mg/kg	J	0.0033				
Benzo(k)Fluoranthene	I690SB022	690SB02201b	02/13/1995	0.039	mg/kg	J			0.596		
Di-n-butyl Phthalate	I690SB022	690SB02201b	02/13/1995	0.054	mg/kg	J					
BEQ	I690SB022	690SB02201b	02/13/1995	705.185	ug/kg	=			1.304		
Aluminum	I690SB023	690SB02301a	02/13/1995	12000.000	mg/kg	=		3470	27400		
Arsenic	I690SB023	690SB02301a	02/13/1995	7.900	mg/kg	=	7.24	0.46	19.7	X	
Barium	I690SB023	690SB02301a	02/13/1995	16.900	mg/kg	J		7.8	43.4		
Beryllium	I690SB023	690SB02301a	02/13/1995	0.470	mg/kg	J		0.34	0.95		
Cadmium	I690SB023	690SB02301a	02/13/1995	0.070	mg/kg	J	1	0.13	0.61		
Calcium	I690SB023	690SB02301a	02/13/1995	4870.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB023	690SB02301a	02/13/1995	21.800	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB023	690SB02301a	02/13/1995	2.800	mg/kg	J		0.64	5.8		
Copper	I690SB023	690SB02301a	02/13/1995	9.300	mg/kg	J	18.7	2.4	556		
Iron	I690SB023	690SB02301a	02/13/1995	10900.000	mg/kg	J		1730	22700		
Lead	I690SB023	690SB02301a	02/13/1995	32.200	mg/kg	J	30.2	5	203	X	
Magnesium	I690SB023	690SB02301a	02/13/1995	1110.000	mg/kg	J		424	3820		
Manganese	I690SB023	690SB02301a	02/13/1995	150.000	mg/kg	=		15.1	426		
Nickel	I690SB023	690SB02301a	02/13/1995	6.100	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB023	690SB02301a	02/13/1995	962.000	mg/kg	J		493	2730		
Selenium	I690SB023	690SB02301a	02/13/1995	0.780	mg/kg	J		0.5	1.1		
Sodium	I690SB023	690SB02301a	02/13/1995	221.000	mg/kg	J		181	2030		
Vanadium	I690SB023	690SB02301a	02/13/1995	25.800	mg/kg	=		8.5	53.3		
Zinc	I690SB023	690SB02301a	02/13/1995	33.800	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB023	690SB02301b	03/08/1995	0.807	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB023	690SB02301b	03/08/1995	36.346	ng/kg	J					
Total Hepta-Dioxins	I690SB023	690SB02301b	03/08/1995	1.637	ng/kg	=					
Gamma BHC (Lindane)	I690SB023	690SB02301a	02/13/1995	0.004	mg/kg	J					
Di-n-butyl Phthalate	I690SB023	690SB02301a	02/13/1995	0.081	mg/kg	J					
Toluene	I690SB023	690SB02301a	02/13/1995	0.002	mg/kg	J					
Aluminum	I690SB024	690SB02401a	02/13/1995	2980.000	mg/kg	=		3470	27400		
Barium	I690SB024	690SB02401a	02/13/1995	5.600	mg/kg	J		7.8	43.4		
Calcium	I690SB024	690SB02401a	02/13/1995	5300.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB024	690SB02401a	02/13/1995	4.100	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB024	690SB02401a	02/13/1995	0.320	mg/kg	J		0.64	5.8		
Copper	I690SB024	690SB02401a	02/13/1995	0.720	mg/kg	J	18.7	2.4	556		
Iron	I690SB024	690SB02401a	02/13/1995	775.000	mg/kg	J		1730	22700		
Lead	I690SB024	690SB02401a	02/13/1995	2.800	mg/kg	J	30.2	5	203		
Magnesium	I690SB024	690SB02401a	02/13/1995	144.000	mg/kg	J		424	3820		
Manganese	I690SB024	690SB02401a	02/13/1995	8.700	mg/kg	=		15.1	426		
Nickel	I690SB024	690SB02401a	02/13/1995	0.560	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB024	690SB02401a	02/13/1995	169.000	mg/kg	J		493	2730		
Selenium	I690SB024	690SB02401a	02/13/1995	0.650	mg/kg	J		0.5	1.1		
Vanadium	I690SB024	690SB02401a	02/13/1995	3.400	mg/kg	J		8.5	53.3		
Zinc	I690SB024	690SB02401a	02/13/1995	2.600	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB024	690SB02401b	03/08/1995	0.866	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB024	690SB02401b	03/08/1995	3.013	ng/kg	=					
Octachlorodibenzofuran	I690SB024	690SB02401b	03/08/1995	2.081	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB024	690SB02401b	03/08/1995	195.970	ng/kg	J					
Total Hepta-Dioxins	I690SB024	690SB02401b	03/08/1995	6.778	ng/kg	=					
Total Hepta-Furans	I690SB024	690SB02401b	03/08/1995	2.337	ng/kg	=					
Di-n-butyl Phthalate	I690SB024	690SB02401a	02/13/1995	0.079	mg/kg	J					
Toluene	I690SB024	690SB02401a	02/13/1995	0.002	mg/kg	J					

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Aluminum	I690SB025	690SB02501a	02/13/1995	5700.000	mg/kg	J		3470	27400		
Arsenic	I690SB025	690SB02501a	02/13/1995	2.600	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB025	690SB02501a	02/13/1995	17.800	mg/kg	J		7.8	43.4		
Calcium	I690SB025	690SB02501a	02/13/1995	94000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB025	690SB02501a	02/13/1995	10.300	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB025	690SB02501a	02/13/1995	1.600	mg/kg	J		0.64	5.8		
Copper	I690SB025	690SB02501a	02/13/1995	16.700	mg/kg	=	18.7	2.4	556		
Iron	I690SB025	690SB02501a	02/13/1995	3880.000	mg/kg	J		1730	22700		
Lead	I690SB025	690SB02501a	02/13/1995	9.800	mg/kg	J	30.2	5	203		
Magnesium	I690SB025	690SB02501a	02/13/1995	1950.000	mg/kg	J		424	3820		
Manganese	I690SB025	690SB02501a	02/13/1995	83.200	mg/kg	J		15.1	426		
Nickel	I690SB025	690SB02501a	02/13/1995	5.400	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB025	690SB02501a	02/13/1995	818.000	mg/kg	J		493	2730		
Tin (Sn)	I690SB025	690SB02501a	02/13/1995	1.400	mg/kg	J		0.98	7.5		
Vanadium	I690SB025	690SB02501a	02/13/1995	9.200	mg/kg	J		8.5	53.3		
Zinc	I690SB025	690SB02501a	02/13/1995	23.300	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB025	690SB02501b	03/09/1995	0.997	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB025	690SB02501b	03/09/1995	4.624	ng/kg	=					
Octachlorodibenzofuran	I690SB025	690SB02501b	03/09/1995	2.037	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB025	690SB02501b	03/09/1995	47.644	ng/kg	J					
Total Hepta-Dioxins	I690SB025	690SB02501b	03/09/1995	4.624	ng/kg	=					
Total Hepta-Furans	I690SB025	690SB02501b	03/09/1995	1.551	ng/kg	=					
Total Hexa-Dioxins	I690SB025	690SB02501b	03/09/1995	4.615	ng/kg	=					
Endrin Aldehyde	I690SB025	690SB02501a	02/13/1995	0.001	mg/kg	J	0.0033				
Aluminum	I690SB026	690SB02601a	02/13/1995	12000.000	mg/kg	=		3470	27400		
Arsenic	I690SB026	690SB02601a	02/13/1995	5.500	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB026	690SB02601a	02/13/1995	19.300	mg/kg	J		7.8	43.4		
Beryllium	I690SB026	690SB02601a	02/13/1995	1.000	mg/kg	J		0.34	0.95		X
Cadmium	I690SB026	690SB02601a	02/13/1995	0.450	mg/kg	J	1	0.13	0.61		
Calcium	I690SB026	690SB02601a	02/13/1995	51700.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB026	690SB02601a	02/13/1995	57.600	mg/kg	=	52.3	7.5	53.7	X	X
Cobalt	I690SB026	690SB02601a	02/13/1995	3.400	mg/kg	J		0.64	5.8		
Copper	I690SB026	690SB02601a	02/13/1995	17.300	mg/kg	J	18.7	2.4	556		
Iron	I690SB026	690SB02601a	02/13/1995	9070.000	mg/kg	J		1730	22700		
Lead	I690SB026	690SB02601a	02/13/1995	7.000	mg/kg	J	30.2	5	203		
Magnesium	I690SB026	690SB02601a	02/13/1995	5270.000	mg/kg	J		424	3820		X
Manganese	I690SB026	690SB02601a	02/13/1995	54.200	mg/kg	=		15.1	426		
Nickel	I690SB026	690SB02601a	02/13/1995	14.900	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB026	690SB02601a	02/13/1995	2080.000	mg/kg	J		493	2730		
Selenium	I690SB026	690SB02601a	02/13/1995	1.000	mg/kg	J		0.5	1.1		
Sodium	I690SB026	690SB02601a	02/13/1995	804.000	mg/kg	J		181	2030		
Vanadium	I690SB026	690SB02601a	02/13/1995	34.200	mg/kg	=		8.5	53.3		
Zinc	I690SB026	690SB02601a	02/13/1995	51.800	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB026	690SB02601b	03/09/1995	0.889	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB026	690SB02601b	03/09/1995	2.790	ng/kg	J					
Octachlorodibenzofuran	I690SB026	690SB02601b	03/09/1995	0.803	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB026	690SB02601b	03/09/1995	25.154	ng/kg	J					
Total Hepta-Dioxins	I690SB026	690SB02601b	03/09/1995	6.984	ng/kg	=					
p,p'-DDE	I690SB026	690SB02601a	02/13/1995	0.023	mg/kg	=					
Di-n-butyl Phthalate	I690SB026	690SB02601a	02/13/1995	0.120	mg/kg	J					
Aluminum	I690SB027	690SB02701a	02/13/1995	22000.000	mg/kg	=		3470	27400		
Arsenic	I690SB027	690SB02701a	02/13/1995	8.200	mg/kg	=	7.24	0.46	19.7	X	
Barium	I690SB027	690SB02701a	02/13/1995	28.600	mg/kg	=		7.8	43.4		
Beryllium	I690SB027	690SB02701a	02/13/1995	0.680	mg/kg	J		0.34	0.95		
Cadmium	I690SB027	690SB02701a	02/13/1995	0.580	mg/kg	J	1	0.13	0.61		
Calcium	I690SB027	690SB02701a	02/13/1995	44000.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB027	690SB02701a	02/13/1995	38.100	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB027	690SB02701a	02/13/1995	4.000	mg/kg	J		0.64	5.8		
Copper	I690SB027	690SB02701a	02/13/1995	25.200	mg/kg	J	18.7	2.4	556	X	
Iron	I690SB027	690SB02701a	02/13/1995	13700.000	mg/kg	J		1730	22700		
Lead	I690SB027	690SB02701a	02/13/1995	19.000	mg/kg	J	30.2	5	203		
Magnesium	I690SB027	690SB02701a	02/13/1995	3670.000	mg/kg	J		424	3820		
Manganese	I690SB027	690SB02701a	02/13/1995	196.000	mg/kg	=		15.1	426		
Mercury	I690SB027	690SB02701a	02/13/1995	0.150	mg/kg	=	0.13	0.13	0.47	X	
Nickel	I690SB027	690SB02701a	02/13/1995	14.600	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB027	690SB02701a	02/13/1995	2340.000	mg/kg	J		493	2730		
Selenium	I690SB027	690SB02701a	02/13/1995	0.800	mg/kg	J		0.5	1.1		
Sodium	I690SB027	690SB02701a	02/13/1995	709.000	mg/kg	J		181	2030		
Vanadium	I690SB027	690SB02701a	02/13/1995	37.300	mg/kg	=		8.5	53.3		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Zinc	I690SB027	690SB02701a	02/13/1995	50.200	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB027	690SB02701b	03/08/1995	0.677	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB027	690SB02701b	03/08/1995	8.658	ng/kg	=					
1,2,3,4,7,8-Hexachlorodibenzofura	I690SB027	690SB02701b	03/08/1995	0.451	ng/kg	J					
Octachlorodibenzofuran	I690SB027	690SB02701b	03/08/1995	1.752	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB027	690SB02701b	03/08/1995	112.570	ng/kg	=					
Total Hepta-Dioxins	I690SB027	690SB02701b	03/08/1995	29.326	ng/kg	=					
Total Hepta-Furans	I690SB027	690SB02701b	03/08/1995	1.879	ng/kg	=					
Total Hexa-Dioxins	I690SB027	690SB02701b	03/08/1995	8.218	ng/kg	=					
Di-n-butyl Phthalate	I690SB027	690SB02701a	02/13/1995	0.065	mg/kg	J					
Aluminum	I690SB028	690SB02801a	02/13/1995	12800.000	mg/kg	J		3470	27400		
Arsenic	I690SB028	690SB02801a	02/13/1995	7.000	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB028	690SB02801a	02/13/1995	17.100	mg/kg	J		7.8	43.4		
Cadmium	I690SB028	690SB02801a	02/13/1995	0.570	mg/kg	J	1	0.13	0.61		
Calcium	I690SB028	690SB02801a	02/13/1995	41500.000	mg/kg	J		1670	59500		
Chromium, Total	I690SB028	690SB02801a	02/13/1995	27.600	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB028	690SB02801a	02/13/1995	2.300	mg/kg	J		0.64	5.8		
Copper	I690SB028	690SB02801a	02/13/1995	14.000	mg/kg	=	18.7	2.4	556		
Iron	I690SB028	690SB02801a	02/13/1995	8500.000	mg/kg	J		1730	22700		
Lead	I690SB028	690SB02801a	02/13/1995	10.300	mg/kg	J	30.2	5	203		
Magnesium	I690SB028	690SB02801a	02/13/1995	3200.000	mg/kg	J		424	3820		
Manganese	I690SB028	690SB02801a	02/13/1995	125.000	mg/kg	J		15.1	426		
Nickel	I690SB028	690SB02801a	02/13/1995	10.500	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB028	690SB02801a	02/13/1995	1510.000	mg/kg	J		493	2730		
Selenium	I690SB028	690SB02801a	02/13/1995	1.100	mg/kg	J		0.5	1.1		
Vanadium	I690SB028	690SB02801a	02/13/1995	23.700	mg/kg	J		8.5	53.3		
Zinc	I690SB028	690SB02801a	02/13/1995	34.400	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB028	690SB02801b	03/08/1995	0.455	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB028	690SB02801b	03/08/1995	8.168	ng/kg	=					
Octachlorodibenzofuran	I690SB028	690SB02801b	03/08/1995	0.473	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB028	690SB02801b	03/08/1995	116.960	ng/kg	J					
Total Hepta-Dioxins	I690SB028	690SB02801b	03/08/1995	32.108	ng/kg	=					
Total Hepta-Furans	I690SB028	690SB02801b	03/08/1995	0.702	ng/kg	=					
Total Hexa-Dioxins	I690SB028	690SB02801b	03/08/1995	17.064	ng/kg	=					
Total Tetra-Dioxins	I690SB028	690SB02801b	03/08/1995	1.944	ng/kg	=					
Total Tetra-Furans	I690SB028	690SB02801b	03/08/1995	3.641	ng/kg	=					
Di-n-butyl Phthalate	I690SB028	690SB02801a	02/13/1995	0.050	mg/kg	J					
Toluene	I690SB028	690SB02801a	02/13/1995	0.002	mg/kg	J					
Aluminum	I690SB029	690SB02901a	02/13/1995	6440.000	mg/kg	J		3470	27400		
Arsenic	I690SB029	690SB02901a	02/13/1995	28.700	mg/kg	J	7.24	0.46	19.7	X	X
Barium	I690SB029	690SB02901a	02/13/1995	27.500	mg/kg	J		7.8	43.4		
Calcium	I690SB029	690SB02901a	02/13/1995	140000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB029	690SB02901a	02/13/1995	19.300	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB029	690SB02901a	02/13/1995	3.900	mg/kg	J		0.64	5.8		
Copper	I690SB029	690SB02901a	02/13/1995	22.300	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB029	690SB02901a	02/13/1995	6270.000	mg/kg	J		1730	22700		
Lead	I690SB029	690SB02901a	02/13/1995	24.500	mg/kg	J	30.2	5	203		
Magnesium	I690SB029	690SB02901a	02/13/1995	5500.000	mg/kg	J		424	3820		X
Manganese	I690SB029	690SB02901a	02/13/1995	172.000	mg/kg	J		15.1	426		
Nickel	I690SB029	690SB02901a	02/13/1995	13.700	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB029	690SB02901a	02/13/1995	1540.000	mg/kg	J		493	2730		
Selenium	I690SB029	690SB02901a	02/13/1995	0.890	mg/kg	J		0.5	1.1		
Vanadium	I690SB029	690SB02901a	02/13/1995	17.800	mg/kg	J		8.5	53.3		
Zinc	I690SB029	690SB02901a	02/13/1995	47.400	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB029	690SB02901b	03/09/1995	1.429	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB029	690SB02901b	03/09/1995	6.952	ng/kg	J					
1,2,3,6,7,8-Hexachlorodibenzofura	I690SB029	690SB02901b	03/09/1995	0.678	ng/kg	J					
Octachlorodibenzofuran	I690SB029	690SB02901b	03/09/1995	3.263	ng/kg	J					
Octachlorodibenzo-p-dioxin	I690SB029	690SB02901b	03/09/1995	127.308	ng/kg	J					
Total Hepta-Dioxins	I690SB029	690SB02901b	03/09/1995	74.625	ng/kg	=					
Total Hepta-Furans	I690SB029	690SB02901b	03/09/1995	1.921	ng/kg	=					
Total Hexa-Dioxins	I690SB029	690SB02901b	03/09/1995	4.386	ng/kg	=					
Endosulfan I	I690SB029	690SB02901a	02/13/1995	0.005	mg/kg	J					
Methoxychlor	I690SB029	690SB02901a	02/13/1995	0.007	mg/kg	J					
p,p'-DDE	I690SB029	690SB02901a	02/13/1995	0.023	mg/kg	=					
1-Methyl naphthalene	I690SB029	690SB02901a	02/13/1995	0.077	mg/kg	J					
2-Methylnaphthalene	I690SB029	690SB02901a	02/13/1995	0.039	mg/kg	J	0.33				
Benzo(a)Pyrene	I690SB029	690SB02901a	02/13/1995	0.079	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB029	690SB02901a	02/13/1995	0.220	mg/kg	J			0.608		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Benzo(k)Fluoranthene	I690SB029	690SB02901a	02/13/1995	0.240	mg/kg	J			0.596		
Chrysene	I690SB029	690SB02901a	02/13/1995	0.170	mg/kg	J	0.33		0.62		
Fluoranthene	I690SB029	690SB02901a	02/13/1995	0.086	mg/kg	J	0.33				
Phenanthrene	I690SB029	690SB02901a	02/13/1995	0.054	mg/kg	J	0.33				
Pyrene	I690SB029	690SB02901a	02/13/1995	0.190	mg/kg	J	0.33				
BEQ	I690SB029	690SB02901a	02/13/1995	412.570	ug/kg	=			1.304		
Aluminum	I690SB030	690SB03001a	02/13/1995	8340.000	mg/kg	J		3470	27400		
Arsenic	I690SB030	690SB03001a	02/13/1995	5.300	mg/kg	J	7.24	0.46	19.7		
Barium	I690SB030	690SB03001a	02/13/1995	17.000	mg/kg	J		7.8	43.4		
Cadmium	I690SB030	690SB03001a	02/13/1995	0.600	mg/kg	J	1	0.13	0.61		
Calcium	I690SB030	690SB03001a	02/13/1995	177000.000	mg/kg	J		1670	59500		X
Chromium, Total	I690SB030	690SB03001a	02/13/1995	21.200	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB030	690SB03001a	02/13/1995	2.500	mg/kg	J		0.64	5.8		
Copper	I690SB030	690SB03001a	02/13/1995	12.600	mg/kg	=	18.7	2.4	556		
Iron	I690SB030	690SB03001a	02/13/1995	6330.000	mg/kg	J		1730	22700		
Lead	I690SB030	690SB03001a	02/13/1995	12.800	mg/kg	J	30.2	5	203		
Magnesium	I690SB030	690SB03001a	02/13/1995	4000.000	mg/kg	J		424	3820		X
Manganese	I690SB030	690SB03001a	02/13/1995	142.000	mg/kg	J		15.1	426		
Nickel	I690SB030	690SB03001a	02/13/1995	10.900	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB030	690SB03001a	02/13/1995	1780.000	mg/kg	J		493	2730		
Selenium	I690SB030	690SB03001a	02/13/1995	0.700	mg/kg	J		0.5	1.1		
Vanadium	I690SB030	690SB03001a	02/13/1995	17.600	mg/kg	J		8.5	53.3		
Zinc	I690SB030	690SB03001a	02/13/1995	38.200	mg/kg	J	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	I690SB030	690SB03001b	03/09/1995	0.653	ng/kg	J					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	I690SB030	690SB03001b	03/09/1995	5.973	ng/kg	=					
Octachlorodibenzo-p-dioxin	I690SB030	690SB03001b	03/09/1995	72.789	ng/kg	J					
Total Hepta-Dioxins	I690SB030	690SB03001b	03/09/1995	5.973	ng/kg	=					
Total Hexa-Dioxins	I690SB030	690SB03001b	03/09/1995	11.400	ng/kg	=					
Total Tetra-Dioxins	I690SB030	690SB03001b	03/09/1995	2.696	ng/kg	=					
Delta BHC (Delta Hexachlorocyclol	I690SB030	690SB03001a	02/13/1995	0.002	mg/kg	J					
Acetone	I690SB030	690SB03001a	02/13/1995	0.096	mg/kg	J					
Toluene	I690SB030	690SB03001a	02/13/1995	0.004	mg/kg	J					
1-Methyl naphthalene	I690SB031	690SB03101	06/20/1995	0.760	mg/kg	J					
2-Methylnaphthalene	I690SB031	690SB03101	06/20/1995	0.690	mg/kg	J	0.33			X	
Anthracene	I690SB031	690SB03101	06/20/1995	0.052	mg/kg	J	0.33				
Benzo(a)Anthracene	I690SB031	690SB03101	06/20/1995	0.690	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB031	690SB03101	06/20/1995	0.530	mg/kg	J	0.33		0.598	X	
Benzo(b)Fluoranthene	I690SB031	690SB03101	06/20/1995	1.300	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	I690SB031	690SB03101	06/20/1995	1.400	mg/kg	J			0.596		X
bis(2-Ethylhexyl) Phthalate	I690SB031	690SB03101	06/20/1995	0.078	mg/kg	J					
Chrysene	I690SB031	690SB03101	06/20/1995	0.760	mg/kg	=	0.33		0.62	X	X
Dibenzofuran	I690SB031	690SB03101	06/20/1995	0.170	mg/kg	J					
Fluoranthene	I690SB031	690SB03101	06/20/1995	1.700	mg/kg	=	0.33			X	
Naphthalene	I690SB031	690SB03101	06/20/1995	0.540	mg/kg	J	0.33			X	
Phenanthrene	I690SB031	690SB03101	06/20/1995	0.920	mg/kg	=	0.33			X	
Pyrene	I690SB031	690SB03101	06/20/1995	1.000	mg/kg	=	0.33			X	
BEQ	I690SB031	690SB03101	06/20/1995	987.260	ug/kg	=			1.304		
1-Methyl naphthalene	I690SB032	690SB03201	06/20/1995	0.110	mg/kg	J					
2-Methylnaphthalene	I690SB032	690SB03201	06/20/1995	0.080	mg/kg	J	0.33				
Benzo(a)Anthracene	I690SB032	690SB03201	06/20/1995	0.360	mg/kg	J	0.33		0.616	X	
Benzo(a)Pyrene	I690SB032	690SB03201	06/20/1995	0.260	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB032	690SB03201	06/20/1995	0.620	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	I690SB032	690SB03201	06/20/1995	0.660	mg/kg	J			0.596		X
bis(2-Ethylhexyl) Phthalate	I690SB032	690SB03201	06/20/1995	1.300	mg/kg	J					
Chrysene	I690SB032	690SB03201	06/20/1995	0.390	mg/kg	J	0.33		0.62	X	
Fluoranthene	I690SB032	690SB03201	06/20/1995	0.550	mg/kg	J	0.33			X	
Naphthalene	I690SB032	690SB03201	06/20/1995	0.072	mg/kg	J	0.33				
Phenanthrene	I690SB032	690SB03201	06/20/1995	0.160	mg/kg	J	0.33				
Pyrene	I690SB032	690SB03201	06/20/1995	0.580	mg/kg	J	0.33			X	
BEQ	I690SB032	690SB03201	06/20/1995	608.490	ug/kg	=			1.304		
Aluminum	I690SB034	690SB03401	04/06/1998	7880.000	mg/kg	=		3470	27400		
Antimony	I690SB034	690SB03401	04/06/1998	24.500	mg/kg	=	12	NA	NA	X	
Arsenic	I690SB034	690SB03401	04/06/1998	10.000	mg/kg	=	7.24	0.46	19.7	X	
Barium	I690SB034	690SB03401	04/06/1998	34.800	mg/kg	=		7.8	43.4		
Beryllium	I690SB034	690SB03401	04/06/1998	0.630	mg/kg	=		0.34	0.95		
Cadmium	I690SB034	690SB03401	04/06/1998	0.700	mg/kg	=	1	0.13	0.61		X
Calcium	I690SB034	690SB03401	04/06/1998	92600.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB034	690SB03401	04/06/1998	58.700	mg/kg	=	52.3	7.5	53.7	X	X
Cobalt	I690SB034	690SB03401	04/06/1998	3.800	mg/kg	=		0.64	5.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Copper	I690SB034	690SB03401	04/06/1998	123.000	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB034	690SB03401	04/06/1998	13200.000	mg/kg	=		1730	22700		
Lead	I690SB034	690SB03401	04/06/1998	132.000	mg/kg	=	30.2	5	203	X	
Magnesium	I690SB034	690SB03401	04/06/1998	2830.000	mg/kg	=		424	3820		
Manganese	I690SB034	690SB03401	04/06/1998	112.000	mg/kg	=		15.1	426		
Mercury	I690SB034	690SB03401	04/06/1998	0.110	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB034	690SB03401	04/06/1998	41.100	mg/kg	=	15.9	1.5	18.1	X	X
Potassium	I690SB034	690SB03401	04/06/1998	972.000	mg/kg	=		493	2730		
Selenium	I690SB034	690SB03401	04/06/1998	0.730	mg/kg	J		0.5	1.1		
Sodium	I690SB034	690SB03401	04/06/1998	368.000	mg/kg	=		181	2030		
Tin (Sn)	I690SB034	690SB03401	04/06/1998	14.600	mg/kg	=		0.98	7.5		X
Vanadium	I690SB034	690SB03401	04/06/1998	25.000	mg/kg	=		8.5	53.3		
Zinc	I690SB034	690SB03401	04/06/1998	152.000	mg/kg	J	124	5.9	150	X	X
2-Methylnaphthalene	I690SB034	690SB03401	04/06/1998	0.050	mg/kg	J	0.33				
Benzyl Butyl Phthalate	I690SB034	690SB03401	04/06/1998	0.097	mg/kg	J					
Fluoranthene	I690SB034	690SB03401	04/06/1998	0.022	mg/kg	J	0.33				
Phenanthrene	I690SB034	690SB03401	04/06/1998	0.034	mg/kg	J	0.33				
Pyrene	I690SB034	690SB03401	04/06/1998	0.019	mg/kg	J	0.33				
Ethylbenzene	I690SB034	690SB03401	04/06/1998	0.002	mg/kg	J					
Xylenes, Total	I690SB034	690SB03401	04/06/1998	0.003	mg/kg	J					
Aluminum	I690SB035	690SB03501	04/06/1998	5690.000	mg/kg	=		3470	27400		
Arsenic	I690SB035	690SB03501	04/06/1998	7.500	mg/kg	=	7.24	0.46	19.7	X	
Barium	I690SB035	690SB03501	04/06/1998	13.100	mg/kg	=		7.8	43.4		
Beryllium	I690SB035	690SB03501	04/06/1998	0.390	mg/kg	J		0.34	0.95		
Cadmium	I690SB035	690SB03501	04/06/1998	0.940	mg/kg	=	1	0.13	0.61		X
Calcium	I690SB035	690SB03501	04/06/1998	269000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB035	690SB03501	04/06/1998	45.400	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB035	690SB03501	04/06/1998	2.100	mg/kg	=		0.64	5.8		
Copper	I690SB035	690SB03501	04/06/1998	37.400	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB035	690SB03501	04/06/1998	7230.000	mg/kg	=		1730	22700		
Lead	I690SB035	690SB03501	04/06/1998	14.800	mg/kg	=	30.2	5	203		
Magnesium	I690SB035	690SB03501	04/06/1998	5680.000	mg/kg	=		424	3820		X
Manganese	I690SB035	690SB03501	04/06/1998	106.000	mg/kg	=		15.1	426		
Mercury	I690SB035	690SB03501	04/06/1998	0.090	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB035	690SB03501	04/06/1998	41.700	mg/kg	=	15.9	1.5	18.1	X	X
Potassium	I690SB035	690SB03501	04/06/1998	1240.000	mg/kg	=		493	2730		
Selenium	I690SB035	690SB03501	04/06/1998	1.200	mg/kg	J		0.5	1.1		X
Sodium	I690SB035	690SB03501	04/06/1998	798.000	mg/kg	=		181	2030		
Tin (Sn)	I690SB035	690SB03501	04/06/1998	2.000	mg/kg	J		0.98	7.5		
Vanadium	I690SB035	690SB03501	04/06/1998	24.700	mg/kg	=		8.5	53.3		
Zinc	I690SB035	690SB03501	04/06/1998	319.000	mg/kg	J	124	5.9	150	X	X
Aluminum	I690SB036	690SB03601	04/02/1998	18100.000	mg/kg	J		3470	27400		
Arsenic	I690SB036	690SB03601	04/02/1998	10.900	mg/kg	=	7.24	0.46	19.7	X	
Barium	I690SB036	690SB03601	04/02/1998	29.700	mg/kg	=		7.8	43.4		
Beryllium	I690SB036	690SB03601	04/02/1998	0.840	mg/kg	J		0.34	0.95		
Calcium	I690SB036	690SB03601	04/02/1998	22000.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB036	690SB03601	04/02/1998	43.700	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB036	690SB03601	04/02/1998	4.600	mg/kg	=		0.64	5.8		
Copper	I690SB036	690SB03601	04/02/1998	20.800	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB036	690SB03601	04/02/1998	20600.000	mg/kg	J		1730	22700		
Lead	I690SB036	690SB03601	04/02/1998	21.500	mg/kg	J	30.2	5	203		
Magnesium	I690SB036	690SB03601	04/02/1998	3110.000	mg/kg	J		424	3820		
Manganese	I690SB036	690SB03601	04/02/1998	461.000	mg/kg	J		15.1	426		X
Mercury	I690SB036	690SB03601	04/02/1998	0.120	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB036	690SB03601	04/02/1998	13.100	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB036	690SB03601	04/02/1998	1310.000	mg/kg	=		493	2730		
Selenium	I690SB036	690SB03601	04/02/1998	0.830	mg/kg	J		0.5	1.1		
Sodium	I690SB036	690SB03601	04/02/1998	243.000	mg/kg	J		181	2030		
Vanadium	I690SB036	690SB03601	04/02/1998	45.300	mg/kg	=		8.5	53.3		
Zinc	I690SB036	690SB03601	04/02/1998	63.600	mg/kg	J	124	5.9	150		
Aluminum	I690SB037	690SB03701	04/02/1998	1920.000	mg/kg	J		3470	27400		
Arsenic	I690SB037	690SB03701	04/02/1998	3.400	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB037	690SB03701	04/02/1998	10.000	mg/kg	=		7.8	43.4		
Cadmium	I690SB037	690SB03701	04/02/1998	0.600	mg/kg	=	1	0.13	0.61		
Calcium	I690SB037	690SB03701	04/02/1998	306000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB037	690SB03701	04/02/1998	10.000	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB037	690SB03701	04/02/1998	3.100	mg/kg	=		0.64	5.8		
Copper	I690SB037	690SB03701	04/02/1998	8.500	mg/kg	=	18.7	2.4	556		
Iron	I690SB037	690SB03701	04/02/1998	4080.000	mg/kg	J		1730	22700		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Lead	I690SB037	690SB03701	04/02/1998	13.100	mg/kg	J	30.2	5	203		
Magnesium	I690SB037	690SB03701	04/02/1998	3400.000	mg/kg	J		424	3820		
Manganese	I690SB037	690SB03701	04/02/1998	263.000	mg/kg	J		15.1	426		
Mercury	I690SB037	690SB03701	04/02/1998	0.020	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB037	690SB03701	04/02/1998	10.100	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB037	690SB03701	04/02/1998	507.000	mg/kg	=		493	2730		
Sodium	I690SB037	690SB03701	04/02/1998	138.000	mg/kg	J		181	2030		
Vanadium	I690SB037	690SB03701	04/02/1998	8.900	mg/kg	=		8.5	53.3		
Zinc	I690SB037	690SB03701	04/02/1998	34.400	mg/kg	J	124	5.9	150		
Methylene Chloride	I690SB037	690SB03701	04/02/1998	0.002	mg/kg	J					
Aluminum	I690SB038	690SB03801	04/02/1998	7880.000	mg/kg	J		3470	27400		
Arsenic	I690SB038	690SB03801	04/02/1998	1.500	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB038	690SB03801	04/02/1998	13.100	mg/kg	=		7.8	43.4		
Calcium	I690SB038	690SB03801	04/02/1998	18900.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB038	690SB03801	04/02/1998	14.300	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB038	690SB03801	04/02/1998	1.500	mg/kg	=		0.64	5.8		
Copper	I690SB038	690SB03801	04/02/1998	12.700	mg/kg	=	18.7	2.4	556		
Iron	I690SB038	690SB03801	04/02/1998	3510.000	mg/kg	J		1730	22700		
Lead	I690SB038	690SB03801	04/02/1998	12.500	mg/kg	J	30.2	5	203		
Magnesium	I690SB038	690SB03801	04/02/1998	961.000	mg/kg	J		424	3820		
Manganese	I690SB038	690SB03801	04/02/1998	42.900	mg/kg	J		15.1	426		
Mercury	I690SB038	690SB03801	04/02/1998	0.030	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB038	690SB03801	04/02/1998	4.900	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB038	690SB03801	04/02/1998	429.000	mg/kg	=		493	2730		
Sodium	I690SB038	690SB03801	04/02/1998	50.700	mg/kg	J		181	2030		
Vanadium	I690SB038	690SB03801	04/02/1998	11.500	mg/kg	=		8.5	53.3		
Zinc	I690SB038	690SB03801	04/02/1998	34.000	mg/kg	J	124	5.9	150		
Methylene Chloride	I690SB038	690SB03801	04/02/1998	0.002	mg/kg	J					
Aluminum	I690SB039	690SB03901	04/02/1998	6630.000	mg/kg	J		3470	27400		
Antimony	I690SB039	690SB03901	04/02/1998	0.570	mg/kg	J	12	NA	NA		
Arsenic	I690SB039	690SB03901	04/02/1998	1.500	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB039	690SB03901	04/02/1998	11.200	mg/kg	=		7.8	43.4		
Calcium	I690SB039	690SB03901	04/02/1998	13400.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB039	690SB03901	04/02/1998	13.900	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB039	690SB03901	04/02/1998	1.200	mg/kg	=		0.64	5.8		
Copper	I690SB039	690SB03901	04/02/1998	15.200	mg/kg	=	18.7	2.4	556		
Iron	I690SB039	690SB03901	04/02/1998	2570.000	mg/kg	J		1730	22700		
Lead	I690SB039	690SB03901	04/02/1998	10.700	mg/kg	J	30.2	5	203		
Magnesium	I690SB039	690SB03901	04/02/1998	786.000	mg/kg	J		424	3820		
Manganese	I690SB039	690SB03901	04/02/1998	26.000	mg/kg	J		15.1	426		
Mercury	I690SB039	690SB03901	04/02/1998	0.030	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB039	690SB03901	04/02/1998	4.100	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB039	690SB03901	04/02/1998	322.000	mg/kg	=		493	2730		
Sodium	I690SB039	690SB03901	04/02/1998	30.200	mg/kg	J		181	2030		
Vanadium	I690SB039	690SB03901	04/02/1998	8.300	mg/kg	=		8.5	53.3		
Zinc	I690SB039	690SB03901	04/02/1998	34.100	mg/kg	J	124	5.9	150		
Benzyl alcohol	I690SB039	690SB03901	04/02/1998	0.370	mg/kg	=					
Aluminum	I690SB040	690SB04001	04/02/1998	9320.000	mg/kg	J		3470	27400		
Arsenic	I690SB040	690SB04001	04/02/1998	3.700	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB040	690SB04001	04/02/1998	20.500	mg/kg	=		7.8	43.4		
Calcium	I690SB040	690SB04001	04/02/1998	30000.000	mg/kg	=		1670	59500		
Chromium, Total	I690SB040	690SB04001	04/02/1998	28.300	mg/kg	J	52.3	7.5	53.7		
Cobalt	I690SB040	690SB04001	04/02/1998	2.900	mg/kg	=		0.64	5.8		
Copper	I690SB040	690SB04001	04/02/1998	28.100	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB040	690SB04001	04/02/1998	7730.000	mg/kg	J		1730	22700		
Lead	I690SB040	690SB04001	04/02/1998	21.600	mg/kg	J	30.2	5	203		
Magnesium	I690SB040	690SB04001	04/02/1998	1670.000	mg/kg	J		424	3820		
Manganese	I690SB040	690SB04001	04/02/1998	152.000	mg/kg	J		15.1	426		
Mercury	I690SB040	690SB04001	04/02/1998	0.060	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB040	690SB04001	04/02/1998	7.900	mg/kg	=	15.9	1.5	18.1		
Potassium	I690SB040	690SB04001	04/02/1998	668.000	mg/kg	=		493	2730		
Sodium	I690SB040	690SB04001	04/02/1998	79.200	mg/kg	J		181	2030		
Tin (Sn)	I690SB040	690SB04001	04/02/1998	4.300	mg/kg	J		0.98	7.5		
Vanadium	I690SB040	690SB04001	04/02/1998	18.900	mg/kg	=		8.5	53.3		
Zinc	I690SB040	690SB04001	04/02/1998	68.900	mg/kg	J	124	5.9	150		
Aluminum	I690SB041	690SB04101	04/06/1998	5170.000	mg/kg	=		3470	27400		
Arsenic	I690SB041	690SB04101	04/06/1998	2.300	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB041	690SB04101	04/06/1998	16.400	mg/kg	=		7.8	43.4		
Calcium	I690SB041	690SB04101	04/06/1998	7870.000	mg/kg	=		1670	59500		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Chromium, Total	I690SB041	690SB04101	04/06/1998	10.400	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB041	690SB04101	04/06/1998	1.900	mg/kg	=		0.64	5.8		
Copper	I690SB041	690SB04101	04/06/1998	15.800	mg/kg	=	18.7	2.4	556		
Iron	I690SB041	690SB04101	04/06/1998	5770.000	mg/kg	=		1730	22700		
Lead	I690SB041	690SB04101	04/06/1998	11.100	mg/kg	=	30.2	5	203		
Magnesium	I690SB041	690SB04101	04/06/1998	895.000	mg/kg	=		424	3820		
Manganese	I690SB041	690SB04101	04/06/1998	36.800	mg/kg	=		15.1	426		
Mercury	I690SB041	690SB04101	04/06/1998	0.020	mg/kg	=	0.13	0.13	0.47		
Nickel	I690SB041	690SB04101	04/06/1998	4.200	mg/kg	J	15.9	1.5	18.1		
Potassium	I690SB041	690SB04101	04/06/1998	295.000	mg/kg	=		493	2730		
Sodium	I690SB041	690SB04101	04/06/1998	159.000	mg/kg	=		181	2030		
Tin (Sn)	I690SB041	690SB04101	04/06/1998	2.800	mg/kg	J		0.98	7.5		
Vanadium	I690SB041	690SB04101	04/06/1998	8.400	mg/kg	=		8.5	53.3		
Zinc	I690SB041	690SB04101	04/06/1998	22.300	mg/kg	J	124	5.9	150		
Fluoranthene	I690SB041	690SB04101	04/06/1998	0.020	mg/kg	J	0.33				
Pyrene	I690SB041	690SB04101	04/06/1998	0.015	mg/kg	J	0.33				
Aluminum	I690SB042	690SB04201	04/06/1998	3680.000	mg/kg	=		3470	27400		
Arsenic	I690SB042	690SB04201	04/06/1998	2.800	mg/kg	=	7.24	0.46	19.7		
Barium	I690SB042	690SB04201	04/06/1998	43.700	mg/kg	=		7.8	43.4		X
Beryllium	I690SB042	690SB04201	04/06/1998	0.430	mg/kg	J		0.34	0.95		
Cadmium	I690SB042	690SB04201	04/06/1998	0.520	mg/kg	J	1	0.13	0.61		
Calcium	I690SB042	690SB04201	04/06/1998	132000.000	mg/kg	=		1670	59500		X
Chromium, Total	I690SB042	690SB04201	04/06/1998	40.000	mg/kg	=	52.3	7.5	53.7		
Cobalt	I690SB042	690SB04201	04/06/1998	3.000	mg/kg	=		0.64	5.8		
Copper	I690SB042	690SB04201	04/06/1998	305.000	mg/kg	=	18.7	2.4	556	X	
Iron	I690SB042	690SB04201	04/06/1998	5820.000	mg/kg	=		1730	22700		
Lead	I690SB042	690SB04201	04/06/1998	122.000	mg/kg	=	30.2	5	203	X	
Magnesium	I690SB042	690SB04201	04/06/1998	2190.000	mg/kg	=		424	3820		
Manganese	I690SB042	690SB04201	04/06/1998	125.000	mg/kg	=		15.1	426		
Mercury	I690SB042	690SB04201	04/06/1998	0.670	mg/kg	=	0.13	0.13	0.47	X	X
Nickel	I690SB042	690SB04201	04/06/1998	20.700	mg/kg	=	15.9	1.5	18.1	X	X
Potassium	I690SB042	690SB04201	04/06/1998	527.000	mg/kg	=		493	2730		
Selenium	I690SB042	690SB04201	04/06/1998	0.540	mg/kg	J		0.5	1.1		
Sodium	I690SB042	690SB04201	04/06/1998	174.000	mg/kg	=		181	2030		
Tin (Sn)	I690SB042	690SB04201	04/06/1998	11.400	mg/kg	=		0.98	7.5		X
Vanadium	I690SB042	690SB04201	04/06/1998	10.100	mg/kg	=		8.5	53.3		
Zinc	I690SB042	690SB04201	04/06/1998	184.000	mg/kg	J	124	5.9	150	X	X
Anthracene	I690SB042	690SB04201	04/06/1998	0.017	mg/kg	J	0.33				
Benzo(a)Anthracene	I690SB042	690SB04201	04/06/1998	0.210	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	I690SB042	690SB04201	04/06/1998	0.160	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	I690SB042	690SB04201	04/06/1998	0.260	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	I690SB042	690SB04201	04/06/1998	0.085	mg/kg	J					
Benzo(k)Fluoranthene	I690SB042	690SB04201	04/06/1998	0.100	mg/kg	J			0.596		
Chrysene	I690SB042	690SB04201	04/06/1998	0.230	mg/kg	J	0.33		0.62		
Dibenz(a,h)anthracene	I690SB042	690SB04201	04/06/1998	0.028	mg/kg	J	0.33		0.525		
Dibenzofuran	I690SB042	690SB04201	04/06/1998	0.020	mg/kg	J					
Fluoranthene	I690SB042	690SB04201	04/06/1998	0.370	mg/kg	J	0.33			X	
Indeno(1,2,3-c,d)pyrene	I690SB042	690SB04201	04/06/1998	0.090	mg/kg	J			0.525		
Phenanthrene	I690SB042	690SB04201	04/06/1998	0.160	mg/kg	J	0.33				
Pyrene	I690SB042	690SB04201	04/06/1998	0.260	mg/kg	J	0.33				
BEQ	I690SB042	690SB04201	04/06/1998	245.230	ug/kg	=			1.304		
Aluminum	IDMASB001	DMASB00101	03/16/1995	30400.000	mg/kg	J		3470	27400		X
Arsenic	IDMASB001	DMASB00101	03/16/1995	14.300	mg/kg	=	7.24	0.46	19.7	X	
Barium	IDMASB001	DMASB00101	03/16/1995	40.400	mg/kg	J		7.8	43.4		
Beryllium	IDMASB001	DMASB00101	03/16/1995	1.200	mg/kg	J		0.34	0.95		X
Cadmium	IDMASB001	DMASB00101	03/16/1995	0.970	mg/kg	=	1	0.13	0.61		X
Calcium	IDMASB001	DMASB00101	03/16/1995	16500.000	mg/kg	J		1670	59500		
Chromium, Total	IDMASB001	DMASB00101	03/16/1995	59.500	mg/kg	J	52.3	7.5	53.7	X	X
Cobalt	IDMASB001	DMASB00101	03/16/1995	6.900	mg/kg	J		0.64	5.8		X
Copper	IDMASB001	DMASB00101	03/16/1995	29.400	mg/kg	=	18.7	2.4	556	X	
Iron	IDMASB001	DMASB00101	03/16/1995	31500.000	mg/kg	J		1730	22700		X
Lead	IDMASB001	DMASB00101	03/16/1995	30.800	mg/kg	J	30.2	5	203	X	
Magnesium	IDMASB001	DMASB00101	03/16/1995	4070.000	mg/kg	J		424	3820		X
Manganese	IDMASB001	DMASB00101	03/16/1995	401.000	mg/kg	J		15.1	426		
Mercury	IDMASB001	DMASB00101	03/16/1995	0.240	mg/kg	J	0.13	0.13	0.47	X	
Nickel	IDMASB001	DMASB00101	03/16/1995	15.400	mg/kg	=	15.9	1.5	18.1		
Potassium	IDMASB001	DMASB00101	03/16/1995	2310.000	mg/kg	=		493	2730		
Selenium	IDMASB001	DMASB00101	03/16/1995	1.900	mg/kg	J		0.5	1.1		X
Sodium	IDMASB001	DMASB00101	03/16/1995	311.000	mg/kg	J		181	2030		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Vanadium	IDMASB001	DMASB00101	03/16/1995	67.100	mg/kg	J		8.5	53.3		X
Zinc	IDMASB001	DMASB00101	03/16/1995	86.300	mg/kg	J	124	5.9	150		
PCB-1260 (Arochlor 1260)	IDMASB001	DMASB00101	03/16/1995	0.060	mg/kg	=	0.033			X	
Endrin Aldehyde	IDMASB001	DMASB00101	03/16/1995	0.003	mg/kg	J	0.0033				
bis(2-Ethylhexyl) Phthalate	IDMASB001	DMASB00101	03/16/1995	0.080	mg/kg	J					
Di-n-butyl Phthalate	IDMASB001	DMASB00101	03/16/1995	0.050	mg/kg	J					
Aluminum	IDMASB005	DMASB00501	03/20/1995	957.000	mg/kg	=		3470	27400		
Barium	IDMASB005	DMASB00501	03/20/1995	7.100	mg/kg	J		7.8	43.4		
Beryllium	IDMASB005	DMASB00501	03/20/1995	0.180	mg/kg	J		0.34	0.95		
Calcium	IDMASB005	DMASB00501	03/20/1995	8040.000	mg/kg	J		1670	59500		
Chromium, Total	IDMASB005	DMASB00501	03/20/1995	4.900	mg/kg	J	52.3	7.5	53.7		
Cobalt	IDMASB005	DMASB00501	03/20/1995	0.520	mg/kg	J		0.64	5.8		
Iron	IDMASB005	DMASB00501	03/20/1995	2130.000	mg/kg	J		1730	22700		
Magnesium	IDMASB005	DMASB00501	03/20/1995	222.000	mg/kg	J		424	3820		
Manganese	IDMASB005	DMASB00501	03/20/1995	30.800	mg/kg	J		15.1	426		
Nickel	IDMASB005	DMASB00501	03/20/1995	0.650	mg/kg	J	15.9	1.5	18.1		
Potassium	IDMASB005	DMASB00501	03/20/1995	136.000	mg/kg	J		493	2730		
Tin (Sn)	IDMASB005	DMASB00501	03/20/1995	2.000	mg/kg	J		0.98	7.5		
Vanadium	IDMASB005	DMASB00501	03/20/1995	3.200	mg/kg	J		8.5	53.3		
Zinc	IDMASB005	DMASB00501	03/20/1995	6.700	mg/kg	J	124	5.9	150		
Beta BHC (Beta Hexachlorocycloh	IDMASB005	DMASB00501	03/20/1995	0.002	mg/kg	J					
Delta BHC (Delta Hexachlorocyclol	IDMASB005	DMASB00501	03/20/1995	0.024	mg/kg	J					
Endosulfan Sulfate	IDMASB005	DMASB00501	03/20/1995	0.006	mg/kg	J					
p,p'-DDD	IDMASB005	DMASB00501	03/20/1995	0.007	mg/kg	J					
Benzo(b)Fluoranthene	IDMASB005	DMASB00501	03/20/1995	0.058	mg/kg	J			0.608		
Benzo(k)Fluoranthene	IDMASB005	DMASB00501	03/20/1995	0.063	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	IDMASB005	DMASB00501	03/20/1995	0.330	mg/kg	J					
Di-n-butyl Phthalate	IDMASB005	DMASB00501	03/20/1995	0.056	mg/kg	J					
BEQ	IDMASB005	DMASB00501	03/20/1995	916.840	ug/kg	=			1.304		
Toluene	IDMASB005	DMASB00501	03/20/1995	0.002	mg/kg	J					
Aluminum	IGDISB002	GDISB00201	02/16/1995	4480.000	mg/kg	=		3470	27400		
Arsenic	IGDISB002	GDISB00201	02/16/1995	4.000	mg/kg	=	7.24	0.46	19.7		
Barium	IGDISB002	GDISB00201	02/16/1995	40.300	mg/kg	=		7.8	43.4		
Beryllium	IGDISB002	GDISB00201	02/16/1995	0.400	mg/kg	J		0.34	0.95		
Cadmium	IGDISB002	GDISB00201	02/16/1995	0.130	mg/kg	J	1	0.13	0.61		
Calcium	IGDISB002	GDISB00201	02/16/1995	59500.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB002	GDISB00201	02/16/1995	25.400	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB002	GDISB00201	02/16/1995	2.600	mg/kg	J		0.64	5.8		
Copper	IGDISB002	GDISB00201	02/16/1995	49.300	mg/kg	J	18.7	2.4	556	X	
Iron	IGDISB002	GDISB00201	02/16/1995	5240.000	mg/kg	J		1730	22700		
Lead	IGDISB002	GDISB00201	02/16/1995	27.300	mg/kg	J	30.2	5	203		
Magnesium	IGDISB002	GDISB00201	02/16/1995	1400.000	mg/kg	J		424	3820		
Manganese	IGDISB002	GDISB00201	02/16/1995	77.100	mg/kg	=		15.1	426		
Nickel	IGDISB002	GDISB00201	02/16/1995	11.400	mg/kg	=	15.9	1.5	18.1		
Potassium	IGDISB002	GDISB00201	02/16/1995	954.000	mg/kg	J		493	2730		
Selenium	IGDISB002	GDISB00201	02/16/1995	0.900	mg/kg	J		0.5	1.1		
Sodium	IGDISB002	GDISB00201	02/16/1995	324.000	mg/kg	J		181	2030		
Tin (Sn)	IGDISB002	GDISB00201	02/16/1995	2.500	mg/kg	J		0.98	7.5		
Vanadium	IGDISB002	GDISB00201	02/16/1995	15.000	mg/kg	=		8.5	53.3		
Zinc	IGDISB002	GDISB00201	02/16/1995	46.000	mg/kg	J	124	5.9	150		
PCB-1260 (Arochlor 1260)	IGDISB002	GDISB00201	02/16/1995	0.029	mg/kg	=	0.033				
Aldrin	IGDISB002	GDISB00201	02/16/1995	0.002	mg/kg	J					
Heptachlor	IGDISB002	GDISB00201	02/16/1995	0.005	mg/kg	J					
1-Methyl naphthalene	IGDISB002	GDISB00201	02/16/1995	0.099	mg/kg	J					
2-Methylnaphthalene	IGDISB002	GDISB00201	02/16/1995	0.060	mg/kg	J	0.33				
Phenanthrene	IGDISB002	GDISB00201	02/16/1995	0.058	mg/kg	J	0.33				
Toluene	IGDISB002	GDISB00201	02/16/1995	0.003	mg/kg	J					
Aluminum	IGDISB005	GDISB00501	02/13/1995	5360.000	mg/kg	=		3470	27400		
Barium	IGDISB005	GDISB00501	02/16/1995	24.900	mg/kg	J		7.8	43.4		
Calcium	IGDISB005	GDISB00501	02/16/1995	1670.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB005	GDISB00501	02/16/1995	7.500	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB005	GDISB00501	02/16/1995	0.640	mg/kg	J		0.64	5.8		
Copper	IGDISB005	GDISB00501	02/16/1995	4.300	mg/kg	J	18.7	2.4	556		
Iron	IGDISB005	GDISB00501	02/16/1995	1730.000	mg/kg	J		1730	22700		
Lead	IGDISB005	GDISB00501	02/16/1995	8.600	mg/kg	J	30.2	5	203		
Magnesium	IGDISB005	GDISB00501	02/16/1995	889.000	mg/kg	J		424	3820		
Manganese	IGDISB005	GDISB00501	02/16/1995	15.100	mg/kg	=		15.1	426		
Nickel	IGDISB005	GDISB00501	02/16/1995	1.500	mg/kg	J	15.9	1.5	18.1		
Potassium	IGDISB005	GDISB00501	02/16/1995	493.000	mg/kg	J		493	2730		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Selenium	IGDISB005	GDISB00501	02/16/1995	0.960	mg/kg	J		0.5	1.1		
Sodium	IGDISB005	GDISB00501	02/16/1995	2030.000	mg/kg	J		181	2030		
Vanadium	IGDISB005	GDISB00501	02/16/1995	8.600	mg/kg	=		8.5	53.3		
Zinc	IGDISB005	GDISB00501	02/16/1995	5.900	mg/kg	J	124	5.9	150		
p,p'-DDE	IGDISB005	GDISB00501	02/16/1995	0.005	mg/kg	J					
Benzoic acid	IGDISB005	GDISB00501	02/16/1995	0.150	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	IGDISB005	GDISB00501	02/16/1995	0.100	mg/kg	J					
Toluene	IGDISB005	GDISB00501	02/16/1995	0.004	mg/kg	J					
Aluminum	IGDISB006	GDISB00601	02/16/1995	19900.000	mg/kg	=		3470	27400		
Arsenic	IGDISB006	GDISB00601	02/16/1995	7.200	mg/kg	=	7.24	0.46	19.7		
Barium	IGDISB006	GDISB00601	02/16/1995	29.100	mg/kg	=		7.8	43.4		
Beryllium	IGDISB006	GDISB00601	02/16/1995	0.750	mg/kg	J		0.34	0.95		
Cadmium	IGDISB006	GDISB00601	02/16/1995	0.440	mg/kg	J	1	0.13	0.61		
Calcium	IGDISB006	GDISB00601	02/16/1995	32800.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB006	GDISB00601	02/16/1995	45.500	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB006	GDISB00601	02/16/1995	4.500	mg/kg	J		0.64	5.8		
Copper	IGDISB006	GDISB00601	02/16/1995	40.400	mg/kg	J	18.7	2.4	556	X	
Iron	IGDISB006	GDISB00601	02/16/1995	16600.000	mg/kg	J		1730	22700		
Lead	IGDISB006	GDISB00601	02/16/1995	47.000	mg/kg	J	30.2	5	203	X	
Magnesium	IGDISB006	GDISB00601	02/16/1995	3810.000	mg/kg	J		424	3820		
Manganese	IGDISB006	GDISB00601	02/16/1995	426.000	mg/kg	=		15.1	426		
Mercury	IGDISB006	GDISB00601	02/16/1995	0.160	mg/kg	=	0.13	0.13	0.47	X	
Nickel	IGDISB006	GDISB00601	02/16/1995	14.400	mg/kg	=	15.9	1.5	18.1		
Potassium	IGDISB006	GDISB00601	02/16/1995	2230.000	mg/kg	J		493	2730		
Selenium	IGDISB006	GDISB00601	02/16/1995	0.860	mg/kg	J		0.5	1.1		
Sodium	IGDISB006	GDISB00601	02/16/1995	1180.000	mg/kg	J		181	2030		
Vanadium	IGDISB006	GDISB00601	02/16/1995	41.100	mg/kg	=		8.5	53.3		
Zinc	IGDISB006	GDISB00601	02/16/1995	80.400	mg/kg	J	124	5.9	150		
Delta BHC (Delta Hexachlorocyclol	IGDISB006	GDISB00601	02/16/1995	0.002	mg/kg	=					
Endrin	IGDISB006	GDISB00601	02/16/1995	0.004	mg/kg	J	0.0033			X	
Endrin Aldehyde	IGDISB006	GDISB00601	02/16/1995	0.001	mg/kg	J	0.0033				
p,p'-DDD	IGDISB006	GDISB00601	02/16/1995	0.013	mg/kg	=					
p,p'-DDE	IGDISB006	GDISB00601	02/16/1995	0.042	mg/kg	J					
bis(2-Ethylhexyl) Phthalate	IGDISB006	GDISB00601	02/16/1995	0.065	mg/kg	J					
Aluminum	IGDISB007	GDISB00701	02/16/1995	27400.000	mg/kg	=		3470	27400		
Arsenic	IGDISB007	GDISB00701	02/16/1995	9.300	mg/kg	=	7.24	0.46	19.7	X	
Barium	IGDISB007	GDISB00701	02/16/1995	38.500	mg/kg	=		7.8	43.4		
Beryllium	IGDISB007	GDISB00701	02/16/1995	0.880	mg/kg	J		0.34	0.95		
Cadmium	IGDISB007	GDISB00701	02/16/1995	0.610	mg/kg	J	1	0.13	0.61		
Calcium	IGDISB007	GDISB00701	02/16/1995	46200.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB007	GDISB00701	02/16/1995	47.000	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB007	GDISB00701	02/16/1995	5.700	mg/kg	J		0.64	5.8		
Copper	IGDISB007	GDISB00701	02/16/1995	24.600	mg/kg	J	18.7	2.4	556	X	
Iron	IGDISB007	GDISB00701	02/16/1995	21800.000	mg/kg	J		1730	22700		
Lead	IGDISB007	GDISB00701	02/16/1995	24.800	mg/kg	J	30.2	5	203		
Magnesium	IGDISB007	GDISB00701	02/16/1995	3810.000	mg/kg	J		424	3820		
Manganese	IGDISB007	GDISB00701	02/16/1995	419.000	mg/kg	=		15.1	426		
Mercury	IGDISB007	GDISB00701	02/16/1995	0.210	mg/kg	=	0.13	0.13	0.47	X	
Nickel	IGDISB007	GDISB00701	02/16/1995	15.300	mg/kg	=	15.9	1.5	18.1		
Potassium	IGDISB007	GDISB00701	02/16/1995	2560.000	mg/kg	J		493	2730		
Sodium	IGDISB007	GDISB00701	02/16/1995	400.000	mg/kg	J		181	2030		
Vanadium	IGDISB007	GDISB00701	02/16/1995	49.300	mg/kg	=		8.5	53.3		
Zinc	IGDISB007	GDISB00701	02/16/1995	84.800	mg/kg	J	124	5.9	150		
PCB-1260 (Arochlor 1260)	IGDISB007	GDISB00701	02/16/1995	0.023	mg/kg	J	0.033				
Chlordane	IGDISB007	GDISB00701	02/16/1995	0.002	mg/kg	J	0.0017			X	
Endrin Aldehyde	IGDISB007	GDISB00701	02/16/1995	0.004	mg/kg	=	0.0033			X	
Benzo(b)Fluoranthene	IGDISB007	GDISB00701	02/16/1995	0.097	mg/kg	J			0.608		
Benzo(k)Fluoranthene	IGDISB007	GDISB00701	02/16/1995	0.120	mg/kg	J			0.596		
Benzyl Butyl Phthalate	IGDISB007	GDISB00701	02/16/1995	0.098	mg/kg	J					
BEQ	IGDISB007	GDISB00701	02/16/1995	926.310	ug/kg	=			1.304		
Toluene	IGDISB007	GDISB00701	02/16/1995	0.002	mg/kg	J					
Aluminum	IGDISB008	GDISB00801	02/16/1995	25700.000	mg/kg	=		3470	27400		
Arsenic	IGDISB008	GDISB00801	02/16/1995	11.000	mg/kg	=	7.24	0.46	19.7	X	
Barium	IGDISB008	GDISB00801	02/16/1995	43.400	mg/kg	=		7.8	43.4		
Beryllium	IGDISB008	GDISB00801	02/16/1995	0.870	mg/kg	J		0.34	0.95		
Cadmium	IGDISB008	GDISB00801	02/16/1995	0.590	mg/kg	J	1	0.13	0.61		
Calcium	IGDISB008	GDISB00801	02/16/1995	33600.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB008	GDISB00801	02/16/1995	49.900	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB008	GDISB00801	02/16/1995	5.500	mg/kg	J		0.64	5.8		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Copper	IGDISB008	GDISB00801	02/16/1995	34.600	mg/kg	J	18.7	2.4	556	X	
Iron	IGDISB008	GDISB00801	02/16/1995	21500.000	mg/kg	J		1730	22700		
Lead	IGDISB008	GDISB00801	02/16/1995	46.500	mg/kg	J	30.2	5	203	X	
Magnesium	IGDISB008	GDISB00801	02/16/1995	3430.000	mg/kg	J		424	3820		
Manganese	IGDISB008	GDISB00801	02/16/1995	275.000	mg/kg	=		15.1	426		
Mercury	IGDISB008	GDISB00801	02/16/1995	0.300	mg/kg	=	0.13	0.13	0.47	X	
Nickel	IGDISB008	GDISB00801	02/16/1995	16.300	mg/kg	=	15.9	1.5	18.1	X	
Potassium	IGDISB008	GDISB00801	02/16/1995	2490.000	mg/kg	J		493	2730		
Selenium	IGDISB008	GDISB00801	02/16/1995	1.100	mg/kg	J		0.5	1.1		
Sodium	IGDISB008	GDISB00801	02/16/1995	367.000	mg/kg	J		181	2030		
Tin (Sn)	IGDISB008	GDISB00801	02/16/1995	2.200	mg/kg	J		0.98	7.5		
Vanadium	IGDISB008	GDISB00801	02/16/1995	51.600	mg/kg	=		8.5	53.3		
Zinc	IGDISB008	GDISB00801	02/16/1995	92.200	mg/kg	J	124	5.9	150		
Endrin Aldehyde	IGDISB008	GDISB00801	02/16/1995	0.002	mg/kg	J	0.0033				
p,p'-DDE	IGDISB008	GDISB00801	02/16/1995	0.007	mg/kg	=					
Benzo(b)Fluoranthene	IGDISB008	GDISB00801	02/16/1995	0.081	mg/kg	J			0.608		
Benzo(k)Fluoranthene	IGDISB008	GDISB00801	02/16/1995	0.097	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	IGDISB008	GDISB00801	02/16/1995	0.100	mg/kg	J					
Pyrene	IGDISB008	GDISB00801	02/16/1995	0.063	mg/kg	J	0.33				
BEQ	IGDISB008	GDISB00801	02/16/1995	924.485	ug/kg	=			1.304		
Aluminum	IGDISB009	GDISB00901	02/17/1995	26400.000	mg/kg	J		3470	27400		
Arsenic	IGDISB009	GDISB00901	02/17/1995	11.000	mg/kg	J	7.24	0.46	19.7	X	
Barium	IGDISB009	GDISB00901	02/17/1995	31.500	mg/kg	J		7.8	43.4		
Beryllium	IGDISB009	GDISB00901	02/17/1995	0.950	mg/kg	=		0.34	0.95		
Calcium	IGDISB009	GDISB00901	02/17/1995	28200.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB009	GDISB00901	02/17/1995	53.700	mg/kg	=	52.3	7.5	53.7	X	
Cobalt	IGDISB009	GDISB00901	02/17/1995	5.800	mg/kg	J		0.64	5.8		
Copper	IGDISB009	GDISB00901	02/17/1995	19.100	mg/kg	=	18.7	2.4	556	X	
Iron	IGDISB009	GDISB00901	02/17/1995	22700.000	mg/kg	J		1730	22700		
Lead	IGDISB009	GDISB00901	02/17/1995	20.200	mg/kg	J	30.2	5	203		
Magnesium	IGDISB009	GDISB00901	02/17/1995	3820.000	mg/kg	J		424	3820		
Manganese	IGDISB009	GDISB00901	02/17/1995	266.000	mg/kg	J		15.1	426		
Mercury	IGDISB009	GDISB00901	02/17/1995	0.230	mg/kg	=	0.13	0.13	0.47	X	
Nickel	IGDISB009	GDISB00901	02/17/1995	15.900	mg/kg	=	15.9	1.5	18.1		
Potassium	IGDISB009	GDISB00901	02/17/1995	2730.000	mg/kg	J		493	2730		
Selenium	IGDISB009	GDISB00901	02/17/1995	0.700	mg/kg	J		0.5	1.1		
Sodium	IGDISB009	GDISB00901	02/17/1995	1080.000	mg/kg	J		181	2030		
Vanadium	IGDISB009	GDISB00901	02/17/1995	53.300	mg/kg	=		8.5	53.3		
Zinc	IGDISB009	GDISB00901	02/17/1995	62.900	mg/kg	J	124	5.9	150		
Endosulfan II	IGDISB009	GDISB00901	02/17/1995	0.005	mg/kg	J					
p,p'-DDT	IGDISB009	GDISB00901	02/17/1995	0.012	mg/kg	J					
Aluminum	IGDISB010	GDISB01001	02/17/1995	23100.000	mg/kg	J		3470	27400		
Arsenic	IGDISB010	GDISB01001	02/17/1995	9.200	mg/kg	J	7.24	0.46	19.7	X	
Barium	IGDISB010	GDISB01001	02/17/1995	37.900	mg/kg	J		7.8	43.4		
Beryllium	IGDISB010	GDISB01001	02/17/1995	0.730	mg/kg	=		0.34	0.95		
Calcium	IGDISB010	GDISB01001	02/17/1995	44000.000	mg/kg	J		1670	59500		
Chromium, Total	IGDISB010	GDISB01001	02/17/1995	49.400	mg/kg	=	52.3	7.5	53.7		
Cobalt	IGDISB010	GDISB01001	02/17/1995	4.400	mg/kg	J		0.64	5.8		
Copper	IGDISB010	GDISB01001	02/17/1995	95.900	mg/kg	=	18.7	2.4	556	X	
Iron	IGDISB010	GDISB01001	02/17/1995	19200.000	mg/kg	J		1730	22700		
Lead	IGDISB010	GDISB01001	02/17/1995	203.000	mg/kg	J	30.2	5	203	X	
Magnesium	IGDISB010	GDISB01001	02/17/1995	3690.000	mg/kg	J		424	3820		
Manganese	IGDISB010	GDISB01001	02/17/1995	291.000	mg/kg	J		15.1	426		
Mercury	IGDISB010	GDISB01001	02/17/1995	0.290	mg/kg	=	0.13	0.13	0.47	X	
Nickel	IGDISB010	GDISB01001	02/17/1995	18.100	mg/kg	=	15.9	1.5	18.1	X	
Potassium	IGDISB010	GDISB01001	02/17/1995	2370.000	mg/kg	J		493	2730		
Selenium	IGDISB010	GDISB01001	02/17/1995	1.000	mg/kg	J		0.5	1.1		
Sodium	IGDISB010	GDISB01001	02/17/1995	951.000	mg/kg	J		181	2030		
Tin (Sn)	IGDISB010	GDISB01001	02/17/1995	6.800	mg/kg	J		0.98	7.5		
Vanadium	IGDISB010	GDISB01001	02/17/1995	43.900	mg/kg	=		8.5	53.3		
Zinc	IGDISB010	GDISB01001	02/17/1995	150.000	mg/kg	J	124	5.9	150	X	
Beta BHC (Beta Hexachlorocyclohe	IGDISB010	GDISB01001	02/17/1995	0.001	mg/kg	J					
Endrin Aldehyde	IGDISB010	GDISB01001	02/17/1995	0.002	mg/kg	J	0.0033				
Heptachlor	IGDISB010	GDISB01001	02/17/1995	0.002	mg/kg	J					
Heptachlor Epoxide	IGDISB010	GDISB01001	02/17/1995	0.009	mg/kg	J					
p,p'-DDD	IGDISB010	GDISB01001	02/17/1995	0.018	mg/kg	J					
p,p'-DDE	IGDISB010	GDISB01001	02/17/1995	0.140	mg/kg	=					
p,p'-DDT	IGDISB010	GDISB01001	02/17/1995	0.053	mg/kg	J					
Aluminum	IRTCSB006	RTCSB00601	05/26/1995	1510.000	mg/kg	=		3470	27400		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	(max, mg/Kg)	Exceeds SSV	Exceeds BCK
Arsenic	IRTCSB006	RTCSB00601	05/26/1995	0.610	mg/kg	J	7.24	0.46	19.7		
Barium	IRTCSB006	RTCSB00601	05/26/1995	5.500	mg/kg	J		7.8	43.4		
Calcium	IRTCSB006	RTCSB00601	05/26/1995	3550.000	mg/kg	J		1670	59500		
Chromium, Total	IRTCSB006	RTCSB00601	05/26/1995	4.600	mg/kg	=	52.3	7.5	53.7		
Cobalt	IRTCSB006	RTCSB00601	05/26/1995	0.850	mg/kg	J		0.64	5.8		
Copper	IRTCSB006	RTCSB00601	05/26/1995	1.500	mg/kg	J	18.7	2.4	556		
Iron	IRTCSB006	RTCSB00601	05/26/1995	2560.000	mg/kg	=		1730	22700		
Lead	IRTCSB006	RTCSB00601	05/26/1995	4.300	mg/kg	=	30.2	5	203		
Magnesium	IRTCSB006	RTCSB00601	05/26/1995	341.000	mg/kg	J		424	3820		
Manganese	IRTCSB006	RTCSB00601	05/26/1995	27.700	mg/kg	=		15.1	426		
Nickel	IRTCSB006	RTCSB00601	05/26/1995	0.990	mg/kg	J	15.9	1.5	18.1		
Potassium	IRTCSB006	RTCSB00601	05/26/1995	177.000	mg/kg	J		493	2730		
Vanadium	IRTCSB006	RTCSB00601	05/26/1995	4.600	mg/kg	J		8.5	53.3		
Zinc	IRTCSB006	RTCSB00601	05/26/1995	13.400	mg/kg	=	124	5.9	150		
Chlordane	IRTCSB006	RTCSB00601	05/26/1995	0.130	mg/kg	=	0.0017			X	
p,p'-DDD	IRTCSB006	RTCSB00601	05/26/1995	0.006	mg/kg	=					
p,p'-DDE	IRTCSB006	RTCSB00601	05/26/1995	0.004	mg/kg	=					
p,p'-DDT	IRTCSB006	RTCSB00601	05/26/1995	0.009	mg/kg	=					
Di-n-butyl Phthalate	IRTCSB006	RTCSB00601	05/26/1995	0.064	mg/kg	J					
Aluminum	IRTCSB007	RTCSB00701	05/26/1995	2610.000	mg/kg	=		3470	27400		
Arsenic	IRTCSB007	RTCSB00701	05/26/1995	1.200	mg/kg	J	7.24	0.46	19.7		
Barium	IRTCSB007	RTCSB00701	05/26/1995	7.300	mg/kg	J		7.8	43.4		
Calcium	IRTCSB007	RTCSB00701	05/26/1995	1740.000	mg/kg	J		1670	59500		
Chromium, Total	IRTCSB007	RTCSB00701	05/26/1995	6.400	mg/kg	=	52.3	7.5	53.7		
Cobalt	IRTCSB007	RTCSB00701	05/26/1995	1.000	mg/kg	J		0.64	5.8		
Copper	IRTCSB007	RTCSB00701	05/26/1995	2.000	mg/kg	J	18.7	2.4	556		
Iron	IRTCSB007	RTCSB00701	05/26/1995	3600.000	mg/kg	=		1730	22700		
Lead	IRTCSB007	RTCSB00701	05/26/1995	3.800	mg/kg	=	30.2	5	203		
Magnesium	IRTCSB007	RTCSB00701	05/26/1995	409.000	mg/kg	J		424	3820		
Manganese	IRTCSB007	RTCSB00701	05/26/1995	30.700	mg/kg	=		15.1	426		
Nickel	IRTCSB007	RTCSB00701	05/26/1995	1.100	mg/kg	J	15.9	1.5	18.1		
Potassium	IRTCSB007	RTCSB00701	05/26/1995	277.000	mg/kg	J		493	2730		
Vanadium	IRTCSB007	RTCSB00701	05/26/1995	6.900	mg/kg	=		8.5	53.3		
Zinc	IRTCSB007	RTCSB00701	05/26/1995	16.400	mg/kg	=	124	5.9	150		
Acetone	IRTCSB007	RTCSB00701	05/26/1995	0.130	mg/kg	J					
Aluminum	IRTCSB008	RTCSB00801	05/26/1995	1950.000	mg/kg	=		3470	27400		
Arsenic	IRTCSB008	RTCSB00801	05/26/1995	1.900	mg/kg	J	7.24	0.46	19.7		
Barium	IRTCSB008	RTCSB00801	05/26/1995	12.300	mg/kg	J		7.8	43.4		
Cadmium	IRTCSB008	RTCSB00801	05/26/1995	0.400	mg/kg	J	1	0.13	0.61		
Calcium	IRTCSB008	RTCSB00801	05/26/1995	2300.000	mg/kg	J		1670	59500		
Chromium, Total	IRTCSB008	RTCSB00801	05/26/1995	10.700	mg/kg	=	52.3	7.5	53.7		
Cobalt	IRTCSB008	RTCSB00801	05/26/1995	1.100	mg/kg	J		0.64	5.8		
Copper	IRTCSB008	RTCSB00801	05/26/1995	8.300	mg/kg	=	18.7	2.4	556		
Iron	IRTCSB008	RTCSB00801	05/26/1995	4140.000	mg/kg	=		1730	22700		
Lead	IRTCSB008	RTCSB00801	05/26/1995	83.600	mg/kg	=	30.2	5	203	X	
Magnesium	IRTCSB008	RTCSB00801	05/26/1995	394.000	mg/kg	J		424	3820		
Manganese	IRTCSB008	RTCSB00801	05/26/1995	36.100	mg/kg	=		15.1	426		
Nickel	IRTCSB008	RTCSB00801	05/26/1995	2.200	mg/kg	J	15.9	1.5	18.1		
Potassium	IRTCSB008	RTCSB00801	05/26/1995	196.000	mg/kg	J		493	2730		
Selenium	IRTCSB008	RTCSB00801	05/26/1995	0.610	mg/kg	=		0.5	1.1		
Vanadium	IRTCSB008	RTCSB00801	05/26/1995	10.100	mg/kg	=		8.5	53.3		
Zinc	IRTCSB008	RTCSB00801	05/26/1995	137.000	mg/kg	=	124	5.9	150	X	
PCB-1260 (Arochlor 1260)	IRTCSB008	RTCSB00801	05/26/1995	0.033	mg/kg	J	0.033				
Endrin	IRTCSB008	RTCSB00801	05/26/1995	0.002	mg/kg	J	0.0033				
Heptachlor Epoxide	IRTCSB008	RTCSB00801	05/26/1995	0.001	mg/kg	J					
p,p'-DDD	IRTCSB008	RTCSB00801	05/26/1995	0.002	mg/kg	J					
p,p'-DDE	IRTCSB008	RTCSB00801	05/26/1995	0.024	mg/kg	J					
p,p'-DDT	IRTCSB008	RTCSB00801	05/26/1995	0.008	mg/kg	J					
Acetone	IRTCSB008	RTCSB00801	05/26/1995	0.012	mg/kg	J					
Aluminum	IRTCSB009	RTCSB00901	05/26/1995	1600.000	mg/kg	=		3470	27400		
Arsenic	IRTCSB009	RTCSB00901	05/26/1995	0.840	mg/kg	J	7.24	0.46	19.7		
Barium	IRTCSB009	RTCSB00901	05/26/1995	7.700	mg/kg	J		7.8	43.4		
Calcium	IRTCSB009	RTCSB00901	05/26/1995	2950.000	mg/kg	J		1670	59500		
Chromium, Total	IRTCSB009	RTCSB00901	05/26/1995	4.900	mg/kg	=	52.3	7.5	53.7		
Cobalt	IRTCSB009	RTCSB00901	05/26/1995	0.860	mg/kg	J		0.64	5.8		
Copper	IRTCSB009	RTCSB00901	05/26/1995	1.100	mg/kg	J	18.7	2.4	556		
Iron	IRTCSB009	RTCSB00901	05/26/1995	3000.000	mg/kg	=		1730	22700		
Lead	IRTCSB009	RTCSB00901	05/26/1995	2.800	mg/kg	=	30.2	5	203		
Magnesium	IRTCSB009	RTCSB00901	05/26/1995	401.000	mg/kg	J		424	3820		

TABLE A1

Step 1 Screening Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Manganese	IRTCSB009	RTCSB00901	05/26/1995	25.200	mg/kg	=		15.1	426		
Mercury	IRTCSB009	RTCSB00901	05/26/1995	0.260	mg/kg	J	0.13	0.13	0.47	X	
Nickel	IRTCSB009	RTCSB00901	05/26/1995	1.000	mg/kg	J	15.9	1.5	18.1		
Potassium	IRTCSB009	RTCSB00901	05/26/1995	217.000	mg/kg	J		493	2730		
Vanadium	IRTCSB009	RTCSB00901	05/26/1995	5.300	mg/kg	J		8.5	53.3		
Zinc	IRTCSB009	RTCSB00901	05/26/1995	11.300	mg/kg	=	124	5.9	150		
Chlordane	IRTCSB009	RTCSB00901	05/26/1995	**0.040**	mg/kg	J	0.0017			X	
p,p'-DDD	IRTCSB009	RTCSB00901	05/26/1995	0.001	mg/kg	J					
p,p'-DDT	IRTCSB009	RTCSB00901	05/26/1995	0.011	mg/kg	J					
Di-n-butyl Phthalate	IRTCSB009	RTCSB00901	05/26/1995	0.045	mg/kg	J					
Acetone	IRTCSB009	RTCSB00901	05/26/1995	0.008	mg/kg	J					
Aluminum	IRTCSB010	RTCSB01001	05/26/1995	2810.000	mg/kg	=		3470	27400		
Arsenic	IRTCSB010	RTCSB01001	05/26/1995	1.500	mg/kg	J	7.24	0.46	19.7		
Barium	IRTCSB010	RTCSB01001	05/26/1995	18.800	mg/kg	J		7.8	43.4		
Calcium	IRTCSB010	RTCSB01001	05/26/1995	7300.000	mg/kg	J		1670	59500		
Chromium, Total	IRTCSB010	RTCSB01001	05/26/1995	6.900	mg/kg	=	52.3	7.5	53.7		
Cobalt	IRTCSB010	RTCSB01001	05/26/1995	0.790	mg/kg	J		0.64	5.8		
Copper	IRTCSB010	RTCSB01001	05/26/1995	9.200	mg/kg	=	18.7	2.4	556		
Iron	IRTCSB010	RTCSB01001	05/26/1995	2840.000	mg/kg	=		1730	22700		
Lead	IRTCSB010	RTCSB01001	05/26/1995	44.700	mg/kg	=	30.2	5	203	X	
Magnesium	IRTCSB010	RTCSB01001	05/26/1995	396.000	mg/kg	J		424	3820		
Manganese	IRTCSB010	RTCSB01001	05/26/1995	22.100	mg/kg	=		15.1	426		
Nickel	IRTCSB010	RTCSB01001	05/26/1995	1.700	mg/kg	J	15.9	1.5	18.1		
Potassium	IRTCSB010	RTCSB01001	05/26/1995	171.000	mg/kg	J		493	2730		
Vanadium	IRTCSB010	RTCSB01001	05/26/1995	6.000	mg/kg	=		8.5	53.3		
Zinc	IRTCSB010	RTCSB01001	05/26/1995	60.300	mg/kg	=	124	5.9	150		
1,2,3,4,6,7,8-Heptachlorodibenzofu	IRTCSB010	RTCSB01001	05/26/1995	12.264	ng/kg	=					
1,2,3,4,6,7,8-Heptachlorodibenzo-p	IRTCSB010	RTCSB01001	05/26/1995	30.181	ng/kg	=					
Octachlorodibenzofuran	IRTCSB010	RTCSB01001	05/26/1995	20.449	ng/kg	=					
Octachlorodibenzo-p-dioxin	IRTCSB010	RTCSB01001	05/26/1995	528.609	ng/kg	=					
Total Hepta-Dioxins	IRTCSB010	RTCSB01001	05/26/1995	91.176	ng/kg	=					
Total Hepta-Furans	IRTCSB010	RTCSB01001	05/26/1995	28.116	ng/kg	=					
Total Hexa-Dioxins	IRTCSB010	RTCSB01001	05/26/1995	3.913	ng/kg	=					
Total Hexa-Furans	IRTCSB010	RTCSB01001	05/26/1995	9.637	ng/kg	=					
Total Penta-Furans	IRTCSB010	RTCSB01001	05/26/1995	2.965	ng/kg	=					
PCB-1260 (Arochlor 1260)	IRTCSB010	RTCSB01001	05/26/1995	**0.190**	mg/kg	J	0.033			X	
Chlordane	IRTCSB010	RTCSB01001	05/26/1995	**0.680**	mg/kg	J	0.0017			X	
Delta BHC (Delta Hexachlorocyclol	IRTCSB010	RTCSB01001	05/26/1995	0.001	mg/kg	J					
Endrin	IRTCSB010	RTCSB01001	05/26/1995	**0.005**	mg/kg	J	0.0033			X	
Endrin Aldehyde	IRTCSB010	RTCSB01001	05/26/1995	**0.005**	mg/kg	J	0.0033			X	
p,p'-DDD	IRTCSB010	RTCSB01001	05/26/1995	0.004	mg/kg	J					
p,p'-DDE	IRTCSB010	RTCSB01001	05/26/1995	0.025	mg/kg	J					
p,p'-DDT	IRTCSB010	RTCSB01001	05/26/1995	0.023	mg/kg	J					
Benzo(a)Anthracene	IRTCSB010	RTCSB01001	05/26/1995	0.130	mg/kg	J	0.33		0.616		
Benzo(a)Pyrene	IRTCSB010	RTCSB01001	05/26/1995	0.140	mg/kg	J	0.33		0.598		
Benzo(b)Fluoranthene	IRTCSB010	RTCSB01001	05/26/1995	0.210	mg/kg	J			0.608		
Benzo(g,h,i)Perylene	IRTCSB010	RTCSB01001	05/26/1995	0.053	mg/kg	J					
Benzo(k)Fluoranthene	IRTCSB010	RTCSB01001	05/26/1995	0.230	mg/kg	J			0.596		
bis(2-Ethylhexyl) Phthalate	IRTCSB010	RTCSB01001	05/26/1995	0.069	mg/kg	J					
Chrysene	IRTCSB010	RTCSB01001	05/26/1995	0.160	mg/kg	J	0.33		0.62		
Di-n-butyl Phthalate	IRTCSB010	RTCSB01001	05/26/1995	0.073	mg/kg	J					
Fluoranthene	IRTCSB010	RTCSB01001	05/26/1995	0.220	mg/kg	J	0.33				
Indeno(1,2,3-c,d)pyrene	IRTCSB010	RTCSB01001	05/26/1995	0.058	mg/kg	J			0.525		
Phenanthrene	IRTCSB010	RTCSB01001	05/26/1995	0.080	mg/kg	J	0.33				
Pyrene	IRTCSB010	RTCSB01001	05/26/1995	0.180	mg/kg	J	0.33				
BEQ	IRTCSB010	RTCSB01001	05/26/1995	422.260	ug/kg	=			1.304		

Bold values exceed the SSV (and range of background concentrations for metals and cPAHs).

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Zinc	A001SB001	001SB00101	10/10/1995	349.00000	mg/kg	J	124	4.5	168	X	X
Barium	A002SB001	002SB00101	10/10/1995	52.90000	mg/kg	=		6.5	46.5		X
Copper	A002SB001	002SB00101	10/10/1995	79.50000	mg/kg	=	18.7	2.2	70.9	X	X
Lead	A002SB001	002SB00101	10/10/1995	233.00000	mg/kg	J	30.2	4.1	93.1	X	X
Manganese	A002SB001	002SB00101	10/10/1995	170.00000	mg/kg	J		8.7	66.1		X
Nickel	A002SB001	002SB00101	10/10/1995	21.20000	mg/kg	=	15.9	3.2	15.4	X	X
Zinc	A002SB001	002SB00101	10/10/1995	227.00000	mg/kg	J	124	4.5	168	X	X
Nickel	A002SB002	002SB00201	10/10/1995	18.70000	mg/kg	=	15.9	3.2	15.4	X	X
Selenium	A002SB002	002SB00201	10/10/1995	1.20000	mg/kg	J		0.7	0.88		X
Selenium	A002SB005	002SB00501	10/10/1995	1.10000	mg/kg	J		0.7	0.88		X
Aluminum	A002SB006	002SB00601	10/10/1995	17400.00000	mg/kg	=		3640	11800		X
Beryllium	A002SB006	002SB00601	10/10/1995	0.36000	mg/kg	J		0.32	0.32		X
Iron	A002SB006	002SB00601	10/10/1995	16700.00000	mg/kg	J		1530	15700		X
Vanadium	A002SB006	002SB00601	10/10/1995	35.40000	mg/kg	=		4.9	28.1		X
Copper	A002SB007	002SB00701	10/10/1995	126.00000	mg/kg	=	18.7	2.2	70.9	X	X
Lead	A002SB007	002SB00701	10/10/1995	186.00000	mg/kg	J	30.2	4.1	93.1	X	X
Manganese	A002SB007	002SB00701	10/10/1995	68.00000	mg/kg	J		8.7	66.1		X
Cadmium	A002SB071	002SB07101	10/06/1993	4.00000	mg/kg	=	1	2.8	2.8	X	X
Copper	A002SB071	002SB07101	10/06/1993	75.00000	mg/kg	=	18.7	2.2	70.9	X	X
Lead	A002SB071	002SB07101	10/06/1993	310.00000	mg/kg	J	30.2	4.1	93.1	X	X
Manganese	A002SB071	002SB07101	10/06/1993	81.00000	mg/kg	=		8.7	66.1		X
Nickel	A002SB071	002SB07101	10/06/1993	18.00000	mg/kg	=	15.9	3.2	15.4	X	X
Zinc	A002SB071	002SB07101	10/06/1993	290.00000	mg/kg	=	124	4.5	168	X	X
Manganese	A002SB081	002SB08101	10/06/1993	140.00000	mg/kg	=		8.7	66.1		X
Chromium, Total	A002SB101	002SB10101	10/06/1993	36.00000	mg/kg	=	52.3	5.7	34.4		X
Nickel	A002SB101	002SB10101	10/06/1993	19.00000	mg/kg	=	15.9	3.2	15.4	X	X
Lead	A002SBC02	002SBC0201	03/29/1999	3980.00000	mg/kg	=	30.2	4.1	93.1	X	X
Barium	A042SB010	042SB01001	10/07/1995	160.00000	mg/kg	=		6.5	46.5		X
Beryllium	A042SB010	042SB01001	10/07/1995	0.38000	mg/kg	J		0.32	0.32		X
Copper	A042SB010	042SB01001	10/07/1995	121.00000	mg/kg	=	18.7	2.2	70.9	X	X
Lead	A042SB010	042SB01001	10/07/1995	339.00000	mg/kg	=	30.2	4.1	93.1	X	X
Manganese	A042SB010	042SB01001	10/07/1995	73.70000	mg/kg	J		8.7	66.1		X
Mercury	A042SB010	042SB01001	10/07/1995	0.32000	mg/kg	J	0.13	0.12	0.3	X	X
Selenium	A042SB010	042SB01001	10/07/1995	1.20000	mg/kg	J		0.7	0.88		X
Vanadium	A042SB010	042SB01001	10/07/1995	39.90000	mg/kg	=		4.9	28.1		X
Zinc	A042SB010	042SB01001	10/07/1995	303.00000	mg/kg	=	124	4.5	168	X	X
Anthracene	A042SB010	042SB01001	10/07/1995	0.49000	mg/kg	J	0.33			X	
Benzo(a)Anthracene	A042SB010	042SB01001	10/07/1995	1.10000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	A042SB010	042SB01001	10/07/1995	1.00000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB010	042SB01001	10/07/1995	3.40000	mg/kg	=			0.608		X
Chrysene	A042SB010	042SB01001	10/07/1995	2.40000	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	A042SB010	042SB01001	10/07/1995	0.35000	mg/kg	J	0.33		0.525	X	
Fluoranthene	A042SB010	042SB01001	10/07/1995	4.00000	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB010	042SB01001	10/07/1995	0.85000	mg/kg	J			0.525		X
Phenanthrene	A042SB010	042SB01001	10/07/1995	2.10000	mg/kg	=	0.33			X	
Pyrene	A042SB010	042SB01001	10/07/1995	2.90000	mg/kg	=	0.33			X	
BEQ	A042SB010	042SB01001	10/07/1995	1892.40000	ug/kg	=			1.304		X
Benzo(a)Anthracene	A042SB016	042SB01601	03/29/1996	0.50000	mg/kg	J	0.33		0.616	X	
Benzo(a)Pyrene	A042SB016	042SB01601	03/29/1996	0.64000	mg/kg	J	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB016	042SB01601	03/29/1996	0.88000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	A042SB016	042SB01601	03/29/1996	0.64000	mg/kg	J			0.596		X
Chrysene	A042SB016	042SB01601	03/29/1996	0.68000	mg/kg	J	0.33		0.62	X	X
Fluoranthene	A042SB016	042SB01601	03/29/1996	0.62000	mg/kg	J	0.33			X	
Pyrene	A042SB016	042SB01601	03/29/1996	0.61000	mg/kg	J	0.33			X	
Arsenic	A042SB017	042SB01701	03/29/1996	38.60000	mg/kg	=	7.24	1.7	30.1	X	X
Manganese	A042SB017	042SB01701	03/29/1996	81.50000	mg/kg	=		8.7	66.1		X
Benzo(a)Anthracene	A042SB017	042SB01701	03/29/1996	0.82000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	A042SB017	042SB01701	03/29/1996	1.10000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	A042SB017	042SB01701	03/29/1996	1.00000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	A042SB017	042SB01701	03/29/1996	1.00000	mg/kg	=			0.596		X
Chrysene	A042SB017	042SB01701	03/29/1996	0.95000	mg/kg	=	0.33		0.62	X	X
Dibenz(a,h)anthracene	A042SB017	042SB01701	03/29/1996	0.50000	mg/kg	J	0.33		0.525	X	
Fluoranthene	A042SB017	042SB01701	03/29/1996	1.50000	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	A042SB017	042SB01701	03/29/1996	0.90000	mg/kg	=			0.525		X
Phenanthrene	A042SB017	042SB01701	03/29/1996	0.54000	mg/kg	J	0.33			X	
Pyrene	A042SB017	042SB01701	03/29/1996	1.20000	mg/kg	=	0.33			X	
BEQ	A042SB017	042SB01701	03/29/1996	1882.95000	ug/kg	=			1.304		X
Lead	A042SB019	042SB01901	03/29/1996	128.00000	mg/kg	J	30.2	4.1	93.1	X	X
Manganese	A042SB019	042SB01901	03/29/1996	68.40000	mg/kg	=		8.7	66.1		X
Mercury	A042SB019	042SB01901	03/29/1996	0.35000	mg/kg	=	0.13	0.12	0.3	X	X
Fluoranthene	A042SB019	042SB01901	03/29/1996	0.36000	mg/kg	J	0.33			X	
Fluoranthene	A042SB042	042SB04201	10/14/1998	0.51000	mg/kg	=	0.33			X	
Pyrene	A042SB042	042SB04201	10/14/1998	0.58000	mg/kg	=	0.33			X	

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Barium	AS01SB002	S01SB00201	10/27/1993	98.40000	mg/kg	=		6.5	46.5		X
Chromium, Total	AS01SB002	S01SB00201	10/27/1993	38.70000	mg/kg	=	52.3	5.7	34.4		X
Copper	AS01SB002	S01SB00201	10/27/1993	443.00000	mg/kg	J	18.7	2.2	70.9	X	X
Manganese	AS01SB002	S01SB00201	10/27/1993	109.00000	mg/kg	J		8.7	66.1		X
Mercury	AS01SB002	S01SB00201	10/27/1993	14.80000	mg/kg	J	0.13	0.12	0.3	X	X
Vanadium	AS01SB002	S01SB00201	10/27/1993	55.00000	mg/kg	=		4.9	28.1		X
Zinc	AS01SB002	S01SB00201	10/27/1993	369.00000	mg/kg	=	124	4.5	168	X	X
Chromium, Total	AS02SB010	S02SB01001	10/06/1993	36.00000	mg/kg	=	52.3	5.7	34.4		X
Nickel	AS02SB010	S02SB01001	10/06/1993	19.00000	mg/kg	=	15.9	3.2	15.4	X	X
Copper	AS02SB018	S02SB01801	10/26/1993	100.00000	mg/kg	=	18.7	2.2	70.9	X	X
Cadmium	E054SB041	054SB04101	09/17/2002	2.85000	mg/kg	=	1	0.06	1.5	X	X
Lead	E054SB041	054SB04101	09/17/2002	673.00000	mg/kg	J	30.2	1	400	X	X
Mercury	E054SB041	054SB04101	09/17/2002	2.74000	mg/kg	=	0.13	0.03	2.7	X	X
Zinc	E054SB041	054SB04101	09/17/2002	1050.00000	mg/kg	=	124	1.9	855	X	X
Fluoranthene	E054SB041	054SB04101	09/17/2002	0.54100	mg/kg	=	0.33			X	
Phenanthrene	E054SB041	054SB04101	09/17/2002	0.34500	mg/kg	J	0.33			X	
Pyrene	E054SB041	054SB04101	09/17/2002	0.57000	mg/kg	J	0.33			X	
Antimony	E054SB045	054SB04501	09/17/2002	10.90000	mg/kg	J	12	0.5	7.4		X
Beryllium	E054SB045	054SB04501	09/17/2002	7.49000	mg/kg	=		0.13	1.6		X
Cadmium	E054SB045	054SB04501	09/17/2002	1.65000	mg/kg	=	1	0.06	1.5	X	X
Lead	E054SB045	054SB04501	09/17/2002	643.00000	mg/kg	J	30.2	1	400	X	X
Zinc	E054SB045	054SB04501	09/17/2002	2990.00000	mg/kg	=	124	1.9	855	X	X
Lead	E054SB049	054SB04901	09/16/2002	822.00000	mg/kg	=	30.2	1	400	X	X
Fluoranthene	E054SB058	054SB05801	12/20/2002	0.38900	mg/kg	=	0.33			X	
Pyrene	E054SB058	054SB05801	12/20/2002	0.48600	mg/kg	=	0.33			X	
Benzo(a)Pyrene	E054SB059	054SB05901	12/20/2002	0.33400	mg/kg	=	0.33		0.598	X	
Benzo(b)Fluoranthene	E054SB059	054SB05901	12/20/2002	1.10000	mg/kg	=			0.608		X
Fluoranthene	E054SB059	054SB05901	12/20/2002	0.49100	mg/kg	=	0.33			X	
Pyrene	E054SB059	054SB05901	12/20/2002	0.74100	mg/kg	=	0.33			X	
Benzo(a)Anthracene	E054SB061	054SB06101	01/23/2003	0.85000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	E054SB061	054SB06101	01/23/2003	0.65900	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	E054SB061	054SB06101	01/23/2003	1.43000	mg/kg	=			0.608		X
Chrysene	E054SB061	054SB06101	01/23/2003	0.90600	mg/kg	=	0.33		0.62	X	X
Fluoranthene	E054SB061	054SB06101	01/23/2003	1.52000	mg/kg	=	0.33			X	
Phenanthrene	E054SB061	054SB06101	01/23/2003	1.14000	mg/kg	=	0.33			X	
Pyrene	E054SB061	054SB06101	01/23/2003	1.65000	mg/kg	=	0.33			X	
Copper	H009SB031	009SB03101	09/27/1993	660.00000	mg/kg	=	18.7	0.94	126	X	X
Zinc	H009SB031	009SB03101	09/27/1993	520.00000	mg/kg	=	124	5	431	X	X
Anthracene	H009SB031	009SB03101	09/27/1993	0.43000	mg/kg	J	0.33			X	
Benzo(a)Anthracene	H009SB031	009SB03101	09/27/1993	1.50000	mg/kg	J	0.33		0.616	X	X
Benzo(a)Pyrene	H009SB031	009SB03101	09/27/1993	1.40000	mg/kg	J	0.33		0.598	X	X
Benzo(b)Fluoranthene	H009SB031	009SB03101	09/27/1993	2.10000	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	H009SB031	009SB03101	09/27/1993	0.69000	mg/kg	J			0.596		X
Chrysene	H009SB031	009SB03101	09/27/1993	1.50000	mg/kg	J	0.33		0.62	X	X
Fluoranthene	H009SB031	009SB03101	09/27/1993	2.70000	mg/kg	J	0.33			X	
Indeno(1,2,3-c,d)pyrene	H009SB031	009SB03101	09/27/1993	0.89000	mg/kg	J			0.525		X
Phenanthrene	H009SB031	009SB03101	09/27/1993	1.70000	mg/kg	J	0.33			X	
Pyrene	H009SB031	009SB03101	09/27/1993	3.80000	mg/kg	J	0.33			X	
BEQ	H009SB031	009SB03101	09/27/1993	2047.40000	ug/kg	=			1.304		X
Barium	H009SB061	009SB06101	09/29/1993	79.00000	mg/kg	=		3.6	72.8		X
Copper	H009SB061	009SB06101	09/29/1993	570.00000	mg/kg	=	18.7	0.94	126	X	X
PCB-1260 (Arochlor 1260)	H009SB061	009SB06101	09/29/1993	0.23000	mg/kg	J	0.033			X	
Dieldrin	H009SB061	009SB06101	09/29/1993	0.00480	mg/kg	J	0.0033			X	
Thallium	H121SB001	121SB00101	08/26/1994	2.70000	mg/kg	J		0.12	1.1		X
Antimony	H121SB002	121SB00201	08/26/1994	3.10000	mg/kg	J	12	1.1	2.2		X
Barium	H121SB002	121SB00201	08/26/1994	89.80000	mg/kg	=		3.6	72.8		X
Cadmium	H121SB002	121SB00201	08/26/1994	1.70000	mg/kg	=	1	0.12	1.6	X	X
Copper	H121SB002	121SB00201	08/26/1994	388.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB002	121SB00201	08/26/1994	254.00000	mg/kg	=	30.2	1.8	172	X	X
Mercury	H121SB002	121SB00201	08/26/1994	4.60000	mg/kg	=	0.13	0.02	3.8	X	X
Nickel	H121SB002	121SB00201	08/26/1994	164.00000	mg/kg	=	15.9	0.63	91.8	X	X
Vanadium	H121SB002	121SB00201	08/26/1994	315.00000	mg/kg	=		4.1	74.8		X
Zinc	H121SB002	121SB00201	08/26/1994	900.00000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB002	121SB00201	08/26/1994	0.12000	mg/kg	J	0.033			X	
Gamma-chlordane	H121SB002	121SB00201	08/26/1994	0.00400	mg/kg	J	0.0017			X	
Antimony	H121SB003	121SB00301	08/26/1994	4.90000	mg/kg	J	12	1.1	2.2		X
Beryllium	H121SB003	121SB00301	08/26/1994	1.70000	mg/kg	=		0.04	1.4		X
Cobalt	H121SB003	121SB00301	08/26/1994	10.90000	mg/kg	=		0.49	7.9		X
Copper	H121SB003	121SB00301	08/26/1994	455.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB003	121SB00301	08/26/1994	247.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB003	121SB00301	08/26/1994	113.00000	mg/kg	=	15.9	0.63	91.8	X	X
Zinc	H121SB003	121SB00301	08/26/1994	1250.00000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB003	121SB00301	08/26/1994	0.11000	mg/kg	=	0.033			X	

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Antimony	H121SB004	121SB00401	08/26/1994	2.80000	mg/kg	J	12	1.1	2.2		X
Arsenic	H121SB004	121SB00401	08/26/1994	18.70000	mg/kg	=	7.24	0.64	18.4	X	X
Barium	H121SB004	121SB00401	08/26/1994	184.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB004	121SB00401	08/26/1994	4.80000	mg/kg	=		0.04	1.4		X
Cobalt	H121SB004	121SB00401	08/26/1994	31.80000	mg/kg	=		0.49	7.9		X
Copper	H121SB004	121SB00401	08/26/1994	1360.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB004	121SB00401	08/26/1994	814.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB004	121SB00401	08/26/1994	374.00000	mg/kg	=	15.9	0.63	91.8	X	X
Vanadium	H121SB004	121SB00401	08/26/1994	76.30000	mg/kg	=		4.1	74.8		X
Zinc	H121SB004	121SB00401	08/26/1994	4470.00000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB004	121SB00401	08/26/1994	0.12000	mg/kg	=	0.033			X	
2-Methylnaphthalene	H121SB004	121SB00401	08/26/1994	0.47000	mg/kg	=	0.33			X	
Antimony	H121SB005	121SB00501	08/26/1994	7.30000	mg/kg	J	12	1.1	2.2		X
Cadmium	H121SB005	121SB00501	08/26/1994	1.80000	mg/kg	J	1	0.12	1.6	X	X
Copper	H121SB005	121SB00501	08/26/1994	460.00000	mg/kg	=	18.7	0.94	126	X	X
Zinc	H121SB005	121SB00501	08/26/1994	689.00000	mg/kg	=	124	5	431	X	X
Barium	H121SB006	121SB00601	01/16/1995	155.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB006	121SB00601	01/16/1995	4.70000	mg/kg	=		0.04	1.4		X
Cobalt	H121SB006	121SB00601	01/16/1995	28.20000	mg/kg	=		0.49	7.9		X
Copper	H121SB006	121SB00601	01/16/1995	1690.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB006	121SB00601	01/16/1995	837.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB006	121SB00601	01/16/1995	383.00000	mg/kg	=	15.9	0.63	91.8	X	X
Selenium	H121SB006	121SB00601	01/16/1995	3.20000	mg/kg	J		0.28	2.6		X
Vanadium	H121SB006	121SB00601	01/16/1995	93.80000	mg/kg	=		4.1	74.8		X
Zinc	H121SB006	121SB00601	01/16/1995	4520.00000	mg/kg	=	124	5	431	X	X
PCB-1254 (Arochlor 1254)	H121SB006	121SB00601	01/16/1995	0.14000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB006	121SB00601	01/16/1995	0.13000	mg/kg	=	0.033			X	
Barium	H121SB007	121SB00701	01/13/1995	407.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB007	121SB00701	01/13/1995	14.60000	mg/kg	=		0.04	1.4		X
Chromium, Total	H121SB007	121SB00701	01/13/1995	210.00000	mg/kg	=	52.3	3.4	114	X	X
Cobalt	H121SB007	121SB00701	01/13/1995	97.20000	mg/kg	=		0.49	7.9		X
Copper	H121SB007	121SB00701	01/13/1995	4060.00000	mg/kg	=	18.7	0.94	126	X	X
Iron	H121SB007	121SB00701	01/13/1995	80800.00000	mg/kg	=		695	38800		X
Lead	H121SB007	121SB00701	01/13/1995	2770.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB007	121SB00701	01/13/1995	995.00000	mg/kg	=	15.9	0.63	91.8	X	X
Vanadium	H121SB007	121SB00701	01/13/1995	470.00000	mg/kg	=		4.1	74.8		X
Zinc	H121SB007	121SB00701	01/13/1995	15100.00000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB007	121SB00701	01/13/1995	0.06600	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB007	121SB00701	01/13/1995	0.21000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB007	121SB00701	01/13/1995	0.27000	mg/kg	=	0.033			X	
Barium	H121SB009	121SB00901	01/16/1995	114.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB009	121SB00901	01/16/1995	3.20000	mg/kg	=		0.04	1.4		X
Cobalt	H121SB009	121SB00901	01/16/1995	19.50000	mg/kg	=		0.49	7.9		X
Copper	H121SB009	121SB00901	01/16/1995	984.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB009	121SB00901	01/16/1995	497.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB009	121SB00901	01/16/1995	217.00000	mg/kg	=	15.9	0.63	91.8	X	X
Zinc	H121SB009	121SB00901	01/16/1995	3170.00000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB009	121SB00901	01/16/1995	0.14000	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB009	121SB00901	01/16/1995	0.24000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB009	121SB00901	01/16/1995	0.33000	mg/kg	=	0.033			X	
Benzo(a)Anthracene	H121SB009	121SB00901	01/16/1995	0.52000	mg/kg	=	0.33		0.616	X	
Benzo(a)Pyrene	H121SB009	121SB00901	01/16/1995	0.54000	mg/kg	=	0.33		0.598	X	
Benzo(b)Fluoranthene	H121SB009	121SB00901	01/16/1995	0.78000	mg/kg	=			0.608		X
Chrysene	H121SB009	121SB00901	01/16/1995	0.56000	mg/kg	=	0.33		0.62	X	
Fluoranthene	H121SB009	121SB00901	01/16/1995	0.85000	mg/kg	=	0.33			X	
Pyrene	H121SB009	121SB00901	01/16/1995	0.75000	mg/kg	=	0.33			X	
Barium	H121SB010	121SB01001	01/16/1995	530.00000	mg/kg	J		3.6	72.8		X
Beryllium	H121SB010	121SB01001	01/16/1995	1.70000	mg/kg	J		0.04	1.4		X
Cobalt	H121SB010	121SB01001	01/16/1995	14.00000	mg/kg	J		0.49	7.9		X
Copper	H121SB010	121SB01001	01/16/1995	585.00000	mg/kg	J	18.7	0.94	126	X	X
Lead	H121SB010	121SB01001	01/16/1995	420.00000	mg/kg	J	30.2	1.8	172	X	X
Nickel	H121SB010	121SB01001	01/16/1995	164.00000	mg/kg	J	15.9	0.63	91.8	X	X
Zinc	H121SB010	121SB01001	01/16/1995	1910.00000	mg/kg	J	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB010	121SB01001	01/16/1995	0.10000	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB010	121SB01001	01/16/1995	0.35000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB010	121SB01001	01/16/1995	0.43000	mg/kg	=	0.033			X	
Benzo(a)Anthracene	H121SB010	121SB01001	01/16/1995	0.51000	mg/kg	=	0.33		0.616	X	
Benzo(a)Pyrene	H121SB010	121SB01001	01/16/1995	0.62000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB010	121SB01001	01/16/1995	1.30000	mg/kg	=			0.608		X
Chrysene	H121SB010	121SB01001	01/16/1995	0.60000	mg/kg	=	0.33		0.62	X	
Fluoranthene	H121SB010	121SB01001	01/16/1995	0.73000	mg/kg	=	0.33			X	
Pyrene	H121SB010	121SB01001	01/16/1995	0.69000	mg/kg	=	0.33			X	
Barium	H121SB011	121SB01101	01/16/1995	164.00000	mg/kg	=		3.6	72.8		X

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Beryllium	H121SB011	121SB01101	01/16/1995	2.00000	mg/kg	=		0.04	1.4		X
Cobalt	H121SB011	121SB01101	01/16/1995	13.60000	mg/kg	=		0.49	7.9		X
Copper	H121SB011	121SB01101	01/16/1995	762.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H121SB011	121SB01101	01/16/1995	546.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB011	121SB01101	01/16/1995	154.00000	mg/kg	=	15.9	0.63	91.8	X	X
Silver	H121SB011	121SB01101	01/16/1995	1.10000	mg/kg	J	2	0.55	0.74		X
Vanadium	H121SB011	121SB01101	01/16/1995	119.00000	mg/kg	=		4.1	74.8		X
Zinc	H121SB011	121SB01101	01/16/1995	2110.00000	mg/kg	=	124	5	431	X	X
PCB-1248 (Arochlor 1248)	H121SB011	121SB01101	01/16/1995	0.16000	mg/kg	=	0.033			X	
PCB-1254 (Arochlor 1254)	H121SB011	121SB01101	01/16/1995	0.32000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB011	121SB01101	01/16/1995	0.54000	mg/kg	=	0.033			X	
Anthracene	H121SB011	121SB01101	01/16/1995	0.61000	mg/kg	=	0.33			X	
Benzo(a)Anthracene	H121SB011	121SB01101	01/16/1995	1.90000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H121SB011	121SB01101	01/16/1995	1.70000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB011	121SB01101	01/16/1995	2.70000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	H121SB011	121SB01101	01/16/1995	0.79000	mg/kg	J			0.596		X
Chrysene	H121SB011	121SB01101	01/16/1995	2.00000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	H121SB011	121SB01101	01/16/1995	3.90000	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB011	121SB01101	01/16/1995	0.75000	mg/kg	=			0.525		X
Phenanthrene	H121SB011	121SB01101	01/16/1995	2.20000	mg/kg	=	0.33			X	
Pyrene	H121SB011	121SB01101	01/16/1995	3.40000	mg/kg	=	0.33			X	
BEQ	H121SB011	121SB01101	01/16/1995	2524.90000	ug/kg	=			1.304		X
Copper	H121SB013	121SB01301	03/22/1995	239.00000	mg/kg	J	18.7	0.94	126	X	X
Zinc	H121SB013	121SB01301	03/22/1995	536.00000	mg/kg	J	124	5	431	X	X
Acenaphthylene	H121SB013	121SB01301	03/22/1995	0.59000	mg/kg	=	0.33			X	
Anthracene	H121SB013	121SB01301	03/22/1995	0.42000	mg/kg	=	0.33			X	
Benzo(a)Anthracene	H121SB013	121SB01301	03/22/1995	1.60000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H121SB013	121SB01301	03/22/1995	1.40000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB013	121SB01301	03/22/1995	2.00000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	H121SB013	121SB01301	03/22/1995	2.20000	mg/kg	J			0.596		X
Chrysene	H121SB013	121SB01301	03/22/1995	1.70000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	H121SB013	121SB01301	03/22/1995	1.50000	mg/kg	=	0.33			X	
Indeno(1,2,3-c,d)pyrene	H121SB013	121SB01301	03/22/1995	0.53000	mg/kg	=			0.525		X
Phenanthrene	H121SB013	121SB01301	03/22/1995	0.44000	mg/kg	=	0.33			X	
Pyrene	H121SB013	121SB01301	03/22/1995	2.30000	mg/kg	=	0.33			X	
BEQ	H121SB013	121SB01301	03/22/1995	2106.70000	ug/kg	=			1.304		X
Barium	H121SB014	121SB01401	03/22/1995	142.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB014	121SB01401	03/22/1995	4.10000	mg/kg	=		0.04	1.4		X
Cadmium	H121SB014	121SB01401	03/22/1995	2.50000	mg/kg	J	1	0.12	1.6	X	X
Cobalt	H121SB014	121SB01401	03/22/1995	22.40000	mg/kg	=		0.49	7.9		X
Copper	H121SB014	121SB01401	03/22/1995	883.00000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB014	121SB01401	03/22/1995	67500.00000	mg/kg	J		695	38800		X
Lead	H121SB014	121SB01401	03/22/1995	549.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB014	121SB01401	03/22/1995	259.00000	mg/kg	J	15.9	0.63	91.8	X	X
Silver	H121SB014	121SB01401	03/22/1995	1.20000	mg/kg	J	2	0.55	0.74		X
Vanadium	H121SB014	121SB01401	03/22/1995	93.90000	mg/kg	=		4.1	74.8		X
Zinc	H121SB014	121SB01401	03/22/1995	3840.00000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB014	121SB01401	03/22/1995	0.11000	mg/kg	=	0.033			X	
Cobalt	H121SB015	121SB01501	03/22/1995	11.80000	mg/kg	=		0.49	7.9		X
Copper	H121SB015	121SB01501	03/22/1995	734.00000	mg/kg	J	18.7	0.94	126	X	X
Lead	H121SB015	121SB01501	03/22/1995	344.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB015	121SB01501	03/22/1995	127.00000	mg/kg	J	15.9	0.63	91.8	X	X
Zinc	H121SB015	121SB01501	03/22/1995	1600.00000	mg/kg	=	124	5	431	X	X
PCB-1260 (Arochlor 1260)	H121SB015	121SB01501	03/22/1995	0.12000	mg/kg	=	0.033			X	
Fluoranthene	H121SB015	121SB01501	03/22/1995	0.60000	mg/kg	=	0.33			X	
Phenanthrene	H121SB015	121SB01501	03/22/1995	0.44000	mg/kg	=	0.33			X	
Pyrene	H121SB015	121SB01501	03/22/1995	0.57000	mg/kg	=	0.33			X	
Barium	H121SB016	121SB01601	03/22/1995	110.00000	mg/kg	=		3.6	72.8		X
Beryllium	H121SB016	121SB01601	03/22/1995	4.60000	mg/kg	=		0.04	1.4		X
Cadmium	H121SB016	121SB01601	03/22/1995	1.70000	mg/kg	J	1	0.12	1.6	X	X
Cobalt	H121SB016	121SB01601	03/22/1995	19.90000	mg/kg	=		0.49	7.9		X
Copper	H121SB016	121SB01601	03/22/1995	1090.00000	mg/kg	J	18.7	0.94	126	X	X
Iron	H121SB016	121SB01601	03/22/1995	57300.00000	mg/kg	J		695	38800		X
Lead	H121SB016	121SB01601	03/22/1995	871.00000	mg/kg	=	30.2	1.8	172	X	X
Nickel	H121SB016	121SB01601	03/22/1995	240.00000	mg/kg	J	15.9	0.63	91.8	X	X
Silver	H121SB016	121SB01601	03/22/1995	1.00000	mg/kg	J	2	0.55	0.74		X
Zinc	H121SB016	121SB01601	03/22/1995	3180.00000	mg/kg	=	124	5	431	X	X
PCB-1254 (Arochlor 1254)	H121SB016	121SB01601	03/22/1995	4.30000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H121SB016	121SB01601	03/22/1995	1.10000	mg/kg	=	0.033			X	
Benzo(a)Anthracene	H121SB016	121SB01601	03/22/1995	0.57000	mg/kg	J	0.33		0.616	X	
Benzo(a)Pyrene	H121SB016	121SB01601	03/22/1995	0.62000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H121SB016	121SB01601	03/22/1995	1.00000	mg/kg	=			0.608		X
Chrysene	H121SB016	121SB01601	03/22/1995	0.63000	mg/kg	=	0.33		0.62	X	X

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Fluoranthene	H121SB016	121SB01601	03/22/1995	1.10000	mg/kg	=	0.33			X	
Phenanthrene	H121SB016	121SB01601	03/22/1995	0.44000	mg/kg	J	0.33			X	
Pyrene	H121SB016	121SB01601	03/22/1995	1.10000	mg/kg	=	0.33			X	
PCB-1260 (Arochlor 1260)	H121SB017	121SB01701	03/22/1995	0.17000	mg/kg	=	0.033			X	
Antimony	H196SB003	196SB00301	09/01/1999	2.80000	mg/kg	J	12	1.1	2.2		X
Copper	H196SB003	196SB00301	09/01/1999	154.00000	mg/kg	=	18.7	0.94	126	X	X
Nickel	H196SB003	196SB00301	09/01/1999	102.00000	mg/kg	=	15.9	0.63	91.8	X	X
PCB-1254 (Arochlor 1254)	H196SB003	196SB00301	09/01/1999	0.09300	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB003	196SB00301	09/01/1999	0.05300	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB003	196SB00301	09/01/1999	0.00660	mg/kg	J	0.0017			X	
Antimony	H196SB004	196SB00401	09/01/1999	46.30000	mg/kg	J	12	1.1	2.2	X	X
Barium	H196SB004	196SB00401	09/01/1999	139.00000	mg/kg	=		3.6	72.8		X
Cadmium	H196SB004	196SB00401	09/01/1999	2.50000	mg/kg	J	1	0.12	1.6	X	X
Cobalt	H196SB004	196SB00401	09/01/1999	10.00000	mg/kg	=		0.49	7.9		X
Copper	H196SB004	196SB00401	09/01/1999	641.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H196SB004	196SB00401	09/01/1999	734.00000	mg/kg	=	30.2	1.8	172	X	X
Silver	H196SB004	196SB00401	09/01/1999	1.90000	mg/kg	=	2	0.55	0.74		X
Zinc	H196SB004	196SB00401	09/01/1999	1040.00000	mg/kg	=	124	5	431	X	X
PCB-1254 (Arochlor 1254)	H196SB004	196SB00401	09/01/1999	0.26000	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB004	196SB00401	09/01/1999	0.15000	mg/kg	J	0.033			X	
Alpha-chlordane	H196SB004	196SB00401	09/01/1999	0.02800	mg/kg	J	0.0017			X	
Gamma-chlordane	H196SB004	196SB00401	09/01/1999	0.03400	mg/kg	=	0.0017			X	
Antimony	H196SB005	196SB00501	09/01/1999	8.60000	mg/kg	J	12	1.1	2.2		X
Copper	H196SB005	196SB00501	09/01/1999	270.00000	mg/kg	=	18.7	0.94	126	X	X
Vanadium	H196SB005	196SB00501	09/01/1999	137.00000	mg/kg	=		4.1	74.8		X
PCB-1254 (Arochlor 1254)	H196SB005	196SB00501	09/01/1999	0.10000	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB005	196SB00501	09/01/1999	0.09700	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB005	196SB00501	09/01/1999	0.00500	mg/kg	J	0.0017			X	
Benzo(a)Anthracene	H196SB005	196SB00501	09/01/1999	0.38000	mg/kg	=	0.33		0.616	X	
Benzo(b)Fluoranthene	H196SB005	196SB00501	09/01/1999	0.64000	mg/kg	=			0.608		X
Chrysene	H196SB005	196SB00501	09/01/1999	0.91000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	H196SB005	196SB00501	09/01/1999	2.00000	mg/kg	=	0.33			X	
Phenanthrene	H196SB005	196SB00501	09/01/1999	0.66000	mg/kg	=	0.33			X	
Pyrene	H196SB005	196SB00501	09/01/1999	1.40000	mg/kg	=	0.33			X	
Copper	H196SB006	196SB00601	09/01/1999	226.00000	mg/kg	=	18.7	0.94	126	X	X
PCB-1254 (Arochlor 1254)	H196SB006	196SB00601	09/01/1999	0.12000	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB006	196SB00601	09/01/1999	0.12000	mg/kg	J	0.033			X	
Benzo(a)Anthracene	H196SB006	196SB00601	09/01/1999	1.00000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	H196SB006	196SB00601	09/01/1999	0.73000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	H196SB006	196SB00601	09/01/1999	1.40000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	H196SB006	196SB00601	09/01/1999	0.61000	mg/kg	=			0.596		X
Chrysene	H196SB006	196SB00601	09/01/1999	1.60000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	H196SB006	196SB00601	09/01/1999	1.90000	mg/kg	=	0.33			X	
Phenanthrene	H196SB006	196SB00601	09/01/1999	0.40000	mg/kg	=	0.33			X	
Pyrene	H196SB006	196SB00601	09/01/1999	1.70000	mg/kg	=	0.33			X	
Copper	H196SB007	196SB00701	09/02/1999	151.00000	mg/kg	=	18.7	0.94	126	X	X
PCB-1254 (Arochlor 1254)	H196SB007	196SB00701	09/02/1999	0.13000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB007	196SB00701	09/02/1999	0.13000	mg/kg	=	0.033			X	
Antimony	H196SB008	196SB00801	09/02/1999	8.30000	mg/kg	J	12	1.1	2.2		X
Cobalt	H196SB008	196SB00801	09/02/1999	8.90000	mg/kg	J		0.49	7.9		X
Copper	H196SB008	196SB00801	09/02/1999	127.00000	mg/kg	=	18.7	0.94	126	X	X
Lead	H196SB008	196SB00801	09/02/1999	181.00000	mg/kg	J	30.2	1.8	172	X	X
PCB-1254 (Arochlor 1254)	H196SB006	196SB00801	09/02/1999	0.12000	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB008	196SB00801	09/02/1999	0.08700	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB008	196SB00801	09/02/1999	0.00380	mg/kg	J	0.0017			X	
Fluoranthene	H196SB008	196SB00801	09/02/1999	0.57000	mg/kg	=	0.33			X	
Pyrene	H196SB008	196SB00801	09/02/1999	0.53000	mg/kg	=	0.33			X	
PCB-1254 (Arochlor 1254)	H196SB009	196SB00901	09/02/1999	0.15000	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB009	196SB00901	09/02/1999	0.08900	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB009	196SB00901	09/02/1999	0.00410	mg/kg	J	0.0017			X	
PCB-1260 (Arochlor 1260)	H196SB010	196SB01001	09/02/1999	0.04000	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB010	196SB01001	09/02/1999	0.00610	mg/kg	J	0.0017			X	
PCB-1254 (Arochlor 1254)	H196SB011	196SB01101	09/02/1999	0.11000	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	H196SB011	196SB01101	09/02/1999	0.05900	mg/kg	=	0.033			X	
Dieldrin	H196SB011	196SB01101	09/02/1999	0.00370	mg/kg	J	0.0033			X	
Gamma-chlordane	H196SB011	196SB01101	09/02/1999	0.00320	mg/kg	J	0.0017			X	
Antimony	H196SB012	196SB01201	09/02/1999	2.30000	mg/kg	J	12	1.1	2.2		X
PCB-1260 (Arochlor 1260)	H196SB012	196SB01201	09/02/1999	0.05500	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB012	196SB01201	09/02/1999	0.00320	mg/kg	J	0.0017			X	
Antimony	H196SB013	196SB01301	09/02/1999	7.60000	mg/kg	J	12	1.1	2.2		X
PCB-1260 (Arochlor 1260)	H196SB013	196SB01301	09/02/1999	0.15000	mg/kg	J	0.033			X	
Gamma-chlordane	H196SB013	196SB01301	09/02/1999	0.00450	mg/kg	=	0.0017			X	
PCB-1260 (Arochlor 1260)	H196SB014	196SB01401	09/02/1999	0.06800	mg/kg	=	0.033			X	

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
PCB-1260 (Arochlor 1260)	H196SB015	196SB01501	09/02/1999	0.05400	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB015	196SB01501	09/02/1999	0.00550	mg/kg	J	0.0017			X	
PCB-1260 (Arochlor 1260)	H196SB017	196SB01701	09/03/1999	0.12000	mg/kg	=	0.033			X	
Gamma-chlordane	H196SB017	196SB01701	09/03/1999	0.01300	mg/kg	J	0.0017			X	
PCB-1260 (Arochlor 1260)	HGDHSB075	GDHSB07501	10/21/1994	0.12500	mg/kg	=	0.033			X	
PCB-1260 (Arochlor 1260)	HGDHSB089	GDHSB08901	11/30/1994	0.10000	mg/kg	=	0.033			X	
Alpha-chlordane	I177SB003	177SB00301	06/07/1996	0.00250	mg/kg	J	0.0017			X	
Gamma-chlordane	I177SB003	177SB00301	06/07/1996	0.00780	mg/kg	=	0.0017			X	
Benzo(a)Anthracene	I177SB010	177SB01001	04/03/1998	0.91000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I177SB010	177SB01001	04/03/1998	1.00000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	I177SB010	177SB01001	04/03/1998	1.00000	mg/kg	=			0.608		X
Benzo(k)Fluoranthene	I177SB010	177SB01001	04/03/1998	1.10000	mg/kg	=			0.596		X
Chrysene	I177SB010	177SB01001	04/03/1998	1.00000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	I177SB010	177SB01001	04/03/1998	1.40000	mg/kg	J	0.33			X	
Indeno(1,2,3-c,d)pyrene	I177SB010	177SB01001	04/03/1998	0.71000	mg/kg	=			0.525		X
Phenanthrene	I177SB010	177SB01001	04/03/1998	0.79000	mg/kg	=	0.33			X	
Pyrene	I177SB010	177SB01001	04/03/1998	1.70000	mg/kg	=	0.33			X	
BEQ	I177SB010	177SB01001	04/03/1998	1459.00000	ug/kg	=			1.304		X
Arsenic	I690SB002	690SB00201	12/14/1994	26.30000	mg/kg	=	7.24	0.46	19.7	X	X
Chromium, Total	I690SB005	690SB00501	12/16/1994	132.00000	mg/kg	=	52.3	7.5	53.7	X	X
PCB-1260 (Arochlor 1260)	I690SB005	690SB00501	12/16/1994	0.03900	mg/kg	J	0.033			X	
PCB-1260 (Arochlor 1260)	I690SB007	690SB00701	12/16/1994	0.05800	mg/kg	=	0.033			X	
Anthracene	I690SB007	690SB00701	12/16/1994	0.34000	mg/kg	J	0.33			X	
Benzo(a)Anthracene	I690SB007	690SB00701	12/16/1994	0.69000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB007	690SB00701	12/16/1994	0.57000	mg/kg	=	0.33		0.598	X	
Benzo(b)Fluoranthene	I690SB007	690SB00701	12/16/1994	0.69000	mg/kg	=			0.608		X
Chrysene	I690SB007	690SB00701	12/16/1994	0.65000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	I690SB007	690SB00701	12/16/1994	1.50000	mg/kg	=	0.33			X	
Phenanthrene	I690SB007	690SB00701	12/16/1994	1.30000	mg/kg	=	0.33			X	
Pyrene	I690SB007	690SB00701	12/16/1994	1.20000	mg/kg	=	0.33			X	
Gamma-chlordane	I690SB008	690SB00801	12/16/1994	0.00400	mg/kg	J	0.0017			X	
Chromium, Total	I690SB009	690SB00901	12/16/1994	66.20000	mg/kg	=	52.3	7.5	53.7	X	X
Mercury	I690SB010	690SB01001	12/16/1994	0.55000	mg/kg	=	0.13	0.13	0.47	X	X
Nickel	I690SB010	690SB01001	12/16/1994	62.30000	mg/kg	=	15.9	1.5	18.1	X	X
Zinc	I690SB010	690SB01001	12/16/1994	252.00000	mg/kg	=	124	5.9	150	X	X
PCB-1260 (Arochlor 1260)	I690SB010	690SB01001	12/16/1994	0.09500	mg/kg	=	0.033			X	
Chrysene	I690SB010	690SB01001	12/16/1994	0.53000	mg/kg	=	0.33		0.62	X	
Tin (Sn)	I690SB011	690SB01101c	02/08/1995	10.30000	mg/kg	J		0.98	7.5		X
Chromium, Total	I690SB013	690SB01301a	02/08/1995	55.90000	mg/kg	J	52.3	7.5	53.7	X	X
Selenium	I690SB014	690SB01401a	02/08/1995	1.20000	mg/kg	J		0.5	1.1		X
Chromium, Total	I690SB016	690SB01601a	02/09/1995	131.00000	mg/kg	J	52.3	7.5	53.7	X	X
PCB-1260 (Arochlor 1260)	I690SB016	690SB01601a	02/09/1995	0.09500	mg/kg	=	0.033			X	
Selenium	I690SB017	690SB01701b	02/09/1995	1.60000	mg/kg	J		0.5	1.1		X
Selenium	I690SB018	690SB01801a	02/09/1995	1.30000	mg/kg	J		0.5	1.1		X
Endrin	I690SB018	690SB01801a	02/09/1995	0.00560	mg/kg	J	0.0033			X	
Benzo(a)Anthracene	I690SB018	690SB01801a	02/09/1995	1.50000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB018	690SB01801a	02/09/1995	1.20000	mg/kg	=	0.33		0.598	X	X
Benzo(b)Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.40000	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.60000	mg/kg	J			0.596		X
Chrysene	I690SB018	690SB01801a	02/09/1995	1.60000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	I690SB018	690SB01801a	02/09/1995	2.60000	mg/kg	=	0.33			X	
Phenanthrene	I690SB018	690SB01801a	02/09/1995	0.95000	mg/kg	=	0.33			X	
Pyrene	I690SB018	690SB01801a	02/09/1995	2.20000	mg/kg	=	0.33			X	
BEQ	I690SB018	690SB01801a	02/09/1995	1788.60000	ug/kg	=			1.304		X
Barium	I690SB019	690SB01901a	02/09/1995	203.00000	mg/kg	J		7.8	43.4		X
Nickel	I690SB019	690SB01901a	02/09/1995	19.30000	mg/kg	J	15.9	1.5	18.1	X	X
Tin (Sn)	I690SB019	690SB01901a	02/09/1995	10.40000	mg/kg	J		0.98	7.5		X
Zinc	I690SB019	690SB01901a	02/09/1995	162.00000	mg/kg	J	124	5.9	150	X	X
PCB-1260 (Arochlor 1260)	I690SB019	690SB01901a	02/09/1995	0.08700	mg/kg	=	0.033			X	
Selenium	I690SB020	690SB02001a	02/09/1995	1.20000	mg/kg	J		0.5	1.1		X
Cadmium	I690SB021	690SB02101b	02/09/1995	1.00000	mg/kg	=	1	0.13	0.61		X
PCB-1260 (Arochlor 1260)	I690SB021	690SB02101b	02/09/1995	0.17000	mg/kg	=	0.033			X	
Chlordane	I690SB022	690SB02201b	02/13/1995	0.00760	mg/kg	=	0.0017			X	
Beryllium	I690SB026	690SB02601a	02/13/1995	1.00000	mg/kg	J		0.34	0.95		X
Chromium, Total	I690SB026	690SB02601a	02/13/1995	57.60000	mg/kg	=	52.3	7.5	53.7	X	X
Arsenic	I690SB029	690SB02901a	02/13/1995	28.70000	mg/kg	J	7.24	0.46	19.7	X	X
2-Methylnaphthalene	I690SB031	690SB03101	06/20/1995	0.69000	mg/kg	J	0.33			X	
Benzo(a)Anthracene	I690SB031	690SB03101	06/20/1995	0.69000	mg/kg	=	0.33		0.616	X	X
Benzo(a)Pyrene	I690SB031	690SB03101	06/20/1995	0.53000	mg/kg	J	0.33		0.598	X	
Benzo(b)Fluoranthene	I690SB031	690SB03101	06/20/1995	1.30000	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	I690SB031	690SB03101	06/20/1995	1.40000	mg/kg	J			0.596		X
Chrysene	I690SB031	690SB03101	06/20/1995	0.76000	mg/kg	=	0.33		0.62	X	X
Fluoranthene	I690SB031	690SB03101	06/20/1995	1.70000	mg/kg	=	0.33			X	

TABLE A2

Summary of Exceedances From Table 1 Chemicals Detected in Surface Soil Samples Near Water Bodies Where Sheet Flow Runoff May Transport Surface Soil to Sediment

Chemical	Station ID	Sample ID	Date Collected	Analytical Result	Units	Qualifier	Sediment Screening Value (SSV, mg/Kg)	Range of Background Concentrations (min, mg/Kg)	Range of Background Concentrations (max, mg/Kg)	Exceeds SSV	Exceeds BCK
Naphthalene	I690SB031	690SB03101	06/20/1995	**0.54000**	mg/kg	J	0.33			X	
Phenanthrene	I690SB031	690SB03101	06/20/1995	**0.92000**	mg/kg	=	0.33			X	
Pyrene	I690SB031	690SB03101	06/20/1995	**1.00000**	mg/kg	=	0.33			X	
Benzo(a)Anthracene	I690SB032	690SB03201	06/20/1995	**0.36000**	mg/kg	J	0.33		0.616	X	
Benzo(b)Fluoranthene	I690SB032	690SB03201	06/20/1995	0.62000	mg/kg	J			0.608		X
Benzo(k)Fluoranthene	I690SB032	690SB03201	06/20/1995	0.66000	mg/kg	J			0.596		X
Chrysene	I690SB032	690SB03201	06/20/1995	**0.39000**	mg/kg	J	0.33		0.62	X	
Fluoranthene	I690SB032	690SB03201	06/20/1995	**0.55000**	mg/kg	J	0.33			X	
Pyrene	I690SB032	690SB03201	06/20/1995	**0.58000**	mg/kg	J	0.33			X	
Cadmium	I690SB034	690SB03401	04/06/1998	0.70000	mg/kg	=	1	0.13	0.61		X
Chromium, Total	I690SB034	690SB03401	04/06/1998	**58.70000**	mg/kg	=	52.3	7.5	53.7	X	X
Nickel	I690SB034	690SB03401	04/06/1998	**41.10000**	mg/kg	=	15.9	1.5	18.1	X	X
Tin (Sn)	I690SB034	690SB03401	04/06/1998	**14.60000**	mg/kg	=		0.98	7.5		X
Zinc	I690SB034	690SB03401	04/06/1998	**152.00000**	mg/kg	J	124	5.9	150	X	X
Cadmium	I690SB035	690SB03501	04/06/1998	0.94000	mg/kg	=	1	0.13	0.61		X
Nickel	I690SB035	690SB03501	04/06/1998	**41.70000**	mg/kg	=	15.9	1.5	18.1	X	X
Selenium	I690SB035	690SB03501	04/06/1998	**1.20000**	mg/kg	J		0.5	1.1		X
Zinc	I690SB035	690SB03501	04/06/1998	**319.00000**	mg/kg	J	124	5.9	150	X	X
Manganese	I690SB036	690SB03601	04/02/1998	**461.00000**	mg/kg	J		15.1	426		X
Barium	I690SB042	690SB04201	04/06/1998	**43.70000**	mg/kg	=		7.8	43.4		X
Mercury	I690SB042	690SB04201	04/06/1998	**0.67000**	mg/kg	=	0.13	0.13	0.47	X	X
Nickel	I690SB042	690SB04201	04/06/1998	**20.70000**	mg/kg	=	15.9	1.5	18.1	X	X
Tin (Sn)	I690SB042	690SB04201	04/06/1998	**11.40000**	mg/kg	=		0.98	7.5		X
Zinc	I690SB042	690SB04201	04/06/1998	**184.00000**	mg/kg	J	124	5.9	150	X	X
Fluoranthene	I690SB042	690SB04201	04/06/1998	**0.37000**	mg/kg	J	0.33			X	
Aluminum	IDMASB001	DMASB00101	03/16/1995	**30400.00000**	mg/kg	J		3470	27400		X
Beryllium	IDMASB001	DMASB00101	03/16/1995	**1.20000**	mg/kg	J		0.34	0.95		X
Cadmium	IDMASB001	DMASB00101	03/16/1995	0.97000	mg/kg	=	1	0.13	0.61		X
Chromium, Total	IDMASB001	DMASB00101	03/16/1995	**59.50000**	mg/kg	J	52.3	7.5	53.7	X	X
Cobalt	IDMASB001	DMASB00101	03/16/1995	**6.90000**	mg/kg	J		0.64	5.8		X
Iron	IDMASB001	DMASB00101	03/16/1995	**31500.00000**	mg/kg	J		1730	22700		X
Selenium	IDMASB001	DMASB00101	03/16/1995	**1.90000**	mg/kg	J		0.5	1.1		X
Vanadium	IDMASB001	DMASB00101	03/16/1995	**67.10000**	mg/kg	J		8.5	53.3		X
PCB-1260 (Arochlor 1260)	IDMASB001	DMASB00101	03/16/1995	**0.06000**	mg/kg	=	0.033			X	
Endrin	IGDISB006	GDISB00601	02/16/1995	**0.00390**	mg/kg	J	0.0033			X	
Chlordane	IGDISB007	GDISB00701	02/16/1995	**0.00220**	mg/kg	J	0.0017			X	
Endrin Aldehyde	IGDISB007	GDISB00701	02/16/1995	**0.00390**	mg/kg	=	0.0033			X	
Chlordane	IRTCSB006	RTCSB00601	05/26/1995	**0.13000**	mg/kg	=	0.0017			X	
Chlordane	IRTCSB009	RTCSB00901	05/26/1995	**0.04000**	mg/kg	J	0.0017			X	
PCB-1260 (Arochlor 1260)	IRTCSB010	RTCSB01001	05/26/1995	**0.19000**	mg/kg	J	0.033			X	
Chlordane	IRTCSB010	RTCSB01001	05/26/1995	**0.68000**	mg/kg	J	0.0017			X	
Endrin	IRTCSB010	RTCSB01001	05/26/1995	**0.00510**	mg/kg	J	0.0033			X	
Endrin Aldehyde	IRTCSB010	RTCSB01001	05/26/1995	**0.00520**	mg/kg	J	0.0033			X	

Bold values exceed the SSV (and range of background concentrations for metals and cPAHs).
Non-bold indicates an exceedance of background only.

APPENDIX I.2

TECHNICAL MEMORANDUM: PROPOSED APPROACH FOR ADDRESSING DIOXIN (TEQ) IN SOILS AT THE CNC SITES.

Proposed Approach for Addressing Dioxin (TEQ) in Soils at the CNC Sites

PREPARED FOR: CNC BCT

PREPARED BY: Vijaya Mylavarapu/CH2M HILL

COPIES: Dean Williamson/CH2M HILL

DATE: March 6, 2002

Introduction

For all sites at which dioxins in soil have been reviewed so far by CH2M Jones, soil TEQ results have been below the EPA policy-based target cleanup level ("action level") of 1 ug/kg for unrestricted land use. During review of several RFI report addenda, DHEC has suggested that although DHEC does not expect to require active remediation at sites with dioxins in soil below the 1 ppb EPA action level, DHEC would like CH2M Jones to conduct a risk assessment for dioxins at sites where dioxins are detected above residential RBCs (typically a value below background concentrations).

CH2M Jones has responded that because the ultimate outcome for the remedial decision will not change based on the risk assessment and because of the large number of sites involved, a more efficient method for addressing dioxins in soil other than a large number of risk assessments would be of benefit to the BCT members. This issue was discussed at the February 2002 BCT meeting and it was agreed that CH2M Jones would review and summarize basewide TEQ values for comparison purposes and would propose a pathway forward for this issue.

In addition, Tony Hunt also recalled that the CNC BCT had previously reached some agreements on this same issue and indicated that he would forward any materials related to these decisions to the team.

Summary of Previous CNC BCT Agreements on Addressing TEQs

The past agency review discussions on TEQs were recently forwarded by Tony Hunt to the BCT members. The following conclusions were drawn from review of this material.

- Ted Simon/EPA did an analysis of Zone H TEQ data in 1995, developed an exposure scenario pertinent to Zone H sites, and recommended use of the EPA's exposure limit value of 1 ug/kg (ppb) as the target for Zone H sites. For sites with TEQs below 1 ppb, he concluded that no action is needed due to lack of excessive human health risks.
- DHEC in 1998 concluded that conducting site-by-site risk assessments for dioxins was not necessary, as part of the review of the Zone C RFI report. DHEC recommended that a qualitative discussion related to TEQs be included for the Zone C RFI report, as none of the soil concentrations exceeded 1 ppb level.

Based on these previous BCT conclusions and agreements for Zone C, it is not necessary to conduct site-by-site risk assessments for TEQs, if TEQ concentrations in soil are below 1 ppb. A qualitative discussion of TEQs should be apropriate where soil TEQs are less than 1 ppb. If TEQs are above 1 ppb, a risk assessment may be necessary.

Summary of Zone and Basewide TEQ Values in Soil

Attached Tables 1 to 3 present the data summaries for the TEQ levels within different zones of CNC for both surface and subsurface soils. These data include all site and background (grid) soil samples . Inspection of these tables indicates that no TEQ results for any soil samples within the CNC exceeded 1 ppb concentration.

Based on the previous discussions and data presented in these tables, CH2M Jones proposes to use the approach advocated for the Zone C RFI report and include a qualitative discussion of the TEQs for sites with TEQ data.

Table 1: TCDD Equivalent Concentrations in Surface Soil by Zone at CNC

Surface Soil							
Zone	**Units**	**Samples**	**Detects**	**Average (detects+non detects)**	**Average Detect**	**Minimum**	**Maximum**
B	ng/kg	3	3	3.3	3.3	0.56	8.4
C	ng/kg	19	19	6.0	6.0	0.46	65
D	ng/kg	1	1	3.4	3.4	3.4	3.4
E	ng/kg	62	62	2.3	2.3	0.23	46
F	ng/kg	13	13	2.0	2.0	0.23	12
G	ng/kg	20	20	51	51	0.29	970
H	ng/kg	119	119	19	19	0.66	428
I	ng/kg	53	53	1.7	1.7	0.23	11
K	ng/kg	40	40	3.9	3.9	0.32	39
K-Clouter	ng/kg	4	4	1.3	1.3	0.30	3.9

Table 2: TCDD Equivalent Concentrations in Subsurface Soil by Zone at CNC

Subsurface Soil							
Zone	**Units**	**Samples**	**Detects**	**Average (detects+non detects)**	**Average Detect**	**Minimum**	**Maximum**
A	ng/kg	4	4	0.72	0.72	0.63	0.90
C	ng/kg	13	13	0.75	0.75	0.31	2.5
E	ng/kg	28	28	1.2	1.2	0.16	6.8
F	ng/kg	1	1	0.86	0.86	0.86	0.86
G	ng/kg	5	4	34	42	0.42	160
H	ng/kg	63	63	8.9	8.9	0.41	57
I	ng/kg	17	17	0.40	0.40	0.084	0.91
K	ng/kg	26	25	1.1	1.1	0.35	3.4
K-Clouter	ng/kg	1	1	0.30	0.30	0.30	0.30

Table 3: CNC Base-wide TCDD Equivalent Concentrations in Surface and Subsurface Soil

Media	Units	Samples	Detects	Average (detects+non detects)	Average Detects	Minimum	Maximum
SS	ng/kg	346	346	11.56	11.56	0.23	970
SB	ng/kg	158	156	5.14	5.20	0.08	160

APPENDIX J

LINKAGE BETWEEN CHARLESTON NAVAL COMPLEX UPLAND AOCs/SWMUs TO ANALYTICAL DATA FROM SEDMENT SAMPLES COLLECTED DURING THE ZONE J RFI

TECHNICAL MEMORANDUM

DATE: May 7, 2004

PREPARED FOR: Rob Harrell, EFD South

PREPARED BY: EnSafe Inc.

RE: Linkage between Charleston Naval Complex Upland AOCs/SWMUs to Analytical Data from Sediment Samples Collected During the Zone J RFI

Purpose

The purpose of this technical memorandum is to present the ecological evaluations for media sampled during the Zone J Resource Conservation and Recovery Act (RCRA), RCRA Facility Investigation (RFI) and determine the potential for upland source linkage to the sediments in the Charleston water bodies. Storm water effluent, surface water, soil, groundwater, and sediment samples have been evaluated. Hazard Quotients and effects range–medium (ERM) were calculated for the sediments to demonstrate a worst case scenario. The information provided in this memorandum will assist the risk managers to determine if existing data gaps with the sediment data have been closed and/or additional data is needed. Data evaluation was completed using the December 2002 database update from CH2M-Hill and data collected by EnSafe Inc. in 2003 during RFI activities at Area of Concern (AOC) 721.

Sediment Ecological Effects Evaluation Methodology

Sediment samples from 130 locations were collected in Noisette and Shipyard Creeks as well as the Cooper River for various zone RFIs.

The sediment evaluation will be based on direct exposure using the (HQ) method by comparing the maximum concentration of constituents identified in each medium with the applicable reference concentrations and United States Environmental Protection Agency Region 4 ecological screening values (ESVs). This method was used to determine which constituents in Zone J pose potential unacceptable levels of risk to the environment.

Prior to the linkage evaluation, sediment data was reviewed based on sediment quality guidelines developed by the U. S. National Oceanic and Atmospheric Administration (NOAA). This scheme provides two values, Effects Range Low (ERL) and Effects Range Median (ERM), which delineate three concentration ranges for a particular chemical. The concentrations below

ERL values represent a minimal-effects range, which is intended to estimate conditions where biological effects would be rarely observed. Concentrations equal to, or greater than ERL, but below ERM, represent a range within which biological effects occur occasionally. Concentrations at, or above ERM values represent a probable-effects range within which adverse biological effects frequently occur. To estimate the adverse effects of mixtures of chemicals, NOAA uses mean ERM quotients which are determined by developing an ERM quotient for each contaminant by dividing the sample concentration by the ERM value; summing the ERM quotient and dividing by the number of constituents for which guidelines are available. This methodology generated four categories used to predict the likelihood of toxicity at each sample location:

- Category 1 – Mean ERM quotient less than 0.1, no ERLs exceeded. Sediments least likely to be toxic (8 – 9% of samples toxic with an average amphipod survival of approximately 92 – 93%)
- Category 2 – Mean ERM quotient between 0.11 and 0.5; 1-5 ERMs exceeded.
- Category 3 – Mean ERM quotient between 0.51 and 1.5; 6-10 ERMs exceeded. Sediments likely to be toxic (about 50% of samples were toxic with an average amphipod survival of about 60 -70%.
- Category 4 – Mean ERM quotient greater than 1.5; greater than 10 ERMs exceeded. High probability to be toxic (73 – 83% of samples were toxic with an average amphipod survival around 40%)

Figure 1 shows the results of the mean ERM calculations for all sediment samples collected in Shipyard Creek, Cooper River and Noisette Creek. For the purpose of this site linkage report, the Category 3 and 4 sample locations will be further evaluated in this report? Each Category 3 or 4 sample was evaluated to determine if the constituents exceeding their individual ERM concentrations could be linked to upland sources at Charleston Naval Complex (CNC). Figures 2 through 17 illustrate sediment ERM value exceedance locations per constituent and associated upland site upper interval soil locations.

Since Poly Aromatic Hydrocarbon (PAH)s often occur as complex mixtures in sediments and have similar toxic mechanisms, they are often evaluated as total PAHs. In the article "*Consensus Sediment Quality Guidelines for Polycyclic Aromatic Hydrocarbon Mixtures*" a

method for evaluating PAH mixtures based on the levels of organic carbon (oc) present in the sediment is presented (Swartz 1999). In this article, sediment guidelines are developed for the low molecular weight, high molecular weight, and total PAHs including:

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Chrysene
Fluoranthene
Fluorene
Naphthalene
Phenanthrene
Pyrene

The methodology calculated oc-normalized sediment quality guidelines, for the sum of the oc-normalized concentrations of the above listed PAHs based on the data evaluated (toxicity and benthic community structure). The HQ's to total PAH were derived simply as the arithmetic mean of the values in each cluster: Threshold Effects Concentration (TEC) --290 µg/g oc; Median Effects Concentration (MEC) -1,800 µg/g oc; and Extreme Effects Concentration (EEC) – 10,000 µg/g oc.

Of these groups, the Threshold Effects Concentration (TEC) offers the most useful guidelines, because it represents a level below which it is reasonable to conclude that PAH mixtures are unlikely to cause adverse effects of benthic ecosystems. The Extreme Effects Concentration (EEC), while rarely exceeded, indicates virtual certainly of adverse effects. The region of greatest uncertainty lies between the TEC and the EEC. Within this range, a broad gradient of sediment contamination occurs along which effects are increasingly more probable. While effects from PAHs between the TEC and EEC range cannot be determined solely by utilizing this methodology, it is a useful tool in refinement of PAHs and the weight of evidence approach employed at most sites.

Investigation Background and Strategy

As central components of the local watershed, the Zone J water bodies receive storm water runoff and other inputs from the majority of surrounding upland areas, including the CNC, via numerous point and non-point source discharges, including several permitted National Pollutant

Discharge Elimination System (NPDES) industrial discharges. The main objective of the Zone J RFI is to assess impacts from CNC related discharges to receptors within Zone J.

The Navy completed the preliminary sediment and surface water sampling of the water bodies in September 1997. In a December 1997 technical memorandum entitled *Preliminary Results of Zone J Sampling*, the Navy presented the investigative approach, deviations from the Zone J work plan, applied sampling protocols, and analytical results of the Zone J sampling. The 1997 technical memorandum presented a preliminary list of Constituent of Potential Concern (COPC) in Zone J sediments and surface waters, and a map of contaminant distributions.

The data set in this preliminary report, which also included results from the small-scale, offshore sampling conducted as part of other zone-specific RFIs, concluded that after the analysis of 130 offshore sediment samples, concentrations at numerous locations in the Cooper River, Shipyard Creek, and Noisette Creek exceeded USEPA's 1995 Region IV Waste Management Division's Sediment Screening Values (SSVs) for [redacted] compounds ([redacted] compounds.

On April 24, 2000, the Navy submitted the *Zone J Draft RFI Report - Part One* for to South Carolina Department of Health and Environmental Control (SCDHEC), South Carolina Department of Natural Resources (SCDNR), National Oceanic and Atmospheric Administration (NOAA), United Sates Environmental Protection Agency (USEPA), and United States Fish and Wildlife Service (USFWS) for their review and comment. The *Part One* report presented a screening-level ecological risk assessment (SLERA) using the preliminary results of Zone J sampling and the protocols outlined in USEPA's 1997 guidance document for Superfund, *Process for Designing and Conducting Ecological Risk Assessments*. The SLERA included a screening-level problem formulation, conceptual model, ecological effects evaluation, exposure estimates, and risk calculations. While addressing agency and trustee comments, migration pathway issues needed to be addressed prior to finalizing the SLERAs. Storm water effluent, sheet flow and groundwater to surface water pathways were identified as potential migration pathways.

The Charleston Base Realignment and Closure (BRAC) Cleanup Team and the Base Closure Team (BCT) concluded that CNC storm water effluent data were required to produce a

reasonably definitive evaluation of the migration pathway scenarios, particularly for contaminant transport via storm water drainage pipelines and effluent.

Using detailed sewer system maps, aerial photographs, and site topography, the suspected paths of storm water runoff were traced from known AOCs and Solid Waste Management Unit (SWMU)s to a particular Zone J discharge point/area in the Cooper River, Noisette or Shipyard Creeks. Analysis of effluent samples from these discharge points would determine if CNC-related contaminants were being transported to Zone J, and if so, would provide relevant data to identify potential source(s).

As a basis of comparison, effluents from several reference locations were sampled to establish a baseline data set representative of non-Navy related inputs to Zone J or similar water bodies. Results of the storm water evaluations were presented in two reports; Zone J Storm Water Effluent Evaluation Report (EnSafe, October 2002) and the Zone J Storm Water Effluent Evaluation Report Addendum (EnSafe, December 2002).

The investigative objectives for the two reports were designed to collect sufficient storm water runoff data to accomplish the following:

- Characterize the storm water runoff from listed RCRA sites to Cooper River and Noisette and Shipyard Creeks
- Define contaminant migration pathways and potential receptors (on and offsite, where applicable)
- Define the nature and extent of contamination, if any
- Characterize reference values
- Identify storm water COPCs

Ecological Effects Evaluation

This technical memorandum summarizes each of the media sampling events for the Cooper River, Noisette and Shipyard Creeks in Zone J and [redacted] Three migration pathways; transport to Zone J via storm water drainage pipeline, overland transport to Zone J via sheet flow, and transport to Zone J via groundwater to surface water discharge, were evaluated to determine if a scenario existed that demonstrates that a contaminant could be released to Zone J.

To determine the potential for unacceptable ecological risk with each exposure pathway, environmental media concentrations were compared with USEPA Region 4's ESVs, which are presented in the screening COPC tables. Concentrations below USEPA Region 4 ESVs are considered an acceptable level of risk. Therefore, this screen can only be used to determine whether there is a level of risk to ecological receptors that requires no further investigation, or additional information is needed to fully evaluate the potential for risk within the Zone J water bodies.

The USEPA Region 4 saltwater ESVs were derived from Water Quality Criteria documents and represent the chronic ambient surface water quality criteria values for the protection of aquatic life. These criteria are intended to protect 95% of the species, 95% of the time. Therefore, anytime the maximum concentration of a constituent is less than the Region 4 ESV, no adverse ecological effect is expected.

Storm Water Effluent Ecological Effects Evaluation

Storm water effluent samples from storm water drainage system locations were collected in the CNC drainage basins investigation for Noisette and Shipyard Creeks and Cooper River. COPC screening for the storm water effluent was based on the following criteria, as agreed upon by the partnering team:

- Comparison of detected constituents, sample quantitation limits Sample Quanitation Limits (SQL)s, and method detection limits with reference effluent concentrations at locations not related to CNC

- Comparison of detected constituents and SQLs with USEPA Region 4 chronic saltwater ESVs
- Comparison of non-detected constituents and SQLs with USEPA Region 4 chronic saltwater ESVs
- Evaluation of detection and exceedances frequency for each constituent detected. The USEPA Region 4 saltwater ESVs were derived from Water Quality Criteria documents and represent the chronic ambient surface water quality criteria values for the protection of aquatic life. These criteria are intended to protect 95% of the species, 95% of the time. Therefore, anytime the maximum concentration of a constituent is less than the Region 4 ESV, no adverse ecological effect is expected.

Surface Water Ecological Effects Evaluation

Surface water samples from 38 locations were collected in Noisette, Shipyard Creeks and Cooper River during 1997. COPC screening for the storm water effluent was based on the following criteria, as agreed upon by the partnering team:

- Comparison of detected constituents and SQLs with USEPA Region 4 ESVs for surface water
- Comparison of non-detected constituents and SQLs with USEPA Region 4 ESVs for surface water
- Evaluation of detection and exceedances frequency for each constituent detected.

The Region 4 surface water ESV values are the same as the chronic salt water ESV for storm water. Figure 18 illustrates the locations of the surface water samples that have saltwater chronic surface water screening value for the sediment ERM parameters.

Groundwater Ecological Effects Evaluation

The RFI reports qualitatively classified upland groundwater and soil COPCs with regards to their anticipated potential for migration. This memorandum evaluates groundwater for its potential connection to sediment exceedances in the water bodies. Available data was reviewed and a groundwater COPC was designated as a possible surface water migrant if the maximum concentration exceeded the chronic ambient water quality criteria (chronic Ambient Water Quality Criteria (AWQC)) for saltwater in the USEPA's *Supplemental Guidance to Risk*

Assessment Guidance for Superfund: Region IV Bulletins, Ecological Risk Assessment, (November 1995) or the Maximum Concentration Level (MCL). Groundwater contours were interpreted to determine the most downgradient monitoring wells that would impact a water body and in an effort to establish potential linkage to sediment results. Review of CNC groundwater analytical data was limited to sediment ERM exceedance constituents.

The RFI Report will evaluate groundwater data to surface water criteria to determine potential to the Zone J waterbodies.

Figures 19 through 26 illustrate downgradient monitoring wells with analytical detections of constituents that exceed AWQC and/or MCL values. Eight constituents were identified in groundwater that exceeded screening values and are discussed separately below. Detections were included in screening evaluations if concentrations during the last three rounds of sampling detections were not below an AWQC and/or MCL.

Noisette Creek

Storm Water Drainage System Inorganic Preliminary COPCs

The storm water effluent samples from nine storm water drainage system locations were collected in the investigation for Noisette Creek. COPC screening results are presented in Table 1. In all, 21 inorganics were detected in at least one of the nine storm water drainage system effluent samples collected as part of the Zone J investigation. Nine of the 21 were detected at concentrations exceeding USEPA Region 4 ESVs and/or reference concentrations:aluminum (13,000 µg/L)

arsenic (190 µg/L)
barium (120 µg/L)
beryllium (4.5 µg/L)
copper (130 µg/L)
iron (180,000 µg/L)
manganese (900 µg/L)
nickel (18 µg/L)
zinc (530 µg/L)

Each constituent's maximum concentration was detected in the STORM water effluent sample from EFF011. Five constituents exceeded the reference concentration only at EFF011: arsenic, barium, beryllium, copper, and iron.

Storm Water Drainage System Organic Preliminary COPCs

One pesticide and three Semivolatile Organic Compound (SVOC)s were detected in at least one of the nine storm water drainage system effluent samples collected as part of the Zone J investigation.

Noisette Creek Storm Water COPC Table 1

In the one location from which it was detected (EFF012), the organochlorine pesticide heptachlor (maximum concentration 0.014 µg/L) exceeded its USEPA Region 4 ESV (0.0036 µg/L).

Two SVOCs were detected at effluent location EFF008: benzo(b)fluoranthene (maximum 0.39 µg/L) and indeno(1,2,3-cd)pyrene (0.59 µg/L). A third SVOC, bis (2- [ethylhexyl)phthalate, was detected at two effluent locations: EFF002 (2.6 µg/L) and EFF009 (0.63 µg/L). These three constituents have no USEPA Region 4 ESV or reference concentration; therefore, they will be included as preliminary COPCs for Noisette Creek.

Surface Water

Six surface water samples were collected in the investigation for Noisette Creek. COPC screening results are presented in Table 2.

Surface Water Inorganic Preliminary COPCs

In all, 15 inorganics were detected in at least one of the six surface water samples collected as part of the Zone J investigation; however, only the copper detection at NOIW00303 exceeded its USEPA Region 4 ESVs.

Surface Water Organic Preliminary COPCs

Two SVOCs were detected in two of the surface water samples collected as part of the Zone J investigation. Benzoic acid was detected in sample NOIW000303 at 1 µg/L; and bis(2-[ethylhexyl)phthalate was detected in sample NOIW000603 at 4 µg/L, however, neither of the constituents has an USEPA Region 4 ESV; therefore, it is unlikely that these COPCs will be carried through the evaluation process.

Noisette Creek Sediment Ecological Effects Evaluation

Fourteen sediment samples have been collected from Noisette Creek as part of the CNC RFI: 10 during the Zone J RFI and four during the Zone C RFI of SWMU 44 for total organic carbon (TOC) only. COPC screening results and HQs are presented in Table 3.

Twenty one out of 25 inorganic constituents were detected in sediments from Noisette Creek. Seven inorganic constituents had maximum concentrations that exceeded their respective USEPA Region 4 ESV;

arsenic (19.9 mg/kg) – NOIM0008
chromium (54.9 mg/kg) – NOIM0002
copper (127 mg/kg) – NOIM0004
lead (126 mg/kg) – NOIM0004
mercury (1.2 mg/kg) – NOIM0002
nickel (20.5 mg/kg) – NOIM0004
zinc (718 mg/kg) – NOIM0004

Twenty organic constituents were detected in sediments from Noisette Creek. Nine constituents had maximum concentrations that exceeded the Region 4 ESV:

Arochlor 1260 (123 µg/kg) - NOIM0003
anthracene (610 µg/kg) - NOIM0004
benzo(a)anthracene (2,400 µg/kg) - NOIM0010
benzo(a)pyrene (1,400 µg/kg) - NOIM0010
bis(2-Ethylhexyl)phthalate (1,800 µg/kg) - NOIM0003
chrysene (3,400 µg/kg) - NOIM0010
fluoranthene (4,800 µg/kg) - NOIM0010
phenanthrene (340 µg/kg) - NOIM0009
pyrene (5,100 µg/kg) - NOIM0010

ERM Quotients Evaluation

The mean ERM quotients calculated for Noisette Creek sediments are located in Appendix A. Of the ten sediment samples collected from Noisette Creek, the sediments fell into the following ERM categories:

- Category 1: NOIM000601;
- Category 2: NOIM000101, NOIM000201, NOIM000301, NOIM000501, NOIM000701, NOIM000801, NOIM000901;
- Category 3: NOIMOOO401, and NOIM001001.

There were no Category four sample locations within Noisette Creek. The only inorganic to exceed its ERM value in Noisette Creek was zinc at NOIM000401. Zinc was the only constituent at NOIM000401 that exceeded its ERM value. At location NOIM001001, benzo(a)anthracene, and chrysene were the only organic constituents to exceed their ERM values.

Noisette Creek Surface Water COPC Table 2

Noisette Creek COPC Sediment Table 3

Groundwater Effects Evaluation

Down gradient monitoring wells adjacent to Noisette Creek were evaluated in association with the ERM exceedance for zinc to determine if groundwater would contribute to the contamination load at NOIM000401. Data revealed that concentrations did not exceed screening criteria; therefore, groundwater should not be considered as a possible migration pathway for location NOIM000401.

Potential Upland Source Identification for Noisette Creek

There are two sediment samples collected from Noisette Creek with ERM value exceedancess. Three parameters were identified as ERM quotient categories 3 or 4: benzo(a)anthracene, chrysene, and zinc. Upper interval soil/sediment sample distributions were then mapped to determine areas that may contribute to a potential accumulation of these constituents. Benzo(a)anthracene and chrysene were not identified in upland soil/sediment intervals or storm water effluent. Table 4 summarizes sediment locations in Noisette Creek with ERM exceedences.

Table 4
Sediment Locations in Noisette Creek
With ERM Quotient Categories of 3 or 4

Sediment ID	ERM Quotient Category	Parameter	Result (mg/kg)	ERM Value (mg/kg)	Upland Drainage Basin	Potential Migration Pathways			
						Upland Soil/ Sediment Interval	Storm Water	Ground Water	Surface Water
NOIM000401	3	Zinc	718	410	10-A	X	-	-	-
NOIM001001	3	Benzo(a)anthracene	2.4	1.60	None	-	-	-	-
		Chrysene	3.4	2.80		-	-	-	-

Notes:
mg/kg = Milligrams per kilogram
\- = No pathway established

Zinc

Zinc was identified in one upland drainage basin exceeding the ERM value. A sediment sample associated with AOC 721 had a detection for zinc exceeding the ERM value.

Zone C, Drainage Basin 10-A

Soil samples collected as part of the Zone C RFI investigation of AOC 721 and SWMU 44 did not have detection of zinc exceeding the ERM value; however, sediment locations associated with AOC 721 had ERM exceedances. Storm water effluent for Drainage Basin 10-A was collected in

2002. Zinc was not present in the storm water effluent at that time. Sediment sample NOIM000401 in Noisette Creek near Outfall 10-E had an ERM exceedance for zinc. Table 5 summarizes the zinc detections associated with Drainage Basin 10-A.

Table 5
Zinc Detections
Drainage Basin 10-A

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Sediment			
721MD01001	4/23/2003	669	Soil

Notes:
mg/kg = Milligram per kilogram

Shipyard Creek

Storm Water

The storm water effluent samples from seven storm water drainage system locations were included in the investigation for Shipyard Creek.

Storm Water Drainage System Inorganic Preliminary COPCs

In all, 16 inorganics were detected in at least one of the seven storm water drainage system effluent samples collected. None of the detections exceeded USEPA Region 4 ESVs; however, barium at EFF067 (100 µg/L) and manganese at EFF063 (140 µg/L) exceeded their respective reference concentrations; therefore, they are included as preliminary COPCs. COPC screening results are presented in Table 6.

Storm Water Drainage System Organic Preliminary COPCs

One SVOC was detected in the seven storm water drainage system effluent samples collected as part of the Zone J investigation. Pentachlorophenol, detected at EFF067 with a concentration of 14 µg/L, exceeded its USEPA Region 4 ESV of 7.9 µg/L.

Surface Water

Fourteen surface water samples were collected in the investigation for Shipyard Creek. COPC screening results are presented in Table 7.

Surface Water Inorganic Preliminary COPCs

In all, 20 inorganics were detected in at least one of the 14 surface water samples collected as part of the Zone J investigation. Two inorganics were detected at concentrations exceeding USEPA Region 4 ESVs and/or reference concentrations:

barium (16.6 µg/L) – SYCW000103

manganese (96.9 µg/L) – SYCW001403

Surface Water Organic Preliminary COPCs

Two SVOCs were detected in a surface water sample collected as part of the Zone J investigation. Benzoic acid was detected in sample SYCW001603 at 1 µg/L; and 2-nitrophenol was detected in sample SYCW000303 at 20 µg/L; however, neither constituent has USEPA Region 4 ESV; therefore further evaluation is not necessary.

Shipyard Creek Sediment Ecological Effects Evaluation

Forty-eight CNC sediment samples have been collected from Shipyard Creek: 24 collected as part of Zone J RFI, 15 collected from [redacted] (a former landfill) as part of the Zone H RFI, and 9 from the headwaters of the Shipyard Creek as part of the ongoing assessment of [redacted] COPC screening results and HQs are presented in Table 8.

Twenty-four out of 25 inorganic constituents were detected in sediments from Shipyard Creek. Eight inorganic constituents had maximum concentrations that exceeded their respective USEPA Region 4 ESV;

arsenic (22.7 mg/kg) – SYCM0017
cadmium (1.7 mg/kg) – 009M0008
chromium (291 mg/kg) – 009M0004
copper (228 mg/kg) – 009M0002
lead (150 mg/kg) – 196M0002
mercury (0.70 mg/kg) – 009M0004
nickel (37.3 mg/kg) – 009M0004
zinc (387 mg/kg) – 009M0004

Shipyard Creek Storm Water COPC Table 6

Shipyard Creek Surface water COPC Table 7

Shipyard Creek Sediment COPC Table 8

Forty-three organic constituents were detected in sediments from Shipyard Creek. Twenty-one constituents had maximum concentrations that exceeded the USEPA Region 4 ESV;

acenaphthene (230 µg/kg) - 009M0014
acenaphthylene (94 µg/kg) - 196M0001
anthracene (110 µg/kg) - 196M0002
benzo(a)anthracene(860 µg/kg)-196M0001
benzo(a)pyrene (1,600 µg/kg)- 196M0001
bis(2-Ethylhexyl)phthalate (1,600 µg/kg) - SYCM0003
chrysene (970 µg/kg) - 196M0001
dibenz(a,h)anthracene (80 µg/kg) - 196M0001
fluoranthene (9,5000 µg/kg) - 009M0004
fluorene (160 µg/kg) - 009M0014
naphthalene (200 µg/kg) - 196M0001
phenanthrene (170 µg/kg) - SYCM0020
pyrene (6,400 µg/kg) - 009M0004
4,4'-DDD (91 µg/kg) - 009M0005
4,4'-DDE (150 µg/kg) - 009M0005
4,4'-DDT (140 µg/kg) - 009M0005
alpha-chlordane (29 µg/kg) - 009M0015
gamma-chlordane (26 µg/kg)- 009M0015
Arochlor 1248 (3,000 µg/kg) - 009M0004
Arochlor 1254 (690 µg/kg) - 009M0004
Arochlor 1260 (890 µg/kg) - 009M0015

ERM Quotients Evaluation

The mean ERM quotients calculated for Shipyard Creek sediments are located in Appendix A. Of the 48 sample collected within Shipyard Creek, only one location was an ERM Category 4 (009M000401). Six locations had an ERM category of 3 (196M000101, 009M000501, 009M000101, 009M001401, 009M001301, and 009M001501). At these Category 3 and 4 locations, total PCBs exceeded its ERM at every location except 196M000101. Other constituents that exceeded their ERM include: 4,4'-DDE (009M000401, 009M000501, and 009M001301); 4,4'-DDT (009M000501, and 009M001501); fluoranthene (009M000401); and pyrene (196M000101 and 009M000401).

Groundwater Effects Evaluation

Down gradient monitoring wells adjacent to Shipyard Creek were evaluated in association with the five ERM Category 3 and 4 exceedances to determine if groundwater would contribute to the contamination load at the seven sediment locations. Data revealed that concentrations did not exceed screening criteria for 4.4'-DDE, pyrene, and total PCBs.

Deep monitoring well GDH002D had a detection of 0.06 µg/L for 4.4'-DDT which exceeded the screening criteria during the first sampling event but two subsequent sampling events had results of non-detect. Though the data from this well did not have three consecutive rounds below the screening criteria, It is our assumption that levels are not high enough to support the theory that the dissolved concentration can contribute to the sediment load.

Fluoranthene was detected above screening criteria in monitoring well 637003 during all four sampling events with the last detection being 8 µg/L, and in well 009013 during all seven sampling events with the last event having a detection of 2.6 µg/L. Previous sampling events for 009013 had detections ranging from 2.5 – 5 µg/L. It is our assumption that levels are not high enough to support the theory that the dissolved concentration can contribute to the sediment load.

Potential Upland Source Identification for Shipyard Creek

There are seven sediment samples collected from Shipyard Creek with ERM value exceedances. Five parameters were identified as ERM quotient categories 3 or 4: pyrene; 4,4'-DDE; 4,4'-DDT; fluoranthene and total PCBs. Upper interval soil/sediment sample distributions were then

mapped to determine areas that may contribute to a potential accumulation of these constituents. 4,4'-DDT and fluoranthene were not identified in upland soil/sediment intervals or storm water effluent. Table 9 summarizes sediment locations in Shipyard Creek with ERM exceedences.

Table 9
Sediment Locations in Shipyard Creek
With ERM Quotient Categories of 3 or 4

Sediment ID	ERM Quotient Category	Parameter	Result (mg/kg)	ERM Value (mg/kg)	Upland Drainage Basin	Potential Migration Pathways			
						Upland Soil/ Sediment Interval	Surface Water	Ground Water	Surface Water
196M000101	3	Pyrene	6.3	2.6	55, SWMU196	X	-	-	-
009M000401	4	4,4'-DDE	0.11	0.027	SWMU 196	X	-	-	-
		Fluoranthene	9.5	5.1		-	-	-	-
		Pyrene	6.4	2.6	55, SWMU 196	X	-	-	-
		Total PCBs	4.86*	0.18		-	-	-	-
009M000501	3	4,4'-DDE	0.15	0.027	SWMU 196	X	-	-	-
		4,4'-DDT	0.14	0.0461		-	-	-	-
		Total PCBs	1.39*	0.18	196	X	-	-	-
009M000101	3	Total PCBs	0.23*	0.18	55	X	-	-	-
009M001401	3	Total PCBs	0.48*	0.18	55	X	-	-	-
009M001301	3	4,4'-DDE	0.036	0.027	SWMU 196	-	-	-	-
		Total PCBs	0.35*	0.18	196	X	-	-	-
009M001501	3	4,4'-DDT	0.051	0.0461	55	-	-	-	-
		Total PCBs	0.352*	0.18		X	-	-	-

Notes:
mg/kg = Milligrams per kilograms
\- = No pathway established
* = Total PCBs values include ½ non-detect concentration

Pyrene

Pyrene was identified in two upland drainage basins exceeding the ERM value. Five upper interval soil samples and one site sediment sample within those drainage basins also had detections of pyrene exceeding the ERM value.

Zone H, Drainage Basin 55 and SWMU 196

Five soil samples collected as a part of the Zone H RFI investigation of SWMUs 9, 20, 121 and AOC 650 had ERM values exceedances. The surface soil sample locations are grassy areas. There are no storm water structures associated with Drainage Basin 55 or SWMU 196. Surface

runoff for Drainage Basin 55 and SWMU 196 sheet flows towards Shipyard Creek. Several SWMU 9 and 196 sediment samples were collected in Shipyard Creek exceeding the ERM value. Table 10 summarizes the pyrene detections associated with Drainage Basin 55 and SWMU 196.

Table 10
Pyrene Concentration
Drainage Basin 55 and SWMU 196

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
009SB03101	9/27/1993	3.8	Soil
009SB07101	9/29/1993	16	Soil
121SB01101	1/16/1995	3.4	Soil
650SB00601	1/19/1995	3.3	Soil
020SB00501	3/27/1995	2.8	Soil
Site Sediment			
196M000102	11/15/1999	2.7	Shipyard Creek

Notes:
mg/kg = Milligram per kilogram

4,4'-DDE

4,4'-DDE was identified in one upland drainage basin exceeding the ERM value. Four upper interval soil samples and a site sediment sample within the drainage basin also had detections of 4,4'-DDE exceeding the ERM value.

Zone H, SWMU 196

Four soil samples collected as a part of the Zone H RFI investigation of SWMU 196 in 1999 had ERM values exceedances. All locations were located in the grassy/gravel areas. SWMU 196 site sediment samples, which also had ERM exceedances for 4.4-DDE, were also collected. There are no storm water structures associated with SWMU 196. All surface runoff flows to Shipyard Creek. Two sediment samples collected in Shipyard Creek near SWMU 196 had 4.4 -DDE ERM exceedances. Table 11 summarizes the 4.4-DDE detections associated with SWMU 196.

Table 11
4,4'-DDE Concentration
SWMU 196

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
196SB00401	9/1/1999	0.027	Gravel
196SB01301	9/2/1999	0.034	Gravel
196SB01601	9/3/1999	0.045	Gravel
196SB01701	9/3/1999	0.083	Gravel
Site Sediment			
196M000302	11/15/1999	0.13	Wetland/Shipyard Creek

Notes:
mg/kg = Milligram per kilogram

Total PCBs

PCBs (arochlor-1254 and arochlor-1260) were identified in two upland drainage basins exceeding the ERM value. Eighteen upper interval soil samples within those drainage basins also had detections of PCBs (arochlor-1254 and arochlor-1260) exceeding the ERM value.

Zone H, SWMU 196 and Drainage Basin 55

Eighteen soil samples collected as part of the Zone H RFI investigation of SWMUs 019, 121, 196 and AOC 650 had ERM exceedances. The locations were located in grassy areas. There are no storm water structures associated with Drainage Basin 55 and SWMU 196. All surface runoff flows to Shipyard Creek. Six sediment samples collected in Shipyard Creek had PCBs ERM exceedances. Table 12 summarizes the PCBs detections associated with SWMU 196 and Drainage Basin 55.

Table 12
PCBs Concentrations
Drainage Basin 55 and SWMU 196

Sample ID	Parameter	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil				
121SB00701	PCB-1254 (Arochlor 1254)	1/13/1995	0.21	Soil
121SB00901	PCB-1254 (Arochlor 1254)	1/16/1995	0.24	Soil
121SB01101	PCB-1254 (Arochlor 1254)	1/16/1995	0.32	Soil
121SB01001	PCB-1254 (Arochlor 1254)	1/16/1995	0.35	Soil
650SB00201	PCB-1254 (Arochlor 1254)	8/22/1994	0.407	Soil
019SB00701	PCB-1254 (Arochlor 1254)	1/17/1995	2.3	Soil
121SB01601	PCB-1254 (Arochlor 1254)	3/22/1995	4.3	Soil
019SB01101	PCB-1260 (Arochlor 1260)	1/17/1995	0.18	Soil
019SB00601	PCB-1260 (Arochlor 1260)	1/17/1995	0.19	Soil
121SB00701	PCB-1260 (Arochlor 1260)	1/13/1995	0.27	Soil
121SB00901	PCB-1260 (Arochlor 1260)	1/16/1995	0.33	Soil
019SB01801	PCB-1260 (Arochlor 1260)	3/22/1995	0.37	Soil
019SB00401	PCB-1260 (Arochlor 1260)	8/29/1994	0.4	Soil
121SB01001	PCB-1260 (Arochlor 1260)	1/16/1995	0.43	Soil
121SB01101	PCB-1260 (Arochlor 1260)	1/16/1995	0.54	Soil
019SB00701	PCB-1260 (Arochlor 1260)	1/17/1995	0.56	Soil
121SB01601	PCB-1260 (Arochlor 1260)	3/22/1995	1.1	Soil
196SB00401	PCB-1254 (Arochlor 1254)	9/1/1999	0.26	Soil

Notes:
mg/kg = Milligrams per kilograms

Cooper River

Storm Water Drainage System Inorganic Preliminary COPCs

The storm water effluent samples from 54 storm water drainage system locations were included in the investigation for Cooper River. In all, 24 inorganics were detected in at least one of the 54 storm water drainage system effluent samples collected as part of the Zone J investigation. Aluminum, barium, iron, manganese, and vanadium were detected in all 54 samples. COPC screening results are presented in Table 13.

15 of the 24 were detected at concentrations exceeding USEPA Region 4 ESVs and/or reference concentrations:

aluminum (16,000 µg/L) – EFF039
antimony (9.9 µg/L) – EFF039
barium (140 µg/L) – EFF039
beryllium (0.88 µg/L) – EFF039
chromium (62 µg/L) – EFF039
cobalt (6.7 µg/L) – EFF039
copper (5,000 µg/L) – EFF071
iron (16,000 µg/L) – EFF039
lead (220 µg/L) – EFF071
manganese (1,200 µg/L) – EFF071
mercury (0.22 µg/L) – CAP001
Nnckel (240 µg/L) – EFF072
tin (290 µg/L) – EFF071
vanadium (130 µg/L) – EFF022
zinc (1,000 µg/L) – EFF015

Cooper River Storm Water COPC Table 13

Storm Water Drainage System Organic Preliminary COPCs

Ten pesticides and 20 SVOCs were detected in at least one of the 54 storm water drainage system effluent samples collected as part of the Zone J investigation. Seven of the pesticides had maximum concentrations that exceeded their respective USEPA Region 4 ESV:

4, 4'-DDD (0.065 µg/L) – EFF044
4, 4'-DDT (0.034 µg/L) – EFF052
alpha-chlordane (0.013 µg/L) – EFF032
endosulfan I (0.022 µg/L) – EFF053
endosulfan II (0.018 µg/L) – EFF052
gamma-BHC (0.025 µg/L) – EFF070
heptachlor (0.038 µg/L) – EFF052

Three pesticides of the 11 (beta-BHC, endosulfan sulfate, and methoxychlor) have no USEPA Region 4 ESV or reference concentration; therefore, they will be included as preliminary COPCs for Cooper River.

Two SVOCs had maximum concentrations that exceeded their respective USEPA Region 4 ESV; fluoranthene at EFF040 and EFF041 (4.1 µg/L), and pentachlorophenol at EFF005 and EFF006 (14µg/L). Acenaphthene, di-n-butylphthalate, and phenol were detected at concentrations that did not exceed their respective ESV. The fifteen SVOCs that did have detections, but no USEPA Region 4 ESVs, will be included as preliminary COPCs for Cooper River.

Surface Water

Eighteen surface water samples were collected in the investigation for Cooper River. COPC screening results are presented in Table 14.

Copper River Surface Water COPC Table 14

Surface Water Organic Preliminary COPCs

Two SVOCs were detected in at least two of the 18 surface water samples collected as part of the Zone J investigation. The maximum concentrations of di-n-butylphthalate and alpha-BHC did not exceed their respective USEPA Region 4 ESV; therefore, further evaluation will not be necessary.

Surface Water Inorganic Preliminary COPCs

Nineteen inorganic constituents were detected in at least 10 of the 18 surface water samples collected with ten inorganic compounds identified as COPCs. The maximum concentrations for copper, mercury, silver, and zinc exceeded their respective USEPA Region 4 ESV; however since there is no ESV for aluminum, barium, beryllium, iron, manganese, and vanadium and detections were noted, these constituents will be included as preliminary COPCs.

Cooper River Sediment Ecological Effects Evaluation

To date, eighty-six CNC sediment samples have been collected from Cooper River: 24 as part of the Zone J RFI, and the remaining from SWMU-specific remedial investigations. COPC screening results and HQs are presented in Table 15. To identify screening-level COPCs, the maximum exposure point (the highest detected concentration) was compared with the USEPA Region 4 sediment ESVs using the HQ method.

Twenty-three out of 25 inorganic constituents were detected in sediments from Cooper River. Seven inorganic constituents had maximum concentrations that exceeded their respective USEPA Region 4 ESV;

arsenic (22.2 mg/kg) – CPRM0024
cadmium (1.4 mg/kg) – CPRM0017
chromium (60.9 mg/kg) – CPRM0001
copper (330mg/kg) – CPRM0002
lead (32.3 mg/kg) – CPRM0013
nickel (18.7 mg/kg) – CPRM0001
zinc (167mg/kg) – CPRM0009

Nineteen organic constituents were detected in sediments from Cooper River. Ten constituents had maximum concentrations that exceeded the USEPA Region 4 ESV;

acenaphthene (730 µg/kg) – CPRM0021

anthracene (880 µg/kg) – CPRM0021

benzo(a)anthracene (1,100 µg/kg) – CPRM0030

benzo(a)pyrene (420 µg/kg) – CPRM0021

bis(2-EthylHexyl)phthalate (1,100 µg/kg) – CPRM0002

chrysene (800 µg/kg) – CPRM0021

fluoranthene (2,600 µg/kg) – CPRM0021/30

fluorene (680 µg/kg) – CPRM0021

phenanthrene (1,900 µg/kg) – CPRM0021

pyrene (2,100 µg/kg) – CPRM0030

Cooper River Sediment COPC Screening Results Table 15

ERM Quotients Evaluation

The mean ERM quotients calculated for Cooper River sediments are located in Appendix A. Of the 86 samples that have been collected in the Cooper River, six were ERM Category 3 (054M000101, 699M0004E1, 556M000701, 556M000801, CPRM002101, and CPRM003001) and one was an ERM Category 4 (556M000501). At these locations the following constituents exceeded their ERMs:

- acenaphthalene: 054M000101, and 556M000701;
- anthracene: 054M000101, 556M000701, 556M000801, 556M000501;
- benzo(a)anthracene: 054M000101, 556M000701, and 556M000501;
- benzo(a)pyrene: 054M000101, and 556M000501;
- chrysene: 054M000101, and 556M000501;
- dibenz(a,h)anthracene: 054M000101, 556M000701, and 556M000501;
- fluoranthene: 054M000101 and 556M000501;
- fluorene: 054M000101;
- phenanthrene: 054M000101, and 556M000501;
- pyrene: 054M000101, 556M000701, 556M000801, and 556M000501;
- total PCBs: 555M000101;
- copper: 556M000501;
- lead: 699M0004E1; and
- zinc: 556M000501.

Groundwater Effects Evaluation

Down gradient monitoring wells adjacent to Cooper River were evaluated in association with the seven ERM Category 3 and 4 exceedances to determine if groundwater would contribute to the contamination load at the sediment locations. Data revealed that concentrations did not exceed screening criteria for anthracene, benzo(a)anthracene, chrysene, dibenz(a,h)anthracene, fluorene, phenanthrene, pyrene, and total PCBs. The remaining six constituents are discussed below:

Acenaphthalene

A total of 10 shallow and one deep wells were determined to have concentrations that exceeded screening criteria and needed further evaluation to determine if acenaphthalene from

these well could contribute to the contamination load of acenaphthalene in sediment. Table 16 lists the wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 16

Location	Sampling Event	Concentration	# of detections	Range
GDEGW022D	4th	30 µg/L	4 (4 events)	16 – 43 µg/L
GDEGW0023	4th	12 µg/L	2 (4 events)	12 µg/L
GDEGW0011	3rd	18 µg/L	1 (4 events)	NA
605GW001	1st	15 µg/L	1 (2 events)	NA
FDSGW01A	2nd	37 µg/L	2 (2 events)	37 - 47µg/L
FDSGW01B	2nd	25 µg/L	2 (2 events)	19 - 25µg/L
FDSGW07D	2nd	71 µg/L	2 (2events)	51 - 71µg/L
GDIGW014	4th	13 µg/L	3 (3 events)	10 - 17µg/L

Notes:
NA = Not Applicable
µg/L = Microgram per liter

Benzo(a)pyrene

Three shallow wells were determined to have concentrations that exceeded screening criteria and needed further evaluation to determine if benzo(a)pyrene from this well could contribute to the contamination load of benzo(a)pyrene in sediment. Table 17 is the listing of wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 17

Location	Sampling Event	Concentration	# of detections	Range
006GW001	4th	0.91 µg/L	1 (5 events)	NA
008GW005	5th	0.47 µg/L	1 (6 events)	NA
FDSGW01A	2nd	2 µg/L	2 (2 events)	2 – 3 µg/L

Notes:
NA = Not Applicable
µg/L = Microgram per liter

Copper

Eleven shallow wells and seven deep wells were determined to have concentrations that exceeded screening criteria and needing further evaluation to determine if copper from these well could contribute to the contamination load of copper in sediment. Table 18 is the listing of wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 18				
Location	**Sampling Event**	**Concentration**	**# of detections**	**Range**
002GW002	3rd	4.2 µg/L	1 (3 events)	NA
002GW003	3rd	9.4 µg/L	1 (4 events)	NA
506GW001	3rd	7.8 µg/L	3 (3 events)	7.8 – 14.4 µg/L
GDAGW001	2nd	8.8 µg/L	2 (3 events)	8.8 – 10.1 µg/L
GDAGW01D	2nd	7.6 µg/L	2 (3 events)	5.5 – 7.6 µg/L
GDAGW003	1st	3.4 µg/L	1 (3 events)	NA
GDAGW03D	4th	445 µg/L	2 (4 events)	7 – 445 µg/L
172GW001	2nd	4.5 µg/L	1 (3 events)	NA
576GW002	4th	3.9 µg/L	1 (4 events)	NA
576GW02D	2nd	11 µg/L	1 (4 events)	NA
FDSGW18A	2nd	3.6 µg/L	2 (2 events)	3.6 – 7.6 µg/L
GDEGW12D	4th	5.7 µg/L	1 (4 events)	NA
GDEGW2DI	1st	3.7 µg/L	1 (2 events)	NA
006GW001	3rd	3.9 µg/L	1 (5 events)	NA
FDSGW01D	1st	5.0 µg/L	1 (2 events)	NA
671GW002	2nd	3.4 µg/L	1 (4 events)	NA
GDIGW17D	4th	15.4 µg/L	1 (4 events)	NA
681GW002	2nd	10.1 µg/L	1 (3 events)	NA

Notes:
NA = Not Applicable
µg/L = Microgram per liter

Fluoranthene

A total of five shallow wells were determined to have concentrations that exceeded screening criteria and needed further evaluation to determine if fluoranthene from these wells could contribute to the contamination load of fluoranthene in sediment. Table 19 is the listing of wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 19				
Location	**Sampling Event**	**Concentration**	**# of detections**	**Range**
065GW002	2nd	6 µg/L	1 (2 events)	NA
563GW002	2nd	2 µg/L	1 (2 events)	NA
605GW001	1st	2 µg/L	1 (2 events)	NA
006GW001	5th	4.6 µg/L	1 (6 events)	NA
FDSGW01A	2ND	34 µg/L	2 (2 events)	34-50 µg/L

Notes:
NA = Not Applicable
µg/L = Microgram per Liter

Lead

A total of three shallow and one deep well were determined to have concentrations that exceeded a screening criteria and needed further evaluation to determine if lead from these well could contribute to the contamination load of lead in sediment. Table 20 is the listing of wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 20

Location	Sampling Event	Concentration	# of detections	Range
GDAGW03D	3rd	18.5 µg/L	1 (2 events)	NA
054GW002	6th	258 µg/L	2 (4 events)	9-258 µg/L
563GW001	3rd	13.6 µg/L	2 (4 events)	13.6-17.6 µg/L
596GW002	2nd	28.1 µg/L	1 (4 events)	NA

Notes:
NA = Not Applicable
µg/L = Microgram per Liter

Zinc

A total of 12 wells (nine shallow and three deep) were determined to have concentrations that exceeded a screening criteria and needed further evaluation to determine if zinc from these wells could contribute to the contamination load of zinc. Table 21 is the listing of wells, last sampling event with concentration exceedance and range of concentrations of exceedances:

Table 21

Location	Sampling Event	Concentration	# of detections	Range
002GW002	5th	183 µg/L	5 (5 events)	104 – 242 µg/L
506GW001	1st	137 µg/L	1 (3 events)	NA
GDAGW001	1st	89 µg/L	1 (3 events)	NA
GDAGW01D	1st	86.9 µg/L	1 (3 events)	NA
GDAGW03D	4th	1,440 µg/L	1 (4 events)	NA
054GW002	5th	103 µg/L	1 (5 events)	NA
065GW003	5th	762 µg/L	5 (5 events)	144 – 1,290 µg/L
576GW02D	2nd	95.2 µg/L	3 (4 events)	86 – 101 µg/L
566GW001	4th	104 µg/L	1 (4 events)	NA
018GW001	4th	117 µg/L	4 (4 events)	109 – 373 µg/L
FDSGW10A	2nd	2,340 µg/L	2 (2 events)	2340– 2790 µg/L
120GW003	4th	316 µg/L	2 (3 events)	198 – 316 µg/L

Notes:
NA = Not Applicable
µg/L = Microgram per liter

It is our assumption that inorganic levels in groundwater are not high enough to support the theory that the dissolved concentration can contribute to the sediment load.

Potential Upland Source Identification for the Cooper River

There are six sediment samples collected from the Cooper River with ERM value exceedancess. Fourteen parameters were identified as ERM quotient categories 3 or 4: acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, phenanthrene, pyrene, total PCBs, lead, copper, and zinc. Upper interval soil/sediment sample distributions were then mapped to determine areas that may contribute to a potential accumulation of these constituents. Copper was not identified in upland soil/sediment intervals or storm water effluent. Table 22 summarizes sediment locations in the Cooper River with ERM exceedences.

Table 22
Sediment Locations in the Cooper River
With ERM Quotient Categories of 3 or 4

Sediment ID	ERM Quotient Category	Parameter	Result (mg/kg)	ERM Value (mg/kg)	Upland Drainage Basin	Potential Migration Pathways			
						Upland Soil/ Sediment Interval	Storm Water	Ground Water	Surface Water
054M000101	3	Acenaphthene	0.64	0.5	23	X	-	-	-
		Anthracene	1.4	1.1	23	X	-	-	-
		Benzo(a)anthracene	2.6	1.6	23	X	-	-	-
		Benzo(a)pyrene	2.2	1.6	23, 30	X	-	-	-
		Chrysene	2.9	2.8	23	X	-	-	-
		Dibenz(a,h)anthracene	0.72	0.26	23	X	-	-	-
		Fluoranthene	6.7	5.1	23, 30	X	-	-	-
		Fluorene	0.76	0.54	23	X	-	-	-
		Phenanthrene	6.9	1.5	23	X	-	-	-
		Pyrene	5.6	2.6	23	X	-	-	-
555M000101	3	Total PCBs	1.457	0.18	28	X	-	-	-
699M0004E1	3	Lead	996	~~218~~	27, 30, 34, 36	X	-	-	-
556M000701	3	Acenaphthene	0.69	0.5	30, 35	X	-	-	-
		Anthracene	1.2	1.1	30	X	-	-	-
		Benzo(a)anthracene	1.8	1.6	30	X	-	-	-
		Dibenz(a,h)anthracene	0.36	0.26	30	X	-	-	-
		Phenanthrene	2.4	1.5	30	X	-	-	-
		Pyrene	4.4	2.6	30, 35	X	-	-	-
556M000801	3	Pyrene	3.2	2.6	30, 35	X	-	-	-
556M000501	4	Anthracene	1.2	1.1	35, 37	X	-	-	-
		Benzo(a)anthracene	4.3	1.6	35, 37, 43	X	-	-	-
		Benzo(a)pyrene	3.6	1.6	30, 35, 37, 43	X	-	-	-
		Chrysene	5.6	2.8	35, 37, 43	X	-	-	-
		Copper	1930	270	No Linkage		-	-	-
		Dibenz(a,h)anthracene	0.82	0.26	35, 37, 41, 43	X	-	-	-
		Fluoranthene	14	5.1	30, 35	X	-	-	-
		Lead	220	218	30, 34, 36, 41	X	X	-	-
		Phenanthrene	5.7	1.5	35, 37	X	-	-	-
		Pyrene	10	2.6	35, 37, 43	X	-	-	-
		Zinc	774	410	35, 41	X	-	X	-

Acenaphthene

Acenaphthene was identified in three upland drainage basins exceeding the ERM value. Twenty-two upper interval soil and two site sediment samples within those drainage basins also had detections of acenaphthene exceeding the ERM value.

Zone E, Drainage Basin 23

Three surface soil samples collected in 1996 and 1997 during the Zone E RFI investigation of AOC 530 had detections above the ERM value. All locations were collected inside of Building 35. Two sediment samples collected near Drainage Basin 23 had a detection of acenaphthene that exceeded the ERM value. One sediment sample was collected during the Zone E RFI at AOC 546 and the second was collected in the Cooper River near Outfall 21. Storm water effluent samples for Drainage Basin 23 were collected in 2002; however, acenaphthene was not detected above the effluent screening level. Table 23 summarizes the detections above the sediment ERM value for acenaphthene in Drainage Basin 23.

Table 23
Acenaphthene Concentration
Drainage Basin 23

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
530SB00601	1/11/1996	5.7	Building 0035
530SB00801	1/11/1996	11	Building 0035
530SB00701	1/11/1996	2.4	Building 0035
Site Sediment			
546M000101	10/31/1995	2.7	Pavement

Notes:
mg/kg = Milligrams per kilogram

Zone E, Drainage Basin 30

Twelve soil samples collected as part of the Zone E RFI of SWMUs 83, 84 and AOCs 559, 570, 572, 574 in drainage basin 30 had detections above the ERM for acenaphthene. Most of the surface soil sample locations were in paved areas. Storm water effluent samples for Drainage Basin 30 were collected in 2002; however, acenaphthene was not detected above the effluent screening levels. One sediment sample collected in the Cooper River in the vicinity of Outfall 30 had a detection of acenaphthene that exceeded the sediment ERM value. Table 24 summarizes the detections above the sediment ERM value for acenaphthene in Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′ deep was excavated. AOC 574 surface soil samples that exceeded the ERM value were not located within the AOC 574 footprint. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 24
Acenaphthene Concentration
Drainage Basin 30

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
083SB00601	12/19/1995	3.6	Building 0009
084SB00101	11/29/1995	0.64	Pavement
084SB00401	12/1/1995	2.2	Soil
559SB01901	11/13/1995	98	Pavement
559SB04201	10/9/2001	1.4	Pavement
559SB04401	10/9/2001	6	Pavement
570SB01201	11/15/1995	0.69	Pavement
570SB01501REMD	11/14/1995	6.2	Pavement
572SB00301	9/10/1995	0.52	Pavement
574SB00501a	11/30/1995	8.8	Pavement
574SB00501c	5/21/1996	1	Pavement
574SB00801	5/22/1996	2.4	Soil

Notes:
mg/kg = Milligram per kilogram

Zone E, Drainage Basin 35

Seven surface soil samples collected as part of the Zone E RFI of SWMU 102 and AOCs 590, 596 had ERM value exceedances. Five surface soil sample locations were in paved areas and two were collected in a building. One site sediment sample collected near AOC 590 had a detection of acenaphthene above the ERM value. A storm water effluent sample for Drainage Basin 35 was collected in 2002; however, acenaphthene was not detected above the effluent screening level. Sediment samples collected in the Cooper River near Outfalls 31/32 and 38 had ERM exceedances of acenaphthene. Table 25 summarizes the acenaphthene ERM exceedances associated with Drainage Basin 35.

Table 25
Acenaphthene Concentration
Drainage Basin 35

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
102SB00301	2/1/1996	0.53	Building 0079
102SB03701a	5/17/1996	0.55	Pavement
102SB04001	5/20/1996	0.62	Pavement
102SB04201	5/20/1996	0.81	Pavement
590SB00101	¼/1996	0.95	Pavement
596SB00601	10/20/1995	20	Building 0101
596SB01301	6/4/1996	1.1	Pavement
Site Sediment			
590M000101	1/5/1996	38	Pavement

Notes:
mg/kg = Milligram per kilogram

Anthracene

Anthracene was identified in four upland drainage basins exceeding the ERM value. Twenty-one upper interval soil and four site sediment samples within those drainage basins also had detections of anthracene exceeding the ERM value.

Zone E, Drainage Basin 23

Four soil samples collected in 1996 as part of the Zone E RFI investigation of AOC 530 had ERM values exceedances. All locations were located in the paved area or associated with a building. A site sediment sample, collected in 1995 for AOC 546, also had ERM exceedances for anthracene. Storm water effluent for Drainage Basin 23 was collected in 2002; however, anthracene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had anthracene ERM exceedances. Table 26 summarizes the anthracene detections associated with Drainage Basin 23.

Table 26
Anthracene Concentration
Drainage Basin 23

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
530SB00401	1/9/1996	1.7	Pavement
530SB00801	1/11/1996	32	Building 0035
530SB00601	1/11/1996	11	Building 0035
530SB00701	1/11/1996	5.2	Building 0035
Site Sediment			
546M000101	10/31/1995	7.4	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zone E, Drainage Basin 30

Eight soil samples collected as part of the Zone E RFI investigation of SWMUs 83, 84, and AOCs 559, 574 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas. Storm water effluent for Drainage Basin 30 was collected in 2002; however, anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 31 and 32 with ERM exceedances. Table 27 summarizes the anthracene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15' x 20' x 4' deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 27
Anthracene Concentration
Drainage Basin 30

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
559SB01901	11/13/1995	240	Pavement
084SB00101	11/29/1995	1.4	Pavement
084SB00401	12/1/1995	5	Soil
083SB00501	12/18/1995	1.3	Building 0009
083SB00601	12/19/1995	1.8	Building 0009
574SB00801	5/22/1996	6.2	Soil
559SB04201	10/9/2001	3.6	Pavement
559SB04401	10/9/2001	10	Pavement

Notes:
mg/kg = milligram per kilogram

Zone E, Drainage Basin 35

Four soil samples collected in 1996 as part of the Zone E RFI investigation of SWMU 102 and AOC 596 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM anthracene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38 and 39 in 1996 with

ERM exceedances. Table 28 summarizes the anthracene detections associated with Drainage Basin 35.

Table 28
Anthracene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
102SB00801	1/31/1996	2.3	Building 0079
102SB03701a	5/17/1996	2.3	Pavement
102SB04001	5/20/1996	2.6	Pavement
596SB01301	6/4/1996	2.5	Pavement
Site Sediment			
590M000101	1/5/1996	48	Pavement

Notes:
mg/kg = Milligram per kilogram

Zones E and F, Drainage Basins 36 and 37

Two soil samples collected as part of the Zones E and F RFI investigation of AOCs 598 and 599 had ERM values exceedances. All of the surface soil sample locations are in paved areas. AOC 607 site sediment samples were collected from catch basins with ERM anthracene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2002; however, anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38 and 39 in 1996 with ERM exceedances. Table 29 summarizes the anthracene detections associated with Drainage Basin 37.

Table 29
Anthracene Concentration
Drainage Basins 36 and 37

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
598SB00201	9/19/1995	6.9	Pavement
599SB00701	9/16/1996	5.2	Pavement
Site Sediment			
607M000401	10/1/1996	2.7	Pavement
607M000301	10/1/1996	32	Pavement

Notes:
mg/kg = Milligram per kilogram

Benzo(a)anthracene

Benzo(a)anthracene was identified in five upland drainage basins exceeding the ERM value. Forty-nine upper interval soil and six site sediment samples within those drainage basins also had detections of benzo(a)anthracene exceeding the ERM value.

Zone E, Drainage Basin 23

There were eight Soil samples collected in 1995-1996 as part of the Zone E RFI investigation of AOCs 530, 531 had ERM values exceedances. All locations were located in the paved area or associated with a building. AOC's 539, 546 site sediment samples, which also had ERM exceedances for benzo(a)anthracene, were also collected. Storm water effluent for Drainage Basin 23 was collected in 2002; however, benzo(a)anthracene was not detected above the above the effluent screening level. Sediment samples collected near Outfalls 21 and 14 had benzo(a)anthracene ERM exceedances. Table 30 summarizes the benzo(a)anthracene detections associated with Drainage Basin 23.

Table 30
Benzo(a)anthracene Concentration
Drainage Basin 23

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
531SB00301	10/27/1995	3.6	Pavement
530SB00401	1/9/1996	7.2	Pavement
530SB00101	1/9/1996	3.4	Pavement
530SB00801	1/11/1996	49	Building
530SB00601	1/11/1996	20	Building
530SB00701	1/11/1996	15	Building
531SB00401	9/3/1996	5.2	Pavement
531SB00501	9/15/1996	4.2	Pavement
Site Sediment			
539M000101	9/7/1995	2.2	Pavement
546M000101	10/31/1995	15	Pavement

Notes:
mg/kg = Milligram per kilogram

Zone E, Drainage Basin 30

There were 13 soil samples collected in 1995, 1996, 2001 as part of the Zone E RFI investigation of SWMUs 83, 84, and AOCs 559, 570, 573, 574 had ERM values exceedances. The majorities of the surface soil sample locations are in paved areas or associated with a building. Storm water effluent for Drainage Basin 30 was collected in 2002; however, benzo(a)anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfall 31 and AOC 556 with ESV exceedances. Table 31 summarizes the benzo(a)anthracene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15' x 20' x 4' deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 31
Benzo(a)anthracene Concentration
Drainage Basin 30

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
573SB00201	9/11/1995	4.2	Pavement
559SB01901	11/13/1995	260	Pavement
570SB01201	11/15/1995	2.7	Pavement
084SB00101	11/29/1995	4.2	Pavement
574SB00101	11/30/1995	3.1	Pavement
574SB00301	11/30/1995	2.2	Pavement
084SB00501	12/1/1995	3	Soil
084SB00301	12/1/1995	1.7	Soil
084SB00401	12/1/1995	11	Building
083SB00601	12/19/1995	3.5	Pavement
574SB00801	5/22/1996	9.3	Pavement
559SB04401	10/9/2001	19	Pavement
559SB04201	10/9/2001	6.7	Pavement

Notes:
mg/kg = Milligram per kilogram

Zone E, Drainage Basin 35

There were nine soil samples collected as part of the Zone E RFI investigation of AOC's 590, 596 and SWMU 102 had ERM values exceedances. The majorities of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM benzo(a)anthracene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, benzo(a)anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40/41 in 1995 with ERM exceedances. Table 32 summarizes the benzo(a)anthracene detections associated with Drainage Basin 35.

Table 32 Benzo(a)anthracenne Concentration Drainage Basin 35			
Sample ID	**Date collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
596SB00601	10/20/1995	70	Building
590SB00101	1/4/1996	1.8	Pavement
102SB00801	1/31/1996	2.4	Building
102SB03801	5/17/1996	1.8	Pavement
102SB03701a	5/17/1996	10	Pavement
102SB03601b	5/17/1996	2	Pavement
102SB04001	5/20/1996	6.7	Pavement
102SB04201	5/20/1996	1.7	Pavement
596SB01301	6/4/1996	3.3	Pavement
Site Sediment			
590M000101	1/5/1996	120	Pavement

Notes:
mg/kg = Milligram per kilogram

Zones E and F, Drainage Basin 37

There were four soil samples collected as part of the Zones E and F RFI investigation of FDS and AOC's 598, 599, 611 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas, except for FDS and AOC 611 sample locations which were collected in grass. AOC 607 site sediment samples were collected from catch basins with ERM benzo(a)anthracene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2001/2002 however, benzo(a)anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40 and 41 in 1995 with ERM exceedances. Table 33 summarizes the benzo(a)anthracene detections associated with Drainage Basin 37.

Table 33 Benzo(a)anthracene Concentration Drainage Basin 37			
Sample ID	**Date collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
FDSSH02601	10/21/1996	2.5	Soil
FDSSH03001	7/28/1999	2.2	Soil
598SB00201	9/19/1995	9.2	Pavement
599SB00701	9/16/1996	19	Pavement
Site Sediment			
607M000301	10/1/1996	51	Pavement
607M000201	10/1/1996	2.1	Pavement
607M000401	10/1/1996	3.7	Pavement

Notes:
mg/kg = Milligram per kilogram

Zone G, Drainage Basin 43

There were 13 soil samples collected as part of the Zone G RFI investigation of SWMUs 6, 7, and AOC 628 had ERM values exceedances. The majorities of the surface soil sample locations are in grassy areas or associated with buildings or pavement. Storm water effluent for Drainage Basin 43 was collected in 2002; however, benzo(a)anthracene was not detected above the effluent screening level. Sediments collected near Outfalls 38, 39, 40 and 41 had ERM exceedances. Table 34 summarizes the benzo(a)anthracene detections associated with Drainage Basin 43.

In [redacted] DET performed an interim measures for SWMUs 6, 7 and AOC 635. DET was tasked to rem[redacted] and lead, as well as the demolition and disposal of Building 3902. The majority of the area was excavated two feet deep; however, in areas of elevated contamination, the area was excavated to four feet. Therefore, the benzo(a)anthracene ERM exceedances have been excavated. Extent of excavation needs to be incorporated into GIS to determine if contamination is still present.

Table 34
Benzo(a)anthracene Concentration
Drainage Basin 43

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
007SB16101	10/11/1993	2.2	Soil
007SB30101	10/13/1993	14	Soil
007SB37101	10/13/1993	4.5	Soil
007SB28101	10/13/1993	1.6	Soil
006SB15101	10/27/1993	1.8	Building
006SB00201	9/19/1996	2.5	Building
628SB00601	12/17/1999	6.8	Soil
628SB01401	1/27/2000	1.6	Pavement

Notes:
mg/kg = Milligram per Kilogram

Benzo(a)pyrene

Benzo(a)pyrene was identified in five upland drainage basins exceeding the ERM value. Fifty-one upper interval soil and five site sediment samples within those drainage basins also had detections of benzo(a)pyrene exceeding the ERM value.

Zone E, Drainage Basin 23

Eight soil samples collected in 1995/1996 as part of the Zone E RFI investigation of AOCs 530 and 531 had ERM values exceedances. All locations were located in the paved or associated with a building. AOC 546 site sediment samples, which also had ERM exceedances for benzo(a)pyrene, were also collected. Storm water effluent for Drainage Basin 23 was collected in 2002; however, benzo(a)pyrene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had benzo(a)pyrene ERM exceedances. Table 35 summarizes the benzo(a)pyrene detections associated with Drainage Basin 23.

Table 35
Benzo(a)pyrene Concentration
Drainage Basin 23

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
531SB00301	10/27/1995	4.1	Pavement
530SB00101	1/9/1996	2.9	Pavement
530SB00401	1/9/1996	4.2	Pavement
530SB00801	1/11/1996	38	Building 0035
530SB00701	1/11/1996	14	Building 0035
530SB00601	1/11/1996	15	Building 0035
531SB00401	9/3/1996	5.5	Pavement
531SB00501	9/15/1996	4.7	Pavement
Site Sediment			
546M000101	10/31/1995	11	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zone E, Drainage Basin 30

Thirteen soil samples collected in 1995, 1996, and 2001 as part of the Zone E RFI investigation of SWMUs 83, 84 and AOCs 559, 570, 573, 574 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas. Site sediment samples were collected exceeding the ESV but were below the ERM values. Storm water effluent for Drainage Basin 30 was collected in 2002; however, benzo(a)pyrene was no detected above the effluent screening level. Sediment samples were collected near Outfalls 31 and 32 with SSV exceedances; however, ERM exceedances were present near Outfalls 21 and 38. Table 36 summarizes the benzo(a)pyrene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′

deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 36
Benzo(a)pyrene Concentration
Drainage Basin 30

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
573SB00201	9/11/1995	3.6	Pavement
559SB01901	11/13/1995	210	Pavement
570SB01201	11/15/1995	2.5	Pavement
084SB00101	11/29/1995	4.1	Pavement
574SB00101	11/30/1995	3.1	Pavement
574SB00301	11/30/1995	2.6	Pavement
084SB00301	12/1/1995	1.7	Soil
084SB00401	12/1/1995	9.3	Soil
084SB00501	12/1/1995	3.4	Soil
083SB00601	12/19/1995	2.9	Building 0009
574SB00801	5/22/1996	7.6	Soil
559SB04201	10/9/2001	4.7	Pavement
559SB04401	10/9/2001	14	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zone E, Drainage Basin 35

Ten soil samples collected in 1995 and 1996 as part of the Zone E RFI investigation of SWMU 102 and AOCs 590, 596 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM benzo(a)pyrene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, benzo(a)pyrene was not detected above in effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40/41 in 1995 with ERM exceedances. Table 37 summarizes the benzo(a)pyrene detections associated with Drainage Basin 35.

Table 37
Benzo(a)pyrene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
596SB00601	10/20/1995	55	Building 0101
590SB00101	1/4/1996	1.8	Pavement
102SB00801	1/31/1996	1.8	Building 0079
102SB03601b	5/17/1996	2.9	Pavement

Table 37 Benzo(a)pyrene Concentration Drainage Basin 35			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
102SB03701a	5/17/1996	8.2	Pavement
102SB03801	5/17/1996	3	Pavement
102SB04201	5/20/1996	1.7	Pavement
102SB04001	5/20/1996	6.1	Pavement
102SB04501	5/21/1996	2.1	Building 0079
596SB01301	6/4/1996	2.8	Pavement
Site Sediment			
590M000101	1/5/1996	92	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zones E and F, Drainage Basin 37

Five soil samples collected from 1995 to 1999 as part of the Zones E and F RFI investigation of AOCs 598, 599, 611 and FDS had ERM values exceedances. The majority of the surface soil sample locations are in grassy areas. AOC 607 site sediment samples were collected from catch basins with ERM benzo(a)pyrene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2002; however, benzo(a)pyrene was detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40 and 41 in 1995 with ERM exceedances. Table 38 summarizes the benzo(a)pyrene detections associated with Drainage Basin 37.

Table 38 Benzo(a)pyrene Concentration Drainage Basin 37			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
598SB00201	9/19/1995	4.9	Pavement
599SB00701	9/16/1996	17	Pavement
611SB00601	1/9/1997	3	Soil
FDSSH02601	10/21/1996	1.7	Soil
FDSSH03001	7/28/1999	2	Soil
Site Sediment			
607M000201	10/1/1996	1.8	Pavement
607M000301	10/1/1996	36	Pavement
607M000401	10/1/1996	6.2	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone G, Drainage Basin 43

Thirteen soil samples collected in 1993, 1996, 1999, and 2002 as part of the Zone G RFI investigation of SWMUs 6, 7 and AOC 628 had ERM values exceedances. The majority of the 13 ERM exceedances were collected in 1993. All of the surface soil sample locations are in

grassy areas, except for AOC 628 sample location. Storm water effluent for Drainage Basin 43 was collected in 2002; however, benzo(a)pyrene was no detected above the effluent sample screening level. Sediment samples were collected near Outfalls 42A and 43 with SSV exceedances. Sediments collected near Outfalls 38, 39, 40 and 41 had ERM exceedances. Table 39 summarizes the benzo(a)pyrene detections associated with Drainage Basin 43.

In 1998, DET performed an interim measures for SWMUs 6, 7 and AOC 635. DET was tasked to remove hot spots of contaminated soil and concrete with elevated levels PCB, pesticides and lead, as well as the demolition and disposal of Building 3902. The majority of the area was excavated two feet deep; however, in areas of elevated contamination, the area was excavated to four feet. Therefore, the benzo(a)pyrene ERM exceedances have been excavated. Extent of excavation needs to be incorporated into GIS to determine if contamination is still present.

Table 39
Benzo(a)pyrene Concentration
Drainage Basin 43

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
007SB27101	10/11/1993	6.4	Soil
007SB16101	10/11/1993	2.1	Soil
007SB28101	10/13/1993	2.5	Soil
007SB30101	10/13/1993	10	Soil
007SB37101	10/13/1993	4.2	Soil
006SB00201	9/19/1996	2.5	Soil
628SB00601	12/17/1999	8.3	Pavement
006SB02101	5/8/2002	1.61	Soil

Notes:
mg/kg = Milligrams per kilogram

Chrysene

Chrysene was identified in four upland drainage basins exceeding the ERM value. Twenty-four upper interval soil and four site sediment samples within those drainage basins also had detections of chrysene exceeding the ERM value.

3.5.1 Zone E, Drainage Basin 23

There were eight soil samples collected in 1995-1996 as part of the Zone C RFI investigation of AOCs 530 and 531 with ERM values exceedances. All locations were located in the paved area or associated with a building. AOC 546 site sediment samples, which also had ERM exceedances for chrysene, were also collected. Storm water effluent for Drainage Basin

23 was collected in 2002; however, chrysene was not detected above the effluent screening level. Sediment samples collected near Outfalls 21 and 14 had chrysene ERM exceedances. Table 40 summarizes the chrysene detections associated with Drainage Basin 23.

Table 40
Chrysene Concentration
Drainage Basin 23

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
531SB00301	10/27/1995	3.8	Pavement
530SB00401	1/9/1996	6	Pavement
530SB00101	1/9/1996	3.4	Pavement
530SB00601	1/11/1996	20	Building
530SB00701	1/11/1996	16	Building
530SB00801	1/11/1996	46	Building
531SB00401	9/3/1996	5.6	Pavement
531SB00501	9/15/1996	4.1	Pavement
Site Sediment			
546M000101	10/31/1995	15	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 35

There were five soil samples collected in 1995-1996 as part of the Zone E RFI investigation of AOC 590 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM chrysene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, chrysene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40/41 in 1995 with ERM exceedances. Table 41 summarizes the chrysene detections associated with Drainage Basin 35.

Table 41
Chrysene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
596SB00601	10/20/1995	82	Building
102SB00801	1/31/1996	3	Building
102SB03701a	5/17/1996	8.4	Pavement
102SB04001	5/20/1996	7.8	Pavement
596SB01301	6/4/1996	4.2	Pavement
Site Sediment			
590M000101	1/5/1996	110	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zones E and F, Drainage Basin 37

There was one soil sample collected as part of the Zones E and F RFI investigation of FDS had ERM values exceedances. The majority of the surface soil sample location was collected in grass. AOC 607 site sediment samples were collected from catch basins with ERM chrysene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2001, however, chrysene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40 and 41 in 1995 with ERM exceedances. Table 42 summarizes the chrysene detections associated with Drainage Basin 37.

Table 42
Chrysene Concentration
Drainage Basin 37

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
FDSSH02601	10/21/1996	3.2	Soil
Site Sediment			
607M000401	10/1/1996	4.2	Pavement
607M000301	10/1/1996	55	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone G, Drainage Basin 43

Six soil samples collected as part of the Zone G RFI investigation of SWMUs 6, 7, and AOC 628 had ERM values exceedances. The majority of the surface soil locations are in grassy areas. Storm water effluent for Drainage Basin 43 was collected in 2002; however, chrysene was not detected in the effluent screening level. Sediments collected near Outfalls 38, 39, 40 and 41 had ERM exceedances. Table 43 summarizes the chrysene detections associated with Drainage Basin 43.

In 1998, DET performed an interim measures for SWMUs 6, 7 and AOC 635. DET was tasked to remove hot spots of contaminated soil and concrete with elevated levels PCB, pesticides and lead, as well as the demolition and disposal of Building 3902. The majority of the area was excavated two feet deep; however, in areas of elevated contamination, the area was excavated to four feet. Therefore, the chrysene ERM exceedances have been excavated. Extent of excavation needs to be incorporated into GIS to determine if contamination is still present.

Table 43
Chrysene Concentration
Drainage Basin 43

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
007SB27101	10/11/1993	9.6	Soil
007SB28101	10/13/1993	3.1	Soil
007SB30101	10/13/1993	11	Soil
007SB37101	10/13/1993	4.2	Soil
006SB00201	9/19/1996	2.8	Soil
628SB00601	12/17/1999	12	Pavement

Notes:
mg/kg = Milligrams per kilograms

Dibenz(a,h)anthracene

Dibenz(a,h)anthracene was identified in six upland drainage basins exceeding the ERM value. Sixty-seven upper interval soil and five site sediment samples within those drainage basins also had detections of dibenz(a,h)anthracene exceeding the ERM value.

Zone E, Drainage Basin 23

There were 12 soil samples collected in 1995-1996 as part of the Zone E RFI investigation of SWMU 37 and AOCs 530, 531, and 542 had ERM values exceedances. All locations were located in the paved areas or associated with a building. AOC 546 site sediment samples, which also had ERM exceedances for dibenz(a,h)anthracene, were also collected. Storm water effluent for Drainage Basin 23 was collected in 2002; however, dibenz(a,h)anthracene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had dibenz(a,h)anthracene ERM exceedances. Table 44 summarizes the dibenz(a,h)anthracene detections associated with Drainage Basin 23.

Table 44
Dibenz(a,h)anthracene Concentration
Drainage Basin 23

Sample ID	Date collected	Concentration (mg/kg)	Groundcover
Site Soil			
542SB00501	8/29/1995	0.41	Pavement
531SB00301	10/27/1995	1.3	Pavement
531SB00201	10/27/1995	0.45	Pavement
530SB00401	1/9/1996	0.93	Pavement
530SB00101	1/9/1996	0.65	Pavement
530SB00801	1/11/1996	12	Building
530SB00601	1/11/1996	4.4	Building
530SB00701	1/11/1996	5	Building
531SB00401	9/3/1996	1.2	Pavement
530SB00901	9/14/1996	0.27	Pavement
530SB01001a	9/14/1996	0.43	Pavement

Table 44 Dibenz(a,h)anthracene Concentration Drainage Basin 23			
Sample ID	**Date collected**	**Concentration (mg/kg)**	**Groundcover**
531SB00501	9/15/1996	0.86	Pavement
Site Sediment			
539M000101	9/7/1995	0.49	Pavement
546M000101	10/31/1995	3.7	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 30

There were 19 soil samples collected in 1995-1996 as part of the Zone E RFI investigation of SWMUs 83, 84, and AOCs 559, 570, 572, 573, 574 had ERM values exceedances. The majorities of the surface soil sample locations are in paved areas or associated with a building. Site sediment samples were collected exceeding the ERM but were below the ESV values. Storm water effluent for Drainage Basin 30 was collected in 2002; however, dibenz(a,h)anthracene was no detected above the effluent screening level. Sediment samples were collected near Outfalls 31 and 32 with ERM exceedances. Additional ERM exceedences are located near Outfalls 21 and 38 through 41. Table 45 summarizes the dibenz(a,h)anthracene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′ deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 45 Dibenz(a,h)anthracene Concentration Drainage Basin 30			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
572SB00301	9/10/1995	0.36	Pavement
573SB00201	9/11/1995	1	Pavement
569SB00501	10/13/1995	0.27	Pavement
570SB00201	11/6/1995	0.32	Pavement
559SB02001	11/13/1995	0.33	Pavement
559SB01901	11/13/1995	60	Pavement
570SB01201	11/15/1995	0.8	Pavement

Table 45
Dibenz(a,h)anthracene Concentration
Drainage Basin 30

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
084SB00101	11/29/1995	0.7	Pavement
574SB00101	11/30/1995	0.49	Pavement
084SB00501	12/1/1995	1.2	Soil
084SB00301	12/1/1995	0.63	Soil
084SB00401	12/1/1995	3.6	Soil
083SB00601	12/19/1995	0.55	Building
574SB00801	5/22/1996	2.7	Soil
574SB00701	5/22/1996	0.51	Pavement
084SB00701	5/24/1996	0.5	Soil
572SB01101	9/14/1996	0.39	Pavement
559SB04401	10/9/2001	1.7	Pavement
559SB04201	10/9/2001	0.54	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 35

There were 12 soil samples collected 1995-1996 as part of the Zone E RFI investigation of AOC 590 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM dibenz(a,h)anthracene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, dibenz(a,h)anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40/41 in 1995 with ERM exceedances. Table 46 summarizes the dibenz(a,h)anthracene detections associated with Drainage Basin 35.

Table 46
Dibenz(a,h)anthracene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
596SB00601	10/20/1995	18	Building
590SB00101	1/4/1996	0.6	Pavement
102SB00801	1/31/1996	0.6	Building
102SB00201	2/1/1996	0.54	Building
102SB00301	2/1/1996	0.5	Building
102SB00501	2/1/1996	0.31	Building
102SB03801	5/17/1996	1.5	Pavement
102SB03701a	5/17/1996	6.3	Pavement
102SB03601b	5/17/1996	1.4	Pavement
102SB04001	5/20/1996	0.43	Pavement
102SB04501	5/21/1996	0.56	Building
596SB01301	6/4/1996	0.87	Pavement
Site Sediment			
590M000101	1/5/1996	23	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zones E and F, Drainage Basin 37

There were two soil samples collected as part of the Zones E and F RFI investigation of FDS had ERM values exceedances. The two soil sample locations are in grassy areas. AOC 607 site sediment samples were collected from catch basins with ERM dibenz(a,h)anthracene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2002, however dibenz(a,h)anthracene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38, 39, 40 and 41 in 1995 with ERM exceedances. Table 47 summarizes the dibenz(a,h)anthracene detections associated with Drainage Basin 37.

Table 47
Dibenz(a,h)anthracene Concentration
Drainage Basin 37

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
FDSSH02601	10/21/1996	0.29	Soil
FDSSH03001	7/28/1999	0.6	Soil
Site Sediment			
607M000301	10/1/1996	9.1	Pavement
607M000401	10/1/1996	1.8	Pavement

Zone E, Drainage Basin 41

There were six soil samples collected as part of the Zone E RFI Investigation of SWMU 18 and AOC 621 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas. Samples were collected near Outfalls 38, 39, 40 and 41 in 1995 with ERM exceedances. Table 48 summarizes the dibenz(a,h)anthracene detections associated with Drainage Basin 41.

Table 48
Dibenz(a,h)anthracene Concentration
Drainage Basin 41

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
605SB00301	9/21/1995	0.29	Pavement
605SB00401	9/21/1995	0.86	Pavement
605SB00801	9/22/1995	0.3	Pavement
018SB00401a	9/25/1995	0.3	Pavement
605SB01401	5/31/1996	0.28	Pavement
605SB01301	5/31/1996	0.31	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone G, Drainage Basin 43

Nine soil samples collected as part of the Zone G RFI investigation of SWMUs 6, 7, and AOC 628 had ERM values exceedances. The majorities of the surface soil sample locations are in grassy areas, or associated within paved areas. Storm water effluent for Drainage Basin 43 was collected in 2002; however, dibenz(a,h)anthracene was not detected above the effluent screening level. Sediments collected near Outfalls 38, 39, 40 and 41 had ERM exceedances. Table 49 summarizes the dibenzo(a,h)anthracene detections associated with Drainage Basin 43.

In 1998, DET performed an interim measures for SWMUs 6, 7 and AOC 635. DET was tasked to remove hot spots of contaminated soil and concrete with elevated levels PCB, pesticides and lead, as well as the demolition and disposal of Building 3902. The majority of the area was excavated two feet deep; however, in areas of elevated contamination, the area was excavated to four feet. Therefore, the dibenzo(a,h)anthracene ERM exceedances have been excavated. Extent of excavation needs to be incorporated into GIS to determine if contamination is still present.

Table 49
Dibenz(a,h)anthracene Concentration
Drainage Basin 43

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
007SB23101	10/11/1993	0.43	Soil
007SB16101	10/11/1993	0.28	Soil
007SB37101	10/13/1993	0.67	Soil
007SB30101	10/13/1993	1.3	Soil
007SB28101	10/13/1993	0.85	Soil
006SB00201	9/19/1996	0.76	Soil
006SB00101	9/19/1996	0.35	Soil
628SB00601	12/17/1999	1.2	Pavement
628SB01401	1/27/2000	0.28	Pavement

Notes:
mg/kg = Milligrams per kilograms

Fluoranthene

Fluoranthene was identified in three upland drainage basins exceeding the ERM value. Twenty-six upper interval soil and three site sediment samples within those drainage basins also had detections of fluoranthene exceeding the ERM value.

Zone E, Drainage Basin 23

Eight soil samples collected in 1995 and 1996 as part of the Zone E RFI investigation of AOCs 530 and 531 had ERM values exceedances. All locations were located in the paved. AOCs 539 and 546 site sediment samples, which also had ERM exceedances for fluoranthene, were also collected. Storm water effluent for Drainage Basin 23 was collected in 2002; however, fluoranthene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had fluoranthene ERM exceedances. Sediment samples collected in the Cooper River with SSV exceedances were also nearby: Outfalls 21, 22, 28, 29, and 30. Table 50 summarizes the fluoranthene detections associated with Drainage Basin 23.

Table 50
Fluoranthene Concentration
Drainage Basin 23

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
531SB00301	10/27/1995	6.5	Pavement
530SB00401	1/9/1996	12	Pavement
530SB00101	1/9/1996	5.6	Pavement
530SB00601	1/11/1996	45	Building 0035
530SB00701	1/11/1996	32	Building 0035
530SB00801	1/11/1996	90	Building 0035
531SB00401	9/3/1996	11	Pavement
531SB00501	9/15/1996	7	Pavement
Site Sediment			
539M000101	9/7/1995	8	Pavement
546M000101	10/31/1995	33	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 30

Eleven soil samples collected in 1995, 1996, and 2001 as part of the Zone E RFI investigation of SWMUs 83, 84 and AOCs 559, 570, 573, 574, 579 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas. Storm water effluent for Drainage Basin 30 was collected in 2002; however, fluoranthene was no detected above the effluent screening level. Sediment samples were collected between Outfalls 22 and 32 with SSV exceedances; however, there were no ERM exceedances close to Outfall 30. ERM exceedances are located near Outfalls 21 and 38-41. Table 51 summarizes the fluoranthene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′ deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 51
Fluoranthene Concentration
Drainage Basin 30

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
573SB00201	9/11/1995	7.7	Pavement
579SB00201	9/12/1995	7.5	Pavement
559SB01901	11/13/1995	550	Pavement
570SB01201	11/15/1995	5.4	Pavement
084SB00101	11/29/1995	12	Pavement
084SB00401	12/1/1995	24	Soil
084SB00501	12/1/1995	6.4	Soil
083SB00601	12/19/1995	7.5	Building 0009
574SB00801	5/22/1996	22	Soil
559SB04401	10/9/2001	34	Pavement
559SB04201	10/9/2001	14	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 35

Five soil samples collected in 1995 and 1996 as part of the Zone E RFI investigation of SWMU 102 and AOC 596 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. AOC 590 site sediment samples were collected from a catch basin with ERM fluoranthene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, fluoranthene was no detected above the effluent screening level Sediment samples were collected near Outfalls 30-32 had SSV exceedances; however, ERM exceedances were near Outfalls 38 to 41. Table 52 summarizes the fluoranthene detections associated with Drainage Basin 35.

Table 52
Fluoranthene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
596SB00601	10/20/1995	220	Building 0101
102SB00801	1/31/1996	7	Building 0079
102SB03701a	5/17/1996	10	Pavement
102SB04001	5/20/1996	16	Pavement
596SB01301	6/4/1996	10	Pavement
Site Sediment			
590M000101	1/5/1996	230	Pavement

Notes:
mg/kg = Milligrams per kilograms

Fluorene

Fluorene was identified in one upland drainage basins exceeding the ERM value. Three upper interval soil and one site sediment samples within those drainage basins also had detections of fluorene exceeding the ERM value.

Zone E, Drainage Basin 23

Three soil samples collected in 1996 as part of the Zone E RFI investigation of AOC 530 had ERM values exceedances. All locations were associated with Building 0035. AOC 546 site sediment sample, which also had ERM exceedance for fluoranthene, was also collected. Storm water effluent for Drainage Basin 23 was collected in 2002; however, fluoranthene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had fluoranthene ERM exceedances. Table 53 summarizes the fluoranthene detections associated with Drainage Basin 23.

Table 53
Fluorene Concentration
Drainage Basin 23

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
530SB00601	1/11/1996	6.8	Building 0035
530SB00701	1/11/1996	3.5	Building 0035
530SB00801	1/11/1996	12	Building 0035
Site Sediment			
546M000101	10/31/1995	3.2	Pavement

Notes:
mg/kg = Milligrams per kilograms

Lead

Lead was identified in five upland drainage basins exceeding the ERM value. Seventy-six upper interval soil and seven site sediment samples within those drainage basins also had detections of lead exceeding the ERM value.

Zone E, Drainage Basin 27

Eleven soil samples collected in 1995, 1996, and 1997 as part of the Zone E RFI investigation of SWMU 25 and AOCs 549, 551 had ERM/background values exceedances. All sample locations are in paved areas or associated with a building. Site sediment samples were also collected in 1996 with ERM exceedances. Storm water effluent for Drainage Basin 27 was collected in 2002; however, lead was not detected above the effluent screening level. Sediment samples were collected near the outfall location in 1997 with ERM exceedances, as well as near Outfalls 22 and 30. Table 54 summarizes the lead detections associated with Drainage Basin 27.

Environmental Detachment Charleston (DET) performed three interim measures at SWMU 25. In 1997, DET was tasked to demolish the electroplating facility associated with Building 44 (SWMU 25). However, after demolition of the electroplating facility, it was determined that the electrical vault 7A could not be removed as planned due to the discovery of high voltage electrical cables traversing the vault. In 1998, the DET investigated the extent of contamination at SWMU 25. Chromium contamination was identified in the electrical vault 7A. The fluids and inside surfaces of the vault were stained yellow with chromium. In 1999, the DET excavated and disposed of electrical vault 7A and associated electrical cable conduit. The majority of the ERM lead exceedances were excavated during the removal of the electrical vault and cable conduit.

Table54
Lead Concentration
Drainage Basin 27

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
549SB00801	8/31/1995	300	Pavement
549SB01001	9/1/1995	1620	Pavement
549SB00101	9/1/1995	516	Pavement
551SB00601	9/29/1995	934	Pavement
025SB00901	2/2/1996	469	Building 0044A
025SB02701	8/28/1997	264	Pavement
025SB01401	8/28/1997	252	Building 0044A
025SB01501	8/28/1997	550	Building 0044A
025SB02301	8/28/1997	917	Building 0044A

Table54 Lead Concentration Drainage Basin 27			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
025SB02201	8/28/1997	1090	Building 0044A
025SB02001	8/28/1997	4890	Pavement
Site Sediment			
025M000101	3/20/1996	754	Not Classified

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 30

Twenty-three soil samples collected in 1995, 1996, 2001, and 2002 as part of the Zone E RFI investigation of SWMUs 83, 84 and AOCs 559, 570, 572, 574, 576, 578 through 580 had ERM/background values exceedances. The majority of the surface soil sample locations are in paved areas. A few samples associated with SWMU 84 were collected in a grassy area. Site sediment samples were collected from storm water catch basins with ERM lead exceedances in 1995. Storm water effluent for Drainage Basin 30 was collected in 2002; however, lead was not detected above the effluent screening level. Sediment samples were collected near the outfall location in 1997 with ERM exceedances. Additional sediment samples with ERM exceedances were collected near Outfalls 22, 27, and 39. Table 55 summarizes the lead detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′ deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 55 Lead Concentration Drainage Basin 30			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
576SB00101	9/9/1995	335	Pavement
572SB00601	9/10/1995	445	Pavement
579SB00201	9/12/1995	362	Pavement
580SB00601	9/14/1995	1180	Pavement
580SB00501	9/14/1995	712	Pavement

Table 55 Lead Concentration Drainage Basin 30			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
570SB00201	11/6/1995	332	Pavement
559SB01901	11/13/1995	249	Pavement
574SB00201	11/30/1995	476	Pavement
574SB00301	11/30/1995	438	Pavement
084SB00401	12/1/1995	317	Soil
084SB00301	12/1/1995	408	Soil
084SB00501	12/1/1995	281	Soil
578SB00101	5/16/1996	567	Building 0025
574SB00501c	5/21/1996	676	Pavement
574SB00801	5/22/1996	411	Soil
574SB00701	5/22/1996	280	Pavement
084SB00701	5/24/1996	644	Soil
083SB01001	5/28/1996	1400	Pavement
572SB01101	9/14/1996	254	Pavement
580SB00901	9/15/1996	376	Pavement
572SB02401	11/28/2001	243	Pavement
578SB00101b	4/25/2002	301	Building 0025
Site Sediment			
173M000101	10/12/1995	4270	Pavement
173M000201	10/12/1995	811	Pavement
173M000301	10/12/1995	721	Pavement
572M000101	10/31/1995	329	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone F, Drainage Basin 34

Three soil samples collected in 1996 and 1999 as part of the Zone F RFI investigation of SWMU 109 had ERM/background values exceedances. Sample locations are in paved and grassy areas. Site sediment sample was collected from storm water catch basin which also had lead ERM exceedance. Storm water effluent for Drainage Basin 34 was collected in 2002; however, lead was not detected above the effluent screening level. There were ERM exceedances on lead in the Cooper River near Outfalls 30 and 39. Table 56 summarizes the lead detections associated with Drainage Basin 34.

Table 56 Lead Concentration Drainage Basin 34			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
109SB00401	9/23/1996	362	Soil
109SB005T1	10/14/1999	793	Soil
109SB001T1	10/15/1999	476	Pavement
Site Sediment			
109M000301	10/1/1996	1150	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 36

Two soil samples collected in 1996 as part of the Zone E RFI investigation of AOC 598 had ERM/background values exceedances. All sample locations are in paved areas. Site sediment samples were collected from storm water catch basin which also had lead ERM exceedances. Storm water effluent for Drainage Basin 36 was collected in 2002; however, lead was not detected above the effluent screening level. The effluent sample was collected upgradient from the surface soil sample exceedances. Sediment samples collected near Outfalls 30 and 39 also exceeded the ERM value for lead. Table 57 summarizes the lead detections associated with Drainage Basin 36.

Table 57
Lead Concentration
Drainage Basin 36

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
598SB00601	9/16/1996	272	Pavement
598SB00501	9/16/1996	1810	Pavement
Site Sediment			
598M000101	9/24/1995	368	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zones E and F, Drainage Basin 41

Thirty-seven soil samples collected in 1995, 1996, and 2001 as part of the Zone E and F RFI investigation of SWMUs 5, 18 and AOCs 605, 620 had ERM/background values exceedances. All sample locations are in paved areas. Storm water effluent for Drainage Basin 41 was collected in 2002, however, lead was not detected above the effluent screening level. Sediment samples collected in the Cooper River near the drainage basin outfall contained ERM lead exceedances. In 2002, 17 locations were within excavation areas and the extent of excavation needs to be incorporated into GIS to determine if contamination is still present. Table 58 summarizes the lead detections associated with Drainage Basin 41.

Table 58
Lead Concentration
Drainage Basin 41

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
605SB00301	9/21/1995	270	Pavement
605SB00701	9/22/1995	1190	Pavement
605SB00601	9/22/1995	399	Pavement
005SB00301*	9/22/1995	462	Pavement
605SB00801*	9/22/1995	460	Pavement
005SB00101*	9/25/1995	338	Pavement
005SB00201*	9/25/1995	10500	Pavement
018SB00501	9/25/1995	680	Pavement
018SB00401*	9/25/1995	1960	Pavement
018SB00101	9/25/1995	404	Pavement
605SB00501	9/26/1995	249	Pavement
605SB00201*	9/26/1995	1600	Pavement
605SB01301	5/31/1996	627	Pavement
605SB01201	5/31/1996	815	Pavement
605SB01501	5/31/1996	1120	Pavement
620SB01801*	6/6/2001	18400	Pavement
620SB03301*	10/10/2001	430	Pavement
620SB03601*	10/10/2001	570	Building 0068
620SB03501*	10/10/2001	770	Pavement
620SB03201*	10/10/2001	1500	Pavement
005SB03301	11/14/2001	490	Pavement
005SB03201	11/14/2001	930	Pavement
005SB02301	11/14/2001	1400	Pavement
005SB03001	11/14/2001	1900	Pavement
005SB02501	11/15/2001	700	Pavement
005SB02701	11/15/2001	400	Pavement
005SB01601*	11/15/2001	840	Pavement
005SB02401	11/15/2001	1900	Pavement
005SB02601	11/15/2001	980	Pavement
005SB01701	11/15/2001	260	Pavement
005SB01201*	11/15/2001	7000	Pavement
005SB01401*	11/15/2001	15000	Pavement
005SB05101*	11/16/2001	8900	Pavement
005SB04801*	11/16/2001	7600	Pavement
005SB04901*	11/16/2001	6300	Pavement
620SB05701	11/26/2001	790	Pavement
620SB05401	11/26/2001	1820	Pavement
Storm Water Effluent (µg/l)			
EFF032	7/11/2002	140	Pavement

Notes:
mg/kg = Milligrams per kilograms
µg/L = Microgram per Liter
* = Location excavated

Phenanthrene

Phenanthrene was identified in four upland drainage basins exceeding the ERM value. Fifty-two upper interval soil and seven site sediment samples within those drainage basins also had detections of phenanthrene exceeding the ERM value.

Zone E, Drainage Basin 23

There were eight soil samples collected in 1995-1996 as part of the Zone E RFI investigation of AOCs 30, 531 had ERM values exceedances. All locations were located in the paved areas or associated with a building. Site sediment samples, which also had ERM exceedances for phenanthrene, were collected as part of the investigation of AOC s 539 and 546. Storm water effluent for Drainage Basin 23 was collected in 2002; however, phenanthrene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had phenanthrene ERM exceedances. Table 59 summarizes the phenanthrene detections associated with Drainage Basin 23.

Table 59
Phenanthrene Concentration
Drainage Basin 23

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
531SB00301	10/27/1995	2.2	Pavement
530SB00401	1/9/1996	6.1	Pavement
530SB00101	1/9/1996	3.3	Pavement
530SB00601	1/11/1996	55	Building
530SB00801	1/11/1996	100	Building
530SB00701	1/11/1996	21	Building
531SB00401	9/3/1996	4.5	Pavement
531SB00501	9/15/1996	2.4	Pavement
Site Sediment			
539M000101	9/7/1995	4.6	Water body
546M000101	10/31/1995	30	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 30

There were 18 soil samples collected as part of the Zone E RFI investigation of SWMUs 83, 84 and AOCs 559, 570, 572, 573, 574, 579 that had ERM values exceedances. The majorities of the surface soil sample locations are in paved areas or associated with grassy areas or buildings. Site sediment samples were collected with ERM phenanthrene exceedances in 1995. Storm water effluent for Drainage Basin 30 was collected in 2002; however, phenanthrene was not detected above the effluent screening level. Sediment samples were collected near outfall 30 in 1995 with ERM exceedances. Table 60 summarizes the phenanthrene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15' x 20' x 4' deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 60
Phenanthrene Concentration
Drainage Basin 30

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
572SB00301	9/10/1995	1.5	Pavement
573SB00201	9/11/1995	3.8	Pavement
579SB00201	9/12/1995	5	Pavement
570SB00201	11/6/1995	2.3	Pavement
559SB01901	11/13/1995	600	Pavement
570SB01201	11/15/1995	4.8	Pavement
084SB00101	11/29/1995	8.3	Pavement
574SB00301	11/30/1995	1.8	Pavement
574SB00401	11/30/1995	2.6	Pavement
084SB00301	12/1/1995	2.6	Soil
084SB00501	12/1/1995	2.5	Soil
084SB00401	12/1/1995	26	Soil
083SB00501	12/18/1995	7	Building
083SB00601	12/19/1995	6.5	Building
574SB00801	5/22/1996	26	Soil
559SB04301	10/9/2001	1.6	Pavement
559SB04401	10/9/2001	31	Pavement
559SB04201	10/9/2001	12	Pavement
Site Sediment			
572M000101	10/31/1995	2.2	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 35

There were 13 soil samples collected as part of the Zone E RFI investigation of SWMU 102 and AOCs 590, 596 that had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. Site sediment samples were collected from a catch basin with ERM phenanthrene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, phenanthrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38 and 39 in 1995 with

ERM exceedances. Table 61 summarizes the phenanthrene detections associated with Drainage Basin 35.

Table 61
Phenanthrene Concentration
Drainage Basin 35

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
596SB00601	10/20/1995	220	Building
590SB00101	1/4/1996	3.5	Pavement
590SB00201	1/5/1996	1.5	Pavement
102SB00801	1/31/1996	7.1	Building
102SB00101	1/31/1996	3.2	Building
102SB00601	1/31/1996	1.6	Building
102SB00201	2/1/1996	2.2	Building
102SB00301	2/1/1996	3	Building
102SB03401a	5/17/1996	1.9	Pavement
102SB03701a	5/17/1996	7.5	Pavement
102SB04001	5/20/1996	9.6	Pavement
102SB04201	5/20/1996	2.5	Pavement
596SB01301	6/4/1996	10	Pavement
Site Sediment			
590M000101	1/5/1996	190	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zones E, F, and G, Drainage Basin 36 and 37

There were 10 soil samples collected in 1995, 96 & 99 as part of the Zones E, F, and G RFI investigation of FDS, 613, and AOCs 598, 599 that had ERM values exceedances. All of the surface soil sample locations are in paved areas, except for FDS sample locations which were collected in grass. AOC 607 site sediment samples were collected from catch basins with ERM phenanthrene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2002; however, phenanthrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38 and 39 in 1995 with ERM exceedances. Table 62 summarizes the phenanthrene detections associated with Drainage Basin 37.

Table 62
Phenanthrene Concentration
Drainage Basin 37

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
FDSSC09501b	12/5/1996	3.1	Pavement
613SB00901	10/13/1999	5	Pavement
FDSSH02301	10/17/1996	1.9	Soil
FDSSH02601	10/21/1996	2.5	Soil
FDSSH02801	7/28/1999	1.8	Soil

Table 62 Phenanthrene Concentration Drainage Basin 37			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
598SB00201	9/19/1995	15	Pavement
598SB00301	9/20/1995	2.5	Pavement
598SB00601	9/16/1996	1.5	Pavement
599SB00301	9/20/1995	1.9	Not classified
599SB00701	9/16/1996	48	Pavement
Site Sediment			
607M000401	10/1/1996	5.9	Pavement
607M000201	10/1/1996	3.2	Pavement
607M000301	10/1/1996	110	Pavement

Notes:
mg/kg = Milligrams per kilograms

Pyrene

Pyrene was identified in five upland drainage basins exceeding the ERM value. Fifty-eight upper interval soil and six site sediment samples within those drainage basins also had detections of pyrene exceeding the ERM value.

Zone E, Drainage Basin 23

Eight soil samples collected in 1995 and 1996 as part of the Zone E RFI investigation of AOCs 530, 531 had ERM values exceedances. All locations were located in the paved area or associated with a building. Site sediment samples, which also had ERM exceedances for pyrene, were collected as part of the investigation of AOCs 539 and 546. Storm water effluent for Drainage Basin 23 was collected in 2002; however, pyrene was not detected above the effluent screening level. Sediment samples collected near Outfall 21 had pyrene ERM exceedances. Table 63 summarizes the pyrene detections associated with Drainage Basin 23.

Table 63 Pyrene Concentration Drainage Basin 23			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
531SB00301	10/27/1995	6.9	Pavement
530SB00101	1/9/1996	5	Pavement
530SB00401	1/9/1996	12	Pavement
530SB00601	1/11/1996	45	Building 0035
530SB00801	1/11/1996	74	Building 0035
530SB00701	1/11/1996	26	Building 0035
531SB00401	9/3/1996	9.8	Pavement
531SB00501	9/15/1996	6.6	Pavement
Site Sediment			
539M000101	9/7/1995	5.5	Pavement

Table 63 Pyrene Concentration Drainage Basin 23			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
546M000101	10/31/1995	25	Pavement

Notes:
mg/kg = Milligrams per kilograms

Zone E, Drainage Basin 30

Seventeen soil samples collected in 1995, 1996, and 2001 as part of the Zone E RFI investigation of SWMUs 83, 84 and AOCs 559, 570, 573, 574, 579 had ERM values exceedances. The majority of the surface soil sample locations are in paved areas. Site sediment samples were collected with pyrene SSV exceedances. Storm water effluent for Drainage Basin 30 was collected in 2002; however, pyrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 31 and 32 in 1995 with ERM exceedances. Table 64 summarizes the pyrene detections associated with Drainage Basin 30.

Environmental Detachment Charleston (DET) performed two interim measures: AOC 574 and Buildings 3, 9, and 68. In 1997, DET was tasked to remove petroleum contaminated soil where two fuel tanks and one waste oil tank were formally located (AOC 574). An area 15′ x 20′ x 4′ deep was excavated. In 1998, DET conducted a sanitary sewer cross-connect dye test study. Several cross-connects were identified in buildings 3, 9, and 68. The report indicated that the restroom cross-connects would be addressed by SOUTHDIV at a later date; however, cross-connections of floor drains, shop sinks, sump drains, etc. were resolved.

Table 64 Pyrene Concentration Drainage Basin 30			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
579SB00201	9/11/1995	6.7	Pavement
570SB00201	9/12/1995	6.4	Pavement
559SB01901	11/6/1995	2.7	Pavement
570SB01501REMD	11/13/1995	430	Pavement
570SB01201	11/14/1995	5.5	Pavement
084SB00101	11/15/1995	5.6	Pavement
574SB00501a	11/29/1995	6.8	Pavement
574SB00301	11/30/1995	59	Pavement
084SB00501	11/30/1995	3.2	Pavement
084SB00301	12/1/1995	4.6	Soil
084SB00401	12/1/1995	3.7	Soil
083SB00601	12/1/1995	24	Soil
574SB00501c	12/19/1995	6.1	Building 0009

Table 64 Pyrene Concentration Drainage Basin 30			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
574SB00801	5/21/1996	14	Pavement
559SB04401	5/22/1996	18	Soil
559SB04201	10/9/2001	27	Pavement
579SB00201	10/9/2001	10	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zone E and F, Drainage Basin 35

Fourteen soil samples collected in 1995, 1996, and 1999 as part of the Zones E and F RFI investigation of SWMU 102 and AOCs 590, 596, 613 had ERM values exceedances. All of the surface soil sample locations are in paved areas or associated with a building. Site sediment samples were collected from a catch basin with ERM pyrene exceedances in 1996. Storm water effluent for Drainage Basin 35 was collected in 2002; however, pyrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 31, 32, 38 through 41 in 1995 with ERM exceedances. Table 65 summarizes the pyrene detections associated with Drainage Basin 35.

Table 65 Pyrene Concentration Drainage Basin 35			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
596SB00601	10/20/1995	160	Building 0101
590SB00101	1/4/1996	2.6	Pavement
102SB00801	1/31/1996	5.7	Building 0079
102SB00301	2/1/1996	5	Building 0079
102SB00201	2/1/1996	3	Building 0079
102SB03701a	5/17/1996	17	Pavement
102SB03801	5/17/1996	5.1	Pavement
102SB03601b	5/17/1996	4.8	Pavement
102SB03401a	5/17/1996	2.6	Pavement
102SB04201	5/20/1996	3.8	Pavement
102SB04001	5/20/1996	16	Pavement
102SB04501	5/21/1996	2.8	Building 0079
596SB01301	6/4/1996	7.7	Pavement
613SB02201b	11/16/1999	2.7	Pavement
Site Sediment			
590M000101	1/5/1996	190	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zones E and G, Drainage Basin 36 and 37

Four soil samples collected as part of the Zones E and G RFI investigation of AOCs 598, 599 and FDS had ERM values exceedances. The majority of the surface soil sample locations are in paved areas, except for FDS sample locations which were collected in grass. AOC 607 site sediment samples were collected from catch basins with ERM pyrene exceedances in 1996. Storm water effluent for Drainage Basin 37 was collected in 2002; however, pyrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 38 through 41 in 1995 with ERM exceedances. Table 66 summarizes the pyrene detections associated with Drainage Basin 37.

Table 66
Pyrene Concentration
Drainage Basin 37

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
598SB00201	9/19/1995	21	Pavement
599SB00701	9/16/1996	29	Pavement
FDSSH02601	10/21/1996	7.5	Soil
FDSSH03001	7/28/1999	3.1	Soil
Site Sediment			
607M000201	10/1/1996	5.3	Pavement
607M000301	10/1/1996	70	Pavement
607M000401	10/1/1996	8.4	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zone G, Drainage Basin 43

Fifteen soil samples collected as part of the Zone G RFI investigation of SWMUs 6, 7 and AOC 628 had ERM values exceedances. The majority of the surface soil sample locations are in grassy areas. Storm water effluent for Drainage Basin 43 was collected in 2002; however, pyrene was not detected above the effluent screening level. Sediment samples were collected near Outfalls 42A and 43 with SSV exceedances. Sediment samples were collected near Outfalls 38 to 41 with ERM exceedances. Table 67 summarizes the pyrene detections associated with Drainage Basin 43.

In 1998, DET performed an interim measures for SWMUs 6, 7 and AOC 635. DET was tasked to remove hot spots of contaminated soil and concrete with elevated levels PCB, pesticides and lead, as well as the demolition and disposal of Building 3902. The majority of the area was excavated two feet deep; however, in areas of elevated contamination, the area was excavated

to four feet. Therefore, the pyrene ERM exceedances have been excavated. Extent of excavation needs to be incorporated into GIS to determine if contamination is still present.

Table 67
Pyrene Concentration
Drainage Basin 43

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
006SB02101a	9/21/1993	2.9	Soil
007SB16101	10/11/1993	3.7	Soil
007SB19101	10/11/1993	2.6	Soil
007SB21101	10/11/1993	3.9	Soil
007SB23101	10/11/1993	3	Soil
007SB27101	10/11/1993	23	Soil
007SB28101	10/13/1993	3.2	Soil
007SB30101	10/13/1993	30	Soil
007SB37101	10/13/1993	5.4	Soil
006SB15101	10/27/1993	4.7	Building 3902
006SB00201	9/19/1996	6.5	Soil
007SB00101	10/3/1996	3.6	Soil
628SB00601	12/17/1999	18	Pavement
628SB01401	1/27/2000	3	Pavement
006SB02101	5/8/2002	4.19	Soil

Notes:
mg/kg = Milligram per Kilogram

Total PCBs

PCBs (Arochlor-1260) were identified in one upland drainage basins exceeding the ERM value. Two upper interval soil samples within Drainage Basin 28 had detections of PCBs (Arochlor-1260) exceeding the ERM value.

3.12.1 Zone E, Drainage Basin 28

Two soil samples collected in 1995 and 1996 as part of the Zones E RFI investigation of SWMU 171 and AOC 559 had PCB (Arochlor-1260) ERM values exceedances. Sample locations are in paved areas. Storm water effluent for Drainage Basin 28 was collected in 2002; however, PCBs were not detected above the effluent screening level. The effluent sample was collected upgradient of the soil detections. Sediment samples collected near Outfall 27 contained PCBs (Arochlor-1260) exceeding the ERM value. Table 68 summarizes the PCB detections associated with Drainage Basin 28.

Table 68 PCBs (Arochlor-1260) Concentration Drainage Basin 28			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
559SB02501	5/29/1996	0.41	Pavement
171SB01201	12/12/1995	0.48	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zinc

Zinc was identified in two upland drainage basins exceeding the ERM value. Seventeen upper interval soil samples and one sediment sample associated with those drainage basins also had detections for zinc exceeding the ERM value.

Zones E and F, Drainage Basin 35

Six soil samples collected in 1996 and 1999 as part of the Zones E and F RFI investigation of SWMU 102 and AOCs 590, 613 had ERM values exceedances. Sample locations are in paved areas or associated with a building. Site sediment samples were collected from storm water catch basin which also had zinc ERM exceedances. Storm water effluent for Drainage Basin 34 was collected in 2002; however, zinc was not detected above the effluent screening level. Sediment samples collected near Outfalls 38-40 contained zinc exceeding the ERM value. Table 69 summarizes the zinc detections associated with Drainage Basin 35.

Table 69 Zinc Concentration Drainage Basin 35			
Sample ID	**Date Collected**	**Concentration (mg/kg)**	**Groundcover**
Site Soil			
102SB00101	1/31/1996	502	Building 0079
102SB00201	2/1/1996	1130	Building 0079
102SB03901	5/17/1996	490	Pavement
102SB03401a	5/17/1996	573	Pavement
590SB00601	9/16/1996	429	Pavement
613SB00201	10/14/1999	498	Pavement
Site Sediment			
590M000101	1/5/1996	538	Pavement

Notes:
mg/kg = Milligram per Kilogram

Zones E, Drainage Basin 41

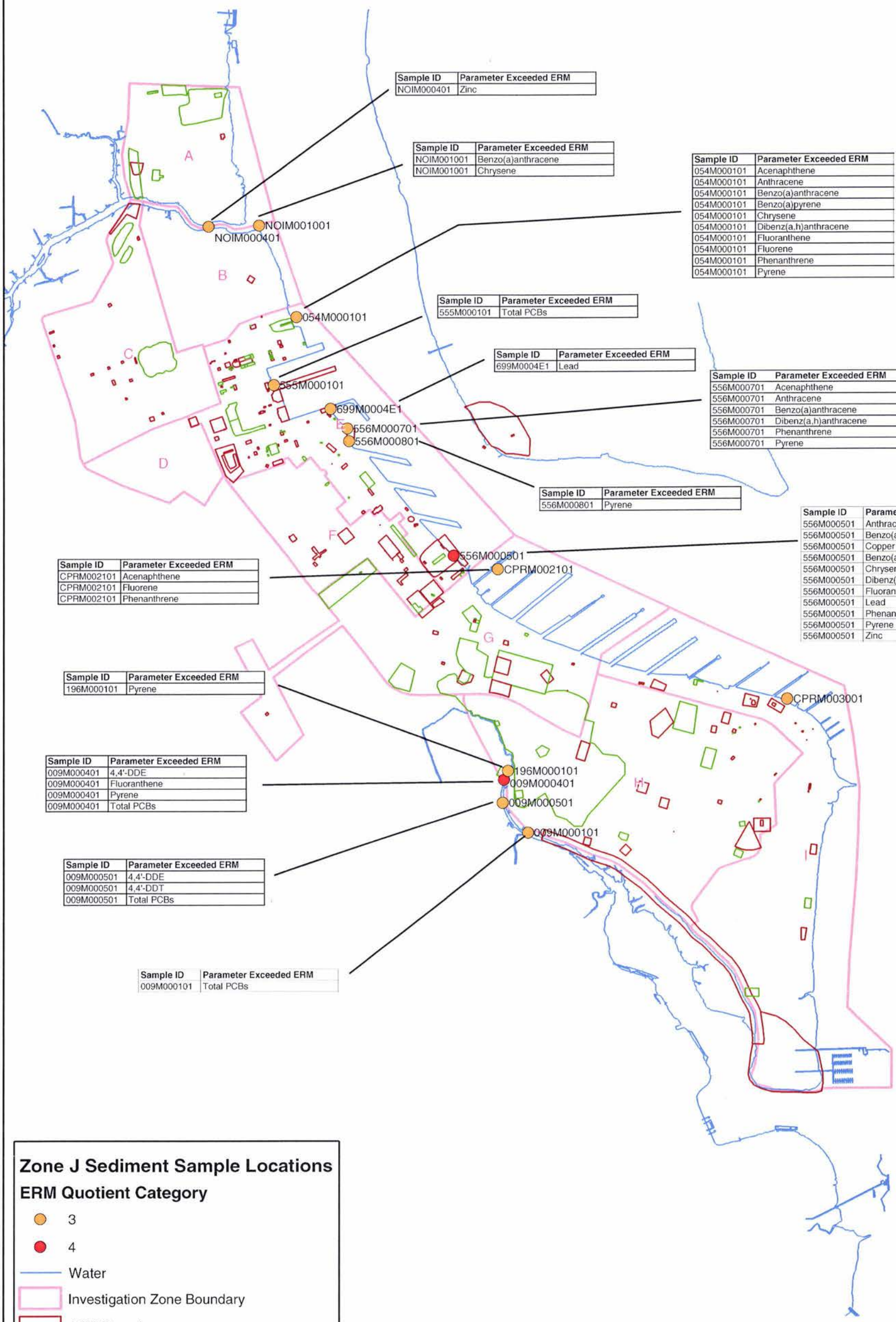
Eleven soil samples collected in 1995 and 1996 as part of the Zone E RFI investigation of SWMUs 5, 18 and AOC 605 had ERM/background values exceedances. All sample locations are

in paved areas. Storm water effluent for Drainage Basin 41 was collected in 2002; however, zinc was not detected above the effluent screening level. Sediment samples collected in the Cooper River near Outfalls 38-40 contained ERM zinc exceedances. Table 70 summarizes the zinc detections associated with Drainage Basin 41.

Table 70
Zinc Concentration
Drainage Basin 41

Sample ID	Date Collected	Concentration (mg/kg)	Groundcover
Site Soil			
605SB00301	9/21/1995	906	Pavement
605SB00601	9/22/1995	550	Pavement
605SB00701	9/22/1995	2670	Pavement
018SB00401a	9/25/1995	672	Pavement
018SB00501a	9/25/1995	764	Pavement
005SB00101	9/25/1995	451	Pavement
605SB00501	9/26/1995	1170	Pavement
605SB01501	5/31/1996	2120	Pavement
605SB01301	5/31/1996	1030	Pavement
605SB01201	5/31/1996	2860	Pavement
605SB01401	5/31/1996	635	Pavement

Notes:
mg/kg = Milligram per Kilogram



Sample ID	Parameter Exceeded ERM
NOIM000401	Zinc

Sample ID	Parameter Exceeded ERM
NOIM001001	Benzo(a)anthracene
NOIM001001	Chrysene

Sample ID	Parameter Exceeded ERM
054M000101	Acenaphthene
054M000101	Anthracene
054M000101	Benzo(a)anthracene
054M000101	Benzo(a)pyrene
054M000101	Chrysene
054M000101	Dibenz(a,h)anthracene
054M000101	Fluoranthene
054M000101	Fluorene
054M000101	Phenanthrene
054M000101	Pyrene

Sample ID	Parameter Exceeded ERM
555M000101	Total PCBs

Sample ID	Parameter Exceeded ERM
699M0004E1	Lead

Sample ID	Parameter Exceeded ERM
556M000701	Acenaphthene
556M000701	Anthracene
556M000701	Benzo(a)anthracene
556M000701	Dibenz(a,h)anthracene
556M000701	Phenanthrene
556M000701	Pyrene

Sample ID	Parameter Exceeded ERM
556M000801	Pyrene

Sample ID	Parameter Exceeded ERM
556M000501	Anthracene
556M000501	Benzo(a)anthracene
556M000501	Copper
556M000501	Benzo(a)pyrene
556M000501	Chrysene
556M000501	Dibenz(a,h)anthracene
556M000501	Fluoranthene
556M000501	Lead
556M000501	Phenanthrene
556M000501	Pyrene
556M000501	Zinc

Sample ID	Parameter Exceeded ERM
CPRM002101	Acenaphthene
CPRM002101	Fluorene
CPRM002101	Phenanthrene

Sample ID	Parameter Exceeded ERM
196M000101	Pyrene

Sample ID	Parameter Exceeded ERM
009M000401	4,4'-DDE
009M000401	Fluoranthene
009M000401	Pyrene
009M000401	Total PCBs

Sample ID	Parameter Exceeded ERM
009M000501	4,4'-DDE
009M000501	4,4'-DDT
009M000501	Total PCBs

Sample ID	Parameter Exceeded ERM
009M000101	Total PCBs

Zone J Sediment Sample Locations

ERM Quotient Category

- 3
- 4
- Water
- Investigation Zone Boundary
- AOC Boundary
- SWMU Boundary

Note:
Samples classified as ERM Quotient Category 3,4 are labeled with the sample id and include a table listing the parameters that exceeded the ERM.
Sample CPRM003001 did not exceed the ERM for any parameter.

N W E S

0 1,200 2,400 4,800 Feet

Figure 7-1
Sediment Samples classified as ERM Quotient Category 3 or 4 and Parameters that Exceed the ERM

Zone J Site Linkage Tech Memo
Charleston Naval Complex
Charleston, South Carolina

Date: 5/11/2004 | CT/Charleston | File:ERMclass3_4_cpd_labels.mxd

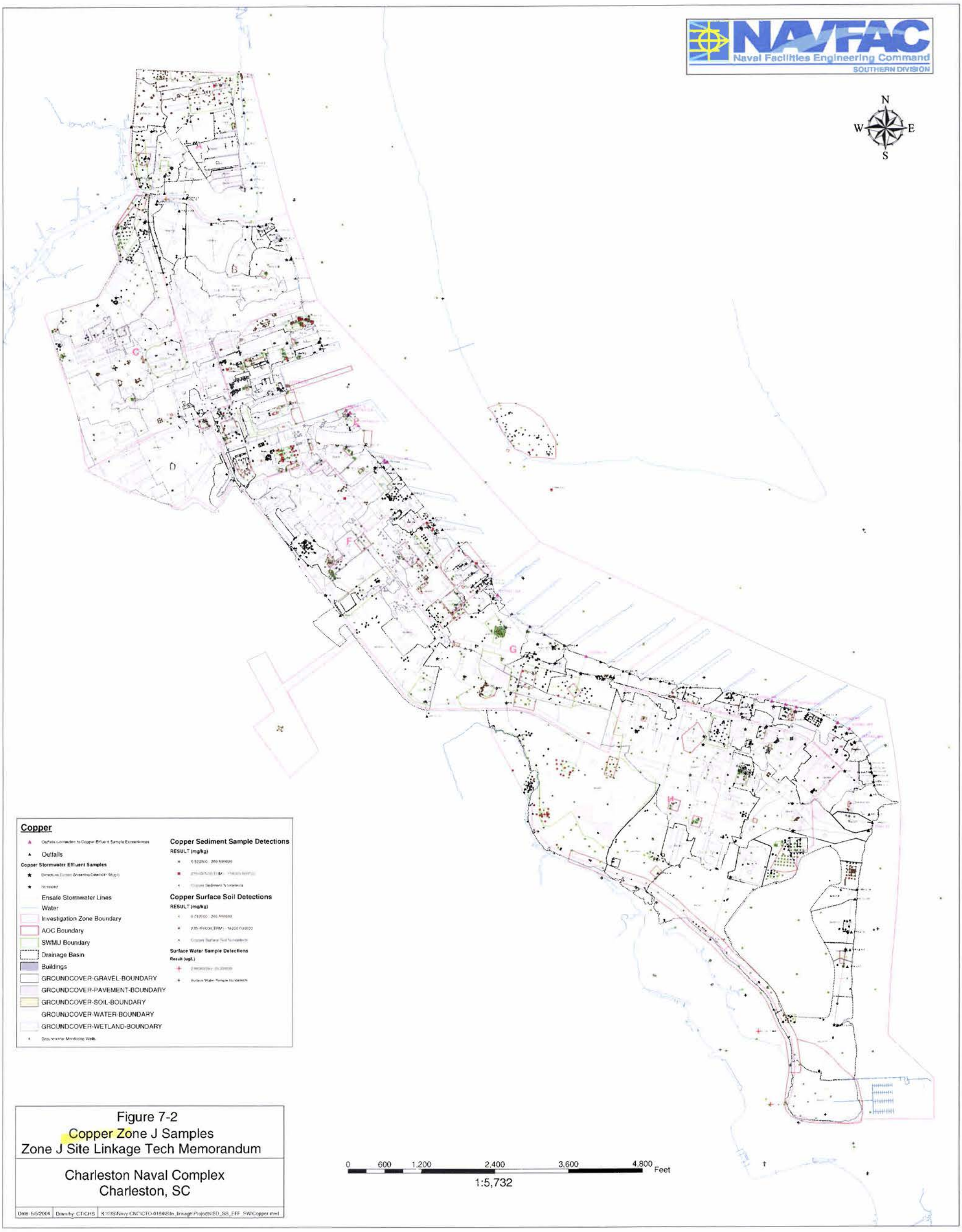


Figure 7-2
Copper Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

Date: 5/5/2004 | Drawn by: CT/CHS | K:\GIS\Navy CNC\CTO-0164\Site_linkage\Project\SD_SS_EFF_SW\Copper.mxd

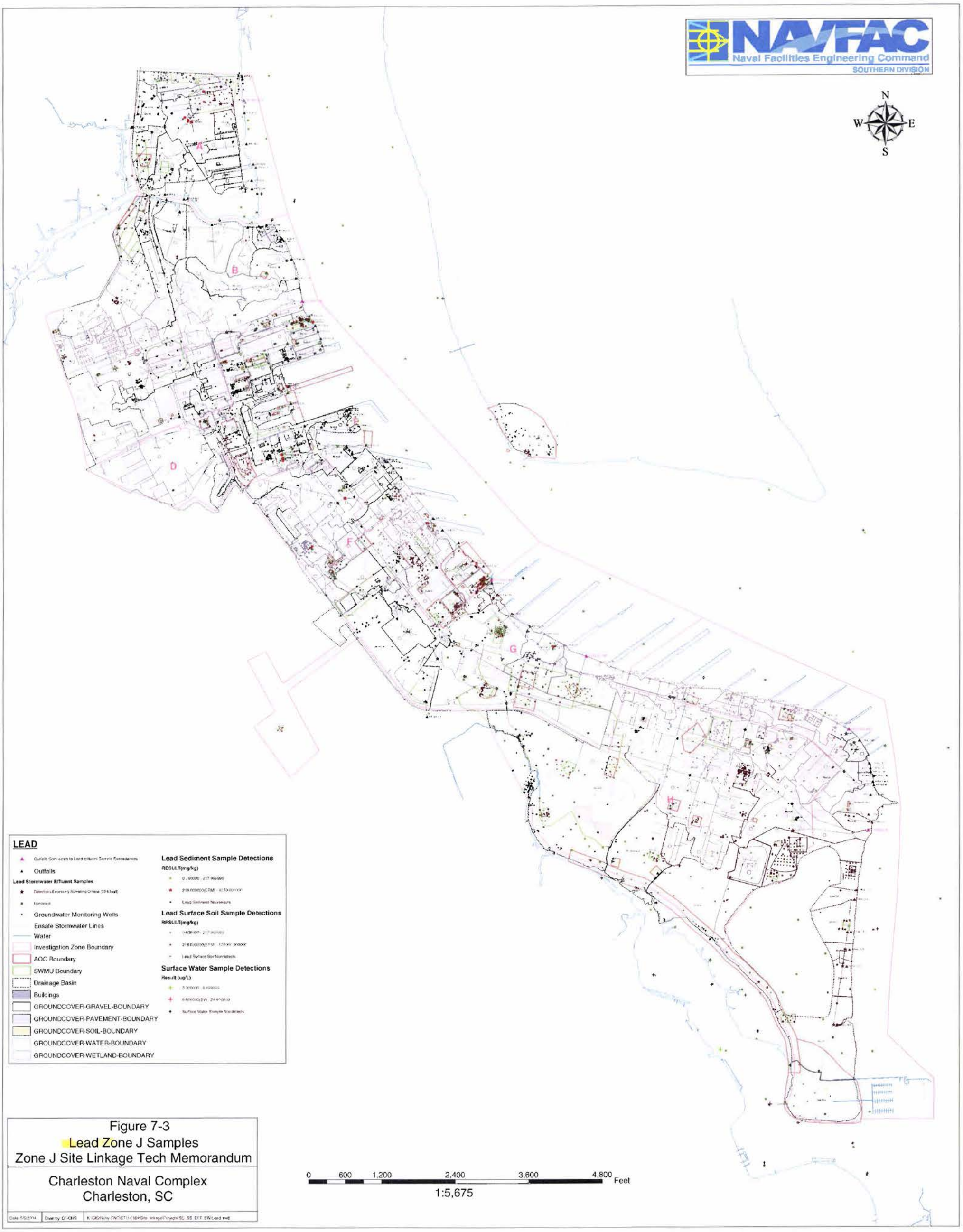


Figure 7-3
Lead Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

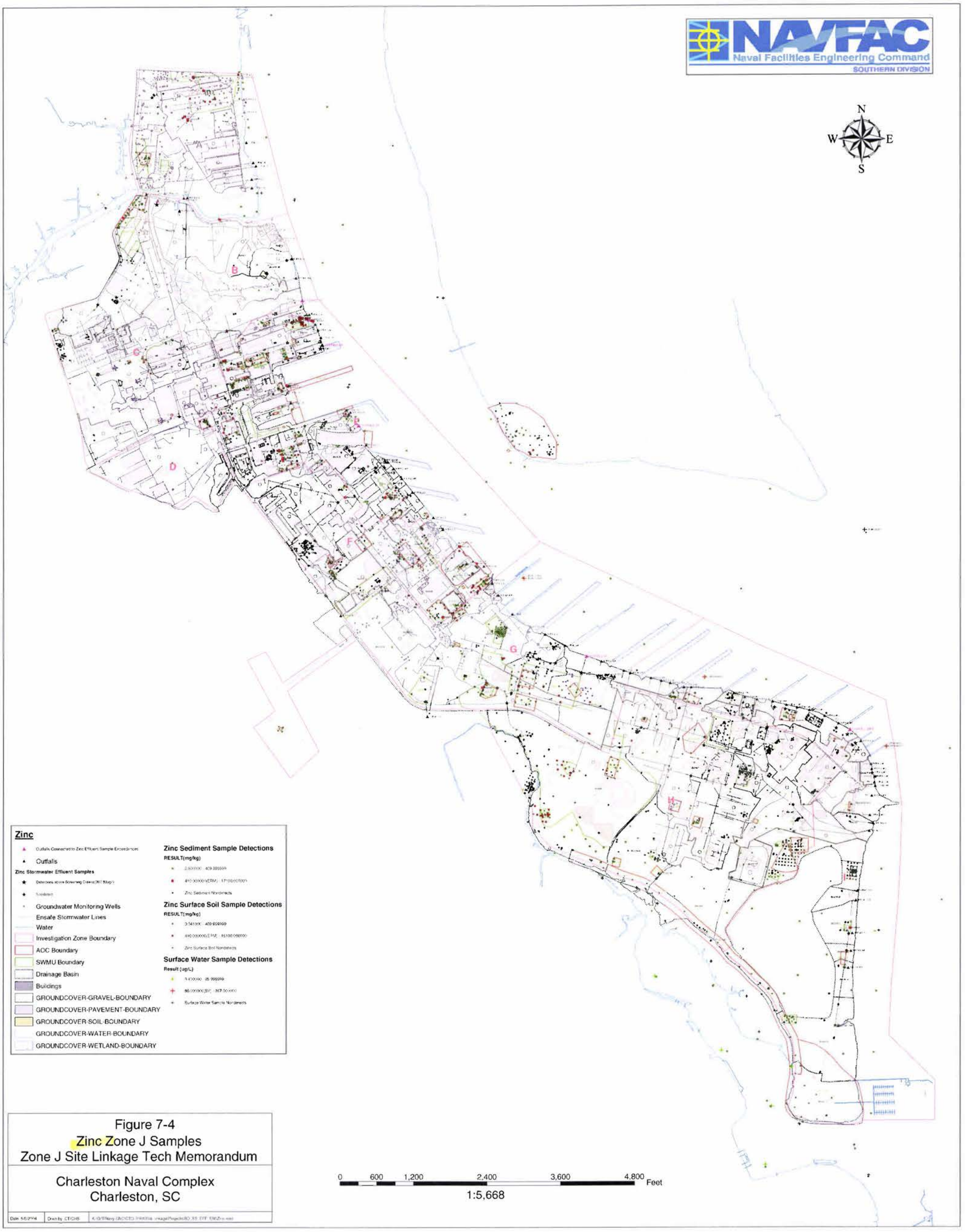


Figure 7-4
Zinc Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

Date 5/5/2004 | Drawn by CT/CHS

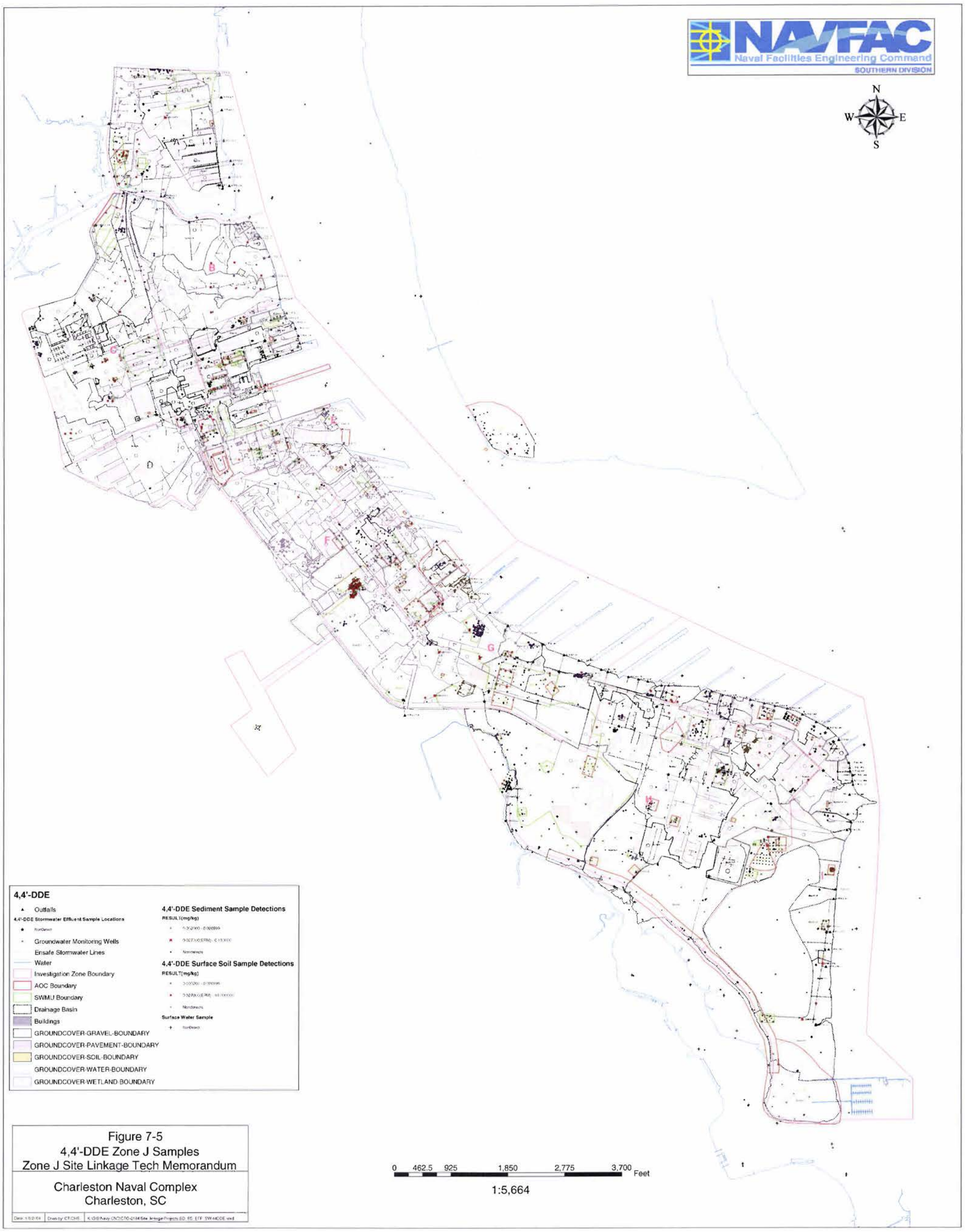


Figure 7-5
4,4'-DDE Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

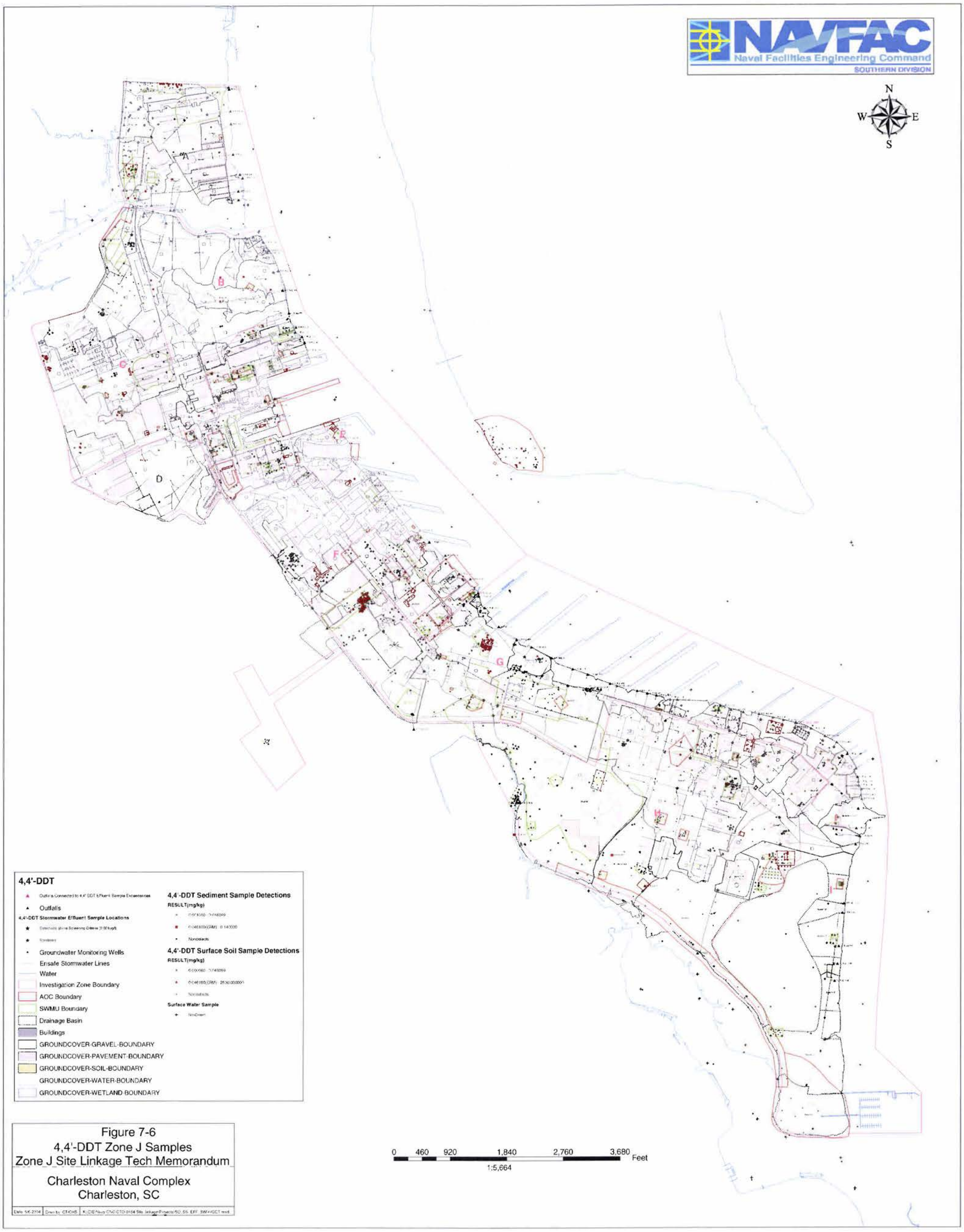


Figure 7-6
4,4'-DDT Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

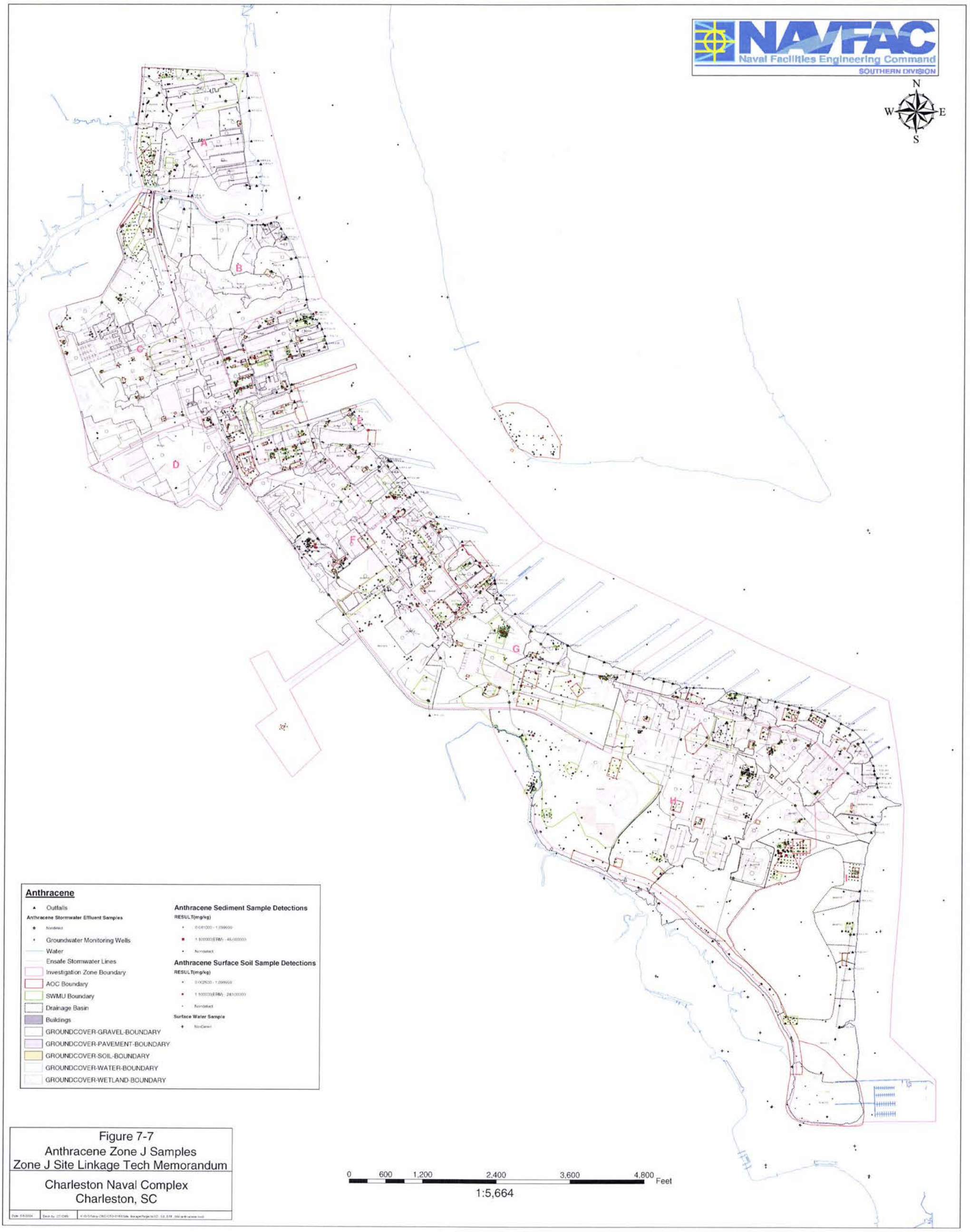


Figure 7-7
Anthracene Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

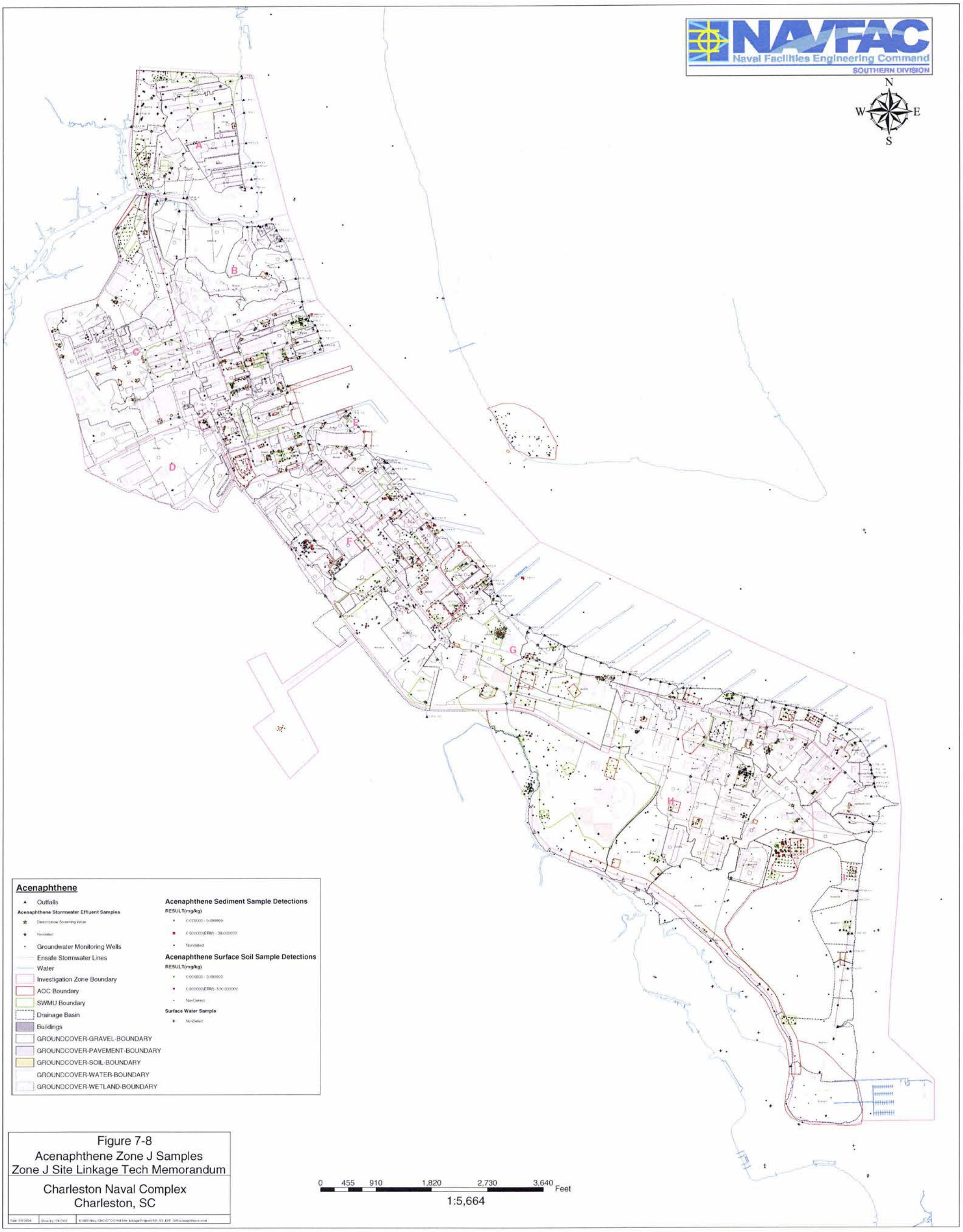


Figure 7-8
Acenaphthene Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

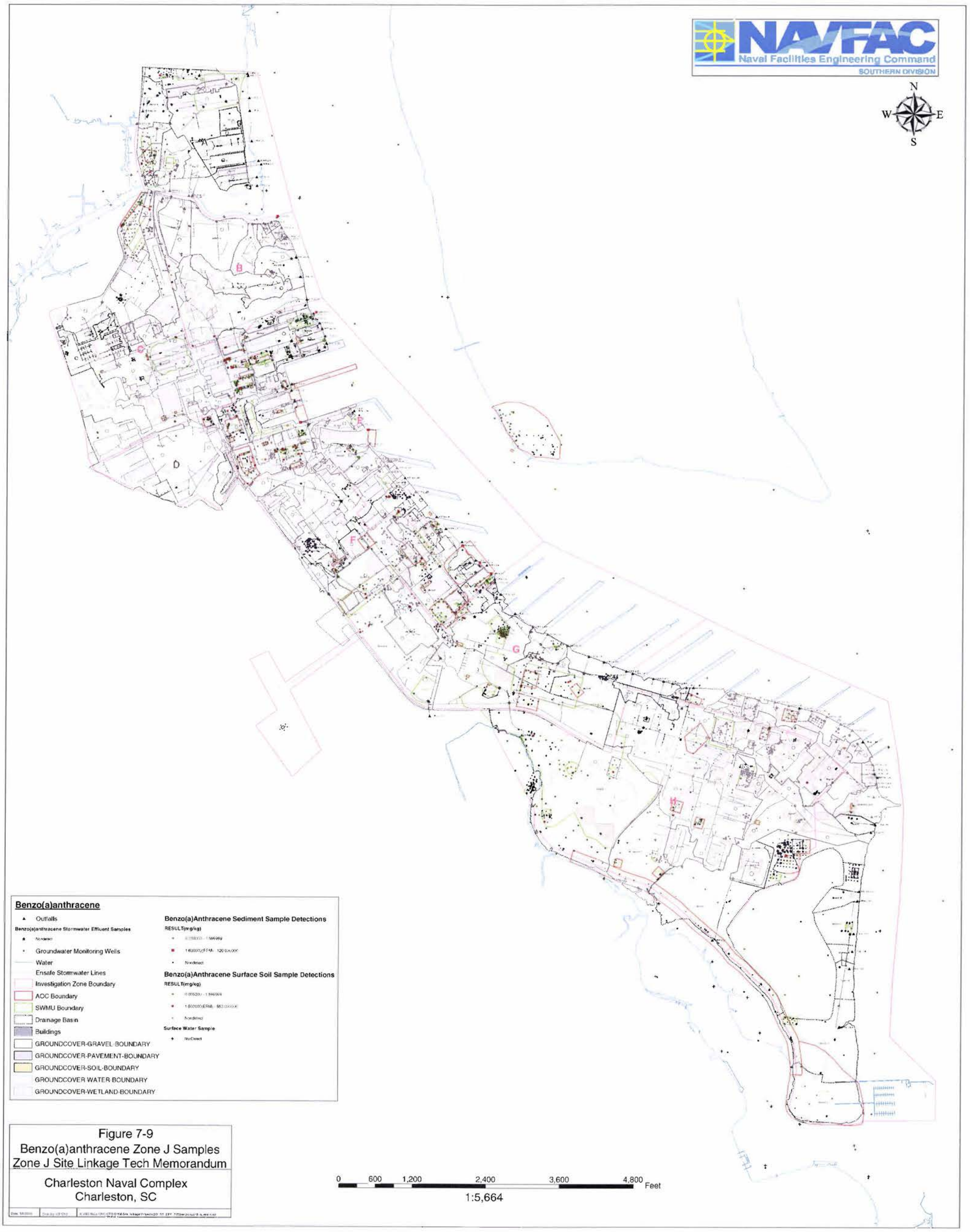


Figure 7-9
Benzo(a)anthracene Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

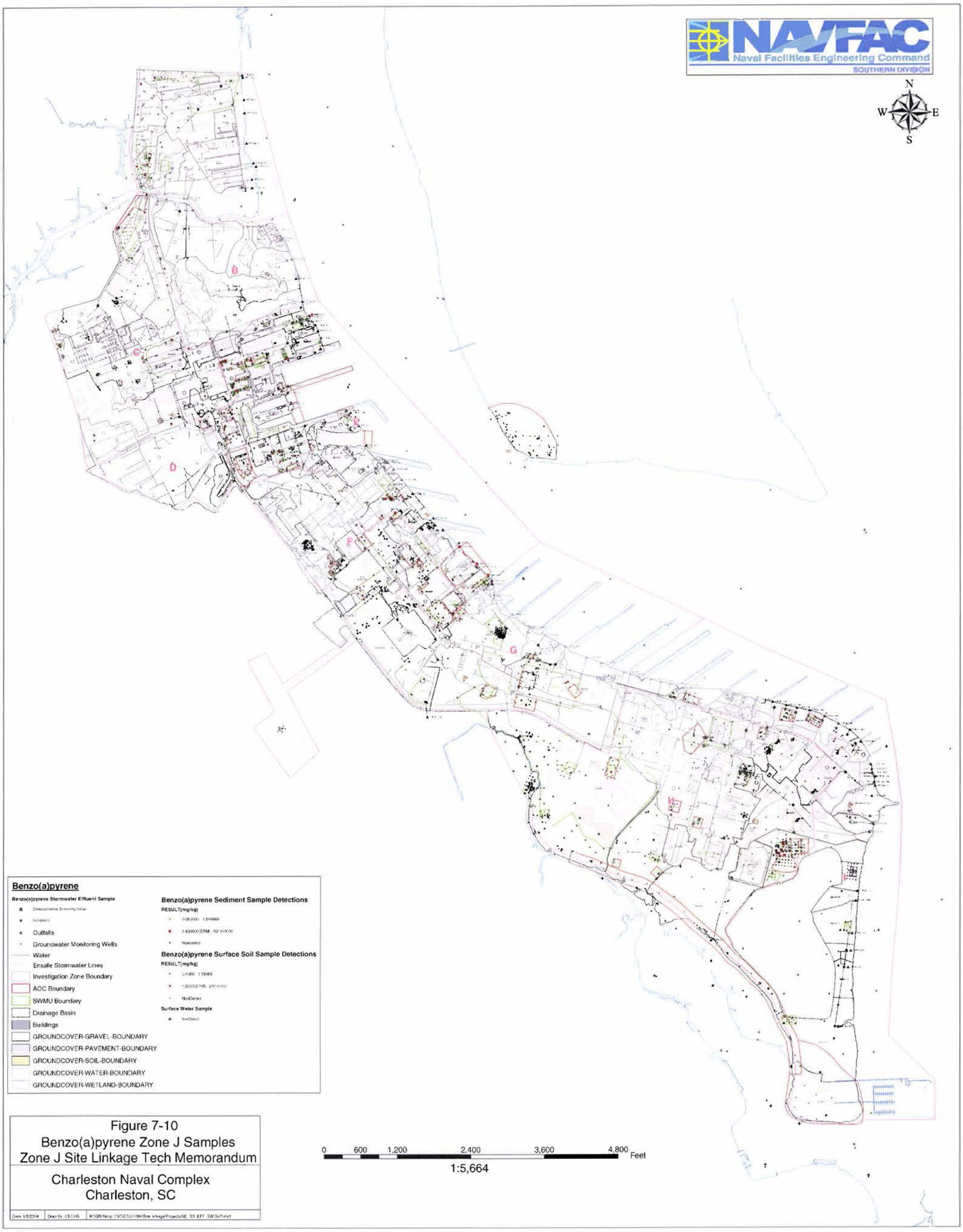


Figure 7-10
Benzo(a)pyrene Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

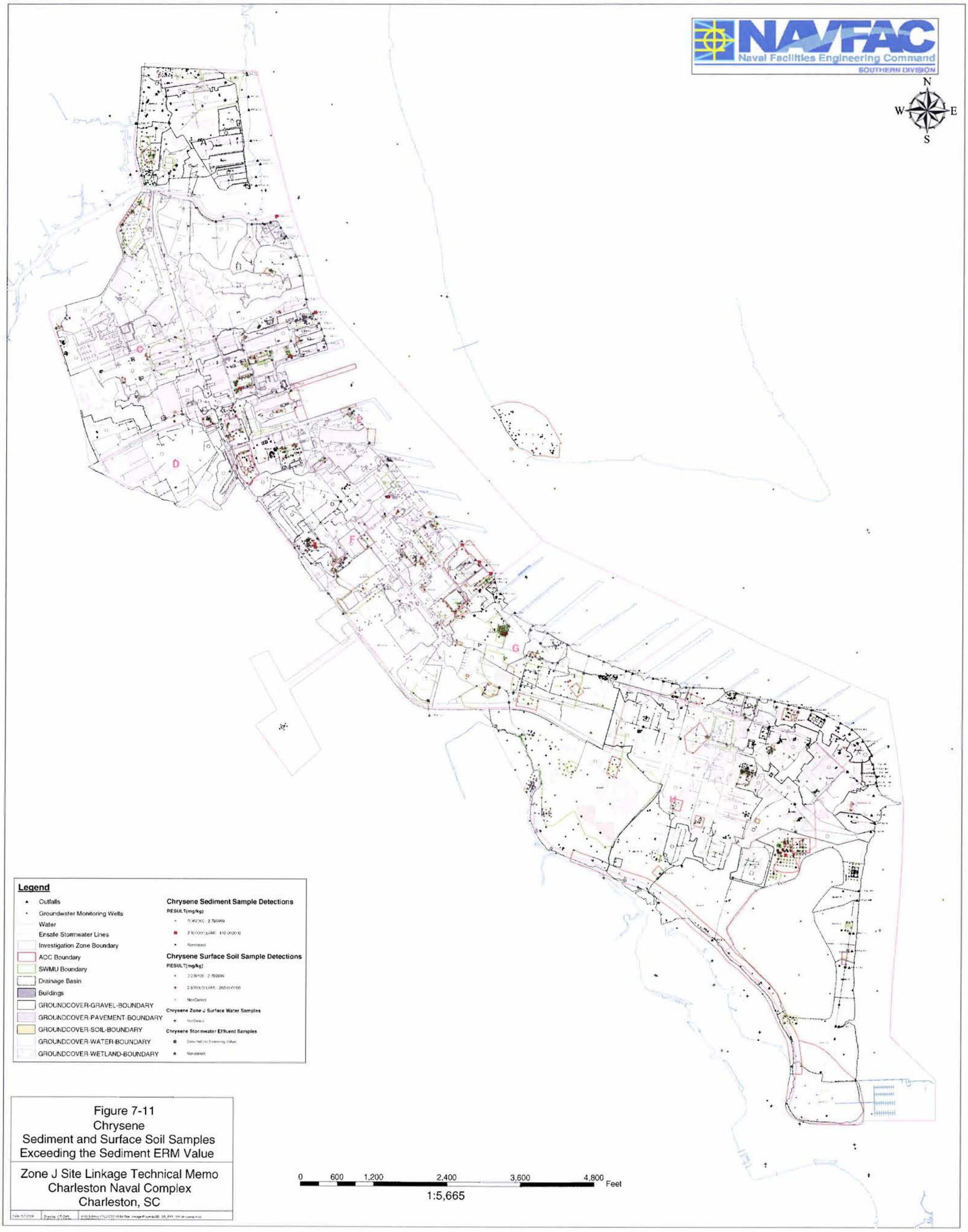


Figure 7-11
Chrysene
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC

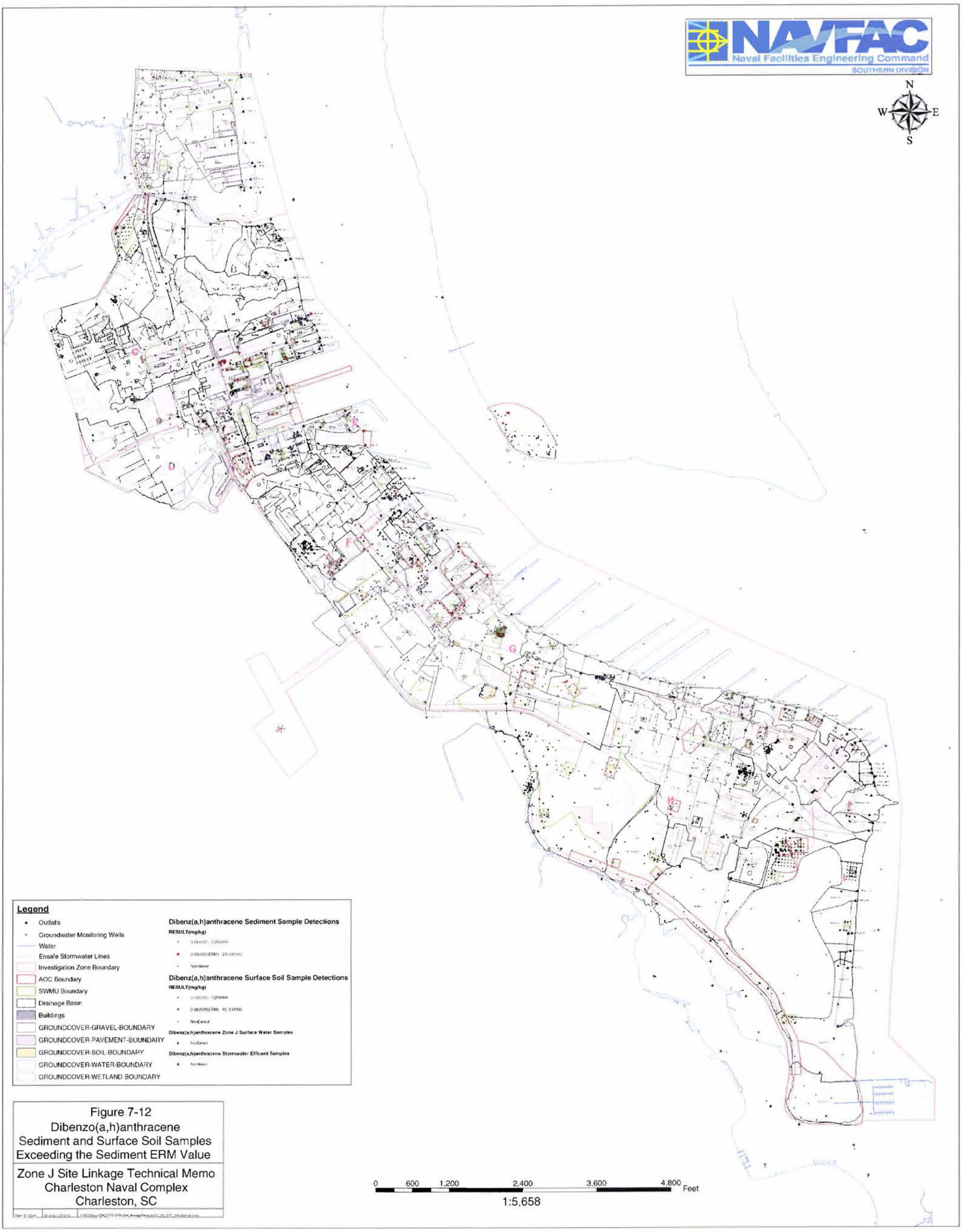


Figure 7-12
Dibenzo(a,h)anthracene
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC

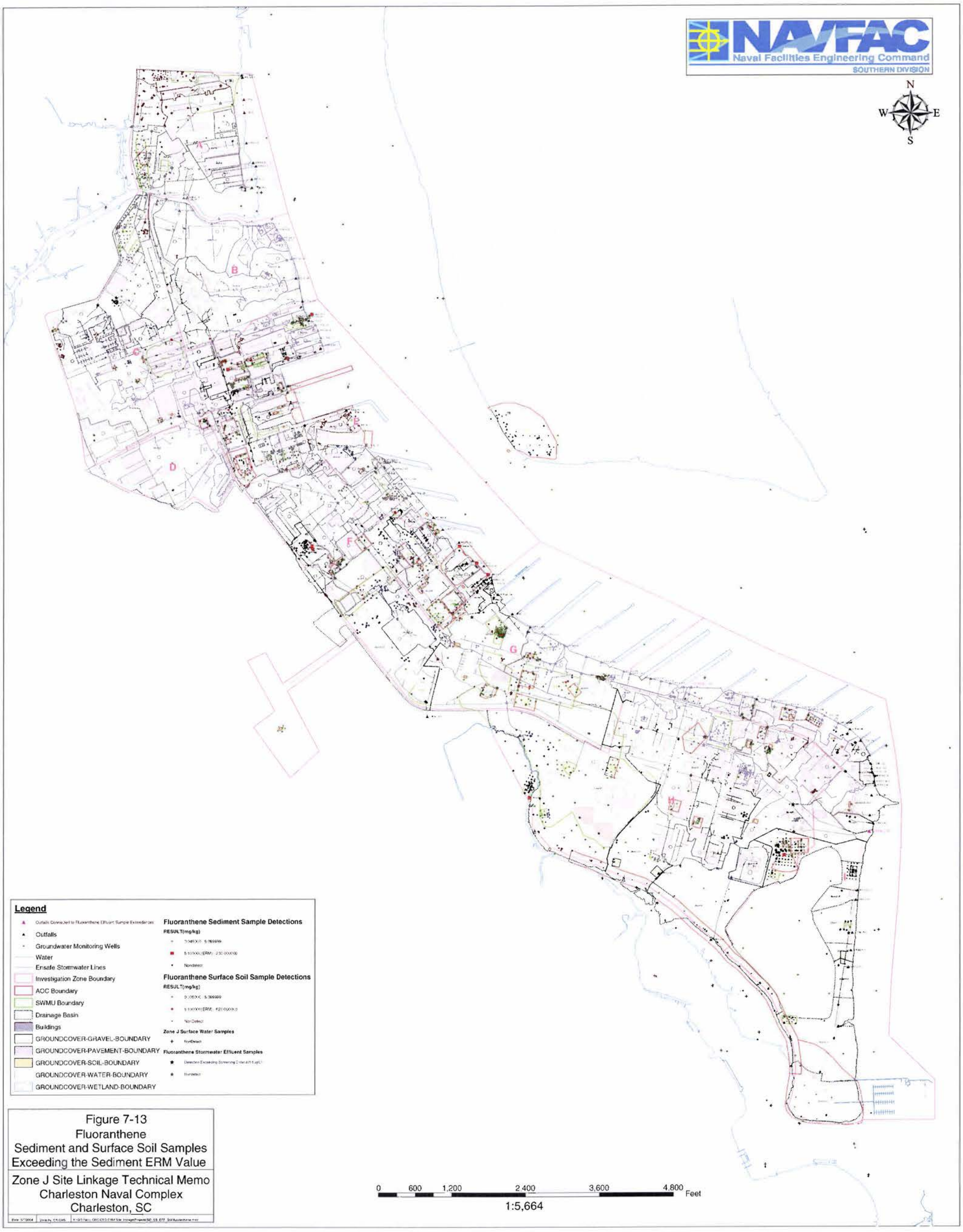


Figure 7-13
Fluoranthene
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC

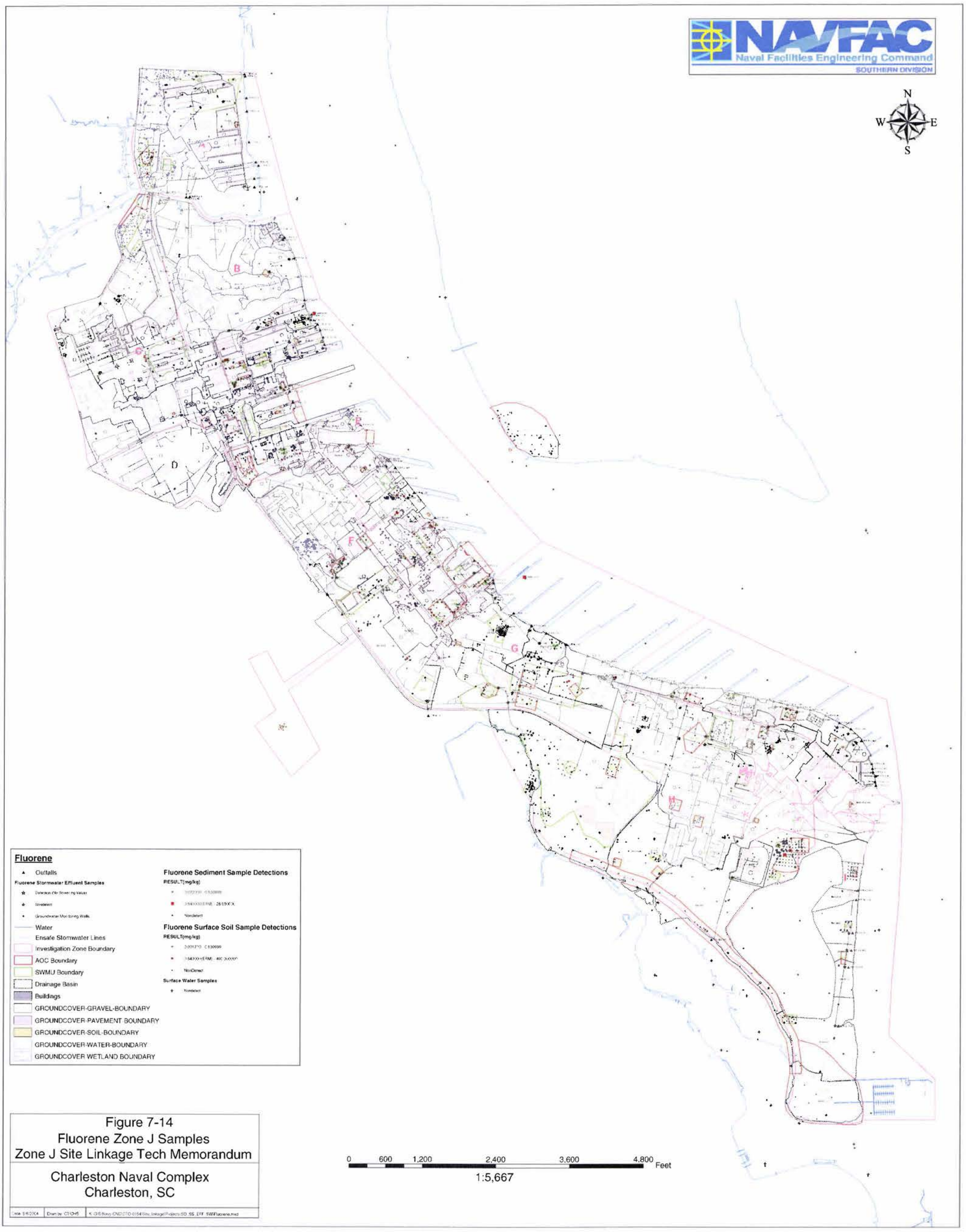


Figure 7-14
Fluorene Zone J Samples
Zone J Site Linkage Tech Memorandum

Charleston Naval Complex
Charleston, SC

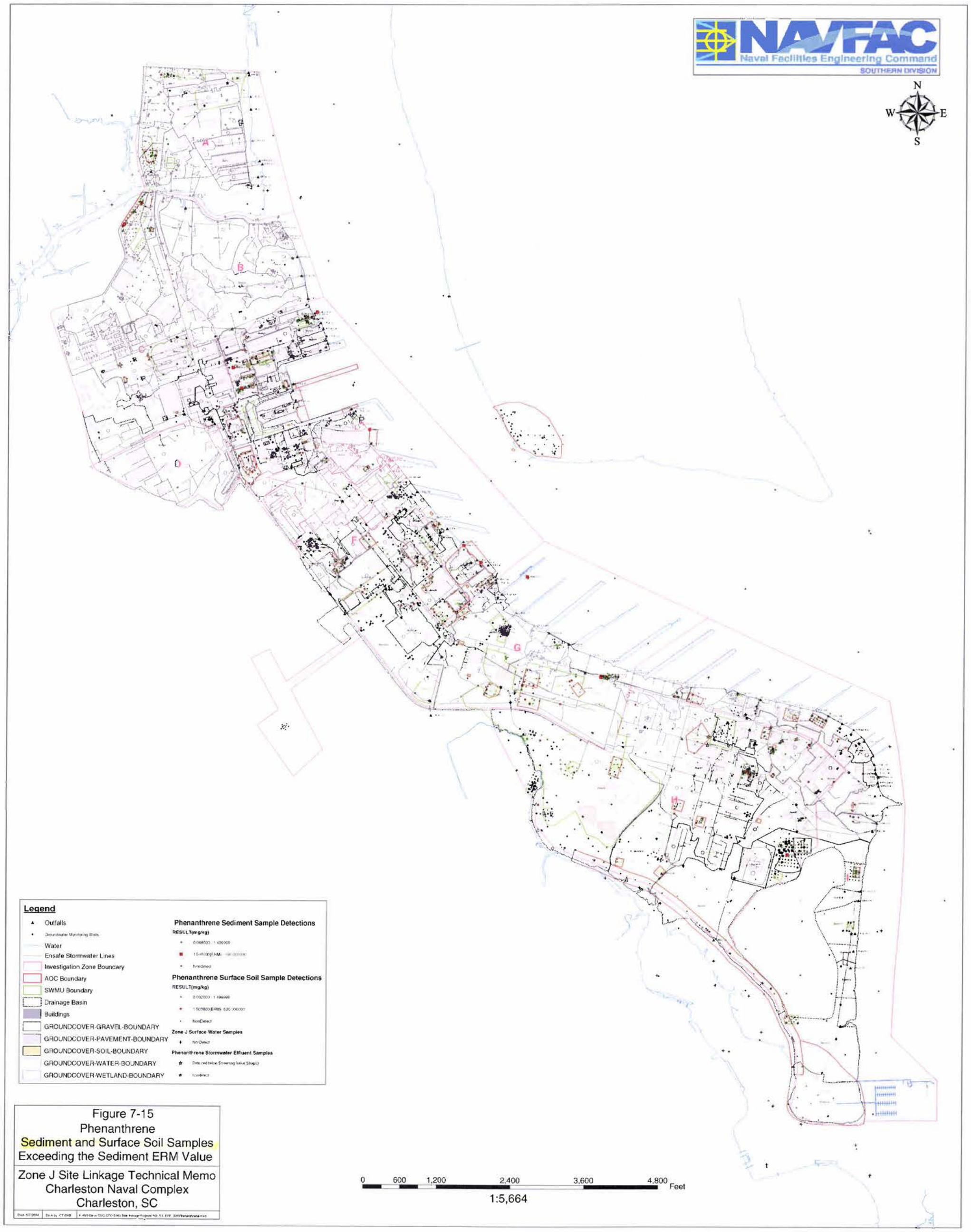


Figure 7-15
Phenanthrene
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC

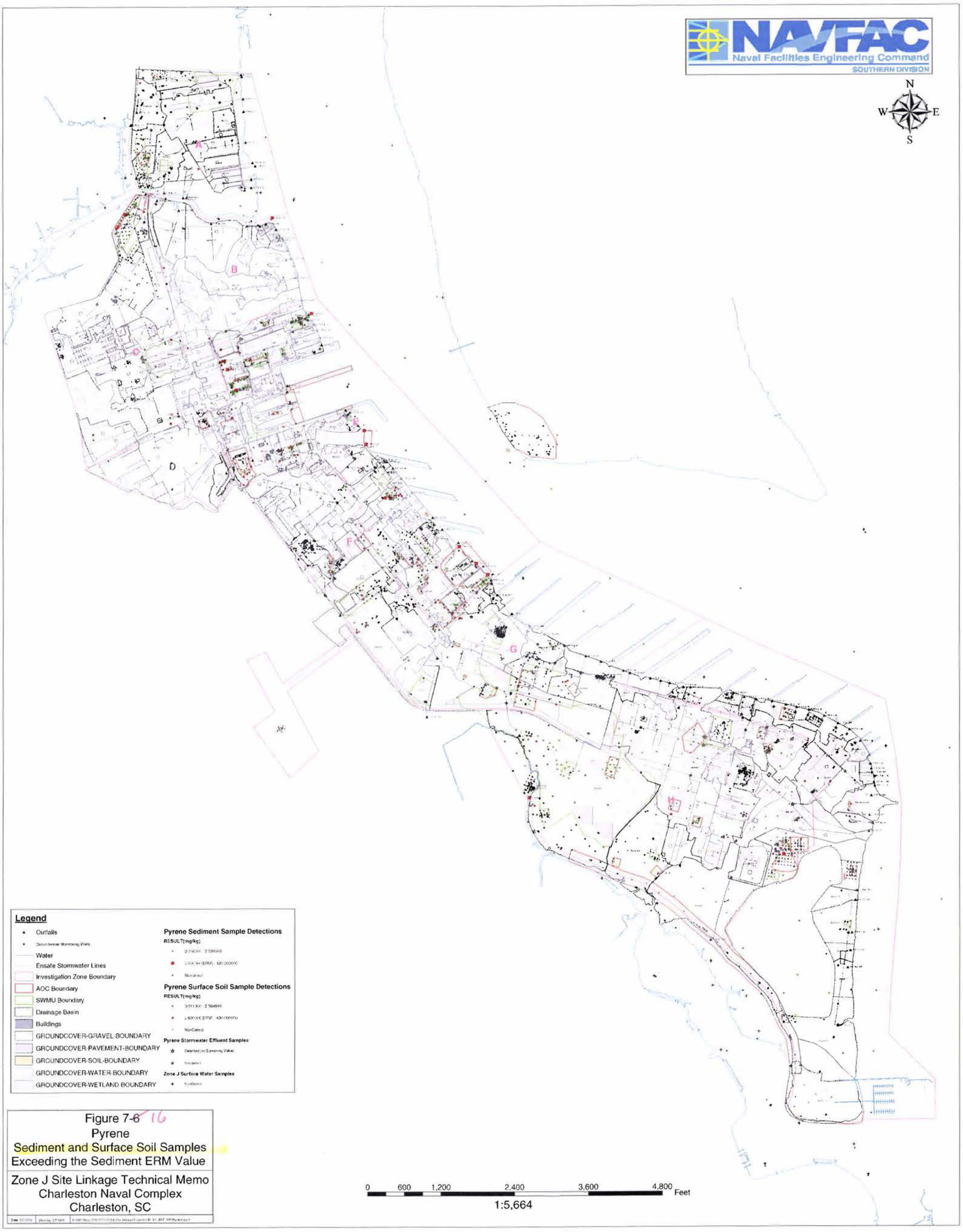


Figure 7-~~6~~ 16
Pyrene
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC

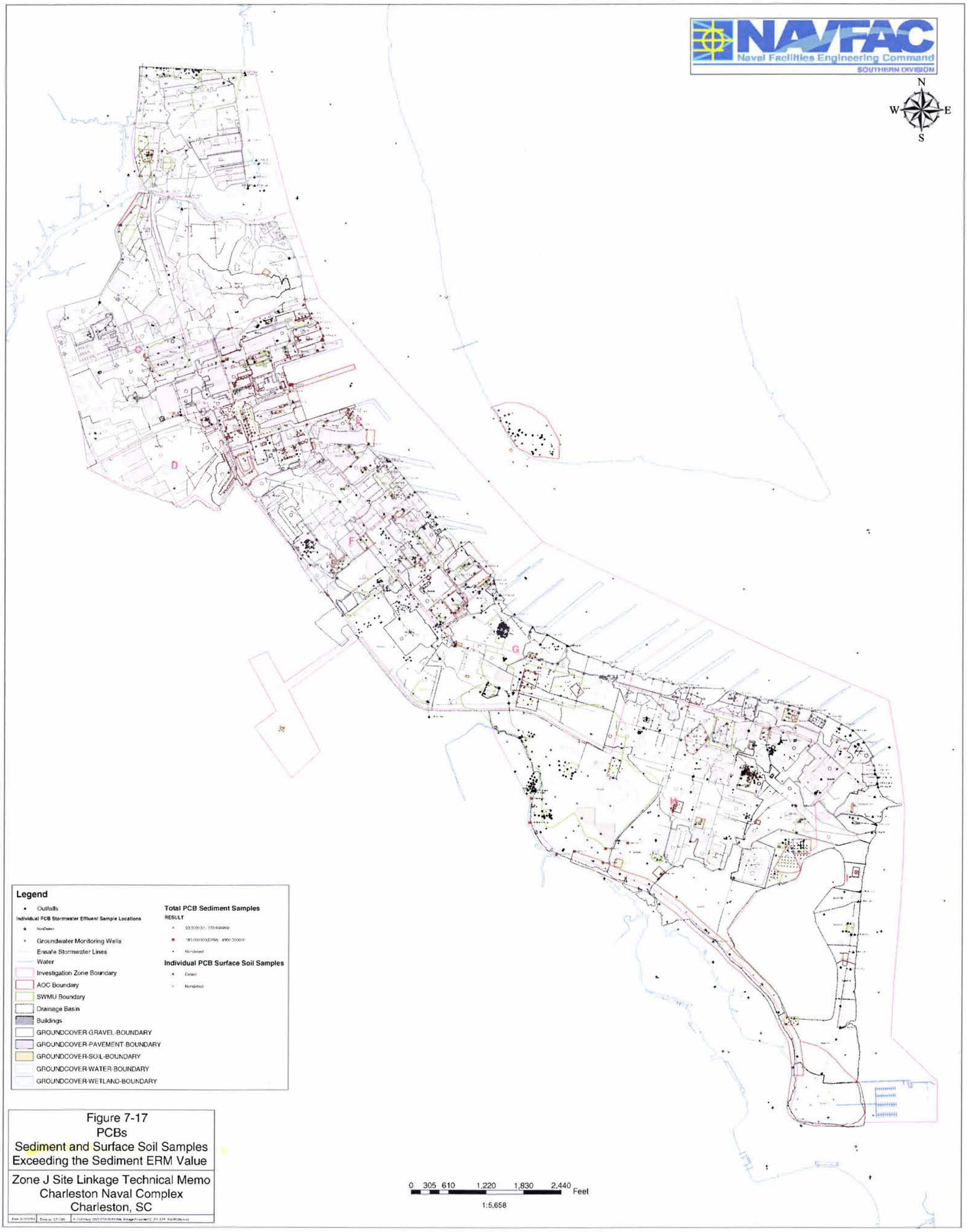
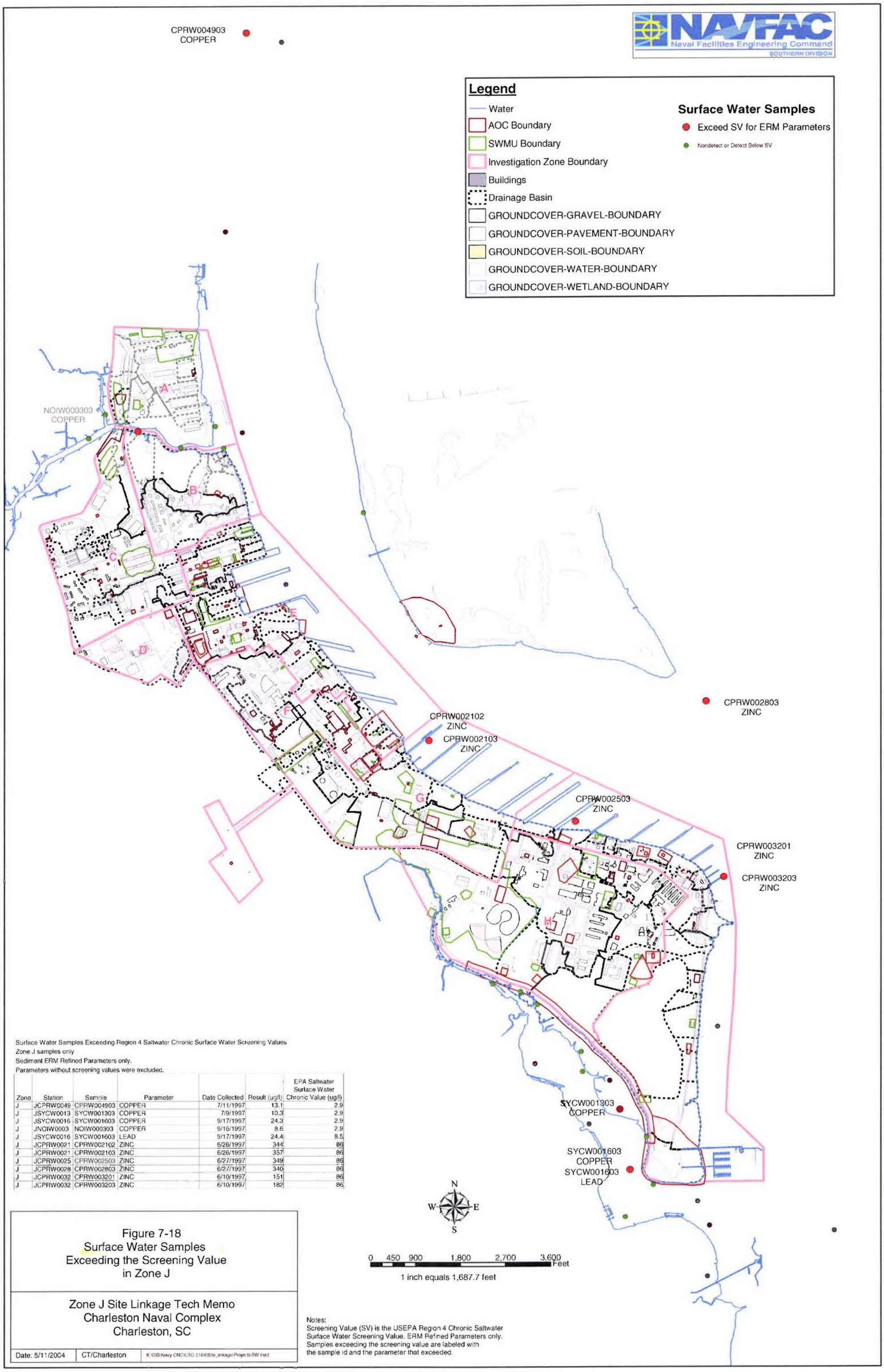


Figure 7-17
PCBs
Sediment and Surface Soil Samples
Exceeding the Sediment ERM Value

Zone J Site Linkage Technical Memo
Charleston Naval Complex
Charleston, SC



Surface Water Samples Exceeding Region 4 Saltwater Chronic Surface Water Screening Values
Zone J samples only
Sediment ERM Refined Parameters only.
Parameters without screening values were excluded.

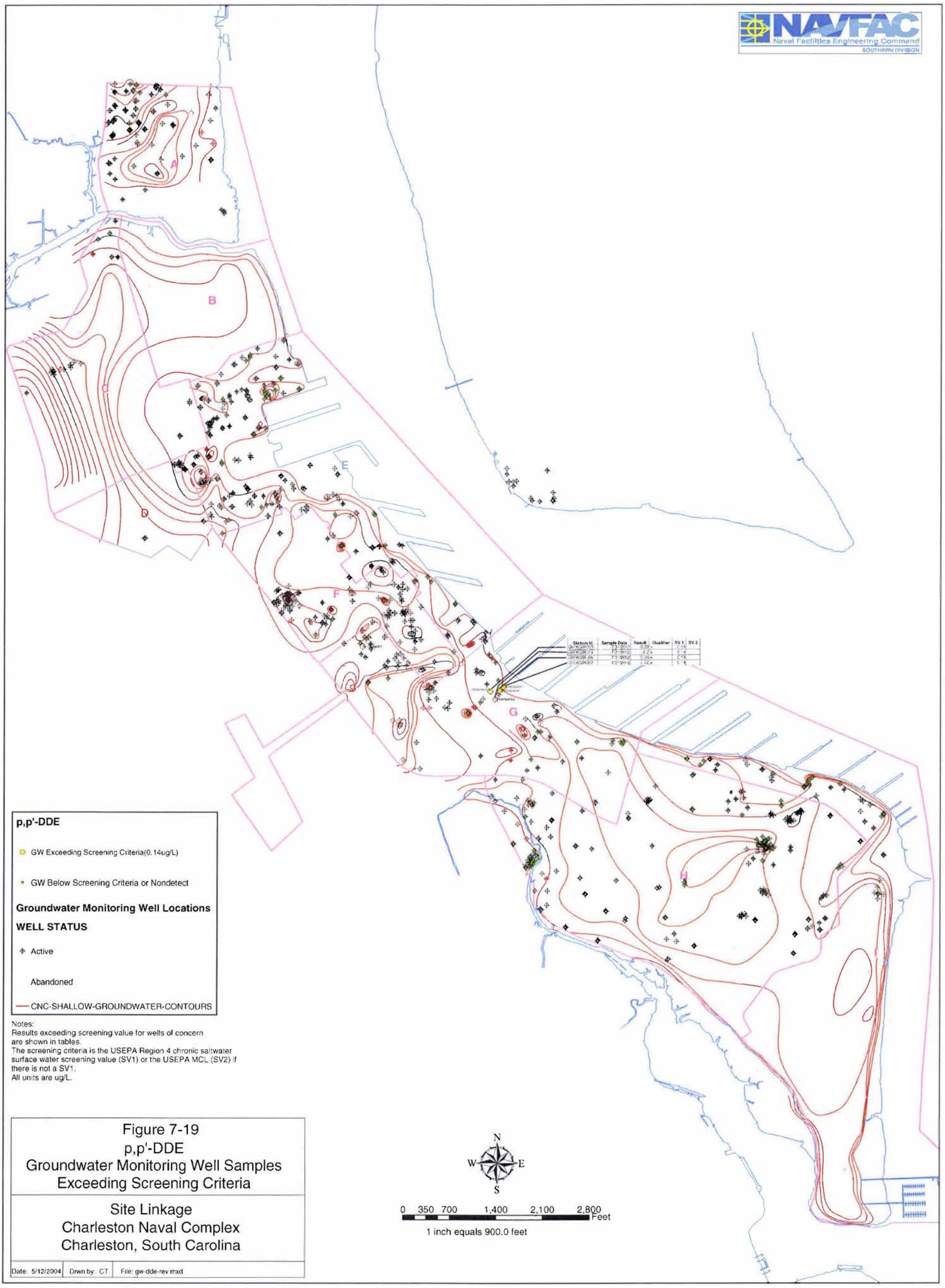
Zone	Station	Sample	Parameter	Date Collected	Result (ug/l)	EPA Saltwater Surface Water Chronic Value (ug/l)
J	JCPRW0049	CPRW004903	COPPER	7/11/1997	13.1	2.9
J	JSYCW0013	SYCW001303	COPPER	7/9/1997	10.3	2.9
J	JSYCW0016	SYCW001603	COPPER	9/17/1997	24.3	2.9
J	JNOIW0003	NOIW000303	COPPER	9/16/1997	8.6	2.9
J	JSYCW0016	SYCW001603	LEAD	9/17/1997	24.4	8.5
J	JCPRW0021	CPRW002102	ZINC	6/26/1997	344	86
J	JCPRW0021	CPRW002103	ZINC	6/26/1997	357	86
J	JCPRW0025	CPRW002503	ZINC	6/27/1997	349	86
J	JCPRW0028	CPRW002803	ZINC	6/27/1997	340	86
J	JCPRW0032	CPRW003201	ZINC	6/10/1997	151	86
J	JCPRW0032	CPRW003203	ZINC	6/10/1997	182	86

Figure 7-18
Surface Water Samples
Exceeding the Screening Value
in Zone J

Zone J Site Linkage Tech Memo
Charleston Naval Complex
Charleston, SC

Date: 5/11/2004 | CT/Charleston | K:\GIS\Navy CNC\CTO 0164\Site_linkage\Projects-SW.mxd

Notes:
Screening Value (SV) is the USEPA Region 4 Chronic Saltwater Surface Water Screening Value. ERM Refined Parameters only. Samples exceeding the screening value are labeled with the sample id and the parameter that exceeded.

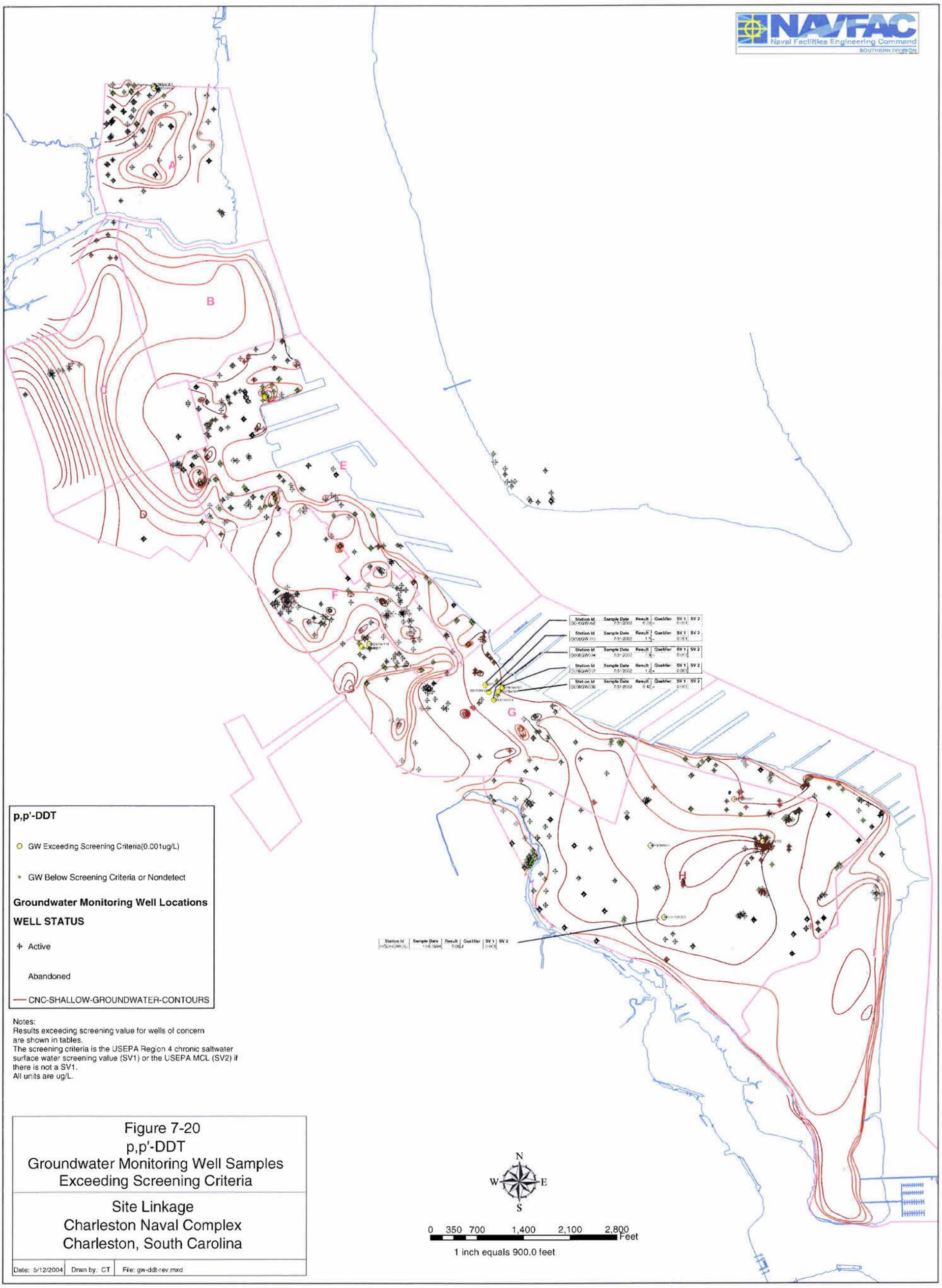


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-19
p,p'-DDE
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/12/2004 | Drwn by: CT | File: gw-dde-rev.mxd

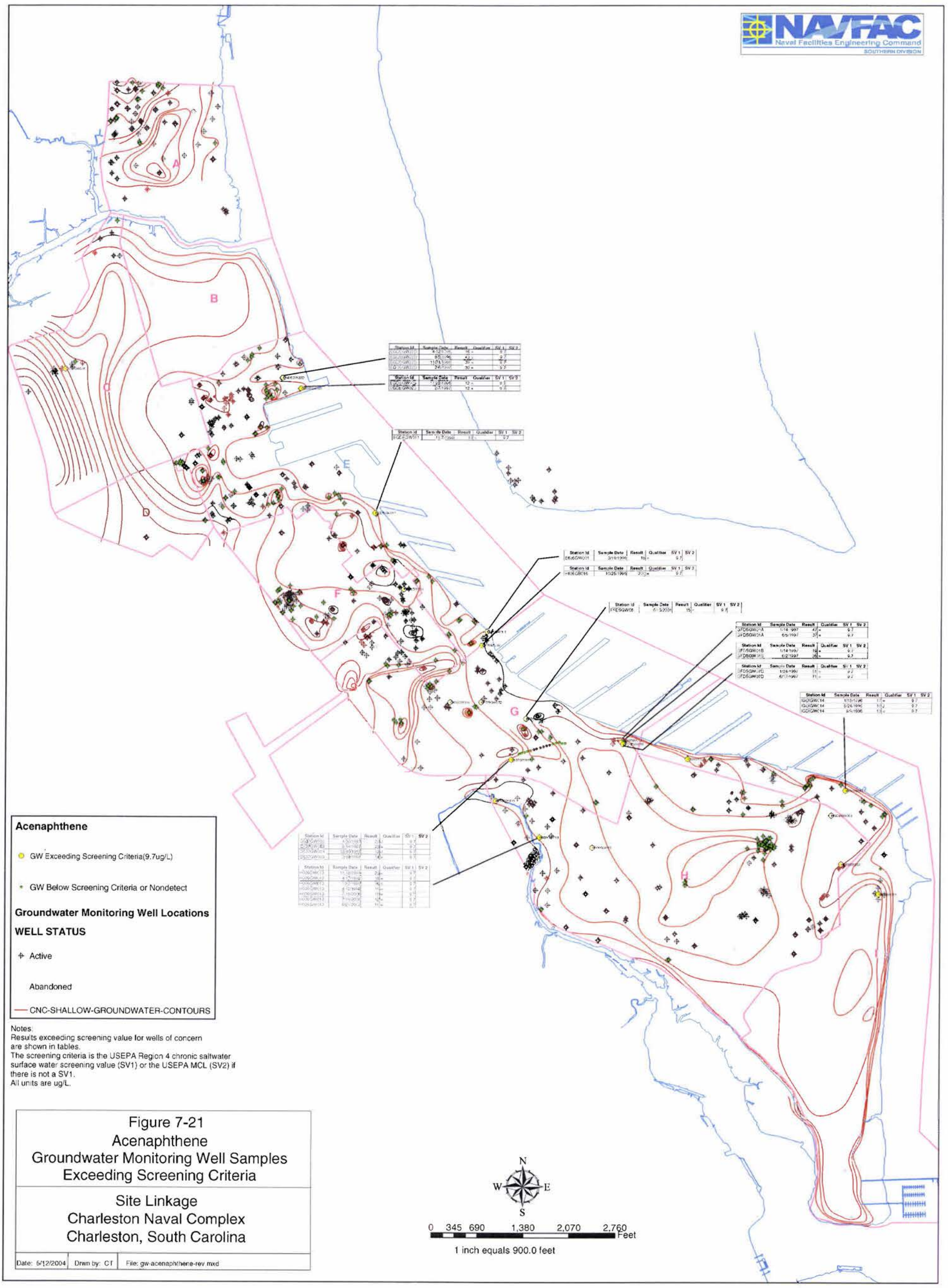


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-20
p,p'-DDT
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/12/2004 | Drwn by: CT | File: gw-ddt-rev.mxd

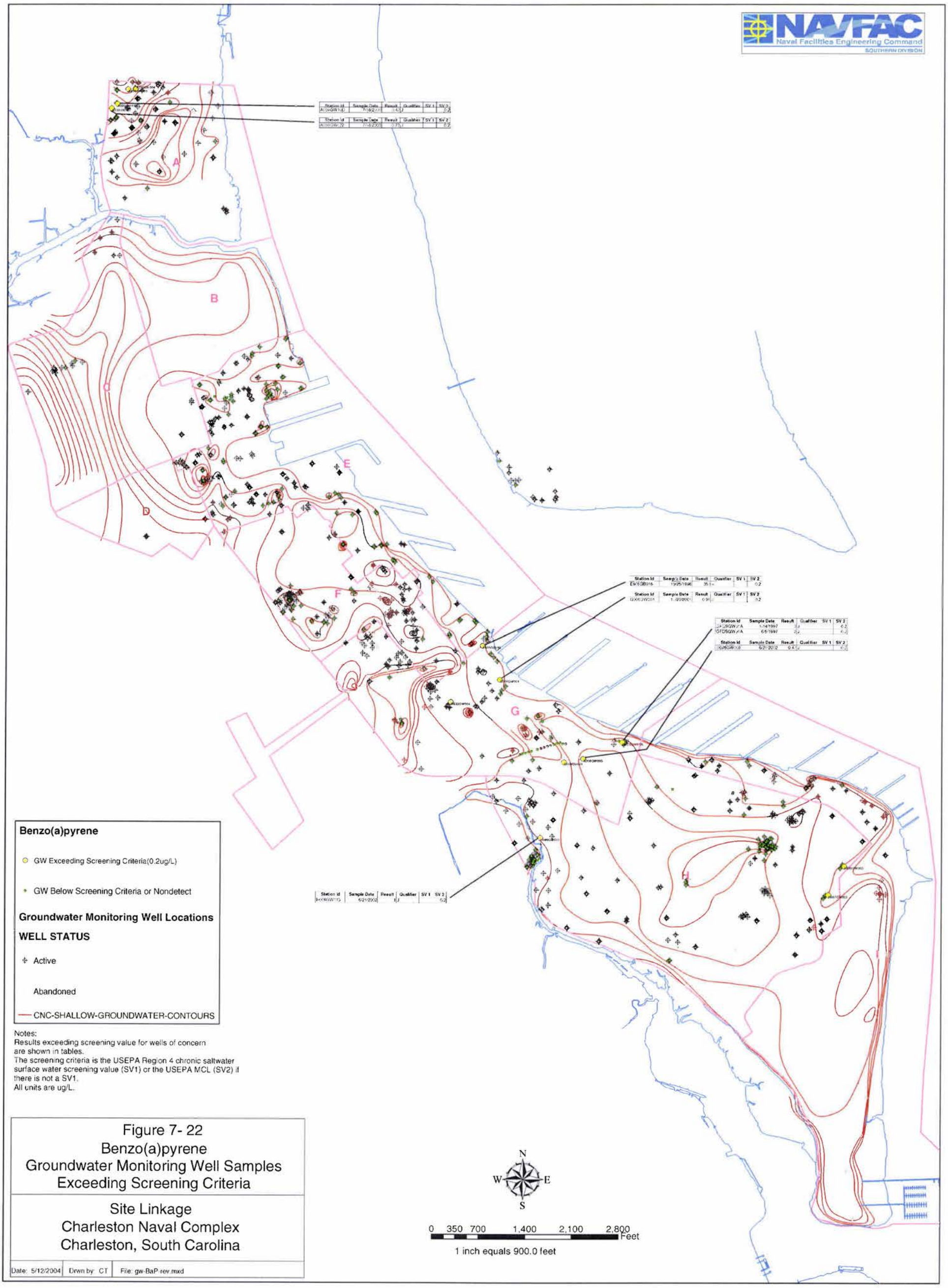


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-21
Acenaphthene
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/12/2004 | Drwn by: CT | File: gw-acenaphthene-rev.mxd

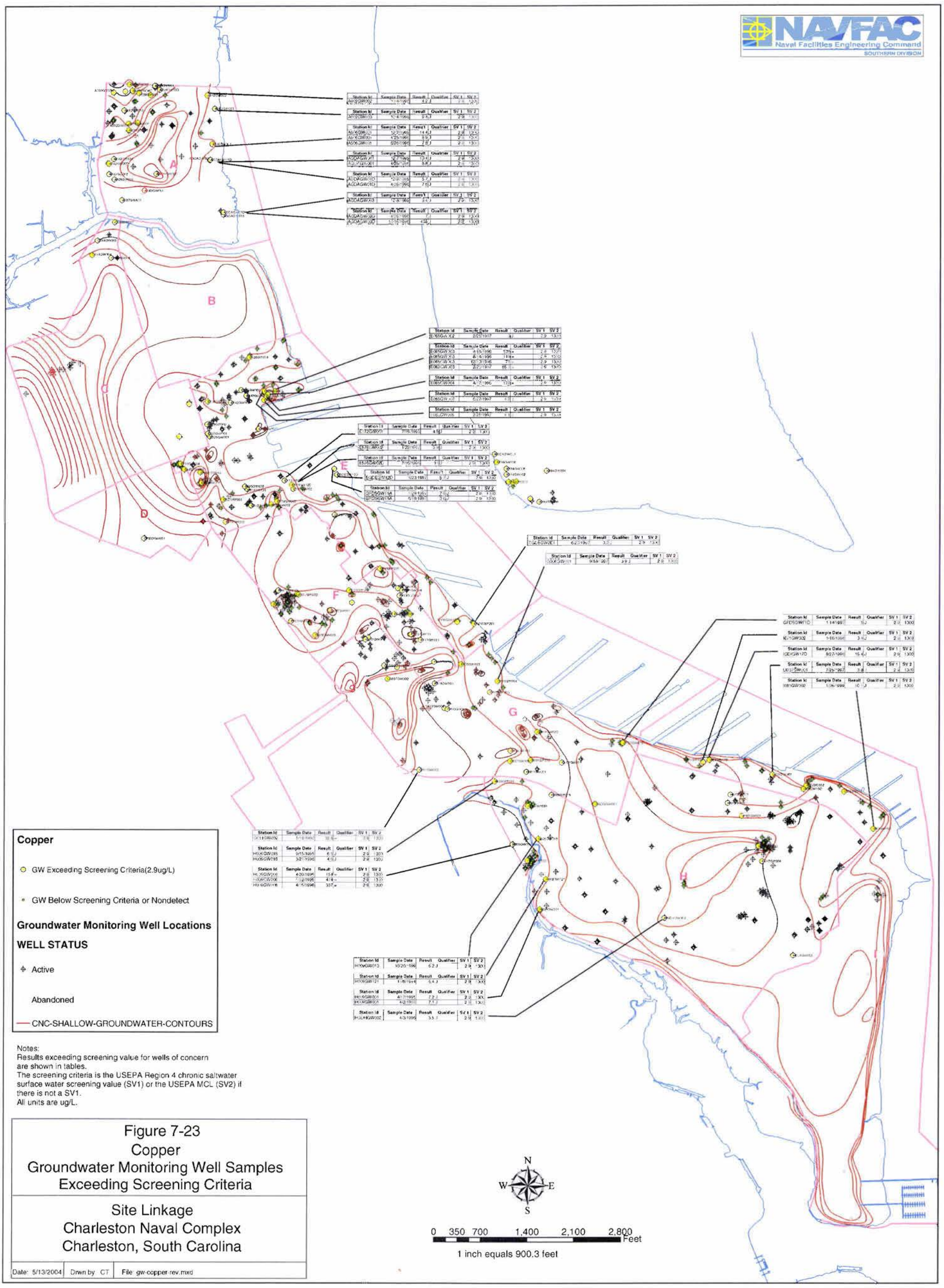


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7- 22
Benzo(a)pyrene
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/12/2004 | Drwn by: CT | File: gw-BaP-rev.mxd

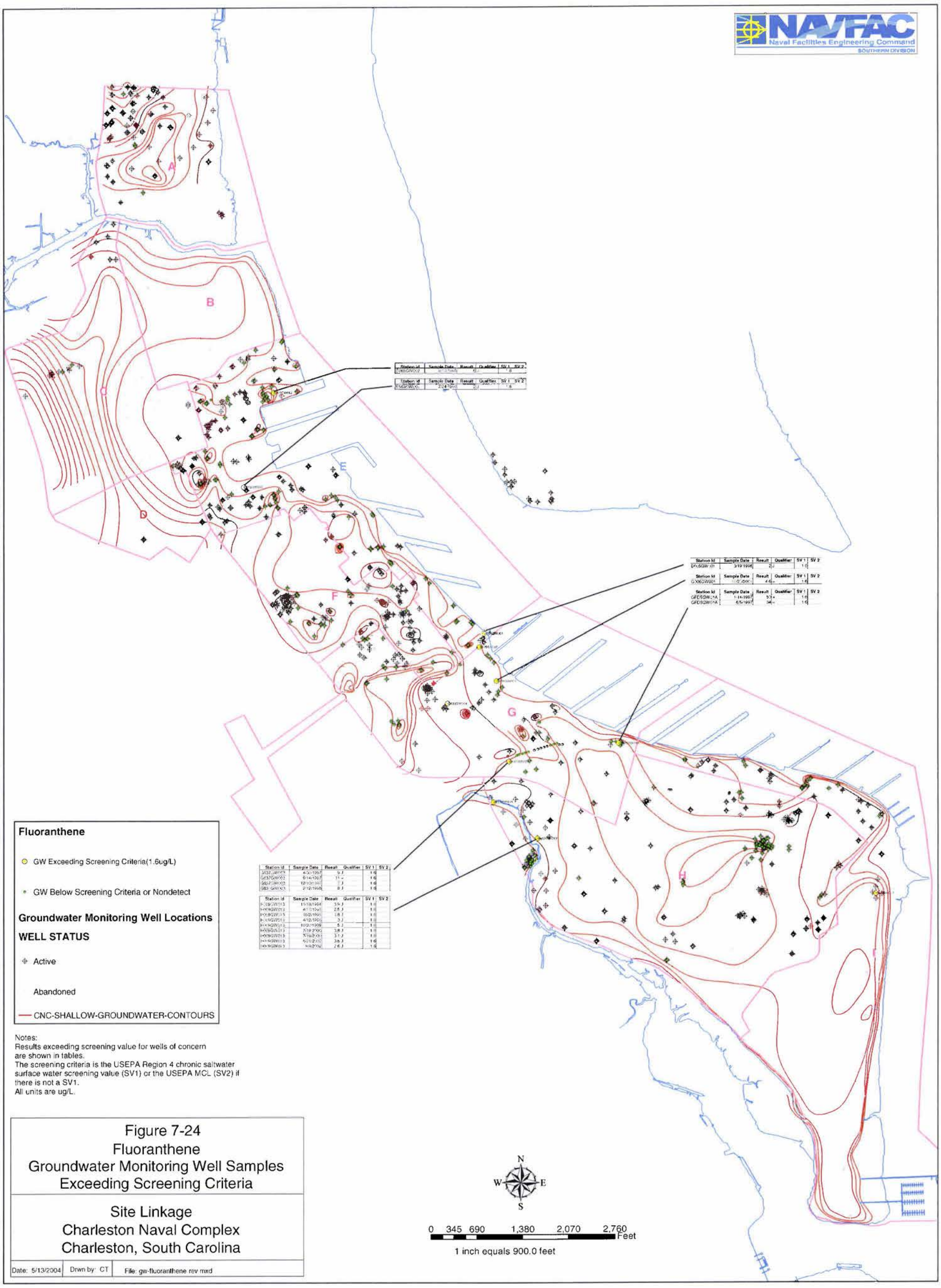


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-23
Copper
Groundwater Monitoring Well Samples Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/13/2004 | Drwn by: CT | File: gw-copper-rev.mxd

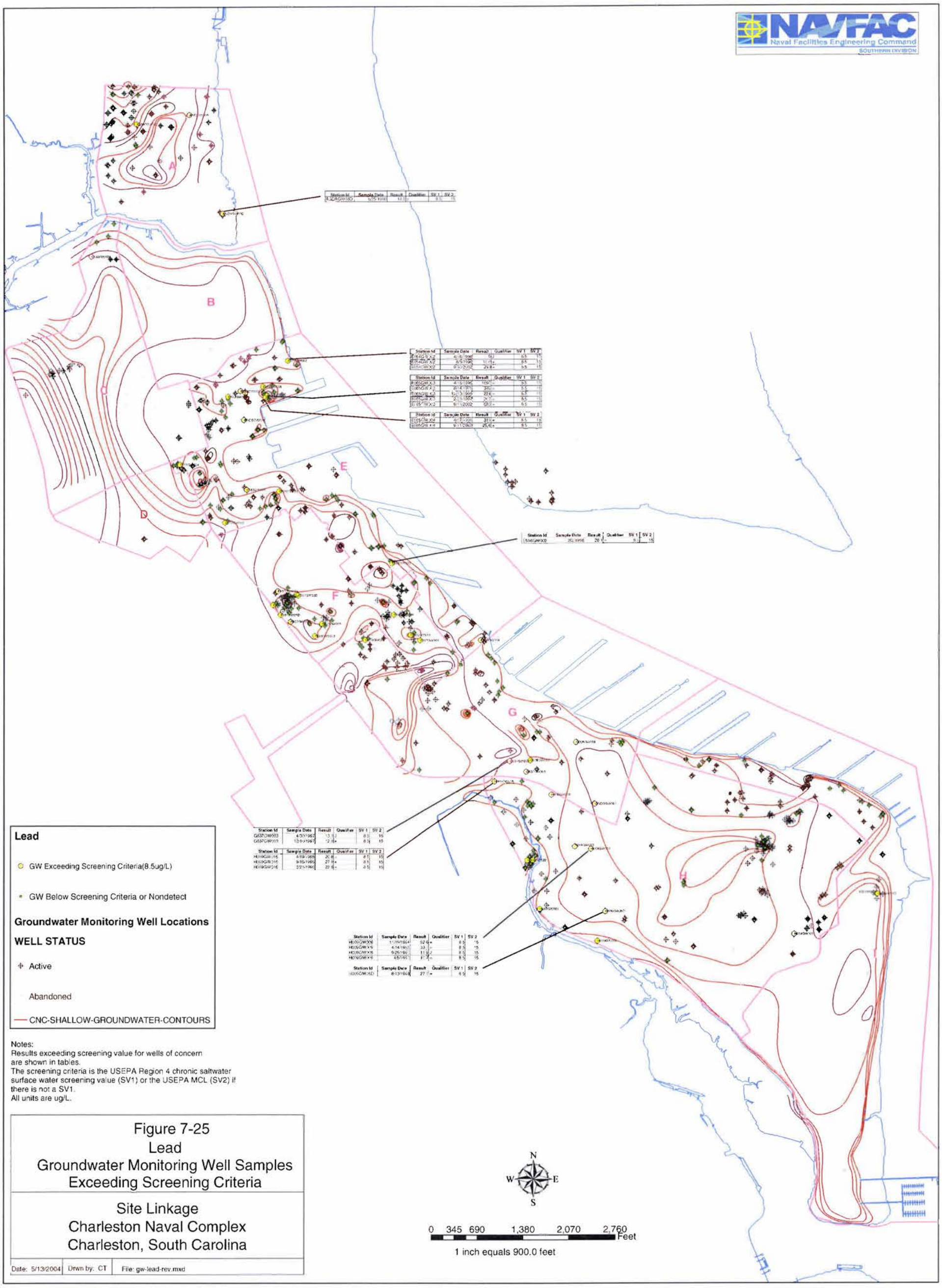


Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-24
Fluoranthene
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/13/2004 | Drwn by: CT | File: gw-fluoranthene rev mxd



Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

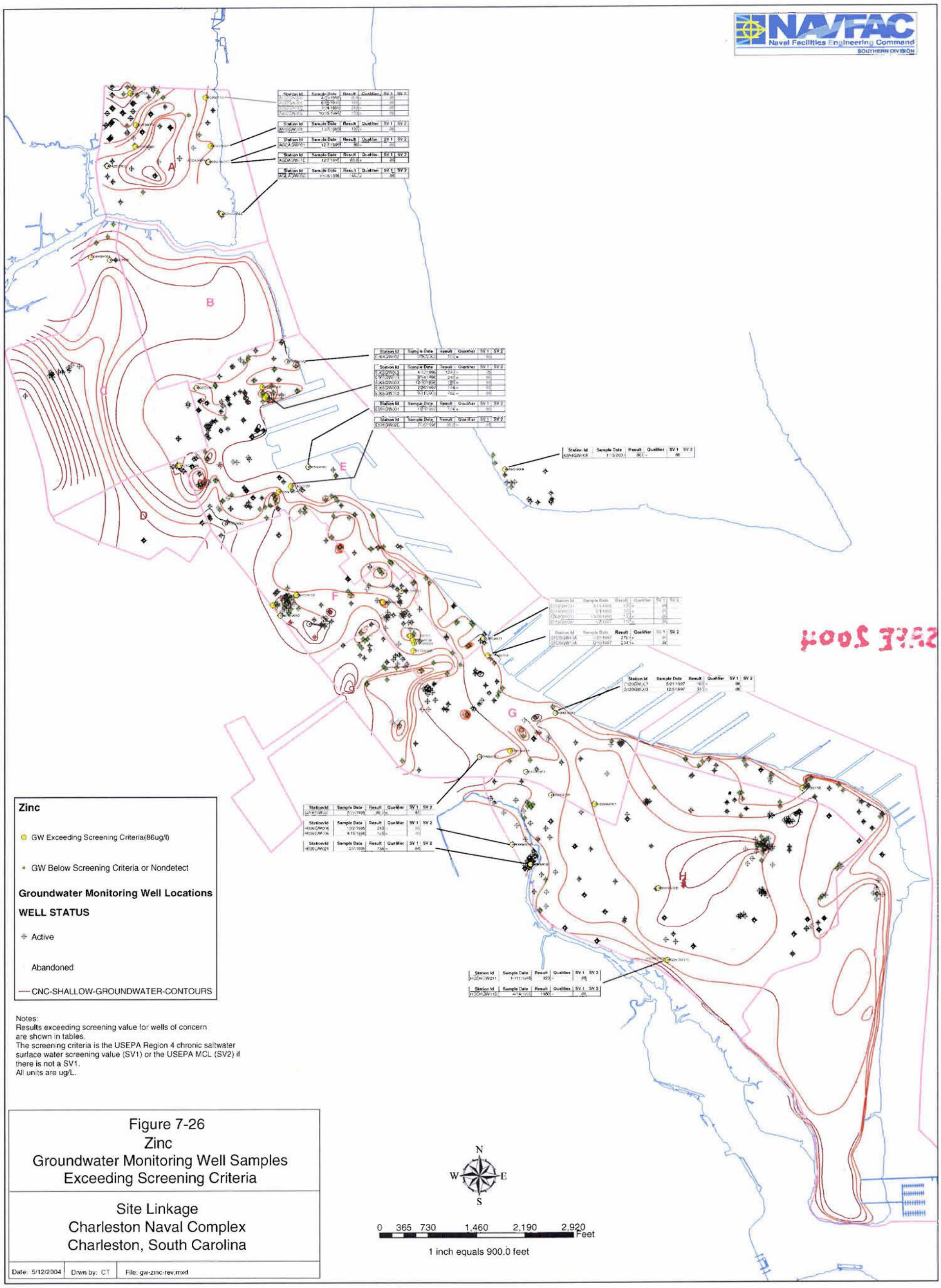
Station Id	Sample Date	Result	Qualifier	SV 1	SV 2
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-25
Lead
Groundwater Monitoring Well Samples Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/13/2004 | Drwn by: CT | File: gw-lead-rev.mxd



Notes:
Results exceeding screening value for wells of concern are shown in tables.
The screening criteria is the USEPA Region 4 chronic saltwater surface water screening value (SV1) or the USEPA MCL (SV2) if there is not a SV1.
All units are ug/L.

Figure 7-26
Zinc
Groundwater Monitoring Well Samples
Exceeding Screening Criteria

Site Linkage
Charleston Naval Complex
Charleston, South Carolina

Date: 5/12/2004 | Drwn by: CT | File: gw-zinc-rev.mxd

APPENDIX K

ZONE J SEDIMENT SAMPLING REPORT
CHARLESTON NAVAL COMPLEX

ZONE J SEDIMENT SAMPLING REPORT
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON,SC

Prepared for:

Department of Navy
Naval Facilities Engineering Command
Southern Division
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Contract No. N62467-05-C-0106

May 5, 2006

Responses to South Carolina Department of Health and Environmental Control Comments to Zone J Draft Completion Report, Zone J Sediment Sampling Activities

Comment #1:
Since the final Zone J Phase II RFI Report has not been completed, referring to this document as the Draft Zone J Completion Report may be somewhat misleading. It is recommended that this document simply be referred to as the Zone J Sediment Sampling Report.

Response #1:
Agreed. The document will be referenced to say "Zone J Sediment Sampling Report".

Comment #2:
Based on the information submitted in the Analytical Results Table, numerous analytes have reporting limits (RL), with the "U" data qualifier, above their respective ecological screening values. In order to ensure the usability of the data with regards to COPC screening, the Department requests the Method Detection Limits (MDLs) be included in the table. If the sediment screening value is below the elevated RL but above the MDL, the data is most likely useable for COPC selection.

Response #2:
The analytical laboratory included the Method Detection Limits (MDLs) with the analytical data package. The analytical data package is included in Appendix A and the MDLs are listed for each individual sample and parameter. Table 3-2, CNC Sediment Location Analytical Results will also include the corresponding MDLs.

Comment #3:
It is not apparent in the Analytical Results Table if the compounds that do not have ecological screening values will be carried through the ecological risk process. EPA ecological risk assessment guidance states that compounds with no screening values or surrogate screening values be retained as COPCs. Please clarify.

Response #3:
The objective of this phase of Zone J Sediment Sampling for the Navy and Spectra Tech was to determine if constituent concentrations at several Zone J locations changed since the initial sampling events in the 1990s. The Navy will provide the data to the CLEAN IV contractor, Tetra Tech and it will be the responsibility for Tetra Tech to complete the ecological risk process.

ACRONYM LIST

AOC	Area of Concern
CLEAN	Comprehensive Long-Term Environmental Action Navy
CNC	Charleston Naval Complex
COPCs	Contaminants of Potential Concern
EnSafe	EnSafe Inc.
ERM	Environmental Risks Effects Range Median
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SLERA	Screening Level Ecological Risk Assessment
Spectra Tech	Spectra Tech, Inc.
SWMU	Solid Waste Management Unit
U.S.	United States

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Appendix A Analytical Hard Copy Data

Appendix B Data Validation Report

1.0 INTRODUCTION

This Sediment Sampling Report has been prepared for Zone J, at the Charleston Naval Complex (CNC) (Figure 1-1) as part of the United States (U.S.) Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) program under the Resource Conservation and Recovery Act (RCRA). Zone J is currently under a RCRA Facility Investigation (RFI) and it was determined by the Navy in order to expedite the RFI process sediment samples would be collected in areas determined to be of concern during the Draft Zone J screening level ecological risk assessment (SLERA) process.

Baseline sediment samples were collected to help quantify typical levels of both naturally occurring inorganic constituents and wide-spread organic constituents (like polynuclear aromatic hydrocarbons and pesticides) in areas nearby, but not likely to have been influenced by historical activities at CNC. Once analytical data is validated sediment sample results will be presented in a technical memorandum and submitted to the U.S. Navy to be utilized in the problem formulation portion of the SLERA in the Final Zone J RFI.

Spectra Tech, Inc. (Spectra Tech) was contracted by the Navy to prepare this CR upon completion of the sediment sampling activities. The CLEAN contractor, EnSafe Inc. (EnSafe), was subcontracted by Spectra Tech to provide technical support.

1.1 Site Description

Zone J consists of the Cooper River, Shipyard Creek, and Noisette Creek, which adjoin CNC properties. The CNC is on the western shore of the Cooper River, approximately 6.75 miles upriver from Fort Sumter. Its 3.75-mile waterfront is dominated by 25 piers and five drydocks, and is protected along most of its length by a wooden and/or concrete seawall. Industrial areas along the CNC's shoreline were associated primarily with the repair and maintenance of large ships. Both Noisette Creek and Shipyard Creek are bordered by less industrial areas, but point-source discharges (i.e., National Pollution Discharge Elimination System outfalls) are also present in these tributaries. Numerous storm water and/or industrial outfalls are also along the CNC shoreline.

Each Zone J water body, although part of the same dynamic watershed, is distinctly different in size, flow, and level of near shore industrialization; therefore, it was considered necessary to segregate the data collected from each water body and assess the Cooper River,

Shipyard Creek, and Noisette Creek as separate entities. A comprehensive description of each Zone J water body, surrounding land uses, and known locations of near shore Area of Concern (AOC)/Solid Waste Management Unit (SWMU) is presented in Section 4.0 of the Final Zone J RFI Work Plan (EnSafe/Allen & Hoshell, 1996).

1.2 Site History

A major component of the Zone J investigation was the completion of SLERAs for each water body to evaluate the potential exposure pathways and identify potential contaminants of potential concern (COPCs) for storm water effluent and sediment ecological effects evaluations for each of the water bodies. SLERAs for the three water bodies were submitted in September 2003 with screening level COPCs being identified for storm water and sediment. Based on the outcome of the SLERAs, the Navy submitted a technical memorandum (Linkage between Charleston Naval Complex Upland AOCs/SWMUs to Analytical Data from Sediment Samples Collected During the Zone J RFI, EnSafe, 2004) to present the ecological evaluations for media sampled during the Zone J RFI and determine the potential for upland source linkage to the sediments in the Charleston water bodies.

Storm water effluent, surface water, soil, groundwater, and sediment samples were evaluated and hazard quotients were calculated for the sediments to demonstrate a worst case scenario, Environmental Risk effects range Median (ERM) quotients were also calculated for sediments. The findings of the memorandum identified five sediment locations with high ERM quotients (Category 4) with CNC upland source linkage (Figure 1-2). However, several data uncertainty, assumptions, and conclusions were made in developing the memorandum:

1. Background sediment samples were never collected, therefore sediment data was not initially screened against an agreed upon reference value. ERM quotient results are presented as a secondary screening number.

2. Storm water data collected was post-Navy operations. Any screening criteria exceedances could not be 100% tied to Navy operations.

3. Upper interval soil data were screened against ERM values to establish areas of potential contamination, not single point sources.

4. Ground water data were screened to determine if conditions exist that would require immediate action.

5. Upper interval soil and groundwater data were not screened against established CNC background values.

6. Excavated areas eliminate on-going potential for contamination to ERM sediments.

To expedite the ERA process, the Navy agreed to resample ERM Quotient Category 4 sediment locations and generate baseline sediment concentrations to evaluate post Navy sediment conditions in the water bodies.

2.0 Sediment Sampling and Analysis

Robb Unger of Spectra Tech and Julie Shaffer and Henry Fellers of EnSafe, performed sediment sampling and analysis on 13 December, 2005. As shown in the table below and in Figure 2.1, a total of 15 sediment sample locations were sampled and analyzed to evaluate post Navy sediment conditions. Of the 15, five confirmatory locations specified in Table 2-1, previously determined to be ERM Quotient Category 3 or 4 with potential CNC site linkages were re-sampled. Ten additional sample locations were identified, sampled and can be used as baseline sediment samples. These ten locations were collected from within the ebb and flow tide cycle (Figure 2-1) of the CNC, and in addition, the baseline locations were in areas with similar physical parameters to the sediments from the CNC locations. The locations were identified after a boat survey was conducted on 23 June, 2005 with representatives from United States Navy, South Carolina Department of Health and Environmental Control, South Carolina Department of Natural Resources, Spectra Tech, and EnSafe.

Table 2.1
Zone J Sediment Sample Locations
Charleston Naval Complex, Charleston, SC

Location	Parameters	Sample Date	Collection Depth	Coordinates Northing/ Easting
NOIM000402	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	9 ft	379342.000/ 2316378.000
054M000102	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	8 ft	377807.612/ 2317881.383
556M000702	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	17 ft	375906.556 / 2318749.274

Table 2.1
Zone J Sediment Sample Locations
Charleston Naval Complex, Charleston, SC

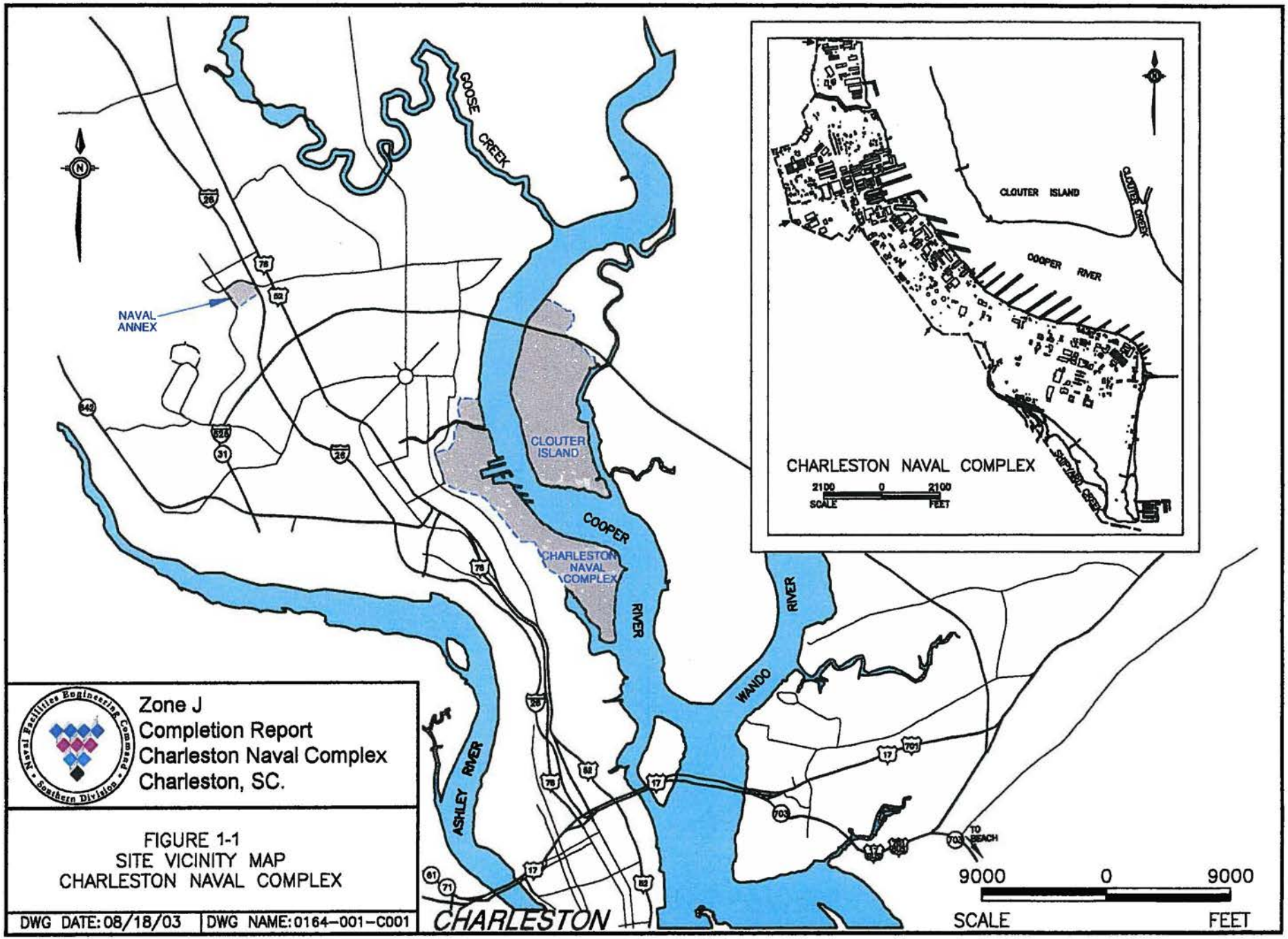
Location	Parameters	Sample Date	Collection Depth	Coordinates Northing/ Easting
556M000502	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	13 ft	373754.634/ 2320576.406
009M000402	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	1 ft	369942.000/ 2321438.000
BSLM0001	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	6 ft	393719.4297/ 2322986.0950
BSLM0002	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	6 ft	391713.7076/ 2323242.8441
BSLM0003	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	5 ft	374071.4861/ 2327138.3487
BSLM0004	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	5 ft	372771.3427 / 2328073.0373
BSLM0005	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	5 ft	359962.5104/ 2334165.5203
BSLM0006	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	11 ft	370599.6049 / 2339520.2522
BSLM0007	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	9 ft	375078.1807/ 2339840.8292
BSLM0008	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	8 ft	342234.7783 / 2328512.2807
BSLM0009	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	9 ft	382007.8651/ 2316863.9798
BSLM0010	Inorganics, Mercury, SVOCs, Pesticides and PCBs	12/13/2005	5 ft	353284.8072/ 2330210.3835

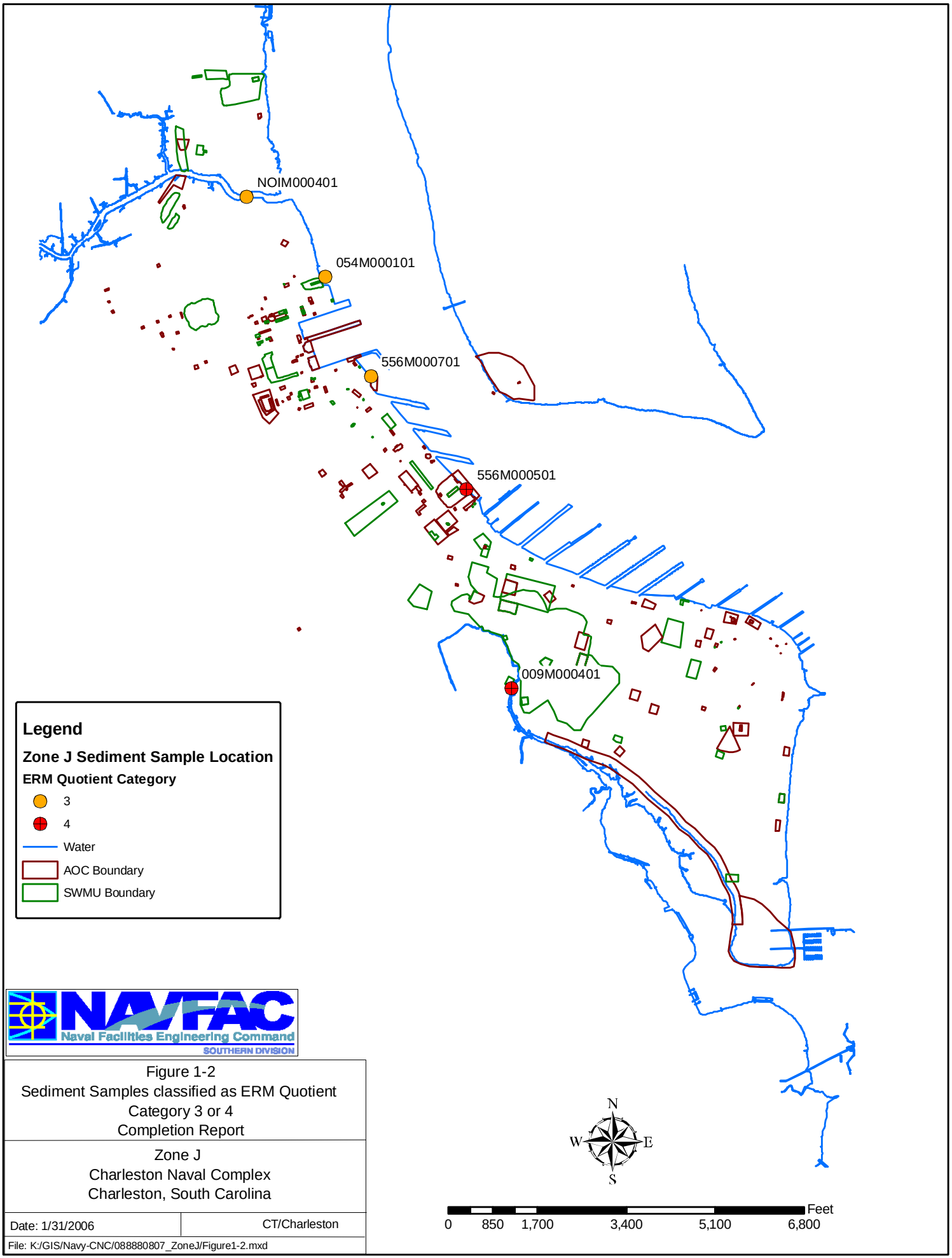
Notes:
SVOCs = Semi-volatile organic compounds
PCBs = Polychlorinated byphenyls

Sampling procedures followed the Environmental Science Division, Standard Operating Procedures and Quality Assurance Manual, which lists several acceptable sampling techniques (dredging, scooping, coring) for collecting sediment samples from surface water bodies and dry land areas, depending upon sampling objectives. All sediment sampling locations were reached by boat with the exception of 009M000402. Due to a fence along Tidewater Road, which borders the eastern shore of Shipyard Creek, access to location 009000402 via CNC property was not possible, therefore; the location was reached via the Macalloy Superfund site property that is on the western side of Shipyard Creek.

Sediment samples generally were collected from the top six inches once the sediment surface was encountered. The samples were collected using a ponar dredge sampler, a steel, clam-shell type scoop activated by a cantilevered system, and analyzed for inorganics, SVOCs, pesticides, and PCBs.

All sampling equipment, bowls, spatulas, spoons, etc. were pre-cleaned and used only once and the ponar dredge was initially decontaminated with nitric acid, isopropanol, distilled water, and Alconox and a final rinse of distilled water. During sampling activities the ponar dredge was decontaminated of visible sediment using pressurized sea water from the on-board wash-down system. Standard quality control and quality assurance measures for sampling collection and documentation were also followed. A chain-of-custody form accompanied the sample shipment to document the transfer of custody from the time and point of collection until delivery to the laboratory for analysis.


GOOSE CREEK
NAVAL ANNEX
CLOUTER ISLAND
COOPER RIVER
CHARLESTON NAVAL COMPLEX
ASHLEY RIVER
WANDO RIVER
CHARLESTON
TO BEACH
9000 0 9000
SCALE FEET
CLOUTER ISLAND
CLOUTER CREEK
COOPER RIVER
SHIPYARD CREEK
CHARLESTON NAVAL COMPLEX
2100 0 2100
SCALE FEET
Zone J
Completion Report
Charleston Naval Complex
Charleston, SC.
Naval Facilities Engineering Command
Southern Division
FIGURE 1-1
SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX
DWG DATE: 08/18/03
DWG NAME: 0164-001-C001



Naval Facilities Engineering Command
SOUTHERN DIVISION

Figure 1-2
Sediment Samples classified as ERM Quotient Category 3 or 4
Completion Report

Zone J
Charleston Naval Complex
Charleston, South Carolina

Date: 1/31/2006 | CT/Charleston

File: K:/GIS/Navy-CNC/088880807_ZoneJ/Figure1-2.mxd

Figure 2-1
Zone J Supplemental Sediment Samples

Charleston Naval Complex
Charleston, SC

Date: 2/2/06 | Drwn by: CT

File: K:/GIS/Navy-CNC/088880807_ZoneJ/figure2-1.mxd

3.0 Analytical Results

Reference Locations

Ten reference locations were selected from outside of the influence of CNC effluent discharge and analyzed for metals, mercury, pesticides, and PCBs. Eighteen inorganic and 12 semi-volatile organic constituents were detected with the majority of the inorganic maximum concentrations (11 constituents) detected in sample BSLM00101. Of the 12 semi-volatile organic constituents detected, three constituents: acenaphthylene, anthracene, and benzo(a)anthracene were detected only once, at location BSLM000901, however; the estimated concentrations did exceed sediment screening values. The maximum concentrations for the remaining semi-volatile organic constituents were detected at location BSLM00901. No pesticide or PCB constituents were detected. Table 3-1 summarizes the analytical results for the reference sediment locations.

Locations BSLM000101 and BSLM000201 were the only samples that had inorganic detections exceeding sediment screening values. Arsenic and silver exceeded the screening values for both BSLM000101 and BSLM000201 and chromium exceeded the screening value for BSLM000101. Comparing semi-volatile detections to screening values, only locations BSLM000801 and BSLM000901 had constituents that exceeded screening values. Benzo(a)pyrene and chrysene detections exceeded sediment screening values in BSLM000801 and acenaphthylene, anthracene, benzo(a)anthracene, and benzo(a)pyrene had detections in BSLM000901 that exceeded screening values.

Primary Locations

Five primary locations were re-sampled based on ERM quotients and analyzed for metals, mercury, pesticides, and PCBs. Twenty inorganic and 14 semi-volatile organic constituents were detected with the majority of maximum inorganic concentrations detected at 556M000502 and the majority of maximum organic concentrations detected at 556M000702. Inorganic concentrations have trended upwards compared to the initial sampling event for the three Copper River locations 054M000102, 556M000502, and 556M000702, with 556M000502 having the most sediment screening value exceedances. However, for the two creek locations, 009M000402 and NOIM000402, the inorganic concentrations trended downwards with only barium and cadmium concentrations in 009M000402 showing an increase compared to the other constituents that have a sediment screening value.

Table 3-1
Reference Location Analytical Results

Chemical Name	Unit	Reference Range	Screening Value	BSLM000101		BSLM000201		BSLM000301		BSLM000401		BSLM000501		BSLM000601		BSLM000701		BSLM000801		BSLM000901		BSLM001001	
Inorganics	mg/kg																						
Aluminum	mg/kg	1600-27000	NSV	27000		19000		7700		1600		7900		4300		8300		14000		12000		5400	
Antimony	mg/kg	NV	12	5.1	U	7.2	U	3.3	U	2.8	U	3.2	U	3.2	U	3.1	U	4.1	U	4.1	U	2.9	U
Arsenic	mg/kg	0.98-15	7.24	**15**		**11**		3.8		0.98	J	5.9		2.4		3.6		**9**		5.2		3.2	
Barium	mg/kg	8.8-30	NSV	30		27		9.7		9.4		11		18		18		25		16		8.8	
Beryllium	mg/kg	0.12-1.5	NSV	1.5		1	J	0.35	J	0.12	J	0.42	J	0.23	J	0.36	J	0.67	J	0.51	J	0.33	J
Cadmium	mg/kg	NV	1	1.3	U	1.8	U	0.83	U	0.69	U	0.8	U	0.79	U	0.76	U	1	U	1	U	0.71	U
Calcium	mg/kg	3000-140000	NSV	3100		16000		19000		3000		40000		6400		4800		140000		19000		15000	
Chromium	mg/kg	4.5-56	52.3	**56**		42		16		4.5		17		10		15		21		23		13	
Cobalt	mg/kg	0.49-8.4	NSV	7.4		8.4		1.8		0.49	J	2		1.2	J	1.9		3.4		3.9		1.3	J
Copper	mg/kg	1.1-16	18.7	7.7		16		5.9		1.1	J	4.3		3.2		5.9		15		13		2.4	J
Iron	mg/kg	1800-33000	NSV	33000		22000		7900		1800		8900		5000		8600		14000		11000		5800	
Lead	mg/kg	2.7-21	30.2	14		15		6.7		2.7		4.9		4.3		8.6		21		9.8		3.4	
Magnesium	mg/kg	530-7100	NSV	7100		6300		2200		530		2800		1600		2100		3900		3700		1900	
Manganese	mg/kg	33-240	NSV	240		180		74		33		97		41		57		160		140		58	
Nickel	mg/kg	1.1-15	15.9	15		12	J	5.2	J	1.1	J	4.8	J	2.4	J	4.6	J	6.9	J	6.9	J	3.2	J
Potassium	mg/kg	240-4200	NSV	4200		2800		970		240		1200		690		1000		1800		1500		830	
Selenium	mg/kg	NV	NSV	6.4	U	9	U	4.1	U	3.5	U	4	U	4	U	3.8	U	5.2	U	5.1	U	3.6	U
Silver	mg/kg	NV	2	**2.6**	U	**3.6**	U	1.7	U	1.4	U	1.6	U	1.6	U	1.5	U	2.1	U	2.1	U	1.4	U
Sodium	mg/kg	2000-14000	NSV	10000		14000		5100		2000		6400		4600		5300		9900		7900		4200	
Thallium	mg/kg	NV	NSV	6.4	U	9	U	4.1	U	3.5	U	4	U	4	U	3.8	U	5.2	U	5.1	U	3.6	U
Vanadium	mg/kg	4.2-61	NSV	61		43		17		4.2		18		11		21		32		25		12	
Zinc	mg/kg	9.7-64	124	53		64		25		9.7		21		18		40		60		43		24	
Mercury	mg/kg	0.0053-0.11	0.13	0.035	J	0.059	J	0.031	J	0.0053	J	0.016	J	0.018	J	0.034		0.11		0.045		0.0078	J
Pesticides																							
4,4'-DDD	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
4,4'-DDE	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
4,4'-DDT	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Aldrin	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
alpha-BHC	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
beta-BHC	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Chlordane (technical)	µg/Kg		1.7	480	U	640	U	310	U	240	U	290	U	270	U	290	U	360	U	390	U	250	U
delta-BHC	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Dieldrin	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Endosulfan I	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Endosulfan II	µg/Kg		NSV	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Endosulfan sulfate	µg/Kg		NSV	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Endrin	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Endrin aldehyde	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
Endrin ketone	µg/Kg		3.3	93	U	120	U	61	U	48	U	56	U	53	U	55	U	70	U	76	U	49	U
gamma-BHC (Lindane)	µg/Kg		3.3	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Heptachlor	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Heptachlor epoxide	µg/Kg		NSV	48	U	64	U	31	U	24	U	29	U	27	U	29	U	36	U	39	U	25	U
Methoxychlor	µg/Kg		NSV	480	U	640	U	310	U	240	U	290	U	270	U	290	U	360	U	390	U	250	U
PCB-1016	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
PCB-1221	µg/Kg		67	1900	U	2500	U	1200	U	960	U	1100	U	1100	U	1100	U	1400	U	1500	U	990	U
PCB-1232	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
PCB-1242	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
PCB-1248	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
PCB-1254	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
PCB-1260	µg/Kg		33	930	U	1200	U	610	U	480	U	560	U	530	U	550	U	700	U	760	U	490	U
Toxaphene	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
Semivolatile Organic Compounds																							
1,2,4-Trichlorobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
1,2-Dichlorobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
1,3-Dichlorobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
1,4-Dichlorobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,4,5-Trichlorophenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,4,6-Trichlorophenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,4-Dichlorophenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,4-Dimethylphenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,4-Dinitrophenol	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
2,4-Dinitrotoluene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2,6-Dinitrotoluene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U

Table 3-1
Reference Location Analytical Results

Chemical Name	Unit	Reference Range	Screening Value	BSLM000101		BSLM000201		BSLM000301		BSLM000401		BSLM000501		BSLM000601		BSLM000701		BSLM000801		BSLM000901		BSLM001001	
Inorganics	mg/kg																						
2-Chloronaphthalene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2-Chlorophenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2-Methylnaphthalene	µg/Kg		20.23	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2-Methylphenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
2-Nitroaniline	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
2-Nitrophenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
3 & 4 Methylphenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
3,3'-Dichlorobenzidine	µg/Kg		NSV	1900	U	2500	U	1200	U	950	U	1100	U	1100	U	1100	U	1400	U	1500	U	980	U
3-Nitroaniline	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
4,6-Dinitro-2-methylphenol	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
4-Bromophenyl phenyl ether	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
4-Chloro-3-methylphenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
4-Chloroaniline	µg/Kg		NSV	1900	U	2500	U	1200	U	950	U	1100	U	1100	U	1100	U	1400	U	1500	U	980	U
4-Chlorophenyl phenyl ether	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
4-Nitroaniline	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
4-Nitrophenol	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
Acenaphthene	µg/Kg		6.71	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Acenaphthylene	µg/Kg	69	5.87	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	**69**	J	490	U
Anthracene	µg/Kg	88	46.9	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	**88**	J	490	U
Benzo[a]anthracene	µg/Kg	230	74.8	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	**230**	J	490	U
Benzo[a]pyrene	µg/Kg	140-380	88.8	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	**140**	J	**380**	J	490	U
Benzo[b]fluoranthene	µg/Kg	170-420	NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	170	J	420	J	490	U
Benzo[g,h,i]perylene	µg/Kg	69-200	NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	69	J	200	J	490	U
Benzo[k]fluoranthene	µg/Kg	140-330	NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	140	J	330	J	490	U
Bis(2-chloroethoxy)methane	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Bis(2-chloroethyl)ether	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Bis(2-ethylhexyl) phthalate	µg/Kg	58-180	182	140	J	170	J	610	U	58	J	560	U	530	U	65	J	700	U	180	J	81	J
bis(chloroisopropyl) ether	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Butyl benzyl phthalate	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Carbazole	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Chrysene	µg/Kg	94-120	108	930	U	94	J	610	U	470	U	560	U	530	U	550	U	**120**	J	360	J	490	U
Dibenz(a,h)anthracene	µg/Kg		6.22	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Dibenzofuran	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Diethyl phthalate	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Dimethyl phthalate	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Di-n-butyl phthalate	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Di-n-octyl phthalate	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Fluoranthene	µg/Kg	52-380	113	930	U	110	J	610	U	470	U	52	J	530	U	550	U	700	U	**380**	J	490	U
Fluorene	µg/Kg		21.2	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Hexachlorobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Hexachlorobutadiene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Hexachlorocyclopentadiene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Hexachloroethane	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Indeno[1,2,3-cd]pyrene	µg/Kg	61-190	NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	61	J	190	J	490	U
Isophorone	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Naphthalene	µg/Kg		34.6	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Nitrobenzene	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
N-Nitrosodi-n-propylamine	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
N-Nitrosodiphenylamine	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Pentachlorophenol	µg/Kg		NSV	4800	U	6400	U	3100	U	2400	U	2900	U	2700	U	2900	U	3600	U	3900	U	2500	U
Phenanthrene	µg/Kg		86.7	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Phenol	µg/Kg		NSV	930	U	1200	U	610	U	470	U	560	U	530	U	550	U	700	U	760	U	490	U
Pyrene	µg/Kg	50-510	153	930	U	**170**	J	610	U	470	U	50	J	530	U	550	U	52	J	**510**	J	490	U
Percent Moisture				65		73		46		31		41		38		41		53		57		33	

Notes:

mg/kg = Milligrams per Kilograms
µg/kg = Micrograms per Kilograms
J = Estimated
U = Non Detect
NV = No Value
NSV = No Screening Value

For the semi-volatile constituents overall concentrations have decreased, however, sediment screening value exceedances were still prevalent at all locations. Location 009M000402 actually had several semi-volatile constituents that showed detections during the 2005 event; however, those detections may have been suppressed in the initial event because quantitation limits were high necessitated by a high dilution factor. It should also be noted when comparing constituent concentrations for 009M000402 and 054M000102 to reference values, only bis(2-ethylhexyl)phthalate remained as a constituent that had concentrations exceeding the sediment reference value, however, detections are estimated values (J flagged).

No pesticide or PCB constituents were detected. Table 3-2 summarizes and compares the analytical results from initial sampling and December 2005 events.

Table 3-2
CNC Sediment Location Analytical Results

Chemical Name	Unit	Reference Range	Screening Value	MDL	009M000401	009M000402		054M000101	054M000102		556M000501	556M000502		556M00701	556M000702		NOIM00401	NOIM000402	
Inorganics	mg/kg																		
Sample Date					**Sep-94**	**Dec-05**	Increase (+) Decrease (-)	**Nov-95**	**Dec-05**	Increase (+) Decrease (-)	**Nov-95**	**Dec-05**	Increase (+) Decrease (-)	**Nov-95**	**Dec-05**	Increase (+) Decrease (-)	**Jun-97**	**Dec-05**	Increase (+) Decrease (-)
Aluminum	mg/kg	1600-27000	NSV	12	20600	14000	**-**	2140	23000	**+**	2770	**35000**	**+**	8770	**31000**	**+**	7830	9500	-
Antimony	mg/kg	NV	12	1.2	**2.7J**	5.3U	-	**1.8J**	4.9U	-	**1.7J**	9.6U	-	1.6U	8.4U	NC	**1.1J**	3.8U	-
Arsenic	mg/kg	0.98-15	7.24	1.7	11.9	7	-	3.7	11	+	5.4	**18**	**+**	9.1	**19**	**+**	10.7	5.9	-
Barium	mg/kg	8.8-30	NSV	0.77	29.1	**37**	**+**	19.5J	**48**	**+**	27.4	**42**	**+**	15J	**93**	**+**	**44.4J**	14	-
Beryllium	mg/kg	0.12-1.5	NSV	0.044	0.94	0.64J	-	0.26J	1	+	0.49J	**1.5J**	**+**	0.59J	1.4J	+	**1.9**	0.46J	-
Cadmium	mg/kg	NV	1	0.56	**0.64J**	**1.6**	**+**	**0.3J**	**0.54J**	**+**	**0.29J**	2.4U	-	0.41U	2.1U	NC	**0.45J**	0.96U	-
Calcium	mg/kg	3000-140000	NSV	6.2	35400	20000	-	8800	11000	+	25300	29000	+	19800	40000	+	51200	2600	-
Chromium	mg/kg	4.5-56	52.3	0.33	**291**	**160**	**-**	28.4	51	+	36.7	**69**	**+**	20.9	**60**	**+**	25.3	20	-
Cobalt	mg/kg	0.49-8.4	NSV	0.44	5.7	3.9	-	2.9J	**10**	**+**	6.8	**10**	+	4.4J	**9.1**	**+**	**10.6J**	3.3	-
Copper	mg/kg	1.1-16	18.7	0.44	**141**	**54**	**-**	**83.1**	**140**	**+**	**1930**	**44**	**-**	**26.9**	**1200**	**+**	**127**	15	-
Iron	mg/kg	1800-33000	NSV	11	26000	15000	-	7170	26000	+	20300	**34000**	**+**	13300	**33000**	**+**	19200	11000	-
Lead	mg/kg	2.7-21	30.2	0.54	**107**	**71**	-	**87J**	**79**	**-**	**220**	**26**	**-**	13.4	**26**	**+**	**126**	**23**	-
Magnesium	mg/kg	530-7100	NSV	3.1	**7200**	4900	-	2080	6100	+	1820	**11000**	**+**	4460	**11000**	**+**	2400	2400	NC
Manganese	mg/kg	33-240	NSV	0.54	**274**	100	-	47.1	**390**	**+**	162	**400**	**+**	230	**650**	**+**	140	52	-
Nickel	mg/kg	1.1-15	15.9	0.67	**37.3**	**19**	**-**	**19.7**	**28**	**+**	**32.6J**	**20**	**-**	7.3J	**25**	**+**	**20.5**	5.6J	-
Potassium	mg/kg	240-4200	NSV	3.3	2470	1900	-	592U	2200	+	656J	**5000**	**+**	2190J	**4400**	**+**	1050J	1300	+
Selenium	mg/kg	NV	NSV	2.3	**0.56J**	6.7U	-	0.64U	6.1U	NC	0.6	12U	-	2U	11U	NC	0.91U	4.8U	NC
Silver	mg/kg	NV	2	0.25	0.46U	2.7U	NC	0.26U	**0.97J**	**+**	0.24U	4.8U	NC	0.81U	4.2U	NC	0.98U	1.9U	NC
Sodium	mg/kg	2000-14000	NSV	130	10600	8700	-	1350	9600	+	1060	**29000**	**+**	8530	**27000**	**+**	4420J	5600	+
Thallium	mg/kg	NV	NSV	3.3	0.52U	6.7U	NC	0.64U	6.1U	NC	0.6U	12U	NC	2U	11U	NC	1.6U	4.8U	NC
Vanadium	mg/kg	4.2-61	NSV	0.36	52.2	32	-	7.4	49	+	6.3J	**77**	+	25.3J	**71**	**+**	22.2	21	-
Zinc	mg/kg	9.7-64	124	1.9	**387**	**230**	**-**	**211J**	**680**	**+**	**774**	**120**	**-**	55.4	**600**	**+**	**718**	**100**	-
Mercury	mg/kg	0.0053-0.11	0.13	0.01	**0.69**	**0.15**	**-**	**0.52**	**0.23**	**-**	0.05	0.077J	**+**	0.09	0.074J	-	**0.16**	**0.14**	
Pesticides																			
4,4'-DDD	µg/Kg		3.3	8.5	**41J**	89U	-	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
4,4'-DDE	µg/Kg		3.3	8.5	**110**	89U	-	NA	88U		**7600**	180U	-	10U	160U	NC	5.65U	72U	NC
4,4'-DDT	µg/Kg		3.3	7.6	50U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Aldrin	µg/Kg		NSV	3.9	18J	46U	-	NA	45U		1700U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
alpha-BHC	µg/Kg		NSV	15	20U	46U	NC	NA	45U		1700U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
beta-BHC	µg/Kg		NSV	13	20U	46U	NC	NA	45U		1700U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Chlordane (technical)	µg/Kg		1.7	85	20U	460U	NC	NA	450U		1700U	930U	NC	5.2U	830U	NC	2.91U	370U	NC
delta-BHC	µg/Kg		NSV	6.5	20U	46U	NC	NA	45U		1700U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Dieldrin	µg/Kg		3.3	9.9	20U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Endosulfan I	µg/Kg		NSV	4.5	20U	46U	NC	NA	45U		1700U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Endosulfan II	µg/Kg		NSV	7.6	50U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Endosulfan sulfate	µg/Kg		NSV	10	50U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Endrin	µg/Kg		3.3	9	20U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Endrin aldehyde	µg/Kg		3.3	18	50U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
Endrin ketone	µg/Kg		3.3	9	50U	89U	NC	NA	88U		3200U	180U	NC	10U	160U	NC	5.65U	72U	NC
gamma-BHC (Lindane)	µg/Kg		3.3	3.9	20UJ	46U	NC	NA	45U		1.7U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Heptachlor	µg/Kg		NSV	9	20U	46U	NC	NA	45U		1.7U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Heptachlor epoxide	µg/Kg		NSV	5.9	20U	46U	NC	NA	45U		1.7U	93U	NC	5.2U	83U	NC	2.91U	37U	NC
Methoxychlor	µg/Kg		NSV	13	200U	460U	NC	NA	450U		45	930U	-	52U	830U	NC	29.1U	370U	NC
PCB-1016	µg/Kg		33	190	200U	890U	NC	NA	880U		43U	1800U	NC	130U	1600U	NC	56.5U	720U	NC
PCB-1221	µg/Kg		67	190	200U	1800U	NC	NA	1800U		43U	3700U	NC	130U	3300U	NC	115U	1500U	NC
PCB-1232	µg/Kg		33	170	200U	890U	NC	NA	880U		43U	1800U	NC	130U	1600U	NC	56.5U	720U	NC
PCB-1242	µg/Kg		33	210	**200**	890U	NC	NA	880U		43U	1800U	NC	130U	1600U	NC	56.5U	720U	NC
PCB-1248	µg/Kg		33	230	**3000**	890U	NC	NA	880U		43U	1800U	NC	130U	1600U	NC	56.5U	720U	NC
PCB-1254	µg/Kg		33	150	**690**	890U	NC	NA	880U		87U	1800U	NC	270U	1600U	NC	56.5U	720U	NC
PCB-1260	µg/Kg		33	180	**770**	890U	NC	NA	880U		87U	1800U	NC	270U	1600U	NC	56.5U	720U	NC
Toxaphene	µg/Kg		NSV	340	900U	4600U	NC	NA	4500U		110U	9300U	NC	330U	8300U	NC	291U	3700U	NC
Semivolatile Organic Compounds																			
1,2,4-Trichlorobenzene	µg/Kg		NSV	59	NA	900U		850U	880U	NC	NA	1800U		NA	1600U		570U	720U	NC
1,2-Dichlorobenzene	µg/Kg		NSV	65	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
1,3-Dichlorobenzene	µg/Kg		NSV	73	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
1,4-Dichlorobenzene	µg/Kg		NSV	62	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2,4,5-Trichlorophenol	µg/Kg		NSV	90	91000U	900U	NC	4100U	880U	NC	8300U	1800U	NC	13000U	1600U	NC	1400U	720U	NC
2,4,6-Trichlorophenol	µg/Kg		NSV	56	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2,4-Dichlorophenol	µg/Kg		NSV	65	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2,4-Dimethylphenol	µg/Kg		NSV	99	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2,4-Dinitrophenol	µg/Kg		NSV	480	91000U	4600U	NC	4100U	4500U	NC	8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
2,4-Dinitrotoluene	µg/Kg		NSV	54	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2,6-Dinitrotoluene	µg/Kg		NSV	93	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2-Chloronaphthalene	µg/Kg		NSV	68	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2-Chlorophenol	µg/Kg		NSV	76	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2-Methylnaphthalene	µg/Kg		20.23	68	3600U	900U	NC	**220J**	880U	-	1700U	1800U	NC	2600U	**130J**	+	570U	720U	NC

Table 3-2
CNC Sediment Location Analytical Results

Chemical Name	Unit	Reference Range	Screening Value	MDL	009M000401	009M000402		054M000101	054M000102		556M000501	556M000502		556M00701	556M000702		NOIM00401	NOIM000402	
Inorganics	mg/kg																		
2-Methylphenol	µg/Kg		NSV	85	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
2-Nitroaniline	µg/Kg		NSV	65	91000U	4600	NC	4100U	4500U	NC	8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
2-Nitrophenol	µg/Kg		NSV	56	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
3 & 4 Methylphenol	µg/Kg		NSV	82	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
3,3'-Dichlorobenzidine	µg/Kg		NSV	85	36000U	1800U	NC	1700U	1800U	NC	3400U	3600U	NC	5300U	3200U	NC	570U	1400U	NC
3-Nitroaniline	µg/Kg		NSV	93	91000U	4600U	NC	4100U	4500U	NC	8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
4,6-Dinitro-2-methylphenol	µg/Kg		NSV	560	91000U	4600U	NC	4100U	4500U	NC	8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
4-Bromophenyl phenyl ether	µg/Kg		NSV	87	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
4-Chloro-3-methylphenol	µg/Kg		NSV	96	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
4-Chloroaniline	µg/Kg		NSV	73	18000U	1800U	NC	850U	1800U	NC	1700U	3600U	NC	2600U	3200U	NC	570U	1400U	NC
4-Chlorophenyl phenyl ether	µg/Kg		NSV	54	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
4-Nitroaniline	µg/Kg		NSV	48	91000U	4600U	NC	NA	4500U		8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
4-Nitrophenol	µg/Kg		NSV	590	91000U	4600U	NC	NA	4500U		8300U	9300U	NC	13000U	8300U	NC	1400U	3700U	NC
Acenaphthene	µg/Kg		6.71	54	3600U	900U	NC	**640J**	880U	-	**260J**	1800U	-	**690J**	**190J**	-	570U	720U	NC
Acenaphthylene	µg/Kg	69	5.87	48	3600U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Anthracene	µg/Kg	88	46.9	65	3600U	900U	NC	**1400**	880U	-	**1200J**	**280J**	-	**1200J**	**680J**	-	**610**	**150J**	-
Benzo[a]anthracene	µg/Kg	230	74.8	87	18000U	**100J**	+	**2600**	880U	-	**4300**	**520J**	-	**1800J**	**870J**	-	**1000**	**290J**	-
Benzo[a]pyrene	µg/Kg	140-380	88.8	54	18000U	**120J**	+	**2200**	78J	-	**3600**	**770J**	-	**1500J**	**670J**	-	**990**	**320J**	-
Benzo[b]fluoranthene	µg/Kg	170-420	NSV	73	18000U	230J	+	850U	99J	-	4300	**880J**	-	2600U	**670J**	-	**1200**	400J	-
Benzo[g,h,i]perylene	µg/Kg	69-200	NSV	65	18000U	100J	+	**1200**	880U	-	1800	**300J**	-	**710J**	**290J**	-	**210J**	**240J**	+
Benzo[k]fluoranthene	µg/Kg	140-330	NSV	100	18000UJ	110J	+	**3600**	880U	-	3200	**790J**	-	**2200J**	**700J**	-	**760**	**330J**	-
Bis(2-chloroethoxy)methane	µg/Kg		NSV	68	18000U	900U	NC	850U	880U	NC	1700U	1800U		2600U	1600U	NC	570U	720U	NC
Bis(2-chloroethyl)ether	µg/Kg		NSV	79	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Bis(2-ethylhexyl) phthalate	µg/Kg	58-180	182	110	18000U	**230J**	+	850U	**230J**	+	1700U	**510J**	+	2600U	**780J**	+	**570U**	**460J**	-
bis(chloroisopropyl) ether	µg/Kg		NSV	99	NA	900U	NC	NA	880U		NA	1800U		NA	1600U		NA	720U	
Butyl benzyl phthalate	µg/Kg		NSV	76	18000U	900U	NC	850U	880U	NC	1700	1800U	-	2600U	1600U	NC	570U	720U	NC
Carbazole	µg/Kg		NSV	79	NA	900U	NC	NA	880U		NA	1800U		NA	1600U		570U	720U	NC
Chrysene	µg/Kg	94-360	108	71	18000U	**150J**	+	**2900**	100J	-	**5600**	**1000J**	-	**1900J**	**1100J**	-	**1500**	**380J**	-
Dibenz(a,h)anthracene	µg/Kg		6.22	68	18000U	900U	NC	**720J**	880U	-	**820J**	1800U	-	**360J**	1600U	-	**150J**	**66J**	-
Dibenzofuran	µg/Kg		NSV	54	18000U	900U	NC	590J	880U	-	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Diethyl phthalate	µg/Kg		NSV	62	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Dimethyl phthalate	µg/Kg		NSV	54	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Di-n-butyl phthalate	µg/Kg		NSV	79	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Di-n-octyl phthalate	µg/Kg		NSV	87	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	290J	1600U	NC	570U	720U	NC
Fluoranthene	µg/Kg	52-380	113	73	**9500J**	**230J**	-	**6700**	**150J**	-	**14000**	**640J**	-	**4600**	**2000**	-	**1500**	**650J**	-
Fluorene	µg/Kg		21.2	62	3600U	900U	NC	**760J**	880U	-	1700U	1800U	NC	**520J**	1600U	-	570U	720U	NC
Hexachlorobenzene	µg/Kg		NSV	73	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Hexachlorobutadiene	µg/Kg		NSV	56	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Hexachlorocyclopentadiene	µg/Kg		NSV	230	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Hexachloroethane	µg/Kg		NSV	56	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Indeno[1,2,3-cd]pyrene	µg/Kg	61-190	NSV	73	18000U	86J	+	**1100**	880U	-	**1800**	**320J**	-	**690J**	**270J**	-	**270J**	**230J**	-
Isophorone	µg/Kg		NSV	62	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Naphthalene	µg/Kg		34.6	54	18000U	900U	NC	**590J**	880U	-	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Nitrobenzene	µg/Kg		NSV	99	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
N-Nitrosodi-n-propylamine	µg/Kg		NSV	79	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
N-Nitrosodiphenylamine	µg/Kg		NSV	65	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Pentachlorophenol	µg/Kg		NSV	230	18000U	4600U	NC	4100	4500U	-	8300	9300U	-	13000U	8300U	NC	1400U	3700U	NC
Phenanthrene	µg/Kg		86.7	82	18000U	900U	NC	6900	880U	-	**5700**	1800U	-	**2400J**	**370J**	-	83J	**110J**	+
Phenol	µg/Kg		NSV	85	18000U	900U	NC	850U	880U	NC	1700U	1800U	NC	2600U	1600U	NC	570U	720U	NC
Pyrene	µg/Kg	50-510	153	56	**6400J**	**230J**	-	**5600**	**200J**	-	**10000**	**1300J**	-	**4400**	**1400J**	-	**950**	**540J**	-
Percent Moisture						63			63			82			80			54	

Notes:
mg/kg = Milligrams per Kilograms
µg/kg = Micrograms per Kilograms
J = Estimated
U = Non Detect
NV = No Value
NSV = No Screening Value

4.0 Conclusions

Based on data validation review, data quality objectives have been met and no further qualification of the data is necessary.

Inorganic concentrations for the three Cooper River locations have increased since the initial sampling event in December 1995 with inorganic concentrations for Shipyard and Noisette Creek locations decreasing. Semi-volatile concentrations show an overall downward trend for all five locations; however, a majority of the detections still exceed a sediment screening value.

Appendix A
Analytical Hard Copy Data

SEVERN TRENT STL®

ANALYTICAL REPORT

Job Number: 680-11658-1

SDG Number: SA0C02

Job Description: ZONE J - CNC

For:

Spectra Tech
132 Jefferson Ct.
Oak Ridge, TN 37830

Attention: Mr. Robb Unger

Linda A. Wolfe

Linda Wolfe
Project Manager I
lwolfe@stl-inc.com
01/13/2006

cc: Mr. Charlie Vernoy

8081/8082 -Non-target matrix interference was present in all samples. The samples were subjected to a florisil cartridge clean-up as well as multiple copper clean-ups. The samples were initially analyzed undiluted directly following continuing calibration standards that passed all criteria. The undiluted run of the samples caused the instrument calibration standards analyzed after the samples to fail approximately 30 % low for all analytes. Additionally, the analysis of the undiluted samples resulted in approximately 80 % -4,4-DDT breakdown. All samples were re-analyzed at a dilution factor of 10. The continuing calibration standards after the diluted samples passed method criteria and data were reported from this run.

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-1	**BSLM000101**					
Bis(2-ethylhexyl) phthalate		140	J	930	ug/Kg	8270C
Aluminum		27000		51	mg/Kg	6010B
Arsenic		15		2.6	mg/Kg	6010B
Barium		30		2.6	mg/Kg	6010B
Beryllium		1.5		1.0	mg/Kg	6010B
Calcium		3100		130	mg/Kg	6010B
Cobalt		7.4		2.6	mg/Kg	6010B
Chromium		56	B	2.6	mg/Kg	6010B
Copper		7.7		5.1	mg/Kg	6010B
Iron		33000		13	mg/Kg	6010B
Potassium		4200	B	260	mg/Kg	6010B
Magnesium		7100		130	mg/Kg	6010B
Manganese		240		2.6	mg/Kg	6010B
Sodium		10000	B	260	mg/Kg	6010B
Nickel		15		10	mg/Kg	6010B
Lead		14		1.3	mg/Kg	6010B
Vanadium		61		2.6	mg/Kg	6010B
Zinc		53		5.1	mg/Kg	6010B
Mercury		0.035	J	0.052	mg/Kg	7471A
Percent Moisture		65		1.0	%	160.3
Percent Solids		35		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-2	BSLM000201					
Fluoranthene		110	J	1200	ug/Kg	8270C
Pyrene		170	J	1200	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		170	J	1200	ug/Kg	8270C
Chrysene		94	J	1200	ug/Kg	8270C
Aluminum		19000		72	mg/Kg	6010B
Arsenic		11		3.6	mg/Kg	6010B
Barium		27		3.6	mg/Kg	6010B
Beryllium		1.0	J	1.4	mg/Kg	6010B
Calcium		16000		180	mg/Kg	6010B
Cobalt		8.4		3.6	mg/Kg	6010B
Chromium		42	B	3.6	mg/Kg	6010B
Copper		16		7.2	mg/Kg	6010B
Iron		22000		18	mg/Kg	6010B
Potassium		2800	B	360	mg/Kg	6010B
Magnesium		6300		180	mg/Kg	6010B
Manganese		180		3.6	mg/Kg	6010B
Sodium		14000	B	360	mg/Kg	6010B
Nickel		12	J	14	mg/Kg	6010B
Lead		15		1.8	mg/Kg	6010B
Vanadium		43		3.6	mg/Kg	6010B
Zinc		64		7.2	mg/Kg	6010B
Mercury		0.059	J	0.074	mg/Kg	7471A
Percent Moisture		73		1.0	%	160.3
Percent Solids		27		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-3	BSLM000901					
Acenaphthylene		69	J	760	ug/Kg	8270C
Anthracene		88	J	760	ug/Kg	8270C
Fluoranthene		380	J	760	ug/Kg	8270C
Pyrene		510	J	760	ug/Kg	8270C
Benzo[a]anthracene		230	J	760	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		180	J	760	ug/Kg	8270C
Chrysene		360	J	760	ug/Kg	8270C
Benzo[b]fluoranthene		420	J	760	ug/Kg	8270C
Benzo[k]fluoranthene		330	J	760	ug/Kg	8270C
Benzo[a]pyrene		380	J	760	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		190	J	760	ug/Kg	8270C
Benzo[g,h,i]perylene		200	J	760	ug/Kg	8270C
Aluminum		12000		41	mg/Kg	6010B
Arsenic		5.2		2.1	mg/Kg	6010B
Barium		16		2.1	mg/Kg	6010B
Beryllium		0.51	J	0.82	mg/Kg	6010B
Calcium		19000		100	mg/Kg	6010B
Cobalt		3.9		2.1	mg/Kg	6010B
Chromium		23	B	2.1	mg/Kg	6010B
Copper		13		4.1	mg/Kg	6010B
Iron		11000		10	mg/Kg	6010B
Potassium		1500	B	210	mg/Kg	6010B
Magnesium		3700		100	mg/Kg	6010B
Manganese		140		2.1	mg/Kg	6010B
Sodium		7900	B	210	mg/Kg	6010B
Nickel		6.9	J	8.2	mg/Kg	6010B
Lead		9.8		1.0	mg/Kg	6010B
Vanadium		25		2.1	mg/Kg	6010B
Zinc		43		4.1	mg/Kg	6010B
Mercury		0.045		0.043	mg/Kg	7471A
Percent Moisture		57		1.0	%	160.3
Percent Solids		44		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-4	054M000102					
Fluoranthene		150	J	880	ug/Kg	8270C
Pyrene		200	J	880	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		230	J	880	ug/Kg	8270C
Chrysene		100	J	880	ug/Kg	8270C
Benzo[b]fluoranthene		99	J	880	ug/Kg	8270C
Benzo[a]pyrene		78	J	880	ug/Kg	8270C
Silver		0.97	J	2.4	mg/Kg	6010B
Aluminum		23000		49	mg/Kg	6010B
Arsenic		11		2.4	mg/Kg	6010B
Barium		48		2.4	mg/Kg	6010B
Beryllium		1.0		0.97	mg/Kg	6010B
Calcium		11000		120	mg/Kg	6010B
Cadmium		0.54	J	1.2	mg/Kg	6010B
Cobalt		10		2.4	mg/Kg	6010B
Chromium		51	B	2.4	mg/Kg	6010B
Copper		140		4.9	mg/Kg	6010B
Iron		26000		12	mg/Kg	6010B
Potassium		2200	B	240	mg/Kg	6010B
Magnesium		6100		120	mg/Kg	6010B
Manganese		390		2.4	mg/Kg	6010B
Sodium		9600	B	240	mg/Kg	6010B
Nickel		28		9.7	mg/Kg	6010B
Lead		79		1.2	mg/Kg	6010B
Vanadium		49		2.4	mg/Kg	6010B
Zinc		680		4.9	mg/Kg	6010B
Mercury		0.23		0.052	mg/Kg	7471A
Percent Moisture		63		1.0	%	160.3
Percent Solids		37		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-5	556M000702					
2-Methylnaphthalene		130	J	1600	ug/Kg	8270C
Acenaphthene		190	J	1600	ug/Kg	8270C
Phenanthrene		370	J	1600	ug/Kg	8270C
Anthracene		680	J	1600	ug/Kg	8270C
Fluoranthene		2000		1600	ug/Kg	8270C
Pyrene		1400	J	1600	ug/Kg	8270C
Benzo[a]anthracene		870	J	1600	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		780	J	1600	ug/Kg	8270C
Chrysene		1100	J	1600	ug/Kg	8270C
Benzo[b]fluoranthene		670	J	1600	ug/Kg	8270C
Benzo[k]fluoranthene		700	J	1600	ug/Kg	8270C
Benzo[a]pyrene		670	J	1600	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		270	J	1600	ug/Kg	8270C
Benzo[g,h,i]perylene		290	J	1600	ug/Kg	8270C
Aluminum		31000		84	mg/Kg	6010B
Arsenic		19		4.2	mg/Kg	6010B
Barium		93		4.2	mg/Kg	6010B
Beryllium		1.4	J	1.7	mg/Kg	6010B
Calcium		40000		210	mg/Kg	6010B
Cobalt		9.1		4.2	mg/Kg	6010B
Chromium		60	B	4.2	mg/Kg	6010B
Copper		1200		8.4	mg/Kg	6010B
Iron		33000		21	mg/Kg	6010B
Potassium		4400	B	420	mg/Kg	6010B
Magnesium		11000		210	mg/Kg	6010B
Manganese		650		4.2	mg/Kg	6010B
Sodium		27000	B	420	mg/Kg	6010B
Nickel		25		17	mg/Kg	6010B
Lead		26		2.1	mg/Kg	6010B
Vanadium		71		4.2	mg/Kg	6010B
Zinc		600		8.4	mg/Kg	6010B
Mercury		0.074	J	0.089	mg/Kg	7471A
Percent Moisture		80		1.0	%	160.3
Percent Solids		21		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-6	556M000502					
Anthracene		280	J	1800	ug/Kg	8270C
Fluoranthene		640	J	1800	ug/Kg	8270C
Pyrene		1300	J	1800	ug/Kg	8270C
Benzo[a]anthracene		520	J	1800	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		510	J	1800	ug/Kg	8270C
Chrysene		1000	J	1800	ug/Kg	8270C
Benzo[b]fluoranthene		880	J	1800	ug/Kg	8270C
Benzo[k]fluoranthene		790	J	1800	ug/Kg	8270C
Benzo[a]pyrene		770	J	1800	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		320	J	1800	ug/Kg	8270C
Benzo[g,h,i]perylene		300	J	1800	ug/Kg	8270C
Aluminum		35000		96	mg/Kg	6010B
Arsenic		18		4.8	mg/Kg	6010B
Barium		42		4.8	mg/Kg	6010B
Beryllium		1.5	J	1.9	mg/Kg	6010B
Calcium		29000		240	mg/Kg	6010B
Cobalt		10		4.8	mg/Kg	6010B
Chromium		69	B	4.8	mg/Kg	6010B
Copper		44		9.6	mg/Kg	6010B
Iron		34000		24	mg/Kg	6010B
Potassium		5000	B	480	mg/Kg	6010B
Magnesium		11000		240	mg/Kg	6010B
Manganese		400		4.8	mg/Kg	6010B
Sodium		29000	B	480	mg/Kg	6010B
Nickel		20		19	mg/Kg	6010B
Lead		26		2.4	mg/Kg	6010B
Vanadium		77		4.8	mg/Kg	6010B
Zinc		120		9.6	mg/Kg	6010B
Mercury		0.077	J	0.10	mg/Kg	7471A
Percent Moisture		82		1.0	%	160.3
Percent Solids		18		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-7	**BSLM000401**					
Bis(2-ethylhexyl) phthalate		58	J	470	ug/Kg	8270C
Aluminum		1600		28	mg/Kg	6010B
Arsenic		0.98	J	1.4	mg/Kg	6010B
Barium		9.4		1.4	mg/Kg	6010B
Beryllium		0.12	J	0.55	mg/Kg	6010B
Calcium		3000		69	mg/Kg	6010B
Cobalt		0.49	J	1.4	mg/Kg	6010B
Chromium		4.5	B	1.4	mg/Kg	6010B
Copper		1.1	J	2.8	mg/Kg	6010B
Iron		1800		6.9	mg/Kg	6010B
Potassium		240	B	140	mg/Kg	6010B
Magnesium		530		69	mg/Kg	6010B
Manganese		33		1.4	mg/Kg	6010B
Sodium		2000	B	140	mg/Kg	6010B
Nickel		1.1	J	5.5	mg/Kg	6010B
Lead		2.7		0.69	mg/Kg	6010B
Vanadium		4.2		1.4	mg/Kg	6010B
Zinc		9.7		2.8	mg/Kg	6010B
Mercury		0.0053	J	0.025	mg/Kg	7471A
Percent Moisture		31		1.0	%	160.3
Percent Solids		69		1.0	%	160.3
680-11658-8	**BSLM000301**					
Aluminum		7700		33	mg/Kg	6010B
Arsenic		3.8		1.7	mg/Kg	6010B
Barium		9.7		1.7	mg/Kg	6010B
Beryllium		0.35	J	0.66	mg/Kg	6010B
Calcium		19000		83	mg/Kg	6010B
Cobalt		1.8		1.7	mg/Kg	6010B
Chromium		16	B	1.7	mg/Kg	6010B
Copper		5.9		3.3	mg/Kg	6010B
Iron		7900		8.3	mg/Kg	6010B
Potassium		970	B	170	mg/Kg	6010B
Magnesium		2200		83	mg/Kg	6010B
Manganese		74		1.7	mg/Kg	6010B
Sodium		5100	B	170	mg/Kg	6010B
Nickel		5.2	J	6.6	mg/Kg	6010B
Lead		6.7		0.83	mg/Kg	6010B
Vanadium		17		1.7	mg/Kg	6010B
Zinc		25		3.3	mg/Kg	6010B
Mercury		0.031	J	0.033	mg/Kg	7471A
Percent Moisture		46		1.0	%	160.3
Percent Solids		54		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-9	BSLM001001					
Bis(2-ethylhexyl) phthalate		81	J	490	ug/Kg	8270C
Aluminum		5400		29	mg/Kg	6010B
Arsenic		3.2		1.4	mg/Kg	6010B
Barium		8.8		1.4	mg/Kg	6010B
Beryllium		0.33	J	0.57	mg/Kg	6010B
Calcium		15000		71	mg/Kg	6010B
Cobalt		1.3	J	1.4	mg/Kg	6010B
Chromium		13	B	1.4	mg/Kg	6010B
Copper		2.4	J	2.9	mg/Kg	6010B
Iron		5800		7.1	mg/Kg	6010B
Potassium		830	B	140	mg/Kg	6010B
Magnesium		1900		71	mg/Kg	6010B
Manganese		58		1.4	mg/Kg	6010B
Sodium		4200	B	140	mg/Kg	6010B
Nickel		3.2	J	5.7	mg/Kg	6010B
Lead		3.4		0.71	mg/Kg	6010B
Vanadium		12		1.4	mg/Kg	6010B
Zinc		24		2.9	mg/Kg	6010B
Mercury		0.0078	J	0.025	mg/Kg	7471A
Percent Moisture		33		1.0	%	160.3
Percent Solids		67		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-10	BSLM000801					
Pyrene		52	J	700	ug/Kg	8270C
Chrysene		120	J	700	ug/Kg	8270C
Benzo[b]fluoranthene		170	J	700	ug/Kg	8270C
Benzo[k]fluoranthene		140	J	700	ug/Kg	8270C
Benzo[a]pyrene		140	J	700	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		61	J	700	ug/Kg	8270C
Benzo[g,h,i]perylene		69	J	700	ug/Kg	8270C
Aluminum		14000		41	mg/Kg	6010B
Arsenic		9.0		2.1	mg/Kg	6010B
Barium		25		2.1	mg/Kg	6010B
Beryllium		0.67	J	0.83	mg/Kg	6010B
Calcium		140000		100	mg/Kg	6010B
Cobalt		3.4		2.1	mg/Kg	6010B
Chromium		21	B	2.1	mg/Kg	6010B
Copper		15		4.1	mg/Kg	6010B
Iron		14000		10	mg/Kg	6010B
Potassium		1800	B	210	mg/Kg	6010B
Magnesium		3900		100	mg/Kg	6010B
Manganese		160		2.1	mg/Kg	6010B
Sodium		9900	B	210	mg/Kg	6010B
Nickel		6.9	J	8.3	mg/Kg	6010B
Lead		21		1.0	mg/Kg	6010B
Vanadium		32		2.1	mg/Kg	6010B
Zinc		60		4.1	mg/Kg	6010B
Mercury		0.11		0.037	mg/Kg	7471A
Percent Moisture		53		1.0	%	160.3
Percent Solids		47		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-11	**BSLM000501**					
Fluoranthene		52	J	560	ug/Kg	8270C
Pyrene		50	J	560	ug/Kg	8270C
Aluminum		7900		32	mg/Kg	6010B
Arsenic		5.9		1.6	mg/Kg	6010B
Barium		11		1.6	mg/Kg	6010B
Beryllium		0.42	J	0.64	mg/Kg	6010B
Calcium		40000		80	mg/Kg	6010B
Cobalt		2.0		1.6	mg/Kg	6010B
Chromium		17	B	1.6	mg/Kg	6010B
Copper		4.3		3.2	mg/Kg	6010B
Iron		8900		8.0	mg/Kg	6010B
Potassium		1200	B	160	mg/Kg	6010B
Magnesium		2800		80	mg/Kg	6010B
Manganese		97		1.6	mg/Kg	6010B
Sodium		6400	B	160	mg/Kg	6010B
Nickel		4.8	J	6.4	mg/Kg	6010B
Lead		4.9		0.80	mg/Kg	6010B
Vanadium		18		1.6	mg/Kg	6010B
Zinc		21		3.2	mg/Kg	6010B
Mercury		0.016	J	0.031	mg/Kg	7471A
Percent Moisture		41		1.0	%	160.3
Percent Solids		59		1.0	%	160.3
680-11658-12	**BSLM000701**					
Bis(2-ethylhexyl) phthalate		65	J	550	ug/Kg	8270C
Aluminum		8300		31	mg/Kg	6010B
Arsenic		3.6		1.5	mg/Kg	6010B
Barium		18		1.5	mg/Kg	6010B
Beryllium		0.36	J	0.61	mg/Kg	6010B
Calcium		4800		76	mg/Kg	6010B
Cobalt		1.9		1.5	mg/Kg	6010B
Chromium		15	B	1.5	mg/Kg	6010B
Copper		5.9		3.1	mg/Kg	6010B
Iron		8600		7.6	mg/Kg	6010B
Potassium		1000	B	150	mg/Kg	6010B
Magnesium		2100		76	mg/Kg	6010B
Manganese		57		1.5	mg/Kg	6010B
Sodium		5300	B	150	mg/Kg	6010B
Nickel		4.6	J	6.1	mg/Kg	6010B
Lead		8.6		0.76	mg/Kg	6010B
Vanadium		21		1.5	mg/Kg	6010B
Zinc		40		3.1	mg/Kg	6010B
Mercury		0.034		0.032	mg/Kg	7471A
Percent Moisture		41		1.0	%	160.3
Percent Solids		60		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-13	**BSLM000601**					
Aluminum		4300		32	mg/Kg	6010B
Arsenic		2.4		1.6	mg/Kg	6010B
Barium		18		1.6	mg/Kg	6010B
Beryllium		0.23	J	0.63	mg/Kg	6010B
Calcium		6400		79	mg/Kg	6010B
Cobalt		1.2	J	1.6	mg/Kg	6010B
Chromium		10	B	1.6	mg/Kg	6010B
Copper		3.2		3.2	mg/Kg	6010B
Iron		5000		7.9	mg/Kg	6010B
Potassium		690	B	160	mg/Kg	6010B
Magnesium		1600		79	mg/Kg	6010B
Manganese		41		1.6	mg/Kg	6010B
Sodium		4600	B	160	mg/Kg	6010B
Nickel		2.4	J	6.3	mg/Kg	6010B
Lead		4.3		0.79	mg/Kg	6010B
Vanadium		11		1.6	mg/Kg	6010B
Zinc		18		3.2	mg/Kg	6010B
Mercury		0.018	J	0.028	mg/Kg	7471A
Percent Moisture		38		1.0	%	160.3
Percent Solids		62		1.0	%	160.3

SEVERN TRENT STL®

EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-14	NOIM000402					
Phenanthrene		110	J	720	ug/Kg	8270C
Anthracene		150	J	720	ug/Kg	8270C
Fluoranthene		650	J	720	ug/Kg	8270C
Pyrene		540	J	720	ug/Kg	8270C
Benzo[a]anthracene		290	J	720	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		460	J	720	ug/Kg	8270C
Chrysene		380	J	720	ug/Kg	8270C
Benzo[b]fluoranthene		400	J	720	ug/Kg	8270C
Benzo[k]fluoranthene		330	J	720	ug/Kg	8270C
Benzo[a]pyrene		320	J	720	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		230	J	720	ug/Kg	8270C
Dibenz(a,h)anthracene		66	J	720	ug/Kg	8270C
Benzo[g,h,i]perylene		240	J	720	ug/Kg	8270C
Aluminum		9500		38	mg/Kg	6010B
Arsenic		5.9		1.9	mg/Kg	6010B
Barium		14		1.9	mg/Kg	6010B
Beryllium		0.46	J	0.77	mg/Kg	6010B
Calcium		2600		96	mg/Kg	6010B
Cobalt		3.3		1.9	mg/Kg	6010B
Chromium		20	B	1.9	mg/Kg	6010B
Copper		15		3.8	mg/Kg	6010B
Iron		11000		9.6	mg/Kg	6010B
Potassium		1300	B	190	mg/Kg	6010B
Magnesium		2400		96	mg/Kg	6010B
Manganese		52		1.9	mg/Kg	6010B
Sodium		5600	B	190	mg/Kg	6010B
Nickel		5.6	J	7.7	mg/Kg	6010B
Lead		23		0.96	mg/Kg	6010B
Vanadium		21		1.9	mg/Kg	6010B
Zinc		100		3.8	mg/Kg	6010B
Mercury		0.14		0.041	mg/Kg	7471A
Percent Moisture		54		1.0	%	160.3
Percent Solids		46		1.0	%	160.3

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EXECUTIVE SUMMARY - Detections

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID / Analyte	Client Sample ID	Result / Qualifier		Reporting Limit	Units	Method
680-11658-15	009M000402					
Fluoranthene		230	J	900	ug/Kg	8270C
Pyrene		230	J	900	ug/Kg	8270C
Benzo[a]anthracene		100	J	900	ug/Kg	8270C
Bis(2-ethylhexyl) phthalate		230	J	900	ug/Kg	8270C
Chrysene		150	J	900	ug/Kg	8270C
Benzo[b]fluoranthene		230	J	900	ug/Kg	8270C
Benzo[k]fluoranthene		110	J	900	ug/Kg	8270C
Benzo[a]pyrene		120	J	900	ug/Kg	8270C
Indeno[1,2,3-cd]pyrene		86	J	900	ug/Kg	8270C
Benzo[g,h,i]perylene		100	J	900	ug/Kg	8270C
Aluminum		14000		53	mg/Kg	6010B
Arsenic		7.0		2.7	mg/Kg	6010B
Barium		37		2.7	mg/Kg	6010B
Beryllium		0.64	J	1.1	mg/Kg	6010B
Calcium		20000		130	mg/Kg	6010B
Cadmium		1.6		1.3	mg/Kg	6010B
Cobalt		3.9		2.7	mg/Kg	6010B
Chromium		160	B	2.7	mg/Kg	6010B
Copper		54		5.3	mg/Kg	6010B
Iron		15000		13	mg/Kg	6010B
Potassium		1900	B	270	mg/Kg	6010B
Magnesium		4900		130	mg/Kg	6010B
Manganese		100		2.7	mg/Kg	6010B
Sodium		8700	B	270	mg/Kg	6010B
Nickel		19		11	mg/Kg	6010B
Lead		71		1.3	mg/Kg	6010B
Vanadium		32		2.7	mg/Kg	6010B
Zinc		230		5.3	mg/Kg	6010B
Mercury		0.15		0.052	mg/Kg	7471A
Percent Moisture		63		1.0	%	160.3
Percent Solids		37		1.0	%	160.3

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METHOD SUMMARY

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	STL-SAV	SW846 8270C	
Ultrasonic Extraction	STL-SAV		SW846 3550B
Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography	STL-SAV	SW846 8081A_8082	
Ultrasonic Extraction	STL-SAV		SW846 3550B
Inductively Coupled Plasma - Atomic Emission Spectrometry	STL-SAV	SW846 6010B	
Acid Digestion of Sediments, Sludges, and Soils	STL-SAV		SW846 3050B
Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)	STL-SAV	SW846 7471A	
Mercury in Solid or Semi-Solid Waste (Manual	STL-SAV		SW846 7471A
Percent Moisture	STL-SAV	EPA 160.3	

LAB REFERENCES:

STL-SAV = STL-Savannah

METHOD REFERENCES:

EPA - US Environmental Protection Agency

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

SEVERN TRENT STL®

SAMPLE SUMMARY

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-11658-1	BSLM000101	Solid	12/13/2005 1058	12/15/2005 0936
680-11658-2	BSLM000201	Solid	12/13/2005 1110	12/15/2005 0936
680-11658-3	BSLM000901	Solid	12/13/2005 1132	12/15/2005 0936
680-11658-4	054M000102	Solid	12/13/2005 1158	12/15/2005 0936
680-11658-5	556M000702	Solid	12/13/2005 1212	12/15/2005 0936
680-11658-6	556M000502	Solid	12/13/2005 1225	12/15/2005 0936
680-11658-7	BSLM000401	Solid	12/13/2005 1238	12/15/2005 0936
680-11658-8	BSLM000301	Solid	12/13/2005 1246	12/15/2005 0936
680-11658-9	BSLM001001	Solid	12/13/2005 1315	12/15/2005 0936
680-11658-10	BSLM000801	Solid	12/13/2005 1340	12/15/2005 0936
680-11658-11	BSLM000501	Solid	12/13/2005 1408	12/15/2005 0936
680-11658-12	BSLM000701	Solid	12/13/2005 1434	12/15/2005 0936
680-11658-13	BSLM000601	Solid	12/13/2005 1450	12/15/2005 0936
680-11658-14	NOIM000402	Solid	12/13/2005 1609	12/15/2005 0936
680-11658-15	009M000402	Solid	12/14/2005 1055	12/15/2005 0936

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000101

Lab Sample ID: 680-11658-1
Client Matrix: Solid % Moisture: 64.6

Date Sampled: 12/13/2005 1058
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1127
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1751.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		930	U	85	930
Bis(2-chloroethyl)ether		930	U	79	930
2-Chlorophenol		930	U	76	930
1,3-Dichlorobenzene		930	U	73	930
1,4-Dichlorobenzene		930	U	62	930
1,2-Dichlorobenzene		930	U	65	930
2-Methylphenol		930	U	85	930
N-Nitrosodi-n-propylamine		930	U	79	930
Hexachloroethane		930	U	56	930
Nitrobenzene		930	U	99	930
Isophorone		930	U	62	930
2-Nitrophenol		930	U	56	930
2,4-Dimethylphenol		930	U	99	930
Bis(2-chloroethoxy)methane		930	U	68	930
2,4-Dichlorophenol		930	U	65	930
1,2,4-Trichlorobenzene		930	U	59	930
Naphthalene		930	U	54	930
4-Chloroaniline		1900	U	73	1900
Hexachlorobutadiene		930	U	56	930
4-Chloro-3-methylphenol		930	U	96	930
2-Methylnaphthalene		930	U	68	930
Hexachlorocyclopentadiene		930	U *	230	930
2,4,6-Trichlorophenol		930	U	56	930
2,4,5-Trichlorophenol		930	U	90	930
2-Chloronaphthalene		930	U	68	930
2-Nitroaniline		4800	U	65	4800
Dimethyl phthalate		930	U	54	930
Acenaphthylene		930	U	48	930
3-Nitroaniline		4800	U	93	4800
Acenaphthene		930	U	54	930
2,4-Dinitrophenol		4800	U	480	4800
4-Nitrophenol		4800	U	590	4800
Dibenzofuran		930	U	54	930
2,4-Dinitrotoluene		930	U	54	930
2,6-Dinitrotoluene		930	U	93	930
3 & 4 Methylphenol		930	U	82	930
Diethyl phthalate		930	U	62	930
4-Chlorophenyl phenyl ether		930	U	54	930
Fluorene		930	U	62	930
4-Nitroaniline		4800	U	48	4800
4,6-Dinitro-2-methylphenol		4800	U	560	4800
N-Nitrosodiphenylamine		930	U	65	930
4-Bromophenyl phenyl ether		930	U	87	930

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000101**

Lab Sample ID: 680-11658-1
Client Matrix: Solid % Moisture: 64.6

Date Sampled: 12/13/2005 1058
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1127
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1751.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		930	U	73	930
Pentachlorophenol		4800	U	230	4800
Phenanthrene		930	U	82	930
Anthracene		930	U	65	930
Di-n-butyl phthalate		930	U	79	930
Fluoranthene		930	U	73	930
Pyrene		930	U	56	930
Butyl benzyl phthalate		930	U	76	930
3,3'-Dichlorobenzidine		1900	U	85	1900
Benzo[a]anthracene		930	U	87	930
Bis(2-ethylhexyl) phthalate		140	J	110	930
Chrysene		930	U	71	930
Di-n-octyl phthalate		930	U	87	930
Benzo[b]fluoranthene		930	U	73	930
Benzo[k]fluoranthene		930	U	100	930
Benzo[a]pyrene		930	U	54	930
Indeno[1,2,3-cd]pyrene		930	U	73	930
Dibenz(a,h)anthracene		930	U	68	930
Benzo[g,h,i]perylene		930	U	65	930
Carbazole		930	U	79	930
bis(chloroisopropyl) ether		930	U	99	930

Surrogate	%Rec	Acceptance Limits
Phenol-d5	53	38 - 102
2-Fluorophenol	52	36 - 101
2,4,6-Tribromophenol	68	27 - 124
Nitrobenzene-d5	50	33 - 94
2-Fluorobiphenyl	51	38 - 104
Terphenyl-d14	59	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000201**

Lab Sample ID: 680-11658-2
Client Matrix: Solid % Moisture: 73.4

Date Sampled: 12/13/2005 1110
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1153
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1752.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		1200	U	110	1200
Bis(2-chloroethyl)ether		1200	U	110	1200
2-Chlorophenol		1200	U	100	1200
1,3-Dichlorobenzene		1200	U	98	1200
1,4-Dichlorobenzene		1200	U	83	1200
1,2-Dichlorobenzene		1200	U	86	1200
2-Methylphenol		1200	U	110	1200
N-Nitrosodi-n-propylamine		1200	U	110	1200
Hexachloroethane		1200	U	75	1200
Nitrobenzene		1200	U	130	1200
Isophorone		1200	U	83	1200
2-Nitrophenol		1200	U	75	1200
2,4-Dimethylphenol		1200	U	130	1200
Bis(2-chloroethoxy)methane		1200	U	90	1200
2,4-Dichlorophenol		1200	U	86	1200
1,2,4-Trichlorobenzene		1200	U	79	1200
Naphthalene		1200	U	71	1200
4-Chloroaniline		2500	U	98	2500
Hexachlorobutadiene		1200	U	75	1200
4-Chloro-3-methylphenol		1200	U	130	1200
2-Methylnaphthalene		1200	U	90	1200
Hexachlorocyclopentadiene		1200	U	310	1200
2,4,6-Trichlorophenol		1200	U	75	1200
2,4,5-Trichlorophenol		1200	U	120	1200
2-Chloronaphthalene		1200	U	90	1200
2-Nitroaniline		6400	U	86	6400
Dimethyl phthalate		1200	U	71	1200
Acenaphthylene		1200	U	64	1200
3-Nitroaniline		6400	U	120	6400
Acenaphthene		1200	U	71	1200
2,4-Dinitrophenol		6400	U	640	6400
4-Nitrophenol		6400	U	790	6400
Dibenzofuran		1200	U	71	1200
2,4-Dinitrotoluene		1200	U	71	1200
2,6-Dinitrotoluene		1200	U	120	1200
3 & 4 Methylphenol		1200	U	110	1200
Diethyl phthalate		1200	U	83	1200
4-Chlorophenyl phenyl ether		1200	U	71	1200
Fluorene		1200	U	83	1200
4-Nitroaniline		6400	U	64	6400
4,6-Dinitro-2-methylphenol		6400	U	750	6400
N-Nitrosodiphenylamine		1200	U	86	1200
4-Bromophenyl phenyl ether		1200	U	120	1200

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000201**

Lab Sample ID: 680-11658-2
Client Matrix: Solid % Moisture: 73.4

Date Sampled: 12/13/2005 1110
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1153
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1752.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		1200	U	98	1200
Pentachlorophenol		6400	U	310	6400
Phenanthrene		1200	U	110	1200
Anthracene		1200	U	86	1200
Di-n-butyl phthalate		1200	U	110	1200
Fluoranthene		110	J	98	1200
Pyrene		170	J	75	1200
Butyl benzyl phthalate		1200	U	100	1200
3,3'-Dichlorobenzidine		2500	U	110	2500
Benzo[a]anthracene		1200	U	120	1200
Bis(2-ethylhexyl) phthalate		170	J	140	1200
Chrysene		94	J	94	1200
Di-n-octyl phthalate		1200	U	120	1200
Benzo[b]fluoranthene		1200	U	98	1200
Benzo[k]fluoranthene		1200	U	140	1200
Benzo[a]pyrene		1200	U	71	1200
Indeno[1,2,3-cd]pyrene		1200	U	98	1200
Dibenz(a,h)anthracene		1200	U	90	1200
Benzo[g,h,i]perylene		1200	U	86	1200
Carbazole		1200	U	110	1200
bis(chloroisopropyl) ether		1200	U	130	1200

Surrogate	%Rec	Acceptance Limits
Phenol-d5	56	38 - 102
2-Fluorophenol	52	36 - 101
2,4,6-Tribromophenol	71	27 - 124
Nitrobenzene-d5	51	33 - 94
2-Fluorobiphenyl	53	38 - 104
Terphenyl-d14	64	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000901**

Lab Sample ID: 680-11658-3
Client Matrix: Solid % Moisture: 56.5

Date Sampled: 12/13/2005 1132
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1110
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1789.d
Initial Weight/Volume: 30.09 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		760	U	69	760
Bis(2-chloroethyl)ether		760	U	64	760
2-Chlorophenol		760	U	62	760
1,3-Dichlorobenzene		760	U	60	760
1,4-Dichlorobenzene		760	U	50	760
1,2-Dichlorobenzene		760	U	53	760
2-Methylphenol		760	U	69	760
N-Nitrosodi-n-propylamine		760	U	64	760
Hexachloroethane		760	U	46	760
Nitrobenzene		760	U	80	760
Isophorone		760	U	50	760
2-Nitrophenol		760	U	46	760
2,4-Dimethylphenol		760	U	80	760
Bis(2-chloroethoxy)methane		760	U	55	760
2,4-Dichlorophenol		760	U	53	760
1,2,4-Trichlorobenzene		760	U	48	760
Naphthalene		760	U	44	760
4-Chloroaniline		1500	U	60	1500
Hexachlorobutadiene		760	U	46	760
4-Chloro-3-methylphenol		760	U	78	760
2-Methylnaphthalene		760	U	55	760
Hexachlorocyclopentadiene		760	U *	190	760
2,4,6-Trichlorophenol		760	U	46	760
2,4,5-Trichlorophenol		760	U	73	760
2-Chloronaphthalene		760	U	55	760
2-Nitroaniline		3900	U	53	3900
Dimethyl phthalate		760	U	44	760
Acenaphthylene		69	J	39	760
3-Nitroaniline		3900	U	76	3900
Acenaphthene		760	U	44	760
2,4-Dinitrophenol		3900	U	390	3900
4-Nitrophenol		3900	U	480	3900
Dibenzofuran		760	U	44	760
2,4-Dinitrotoluene		760	U	44	760
2,6-Dinitrotoluene		760	U	76	760
3 & 4 Methylphenol		760	U	66	760
Diethyl phthalate		760	U	50	760
4-Chlorophenyl phenyl ether		760	U	44	760
Fluorene		760	U	50	760
4-Nitroaniline		3900	U	39	3900
4,6-Dinitro-2-methylphenol		3900	U	460	3900
N-Nitrosodiphenylamine		760	U	53	760
4-Bromophenyl phenyl ether		760	U	71	760

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000901**

Lab Sample ID: 680-11658-3
Client Matrix: Solid % Moisture: 56.5

Date Sampled: 12/13/2005 1132
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1110
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1789.d
Initial Weight/Volume: 30.09 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		760	U	60	760
Pentachlorophenol		3900	U	190	3900
Phenanthrene		760	U	66	760
Anthracene		88	J	53	760
Di-n-butyl phthalate		760	U	64	760
Fluoranthene		380	J	60	760
Pyrene		510	J	46	760
Butyl benzyl phthalate		760	U	62	760
3,3'-Dichlorobenzidine		1500	U	69	1500
Benzo[a]anthracene		230	J	71	760
Bis(2-ethylhexyl) phthalate		180	J	87	760
Chrysene		360	J	57	760
Di-n-octyl phthalate		760	U	71	760
Benzo[b]fluoranthene		420	J	60	760
Benzo[k]fluoranthene		330	J	83	760
Benzo[a]pyrene		380	J	44	760
Indeno[1,2,3-cd]pyrene		190	J	60	760
Dibenz(a,h)anthracene		760	U	55	760
Benzo[g,h,i]perylene		200	J	53	760
Carbazole		760	U	64	760
bis(chloroisopropyl) ether		760	U	80	760

Surrogate	%Rec	Acceptance Limits
Phenol-d5	56	38 - 102
2-Fluorophenol	56	36 - 101
2,4,6-Tribromophenol	71	27 - 124
Nitrobenzene-d5	54	33 - 94
2-Fluorobiphenyl	57	38 - 104
Terphenyl-d14	69	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 054M000102

Lab Sample ID: 680-11658-4
Client Matrix: Solid % Moisture: 62.7

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1244
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1754.d
Initial Weight/Volume: 30.06 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		880	U	80	880
Bis(2-chloroethyl)ether		880	U	75	880
2-Chlorophenol		880	U	72	880
1,3-Dichlorobenzene		880	U	70	880
1,4-Dichlorobenzene		880	U	59	880
1,2-Dichlorobenzene		880	U	62	880
2-Methylphenol		880	U	80	880
N-Nitrosodi-n-propylamine		880	U	75	880
Hexachloroethane		880	U	54	880
Nitrobenzene		880	U	94	880
Isophorone		880	U	59	880
2-Nitrophenol		880	U	54	880
2,4-Dimethylphenol		880	U	94	880
Bis(2-chloroethoxy)methane		880	U	64	880
2,4-Dichlorophenol		880	U	62	880
1,2,4-Trichlorobenzene		880	U	56	880
Naphthalene		880	U	51	880
4-Chloroaniline		1800	U	70	1800
Hexachlorobutadiene		880	U	54	880
4-Chloro-3-methylphenol		880	U	91	880
2-Methylnaphthalene		880	U	64	880
Hexachlorocyclopentadiene		880	U *	220	880
2,4,6-Trichlorophenol		880	U	54	880
2,4,5-Trichlorophenol		880	U	86	880
2-Chloronaphthalene		880	U	64	880
2-Nitroaniline		4500	U	62	4500
Dimethyl phthalate		880	U	51	880
Acenaphthylene		880	U	45	880
3-Nitroaniline		4500	U	88	4500
Acenaphthene		880	U	51	880
2,4-Dinitrophenol		4500	U	450	4500
4-Nitrophenol		4500	U	560	4500
Dibenzofuran		880	U	51	880
2,4-Dinitrotoluene		880	U	51	880
2,6-Dinitrotoluene		880	U	88	880
3 & 4 Methylphenol		880	U	78	880
Diethyl phthalate		880	U	59	880
4-Chlorophenyl phenyl ether		880	U	51	880
Fluorene		880	U	59	880
4-Nitroaniline		4500	U	45	4500
4,6-Dinitro-2-methylphenol		4500	U	540	4500
N-Nitrosodiphenylamine		880	U	62	880
4-Bromophenyl phenyl ether		880	U	83	880

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 054M000102

Lab Sample ID: 680-11658-4
Client Matrix: Solid % Moisture: 62.7

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1244
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1754.d
Initial Weight/Volume: 30.06 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		880	U	70	880
Pentachlorophenol		4500	U	220	4500
Phenanthrene		880	U	78	880
Anthracene		880	U	62	880
Di-n-butyl phthalate		880	U	75	880
Fluoranthene		150	J	70	880
Pyrene		200	J	54	880
Butyl benzyl phthalate		880	U	72	880
3,3'-Dichlorobenzidine		1800	U	80	1800
Benzo[a]anthracene		880	U	83	880
Bis(2-ethylhexyl) phthalate		230	J	100	880
Chrysene		100	J	67	880
Di-n-octyl phthalate		880	U	83	880
Benzo[b]fluoranthene		99	J	70	880
Benzo[k]fluoranthene		880	U	96	880
Benzo[a]pyrene		78	J	51	880
Indeno[1,2,3-cd]pyrene		880	U	70	880
Dibenz(a,h)anthracene		880	U	64	880
Benzo[g,h,i]perylene		880	U	62	880
Carbazole		880	U	75	880
bis(chloroisopropyl) ether		880	U	94	880

Surrogate	%Rec	Acceptance Limits
Phenol-d5	50	38 - 102
2-Fluorophenol	48	36 - 101
2,4,6-Tribromophenol	62	27 - 124
Nitrobenzene-d5	47	33 - 94
2-Fluorobiphenyl	48	38 - 104
Terphenyl-d14	61	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **556M000702**

Lab Sample ID: 680-11658-5
Client Matrix: Solid % Moisture: 79.5

Date Sampled: 12/13/2005 1212
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1309
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1755.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		1600	U	150	1600
Bis(2-chloroethyl)ether		1600	U	140	1600
2-Chlorophenol		1600	U	130	1600
1,3-Dichlorobenzene		1600	U	130	1600
1,4-Dichlorobenzene		1600	U	110	1600
1,2-Dichlorobenzene		1600	U	110	1600
2-Methylphenol		1600	U	150	1600
N-Nitrosodi-n-propylamine		1600	U	140	1600
Hexachloroethane		1600	U	97	1600
Nitrobenzene		1600	U	170	1600
Isophorone		1600	U	110	1600
2-Nitrophenol		1600	U	97	1600
2,4-Dimethylphenol		1600	U	170	1600
Bis(2-chloroethoxy)methane		1600	U	120	1600
2,4-Dichlorophenol		1600	U	110	1600
1,2,4-Trichlorobenzene		1600	U	100	1600
Naphthalene		1600	U	93	1600
4-Chloroaniline		3200	U	130	3200
Hexachlorobutadiene		1600	U	97	1600
4-Chloro-3-methylphenol		1600	U	170	1600
2-Methylnaphthalene		130	J	120	1600
Hexachlorocyclopentadiene		1600	U *	400	1600
2,4,6-Trichlorophenol		1600	U	97	1600
2,4,5-Trichlorophenol		1600	U	160	1600
2-Chloronaphthalene		1600	U	120	1600
2-Nitroaniline		8300	U	110	8300
Dimethyl phthalate		1600	U	93	1600
Acenaphthylene		1600	U	83	1600
3-Nitroaniline		8300	U	160	8300
Acenaphthene		190	J	93	1600
2,4-Dinitrophenol		8300	U	830	8300
4-Nitrophenol		8300	U	1000	8300
Dibenzofuran		1600	U	93	1600
2,4-Dinitrotoluene		1600	U	93	1600
2,6-Dinitrotoluene		1600	U	160	1600
3 & 4 Methylphenol		1600	U	140	1600
Diethyl phthalate		1600	U	110	1600
4-Chlorophenyl phenyl ether		1600	U	93	1600
Fluorene		1600	U	110	1600
4-Nitroaniline		8300	U	83	8300
4,6-Dinitro-2-methylphenol		8300	U	970	8300
N-Nitrosodiphenylamine		1600	U	110	1600
4-Bromophenyl phenyl ether		1600	U	150	1600

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000702

Lab Sample ID: 680-11658-5
Client Matrix: Solid % Moisture: 79.5

Date Sampled: 12/13/2005 1212
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1309
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1755.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		1600	U	130	1600
Pentachlorophenol		8300	U	400	8300
Phenanthrene		370	J	140	1600
Anthracene		680	J	110	1600
Di-n-butyl phthalate		1600	U	140	1600
Fluoranthene		2000		130	1600
Pyrene		1400	J	97	1600
Butyl benzyl phthalate		1600	U	130	1600
3,3'-Dichlorobenzidine		3200	U	150	3200
Benzo[a]anthracene		870	J	150	1600
Bis(2-ethylhexyl) phthalate		780	J	190	1600
Chrysene		1100	J	120	1600
Di-n-octyl phthalate		1600	U	150	1600
Benzo[b]fluoranthene		670	J	130	1600
Benzo[k]fluoranthene		700	J	180	1600
Benzo[a]pyrene		670	J	93	1600
Indeno[1,2,3-cd]pyrene		270	J	130	1600
Dibenz(a,h)anthracene		1600	U	120	1600
Benzo[g,h,i]perylene		290	J	110	1600
Carbazole		1600	U	140	1600
bis(chloroisopropyl) ether		1600	U	170	1600

Surrogate	%Rec	Acceptance Limits
Phenol-d5	57	38 - 102
2-Fluorophenol	54	36 - 101
2,4,6-Tribromophenol	75	27 - 124
Nitrobenzene-d5	53	33 - 94
2-Fluorobiphenyl	54	38 - 104
Terphenyl-d14	61	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000502

Lab Sample ID: 680-11658-6
Client Matrix: Solid % Moisture: 81.8

Date Sampled: 12/13/2005 1225
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1335
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1756.d
Initial Weight/Volume: 30.01 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		1800	U	160	1800
Bis(2-chloroethyl)ether		1800	U	150	1800
2-Chlorophenol		1800	U	150	1800
1,3-Dichlorobenzene		1800	U	140	1800
1,4-Dichlorobenzene		1800	U	120	1800
1,2-Dichlorobenzene		1800	U	130	1800
2-Methylphenol		1800	U	160	1800
N-Nitrosodi-n-propylamine		1800	U	150	1800
Hexachloroethane		1800	U	110	1800
Nitrobenzene		1800	U	190	1800
Isophorone		1800	U	120	1800
2-Nitrophenol		1800	U	110	1800
2,4-Dimethylphenol		1800	U	190	1800
Bis(2-chloroethoxy)methane		1800	U	130	1800
2,4-Dichlorophenol		1800	U	130	1800
1,2,4-Trichlorobenzene		1800	U	120	1800
Naphthalene		1800	U	100	1800
4-Chloroaniline		3600	U	140	3600
Hexachlorobutadiene		1800	U	110	1800
4-Chloro-3-methylphenol		1800	U	190	1800
2-Methylnaphthalene		1800	U	130	1800
Hexachlorocyclopentadiene		1800	U *	460	1800
2,4,6-Trichlorophenol		1800	U	110	1800
2,4,5-Trichlorophenol		1800	U	180	1800
2-Chloronaphthalene		1800	U	130	1800
2-Nitroaniline		9300	U	130	9300
Dimethyl phthalate		1800	U	100	1800
Acenaphthylene		1800	U	93	1800
3-Nitroaniline		9300	U	180	9300
Acenaphthene		1800	U	100	1800
2,4-Dinitrophenol		9300	U	930	9300
4-Nitrophenol		9300	U	1200	9300
Dibenzofuran		1800	U	100	1800
2,4-Dinitrotoluene		1800	U	100	1800
2,6-Dinitrotoluene		1800	U	180	1800
3 & 4 Methylphenol		1800	U	160	1800
Diethyl phthalate		1800	U	120	1800
4-Chlorophenyl phenyl ether		1800	U	100	1800
Fluorene		1800	U	120	1800
4-Nitroaniline		9300	U	93	9300
4,6-Dinitro-2-methylphenol		9300	U	1100	9300
N-Nitrosodiphenylamine		1800	U	130	1800
4-Bromophenyl phenyl ether		1800	U	170	1800

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000502

Lab Sample ID: 680-11658-6
Client Matrix: Solid % Moisture: 81.8

Date Sampled: 12/13/2005 1225
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1335
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1756.d
Initial Weight/Volume: 30.01 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		1800	U	140	1800
Pentachlorophenol		9300	U	460	9300
Phenanthrene		1800	U	160	1800
Anthracene		280	J	130	1800
Di-n-butyl phthalate		1800	U	150	1800
Fluoranthene		640	J	140	1800
Pyrene		1300	J	110	1800
Butyl benzyl phthalate		1800	U	150	1800
3,3'-Dichlorobenzidine		3600	U	160	3600
Benzo[a]anthracene		520	J	170	1800
Bis(2-ethylhexyl) phthalate		510	J	210	1800
Chrysene		1000	J	140	1800
Di-n-octyl phthalate		1800	U	170	1800
Benzo[b]fluoranthene		880	J	140	1800
Benzo[k]fluoranthene		790	J	200	1800
Benzo[a]pyrene		770	J	100	1800
Indeno[1,2,3-cd]pyrene		320	J	140	1800
Dibenz(a,h)anthracene		1800	U	130	1800
Benzo[g,h,i]perylene		300	J	130	1800
Carbazole		1800	U	150	1800
bis(chloroisopropyl) ether		1800	U	190	1800

Surrogate	%Rec	Acceptance Limits
Phenol-d5	51	38 - 102
2-Fluorophenol	50	36 - 101
2,4,6-Tribromophenol	66	27 - 124
Nitrobenzene-d5	49	33 - 94
2-Fluorobiphenyl	50	38 - 104
Terphenyl-d14	61	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000401**

Lab Sample ID: 680-11658-7
Client Matrix: Solid % Moisture: 30.6

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1401
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1757.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		470	U	43	470
Bis(2-chloroethyl)ether		470	U	40	470
2-Chlorophenol		470	U	39	470
1,3-Dichlorobenzene		470	U	37	470
1,4-Dichlorobenzene		470	U	32	470
1,2-Dichlorobenzene		470	U	33	470
2-Methylphenol		470	U	43	470
N-Nitrosodi-n-propylamine		470	U	40	470
Hexachloroethane		470	U	29	470
Nitrobenzene		470	U	50	470
Isophorone		470	U	32	470
2-Nitrophenol		470	U	29	470
2,4-Dimethylphenol		470	U	50	470
Bis(2-chloroethoxy)methane		470	U	35	470
2,4-Dichlorophenol		470	U	33	470
1,2,4-Trichlorobenzene		470	U	30	470
Naphthalene		470	U	27	470
4-Chloroaniline		950	U	37	950
Hexachlorobutadiene		470	U	29	470
4-Chloro-3-methylphenol		470	U	49	470
2-Methylnaphthalene		470	U	35	470
Hexachlorocyclopentadiene		470	U	120	470
2,4,6-Trichlorophenol		470	U	29	470
2,4,5-Trichlorophenol		470	U	46	470
2-Chloronaphthalene		470	U	35	470
2-Nitroaniline		2400	U	33	2400
Dimethyl phthalate		470	U	27	470
Acenaphthylene		470	U	24	470
3-Nitroaniline		2400	U	47	2400
Acenaphthene		470	U	27	470
2,4-Dinitrophenol		2400	U	240	2400
4-Nitrophenol		2400	U	300	2400
Dibenzofuran		470	U	27	470
2,4-Dinitrotoluene		470	U	27	470
2,6-Dinitrotoluene		470	U	47	470
3 & 4 Methylphenol		470	U	42	470
Diethyl phthalate		470	U	32	470
4-Chlorophenyl phenyl ether		470	U	27	470
Fluorene		470	U	32	470
4-Nitroaniline		2400	U	24	2400
4,6-Dinitro-2-methylphenol		2400	U	290	2400
N-Nitrosodiphenylamine		470	U	33	470
4-Bromophenyl phenyl ether		470	U	45	470

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000401**

Lab Sample ID: 680-11658-7
Client Matrix: Solid % Moisture: 30.6

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1401
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1757.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		470	U	37	470
Pentachlorophenol		2400	U	120	2400
Phenanthrene		470	U	42	470
Anthracene		470	U	33	470
Di-n-butyl phthalate		470	U	40	470
Fluoranthene		470	U	37	470
Pyrene		470	U	29	470
Butyl benzyl phthalate		470	U	39	470
3,3'-Dichlorobenzidine		950	U	43	950
Benzo[a]anthracene		470	U	45	470
Bis(2-ethylhexyl) phthalate		58	J	55	470
Chrysene		470	U	36	470
Di-n-octyl phthalate		470	U	45	470
Benzo[b]fluoranthene		470	U	37	470
Benzo[k]fluoranthene		470	U	52	470
Benzo[a]pyrene		470	U	27	470
Indeno[1,2,3-cd]pyrene		470	U	37	470
Dibenz(a,h)anthracene		470	U	35	470
Benzo[g,h,i]perylene		470	U	33	470
Carbazole		470	U	40	470
bis(chloroisopropyl) ether		470	U	50	470

Surrogate	%Rec	Acceptance Limits
Phenol-d5	54	38 - 102
2-Fluorophenol	53	36 - 101
2,4,6-Tribromophenol	69	27 - 124
Nitrobenzene-d5	51	33 - 94
2-Fluorobiphenyl	54	38 - 104
Terphenyl-d14	67	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000301

Lab Sample ID: 680-11658-8
Client Matrix: Solid % Moisture: 46.0

Date Sampled: 12/13/2005 1246
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1427
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1758.d
Initial Weight/Volume: 30.02 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		610	U	56	610
Bis(2-chloroethyl)ether		610	U	52	610
2-Chlorophenol		610	U	50	610
1,3-Dichlorobenzene		610	U	48	610
1,4-Dichlorobenzene		610	U	41	610
1,2-Dichlorobenzene		610	U	43	610
2-Methylphenol		610	U	56	610
N-Nitrosodi-n-propylamine		610	U	52	610
Hexachloroethane		610	U	37	610
Nitrobenzene		610	U	65	610
Isophorone		610	U	41	610
2-Nitrophenol		610	U	37	610
2,4-Dimethylphenol		610	U	65	610
Bis(2-chloroethoxy)methane		610	U	44	610
2,4-Dichlorophenol		610	U	43	610
1,2,4-Trichlorobenzene		610	U	39	610
Naphthalene		610	U	35	610
4-Chloroaniline		1200	U	48	1200
Hexachlorobutadiene		610	U	37	610
4-Chloro-3-methylphenol		610	U	63	610
2-Methylnaphthalene		610	U	44	610
Hexachlorocyclopentadiene		610	U *	150	610
2,4,6-Trichlorophenol		610	U	37	610
2,4,5-Trichlorophenol		610	U	59	610
2-Chloronaphthalene		610	U	44	610
2-Nitroaniline		3100	U	43	3100
Dimethyl phthalate		610	U	35	610
Acenaphthylene		610	U	31	610
3-Nitroaniline		3100	U	61	3100
Acenaphthene		610	U	35	610
2,4-Dinitrophenol		3100	U	310	3100
4-Nitrophenol		3100	U	390	3100
Dibenzofuran		610	U	35	610
2,4-Dinitrotoluene		610	U	35	610
2,6-Dinitrotoluene		610	U	61	610
3 & 4 Methylphenol		610	U	54	610
Diethyl phthalate		610	U	41	610
4-Chlorophenyl phenyl ether		610	U	35	610
Fluorene		610	U	41	610
4-Nitroaniline		3100	U	31	3100
4,6-Dinitro-2-methylphenol		3100	U	370	3100
N-Nitrosodiphenylamine		610	U	43	610
4-Bromophenyl phenyl ether		610	U	57	610

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000301

Lab Sample ID: 680-11658-8
Client Matrix: Solid % Moisture: 46.0

Date Sampled: 12/13/2005 1246
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1427
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1758.d
Initial Weight/Volume: 30.02 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		610	U	48	610
Pentachlorophenol		3100	U	150	3100
Phenanthrene		610	U	54	610
Anthracene		610	U	43	610
Di-n-butyl phthalate		610	U	52	610
Fluoranthene		610	U	48	610
Pyrene		610	U	37	610
Butyl benzyl phthalate		610	U	50	610
3,3'-Dichlorobenzidine		1200	U	56	1200
Benzo[a]anthracene		610	U	57	610
Bis(2-ethylhexyl) phthalate		610	U	70	610
Chrysene		610	U	46	610
Di-n-octyl phthalate		610	U	57	610
Benzo[b]fluoranthene		610	U	48	610
Benzo[k]fluoranthene		610	U	67	610
Benzo[a]pyrene		610	U	35	610
Indeno[1,2,3-cd]pyrene		610	U	48	610
Dibenz(a,h)anthracene		610	U	44	610
Benzo[g,h,i]perylene		610	U	43	610
Carbazole		610	U	52	610
bis(chloroisopropyl) ether		610	U	65	610

Surrogate	%Rec	Acceptance Limits
Phenol-d5	58	38 - 102
2-Fluorophenol	57	36 - 101
2,4,6-Tribromophenol	69	27 - 124
Nitrobenzene-d5	55	33 - 94
2-Fluorobiphenyl	53	38 - 104
Terphenyl-d14	67	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM001001**

Lab Sample ID: 680-11658-9
Client Matrix: Solid % Moisture: 32.6

Date Sampled: 12/13/2005 1315
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1452
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1759.d
Initial Weight/Volume: 30.06 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		490	U	44	490
Bis(2-chloroethyl)ether		490	U	41	490
2-Chlorophenol		490	U	40	490
1,3-Dichlorobenzene		490	U	38	490
1,4-Dichlorobenzene		490	U	33	490
1,2-Dichlorobenzene		490	U	34	490
2-Methylphenol		490	U	44	490
N-Nitrosodi-n-propylamine		490	U	41	490
Hexachloroethane		490	U	30	490
Nitrobenzene		490	U	52	490
Isophorone		490	U	33	490
2-Nitrophenol		490	U	30	490
2,4-Dimethylphenol		490	U	52	490
Bis(2-chloroethoxy)methane		490	U	36	490
2,4-Dichlorophenol		490	U	34	490
1,2,4-Trichlorobenzene		490	U	31	490
Naphthalene		490	U	28	490
4-Chloroaniline		980	U	38	980
Hexachlorobutadiene		490	U	30	490
4-Chloro-3-methylphenol		490	U	50	490
2-Methylnaphthalene		490	U	36	490
Hexachlorocyclopentadiene		490	U *	120	490
2,4,6-Trichlorophenol		490	U	30	490
2,4,5-Trichlorophenol		490	U	47	490
2-Chloronaphthalene		490	U	36	490
2-Nitroaniline		2500	U	34	2500
Dimethyl phthalate		490	U	28	490
Acenaphthylene		490	U	25	490
3-Nitroaniline		2500	U	49	2500
Acenaphthene		490	U	28	490
2,4-Dinitrophenol		2500	U	250	2500
4-Nitrophenol		2500	U	310	2500
Dibenzofuran		490	U	28	490
2,4-Dinitrotoluene		490	U	28	490
2,6-Dinitrotoluene		490	U	49	490
3 & 4 Methylphenol		490	U	43	490
Diethyl phthalate		490	U	33	490
4-Chlorophenyl phenyl ether		490	U	28	490
Fluorene		490	U	33	490
4-Nitroaniline		2500	U	25	2500
4,6-Dinitro-2-methylphenol		2500	U	300	2500
N-Nitrosodiphenylamine		490	U	34	490
4-Bromophenyl phenyl ether		490	U	46	490

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM001001

Lab Sample ID: 680-11658-9
Client Matrix: Solid % Moisture: 32.6

Date Sampled: 12/13/2005 1315
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1452
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1759.d
Initial Weight/Volume: 30.06 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		490	U	38	490
Pentachlorophenol		2500	U	120	2500
Phenanthrene		490	U	43	490
Anthracene		490	U	34	490
Di-n-butyl phthalate		490	U	41	490
Fluoranthene		490	U	38	490
Pyrene		490	U	30	490
Butyl benzyl phthalate		490	U	40	490
3,3'-Dichlorobenzidine		980	U	44	980
Benzo[a]anthracene		490	U	46	490
Bis(2-ethylhexyl) phthalate		81	J	56	490
Chrysene		490	U	37	490
Di-n-octyl phthalate		490	U	46	490
Benzo[b]fluoranthene		490	U	38	490
Benzo[k]fluoranthene		490	U	53	490
Benzo[a]pyrene		490	U	28	490
Indeno[1,2,3-cd]pyrene		490	U	38	490
Dibenz(a,h)anthracene		490	U	36	490
Benzo[g,h,i]perylene		490	U	34	490
Carbazole		490	U	41	490
bis(chloroisopropyl) ether		490	U	52	490

Surrogate	%Rec	Acceptance Limits
Phenol-d5	46	38 - 102
2-Fluorophenol	43	36 - 101
2,4,6-Tribromophenol	61	27 - 124
Nitrobenzene-d5	42	33 - 94
2-Fluorobiphenyl	45	38 - 104
Terphenyl-d14	61	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000801

Lab Sample ID: 680-11658-10
Client Matrix: Solid % Moisture: 52.7

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1136
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1790.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		700	U	63	700
Bis(2-chloroethyl)ether		700	U	59	700
2-Chlorophenol		700	U	57	700
1,3-Dichlorobenzene		700	U	55	700
1,4-Dichlorobenzene		700	U	46	700
1,2-Dichlorobenzene		700	U	48	700
2-Methylphenol		700	U	63	700
N-Nitrosodi-n-propylamine		700	U	59	700
Hexachloroethane		700	U	42	700
Nitrobenzene		700	U	74	700
Isophorone		700	U	46	700
2-Nitrophenol		700	U	42	700
2,4-Dimethylphenol		700	U	74	700
Bis(2-chloroethoxy)methane		700	U	51	700
2,4-Dichlorophenol		700	U	48	700
1,2,4-Trichlorobenzene		700	U	44	700
Naphthalene		700	U	40	700
4-Chloroaniline		1400	U	55	1400
Hexachlorobutadiene		700	U	42	700
4-Chloro-3-methylphenol		700	U	72	700
2-Methylnaphthalene		700	U	51	700
Hexachlorocyclopentadiene		700	U *	180	700
2,4,6-Trichlorophenol		700	U	42	700
2,4,5-Trichlorophenol		700	U	67	700
2-Chloronaphthalene		700	U	51	700
2-Nitroaniline		3600	U	48	3600
Dimethyl phthalate		700	U	40	700
Acenaphthylene		700	U	36	700
3-Nitroaniline		3600	U	70	3600
Acenaphthene		700	U	40	700
2,4-Dinitrophenol		3600	U	360	3600
4-Nitrophenol		3600	U	440	3600
Dibenzofuran		700	U	40	700
2,4-Dinitrotoluene		700	U	40	700
2,6-Dinitrotoluene		700	U	70	700
3 & 4 Methylphenol		700	U	61	700
Diethyl phthalate		700	U	46	700
4-Chlorophenyl phenyl ether		700	U	40	700
Fluorene		700	U	46	700
4-Nitroaniline		3600	U	36	3600
4,6-Dinitro-2-methylphenol		3600	U	420	3600
N-Nitrosodiphenylamine		700	U	48	700
4-Bromophenyl phenyl ether		700	U	65	700

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000801**

Lab Sample ID: 680-11658-10
Client Matrix: Solid % Moisture: 52.7

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1136
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1790.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		700	U	55	700
Pentachlorophenol		3600	U	180	3600
Phenanthrene		700	U	61	700
Anthracene		700	U	48	700
Di-n-butyl phthalate		700	U	59	700
Fluoranthene		700	U	55	700
Pyrene		52	J	42	700
Butyl benzyl phthalate		700	U	57	700
3,3'-Dichlorobenzidine		1400	U	63	1400
Benzo[a]anthracene		700	U	65	700
Bis(2-ethylhexyl) phthalate		700	U	80	700
Chrysene		120	J	53	700
Di-n-octyl phthalate		700	U	65	700
Benzo[b]fluoranthene		170	J	55	700
Benzo[k]fluoranthene		140	J	76	700
Benzo[a]pyrene		140	J	40	700
Indeno[1,2,3-cd]pyrene		61	J	55	700
Dibenz(a,h)anthracene		700	U	51	700
Benzo[g,h,i]perylene		69	J	48	700
Carbazole		700	U	59	700
bis(chloroisopropyl) ether		700	U	74	700

Surrogate	%Rec	Acceptance Limits
Phenol-d5	50	38 - 102
2-Fluorophenol	50	36 - 101
2,4,6-Tribromophenol	61	27 - 124
Nitrobenzene-d5	45	33 - 94
2-Fluorobiphenyl	48	38 - 104
Terphenyl-d14	64	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000501**

Lab Sample ID: 680-11658-11
Client Matrix: Solid % Moisture: 41.2

Date Sampled: 12/13/2005 1408
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1201
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1791.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		560	U	51	560
Bis(2-chloroethyl)ether		560	U	48	560
2-Chlorophenol		560	U	46	560
1,3-Dichlorobenzene		560	U	44	560
1,4-Dichlorobenzene		560	U	37	560
1,2-Dichlorobenzene		560	U	39	560
2-Methylphenol		560	U	51	560
N-Nitrosodi-n-propylamine		560	U	48	560
Hexachloroethane		560	U	34	560
Nitrobenzene		560	U	59	560
Isophorone		560	U	37	560
2-Nitrophenol		560	U	34	560
2,4-Dimethylphenol		560	U	59	560
Bis(2-chloroethoxy)methane		560	U	41	560
2,4-Dichlorophenol		560	U	39	560
1,2,4-Trichlorobenzene		560	U	36	560
Naphthalene		560	U	32	560
4-Chloroaniline		1100	U	44	1100
Hexachlorobutadiene		560	U	34	560
4-Chloro-3-methylphenol		560	U	58	560
2-Methylnaphthalene		560	U	41	560
Hexachlorocyclopentadiene		560	U *	140	560
2,4,6-Trichlorophenol		560	U	34	560
2,4,5-Trichlorophenol		560	U	54	560
2-Chloronaphthalene		560	U	41	560
2-Nitroaniline		2900	U	39	2900
Dimethyl phthalate		560	U	32	560
Acenaphthylene		560	U	29	560
3-Nitroaniline		2900	U	56	2900
Acenaphthene		560	U	32	560
2,4-Dinitrophenol		2900	U	290	2900
4-Nitrophenol		2900	U	360	2900
Dibenzofuran		560	U	32	560
2,4-Dinitrotoluene		560	U	32	560
2,6-Dinitrotoluene		560	U	56	560
3 & 4 Methylphenol		560	U	49	560
Diethyl phthalate		560	U	37	560
4-Chlorophenyl phenyl ether		560	U	32	560
Fluorene		560	U	37	560
4-Nitroaniline		2900	U	29	2900
4,6-Dinitro-2-methylphenol		2900	U	340	2900
N-Nitrosodiphenylamine		560	U	39	560
4-Bromophenyl phenyl ether		560	U	53	560

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000501**

Lab Sample ID: 680-11658-11
Client Matrix: Solid % Moisture: 41.2

Date Sampled: 12/13/2005 1408
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/05/2006 1201
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32997
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1791.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		560	U	44	560
Pentachlorophenol		2900	U	140	2900
Phenanthrene		560	U	49	560
Anthracene		560	U	39	560
Di-n-butyl phthalate		560	U	48	560
Fluoranthene		52	J	44	560
Pyrene		50	J	34	560
Butyl benzyl phthalate		560	U	46	560
3,3'-Dichlorobenzidine		1100	U	51	1100
Benzo[a]anthracene		560	U	53	560
Bis(2-ethylhexyl) phthalate		560	U	65	560
Chrysene		560	U	42	560
Di-n-octyl phthalate		560	U	53	560
Benzo[b]fluoranthene		560	U	44	560
Benzo[k]fluoranthene		560	U	61	560
Benzo[a]pyrene		560	U	32	560
Indeno[1,2,3-cd]pyrene		560	U	44	560
Dibenz(a,h)anthracene		560	U	41	560
Benzo[g,h,i]perylene		560	U	39	560
Carbazole		560	U	48	560
bis(chloroisopropyl) ether		560	U	59	560

Surrogate	%Rec	Acceptance Limits
Phenol-d5	53	38 - 102
2-Fluorophenol	51	36 - 101
2,4,6-Tribromophenol	70	27 - 124
Nitrobenzene-d5	49	33 - 94
2-Fluorobiphenyl	49	38 - 104
Terphenyl-d14	70	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000701**

Lab Sample ID: 680-11658-12
Client Matrix: Solid % Moisture: 40.5

Date Sampled: 12/13/2005 1434
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1608
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1762.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		550	U	50	550
Bis(2-chloroethyl)ether		550	U	47	550
2-Chlorophenol		550	U	45	550
1,3-Dichlorobenzene		550	U	44	550
1,4-Dichlorobenzene		550	U	37	550
1,2-Dichlorobenzene		550	U	39	550
2-Methylphenol		550	U	50	550
N-Nitrosodi-n-propylamine		550	U	47	550
Hexachloroethane		550	U	34	550
Nitrobenzene		550	U	59	550
Isophorone		550	U	37	550
2-Nitrophenol		550	U	34	550
2,4-Dimethylphenol		550	U	59	550
Bis(2-chloroethoxy)methane		550	U	40	550
2,4-Dichlorophenol		550	U	39	550
1,2,4-Trichlorobenzene		550	U	35	550
Naphthalene		550	U	32	550
4-Chloroaniline		1100	U	44	1100
Hexachlorobutadiene		550	U	34	550
4-Chloro-3-methylphenol		550	U	57	550
2-Methylnaphthalene		550	U	40	550
Hexachlorocyclopentadiene		550	U *	140	550
2,4,6-Trichlorophenol		550	U	34	550
2,4,5-Trichlorophenol		550	U	54	550
2-Chloronaphthalene		550	U	40	550
2-Nitroaniline		2900	U	39	2900
Dimethyl phthalate		550	U	32	550
Acenaphthylene		550	U	29	550
3-Nitroaniline		2900	U	55	2900
Acenaphthene		550	U	32	550
2,4-Dinitrophenol		2900	U	290	2900
4-Nitrophenol		2900	U	350	2900
Dibenzofuran		550	U	32	550
2,4-Dinitrotoluene		550	U	32	550
2,6-Dinitrotoluene		550	U	55	550
3 & 4 Methylphenol		550	U	49	550
Diethyl phthalate		550	U	37	550
4-Chlorophenyl phenyl ether		550	U	32	550
Fluorene		550	U	37	550
4-Nitroaniline		2900	U	29	2900
4,6-Dinitro-2-methylphenol		2900	U	340	2900
N-Nitrosodiphenylamine		550	U	39	550
4-Bromophenyl phenyl ether		550	U	52	550

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000701

Lab Sample ID: 680-11658-12
Client Matrix: Solid % Moisture: 40.5

Date Sampled: 12/13/2005 1434
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1608
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1762.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		550	U	44	550
Pentachlorophenol		2900	U	140	2900
Phenanthrene		550	U	49	550
Anthracene		550	U	39	550
Di-n-butyl phthalate		550	U	47	550
Fluoranthene		550	U	44	550
Pyrene		550	U	34	550
Butyl benzyl phthalate		550	U	45	550
3,3'-Dichlorobenzidine		1100	U	50	1100
Benzo[a]anthracene		550	U	52	550
Bis(2-ethylhexyl) phthalate		65	J	64	550
Chrysene		550	U	42	550
Di-n-octyl phthalate		550	U	52	550
Benzo[b]fluoranthene		550	U	44	550
Benzo[k]fluoranthene		550	U	60	550
Benzo[a]pyrene		550	U	32	550
Indeno[1,2,3-cd]pyrene		550	U	44	550
Dibenz(a,h)anthracene		550	U	40	550
Benzo[g,h,i]perylene		550	U	39	550
Carbazole		550	U	47	550
bis(chloroisopropyl) ether		550	U	59	550

Surrogate	%Rec	Acceptance Limits
Phenol-d5	44	38 - 102
2-Fluorophenol	43	36 - 101
2,4,6-Tribromophenol	65	27 - 124
Nitrobenzene-d5	45	33 - 94
2-Fluorobiphenyl	47	38 - 104
Terphenyl-d14	66	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000601**

Lab Sample ID: 680-11658-13
Client Matrix: Solid % Moisture: 38.1

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1633
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1763.d
Initial Weight/Volume: 30.03 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		530	U	48	530
Bis(2-chloroethyl)ether		530	U	45	530
2-Chlorophenol		530	U	44	530
1,3-Dichlorobenzene		530	U	42	530
1,4-Dichlorobenzene		530	U	36	530
1,2-Dichlorobenzene		530	U	37	530
2-Methylphenol		530	U	48	530
N-Nitrosodi-n-propylamine		530	U	45	530
Hexachloroethane		530	U	32	530
Nitrobenzene		530	U	56	530
Isophorone		530	U	36	530
2-Nitrophenol		530	U	32	530
2,4-Dimethylphenol		530	U	56	530
Bis(2-chloroethoxy)methane		530	U	39	530
2,4-Dichlorophenol		530	U	37	530
1,2,4-Trichlorobenzene		530	U	34	530
Naphthalene		530	U	31	530
4-Chloroaniline		1100	U	42	1100
Hexachlorobutadiene		530	U	32	530
4-Chloro-3-methylphenol		530	U	55	530
2-Methylnaphthalene		530	U	39	530
Hexachlorocyclopentadiene		530	U *	130	530
2,4,6-Trichlorophenol		530	U	32	530
2,4,5-Trichlorophenol		530	U	52	530
2-Chloronaphthalene		530	U	39	530
2-Nitroaniline		2700	U	37	2700
Dimethyl phthalate		530	U	31	530
Acenaphthylene		530	U	27	530
3-Nitroaniline		2700	U	53	2700
Acenaphthene		530	U	31	530
2,4-Dinitrophenol		2700	U	270	2700
4-Nitrophenol		2700	U	340	2700
Dibenzofuran		530	U	31	530
2,4-Dinitrotoluene		530	U	31	530
2,6-Dinitrotoluene		530	U	53	530
3 & 4 Methylphenol		530	U	47	530
Diethyl phthalate		530	U	36	530
4-Chlorophenyl phenyl ether		530	U	31	530
Fluorene		530	U	36	530
4-Nitroaniline		2700	U	27	2700
4,6-Dinitro-2-methylphenol		2700	U	320	2700
N-Nitrosodiphenylamine		530	U	37	530
4-Bromophenyl phenyl ether		530	U	50	530

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000601

Lab Sample ID: 680-11658-13
Client Matrix: Solid % Moisture: 38.1

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1633
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1763.d
Initial Weight/Volume: 30.03 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		530	U	42	530
Pentachlorophenol		2700	U	130	2700
Phenanthrene		530	U	47	530
Anthracene		530	U	37	530
Di-n-butyl phthalate		530	U	45	530
Fluoranthene		530	U	42	530
Pyrene		530	U	32	530
Butyl benzyl phthalate		530	U	44	530
3,3'-Dichlorobenzidine		1100	U	48	1100
Benzo[a]anthracene		530	U	50	530
Bis(2-ethylhexyl) phthalate		530	U	61	530
Chrysene		530	U	40	530
Di-n-octyl phthalate		530	U	50	530
Benzo[b]fluoranthene		530	U	42	530
Benzo[k]fluoranthene		530	U	58	530
Benzo[a]pyrene		530	U	31	530
Indeno[1,2,3-cd]pyrene		530	U	42	530
Dibenz(a,h)anthracene		530	U	39	530
Benzo[g,h,i]perylene		530	U	37	530
Carbazole		530	U	45	530
bis(chloroisopropyl) ether		530	U	56	530

Surrogate	%Rec	Acceptance Limits
Phenol-d5	53	38 - 102
2-Fluorophenol	51	36 - 101
2,4,6-Tribromophenol	67	27 - 124
Nitrobenzene-d5	51	33 - 94
2-Fluorobiphenyl	53	38 - 104
Terphenyl-d14	69	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: NOIM000402

Lab Sample ID: 680-11658-14
Client Matrix: Solid % Moisture: 54.3

Date Sampled: 12/13/2005 1609
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1659
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1764.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		720	U	65	720
Bis(2-chloroethyl)ether		720	U	61	720
2-Chlorophenol		720	U	59	720
1,3-Dichlorobenzene		720	U	57	720
1,4-Dichlorobenzene		720	U	48	720
1,2-Dichlorobenzene		720	U	50	720
2-Methylphenol		720	U	65	720
N-Nitrosodi-n-propylamine		720	U	61	720
Hexachloroethane		720	U	44	720
Nitrobenzene		720	U	76	720
Isophorone		720	U	48	720
2-Nitrophenol		720	U	44	720
2,4-Dimethylphenol		720	U	76	720
Bis(2-chloroethoxy)methane		720	U	52	720
2,4-Dichlorophenol		720	U	50	720
1,2,4-Trichlorobenzene		720	U	46	720
Naphthalene		720	U	41	720
4-Chloroaniline		1400	U	57	1400
Hexachlorobutadiene		720	U	44	720
4-Chloro-3-methylphenol		720	U	74	720
2-Methylnaphthalene		720	U	52	720
Hexachlorocyclopentadiene		720	U*	180	720
2,4,6-Trichlorophenol		720	U	44	720
2,4,5-Trichlorophenol		720	U	70	720
2-Chloronaphthalene		720	U	52	720
2-Nitroaniline		3700	U	50	3700
Dimethyl phthalate		720	U	41	720
Acenaphthylene		720	U	37	720
3-Nitroaniline		3700	U	72	3700
Acenaphthene		720	U	41	720
2,4-Dinitrophenol		3700	U	370	3700
4-Nitrophenol		3700	U	460	3700
Dibenzofuran		720	U	41	720
2,4-Dinitrotoluene		720	U	41	720
2,6-Dinitrotoluene		720	U	72	720
3 & 4 Methylphenol		720	U	63	720
Diethyl phthalate		720	U	48	720
4-Chlorophenyl phenyl ether		720	U	41	720
Fluorene		720	U	48	720
4-Nitroaniline		3700	U	37	3700
4,6-Dinitro-2-methylphenol		3700	U	440	3700
N-Nitrosodiphenylamine		720	U	50	720
4-Bromophenyl phenyl ether		720	U	68	720

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: NOIM000402

Lab Sample ID: 680-11658-14
Client Matrix: Solid % Moisture: 54.3

Date Sampled: 12/13/2005 1609
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1659
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1764.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		720	U	57	720
Pentachlorophenol		3700	U	180	3700
Phenanthrene		110	J	63	720
Anthracene		150	J	50	720
Di-n-butyl phthalate		720	U	61	720
Fluoranthene		650	J	57	720
Pyrene		540	J	44	720
Butyl benzyl phthalate		720	U	59	720
3,3'-Dichlorobenzidine		1400	U	65	1400
Benzo[a]anthracene		290	J	68	720
Bis(2-ethylhexyl) phthalate		460	J	83	720
Chrysene		380	J	55	720
Di-n-octyl phthalate		720	U	68	720
Benzo[b]fluoranthene		400	J	57	720
Benzo[k]fluoranthene		330	J	79	720
Benzo[a]pyrene		320	J	41	720
Indeno[1,2,3-cd]pyrene		230	J	57	720
Dibenz(a,h)anthracene		66	J	52	720
Benzo[g,h,i]perylene		240	J	50	720
Carbazole		720	U	61	720
bis(chloroisopropyl) ether		720	U	76	720

Surrogate	%Rec	Acceptance Limits
Phenol-d5	55	38 - 102
2-Fluorophenol	54	36 - 101
2,4,6-Tribromophenol	71	27 - 124
Nitrobenzene-d5	53	33 - 94
2-Fluorobiphenyl	56	38 - 104
Terphenyl-d14	68	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 009M000402

Lab Sample ID: 680-11658-15
Client Matrix: Solid % Moisture: 63.2

Date Sampled: 12/14/2005 1055
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1724
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1765.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Phenol		900	U	82	900
Bis(2-chloroethyl)ether		900	U	76	900
2-Chlorophenol		900	U	73	900
1,3-Dichlorobenzene		900	U	71	900
1,4-Dichlorobenzene		900	U	60	900
1,2-Dichlorobenzene		900	U	63	900
2-Methylphenol		900	U	82	900
N-Nitrosodi-n-propylamine		900	U	76	900
Hexachloroethane		900	U	54	900
Nitrobenzene		900	U	95	900
Isophorone		900	U	60	900
2-Nitrophenol		900	U	54	900
2,4-Dimethylphenol		900	U	95	900
Bis(2-chloroethoxy)methane		900	U	65	900
2,4-Dichlorophenol		900	U	63	900
1,2,4-Trichlorobenzene		900	U	57	900
Naphthalene		900	U	52	900
4-Chloroaniline		1800	U	71	1800
Hexachlorobutadiene		900	U	54	900
4-Chloro-3-methylphenol		900	U	92	900
2-Methylnaphthalene		900	U	65	900
Hexachlorocyclopentadiene		900	U *	230	900
2,4,6-Trichlorophenol		900	U	54	900
2,4,5-Trichlorophenol		900	U	87	900
2-Chloronaphthalene		900	U	65	900
2-Nitroaniline		4600	U	63	4600
Dimethyl phthalate		900	U	52	900
Acenaphthylene		900	U	46	900
3-Nitroaniline		4600	U	90	4600
Acenaphthene		900	U	52	900
2,4-Dinitrophenol		4600	U	450	4600
4-Nitrophenol		4600	U	570	4600
Dibenzofuran		900	U	52	900
2,4-Dinitrotoluene		900	U	52	900
2,6-Dinitrotoluene		900	U	90	900
3 & 4 Methylphenol		900	U	79	900
Diethyl phthalate		900	U	60	900
4-Chlorophenyl phenyl ether		900	U	52	900
Fluorene		900	U	60	900
4-Nitroaniline		4600	U	46	4600
4,6-Dinitro-2-methylphenol		4600	U	540	4600
N-Nitrosodiphenylamine		900	U	63	900
4-Bromophenyl phenyl ether		900	U	84	900

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 009M000402

Lab Sample ID: 680-11658-15
Client Matrix: Solid
% Moisture: 63.2

Date Sampled: 12/14/2005 1055
Date Received: 12/15/2005 0936

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Method: 8270C
Preparation: 3550B
Dilution: 1.0
Date Analyzed: 01/04/2006 1724
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1765.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
Hexachlorobenzene		900	U	71	900
Pentachlorophenol		4600	U	230	4600
Phenanthrene		900	U	79	900
Anthracene		900	U	63	900
Di-n-butyl phthalate		900	U	76	900
Fluoranthene		230	J	71	900
Pyrene		230	J	54	900
Butyl benzyl phthalate		900	U	73	900
3,3'-Dichlorobenzidine		1800	U	82	1800
Benzo[a]anthracene		100	J	84	900
Bis(2-ethylhexyl) phthalate		230	J	100	900
Chrysene		150	J	68	900
Di-n-octyl phthalate		900	U	84	900
Benzo[b]fluoranthene		230	J	71	900
Benzo[k]fluoranthene		110	J	98	900
Benzo[a]pyrene		120	J	52	900
Indeno[1,2,3-cd]pyrene		86	J	71	900
Dibenz(a,h)anthracene		900	U	65	900
Benzo[g,h,i]perylene		100	J	63	900
Carbazole		900	U	76	900
bis(chloroisopropyl) ether		900	U	95	900

Surrogate	%Rec	Acceptance Limits
Phenol-d5	47	38 - 102
2-Fluorophenol	45	36 - 101
2,4,6-Tribromophenol	61	27 - 124
Nitrobenzene-d5	43	33 - 94
2-Fluorobiphenyl	46	38 - 104
Terphenyl-d14	58	40 - 129

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000101**

Lab Sample ID: 680-11658-1
Client Matrix: Solid % Moisture: 64.6

Date Sampled: 12/13/2005 1058
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0336
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04043.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		93	U	8.5	93
4,4'-DDE		93	U	8.5	93
4,4'-DDT		93	U	7.6	93
Aldrin		48	U	3.9	48
alpha-BHC		48	U	15	48
beta-BHC		48	U	13	48
Chlordane (technical)		480	U	85	480
delta-BHC		48	U	6.5	48
Dieldrin		93	U	9.9	93
Endosulfan I		48	U	4.5	48
Endosulfan II		93	U	7.6	93
Endosulfan sulfate		93	U	10	93
Endrin		93	U	9.0	93
Endrin aldehyde		93	U	18	93
Endrin ketone		93	U	9.0	93
gamma-BHC (Lindane)		48	U	3.9	48
Heptachlor		48	U	9.0	48
Heptachlor epoxide		48	U	5.9	48
Methoxychlor		480	U	13	480
PCB-1016		930	U	190	930
PCB-1221		1900	U	190	1900
PCB-1232		930	U	170	930
PCB-1242		930	U	210	930
PCB-1248		930	U	230	930
PCB-1254		930	U	150	930
PCB-1260		930	U	180	930
Toxaphene		4800	U	340	4800

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

SEVERN TRENT STL®

Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000201

Lab Sample ID: 680-11658-2
Client Matrix: Solid % Moisture: 73.4

Date Sampled: 12/13/2005 1110
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0356
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04044.d
Initial Weight/Volume: 30.03 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		120	U	11	120
4,4'-DDE		120	U	11	120
4,4'-DDT		120	U	10	120
Aldrin		64	U	5.3	64
alpha-BHC		64	U	20	64
beta-BHC		64	U	18	64
Chlordane (technical)		640	U	110	640
delta-BHC		64	U	8.6	64
Dieldrin		120	U	13	120
Endosulfan I		64	U	6.0	64
Endosulfan II		120	U	10	120
Endosulfan sulfate		120	U	14	120
Endrin		120	U	12	120
Endrin aldehyde		120	U	24	120
Endrin ketone		120	U	12	120
gamma-BHC (Lindane)		64	U	5.3	64
Heptachlor		64	U	12	64
Heptachlor epoxide		64	U	7.9	64
Methoxychlor		640	U	18	640
PCB-1016		1200	U	250	1200
PCB-1221		2500	U	260	2500
PCB-1232		1200	U	230	1200
PCB-1242		1200	U	280	1200
PCB-1248		1200	U	300	1200
PCB-1254		1200	U	200	1200
PCB-1260		1200	U	240	1200
Toxaphene		6400	U	450	6400

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000901**

Lab Sample ID: 680-11658-3
Client Matrix: Solid % Moisture: 56.5

Date Sampled: 12/13/2005 1132
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0415
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04045.d
Initial Weight/Volume: 30.07 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		76	U	6.9	76
4,4'-DDE		76	U	6.9	76
4,4'-DDT		76	U	6.2	76
Aldrin		39	U	3.2	39
alpha-BHC		39	U	12	39
beta-BHC		39	U	11	39
Chlordane (technical)		390	U	69	390
delta-BHC		39	U	5.3	39
Dieldrin		76	U	8.0	76
Endosulfan I		39	U	3.7	39
Endosulfan II		76	U	6.2	76
Endosulfan sulfate		76	U	8.5	76
Endrin		76	U	7.3	76
Endrin aldehyde		76	U	15	76
Endrin ketone		76	U	7.3	76
gamma-BHC (Lindane)		39	U	3.2	39
Heptachlor		39	U	7.3	39
Heptachlor epoxide		39	U	4.8	39
Methoxychlor		390	U	11	390
PCB-1016		760	U	150	760
PCB-1221		1500	U	160	1500
PCB-1232		760	U	140	760
PCB-1242		760	U	170	760
PCB-1248		760	U	180	760
PCB-1254		760	U	120	760
PCB-1260		760	U	150	760
Toxaphene		3900	U	280	3900

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 054M000102

Lab Sample ID: 680-11658-4
Client Matrix: Solid % Moisture: 62.7

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0435
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04046.d
Initial Weight/Volume: 30.09 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		88	U	8.0	88
4,4'-DDE		88	U	8.0	88
4,4'-DDT		88	U	7.2	88
Aldrin		45	U	3.7	45
alpha-BHC		45	U	14	45
beta-BHC		45	U	13	45
Chlordane (technical)		450	U	80	450
delta-BHC		45	U	6.1	45
Dieldrin		88	U	9.4	88
Endosulfan I		45	U	4.3	45
Endosulfan II		88	U	7.2	88
Endosulfan sulfate		88	U	9.9	88
Endrin		88	U	8.6	88
Endrin aldehyde		88	U	17	88
Endrin ketone		88	U	8.6	88
gamma-BHC (Lindane)		45	U	3.7	45
Heptachlor		45	U	8.6	45
Heptachlor epoxide		45	U	5.6	45
Methoxychlor		450	U	13	450
PCB-1016		880	U	180	880
PCB-1221		1800	U	180	1800
PCB-1232		880	U	170	880
PCB-1242		880	U	200	880
PCB-1248		880	U	210	880
PCB-1254		880	U	140	880
PCB-1260		880	U	170	880
Toxaphene		4500	U	320	4500

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000702

Lab Sample ID: 680-11658-5
Client Matrix: Solid % Moisture: 79.5

Date Sampled: 12/13/2005 1212
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0454
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04047.d
Initial Weight/Volume: 30.05 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		160	U	15	160
4,4'-DDE		160	U	15	160
4,4'-DDT		160	U	13	160
Aldrin		83	U	6.8	83
alpha-BHC		83	U	25	83
beta-BHC		83	U	23	83
Chlordane (technical)		830	U	150	830
delta-BHC		83	U	11	83
Dieldrin		160	U	17	160
Endosulfan I		83	U	7.8	83
Endosulfan II		160	U	13	160
Endosulfan sulfate		160	U	18	160
Endrin		160	U	16	160
Endrin aldehyde		160	U	32	160
Endrin ketone		160	U	16	160
gamma-BHC (Lindane)		83	U	6.8	83
Heptachlor		83	U	16	83
Heptachlor epoxide		83	U	10	83
Methoxychlor		830	U	23	830
PCB-1016		1600	U	330	1600
PCB-1221		3300	U	330	3300
PCB-1232		1600	U	300	1600
PCB-1242		1600	U	370	1600
PCB-1248		1600	U	390	1600
PCB-1254		1600	U	250	1600
PCB-1260		1600	U	310	1600
Toxaphene		8300	U	580	8300

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000502

Lab Sample ID: 680-11658-6
Client Matrix: Solid % Moisture: 81.8

Date Sampled: 12/13/2005 1225
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0513
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04048.d
Initial Weight/Volume: 30.02 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		180	U	16	180
4,4'-DDE		180	U	16	180
4,4'-DDT		180	U	15	180
Aldrin		93	U	7.7	93
alpha-BHC		93	U	29	93
beta-BHC		93	U	26	93
Chlordane (technical)		930	U	160	930
delta-BHC		93	U	13	93
Dieldrin		180	U	19	180
Endosulfan I		93	U	8.8	93
Endosulfan II		180	U	15	180
Endosulfan sulfate		180	U	20	180
Endrin		180	U	18	180
Endrin aldehyde		180	U	36	180
Endrin ketone		180	U	18	180
gamma-BHC (Lindane)		93	U	7.7	93
Heptachlor		93	U	18	93
Heptachlor epoxide		93	U	12	93
Methoxychlor		930	U	26	930
PCB-1016		1800	U	370	1800
PCB-1221		3700	U	370	3700
PCB-1232		1800	U	340	1800
PCB-1242		1800	U	410	1800
PCB-1248		1800	U	440	1800
PCB-1254		1800	U	290	1800
PCB-1260		1800	U	350	1800
Toxaphene		9300	U	660	9300

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000401

Lab Sample ID: 680-11658-7
Client Matrix: Solid % Moisture: 30.6

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0533
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04049.d
Initial Weight/Volume: 30.02 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		48	U	4.3	48
4,4'-DDE		48	U	4.3	48
4,4'-DDT		48	U	3.9	48
Aldrin		24	U	2.0	24
alpha-BHC		24	U	7.5	24
beta-BHC		24	U	6.8	24
Chlordane (technical)		240	U	43	240
delta-BHC		24	U	3.3	24
Dieldrin		48	U	5.0	48
Endosulfan I		24	U	2.3	24
Endosulfan II		48	U	3.9	48
Endosulfan sulfate		48	U	5.3	48
Endrin		48	U	4.6	48
Endrin aldehyde		48	U	9.4	48
Endrin ketone		48	U	4.6	48
gamma-BHC (Lindane)		24	U	2.0	24
Heptachlor		24	U	4.6	24
Heptachlor epoxide		24	U	3.0	24
Methoxychlor		240	U	6.8	240
PCB-1016		480	U	96	480
PCB-1221		960	U	98	960
PCB-1232		480	U	89	480
PCB-1242		480	U	110	480
PCB-1248		480	U	120	480
PCB-1254		480	U	75	480
PCB-1260		480	U	92	480
Toxaphene		2400	U	170	2400

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000301

Lab Sample ID: 680-11658-8
Client Matrix: Solid % Moisture: 46.0

Date Sampled: 12/13/2005 1246
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0552
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04050.d
Initial Weight/Volume: 30.03 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		61	U	5.6	61
4,4'-DDE		61	U	5.6	61
4,4'-DDT		61	U	5.0	61
Aldrin		31	U	2.6	31
alpha-BHC		31	U	9.6	31
beta-BHC		31	U	8.7	31
Chlordane (technical)		310	U	56	310
delta-BHC		31	U	4.3	31
Dieldrin		61	U	6.5	61
Endosulfan I		31	U	3.0	31
Endosulfan II		61	U	5.0	61
Endosulfan sulfate		61	U	6.8	61
Endrin		61	U	5.9	61
Endrin aldehyde		61	U	12	61
Endrin ketone		61	U	5.9	61
gamma-BHC (Lindane)		31	U	2.6	31
Heptachlor		31	U	5.9	31
Heptachlor epoxide		31	U	3.9	31
Methoxychlor		310	U	8.7	310
PCB-1016		610	U	120	610
PCB-1221		1200	U	130	1200
PCB-1232		610	U	110	610
PCB-1242		610	U	140	610
PCB-1248		610	U	150	610
PCB-1254		610	U	96	610
PCB-1260		610	U	120	610
Toxaphene		3100	U	220	3100

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM001001

Lab Sample ID: 680-11658-9
Client Matrix: Solid % Moisture: 32.6

Date Sampled: 12/13/2005 1315
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0612
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04051.d
Initial Weight/Volume: 30.07 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		49	U	4.4	49
4,4'-DDE		49	U	4.4	49
4,4'-DDT		49	U	4.0	49
Aldrin		25	U	2.1	25
alpha-BHC		25	U	7.7	25
beta-BHC		25	U	7.0	25
Chlordane (technical)		250	U	44	250
delta-BHC		25	U	3.4	25
Dieldrin		49	U	5.2	49
Endosulfan I		25	U	2.4	25
Endosulfan II		49	U	4.0	49
Endosulfan sulfate		49	U	5.5	49
Endrin		49	U	4.7	49
Endrin aldehyde		49	U	9.6	49
Endrin ketone		49	U	4.7	49
gamma-BHC (Lindane)		25	U	2.1	25
Heptachlor		25	U	4.7	25
Heptachlor epoxide		25	U	3.1	25
Methoxychlor		250	U	7.0	250
PCB-1016		490	U	99	490
PCB-1221		990	U	100	990
PCB-1232		490	U	92	490
PCB-1242		490	U	110	490
PCB-1248		490	U	120	490
PCB-1254		490	U	77	490
PCB-1260		490	U	95	490
Toxaphene		2500	U	180	2500

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000801**

Lab Sample ID: 680-11658-10
Client Matrix: Solid % Moisture: 52.7

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0631
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04052.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		70	U	6.3	70
4,4'-DDE		70	U	6.3	70
4,4'-DDT		70	U	5.7	70
Aldrin		36	U	3.0	36
alpha-BHC		36	U	11	36
beta-BHC		36	U	9.9	36
Chlordane (technical)		360	U	63	360
delta-BHC		36	U	4.8	36
Dieldrin		70	U	7.4	70
Endosulfan I		36	U	3.4	36
Endosulfan II		70	U	5.7	70
Endosulfan sulfate		70	U	7.8	70
Endrin		70	U	6.7	70
Endrin aldehyde		70	U	14	70
Endrin ketone		70	U	6.7	70
gamma-BHC (Lindane)		36	U	3.0	36
Heptachlor		36	U	6.7	36
Heptachlor epoxide		36	U	4.4	36
Methoxychlor		360	U	9.9	360
PCB-1016		700	U	140	700
PCB-1221		1400	U	140	1400
PCB-1232		700	U	130	700
PCB-1242		700	U	160	700
PCB-1248		700	U	170	700
PCB-1254		700	U	110	700
PCB-1260		700	U	130	700
Toxaphene		3600	U	250	3600

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000501

Lab Sample ID: 680-11658-11
Client Matrix: Solid % Moisture: 41.2

Date Sampled: 12/13/2005 1408
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0651
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04053.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		56	U	5.1	56
4,4'-DDE		56	U	5.1	56
4,4'-DDT		56	U	4.6	56
Aldrin		29	U	2.4	29
alpha-BHC		29	U	8.8	29
beta-BHC		29	U	8.0	29
Chlordane (technical)		290	U	51	290
delta-BHC		29	U	3.9	29
Dieldrin		56	U	5.9	56
Endosulfan I		29	U	2.7	29
Endosulfan II		56	U	4.6	56
Endosulfan sulfate		56	U	6.3	56
Endrin		56	U	5.4	56
Endrin aldehyde		56	U	11	56
Endrin ketone		56	U	5.4	56
gamma-BHC (Lindane)		29	U	2.4	29
Heptachlor		29	U	5.4	29
Heptachlor epoxide		29	U	3.6	29
Methoxychlor		290	U	8.0	290
PCB-1016		560	U	110	560
PCB-1221		1100	U	120	1100
PCB-1232		560	U	110	560
PCB-1242		560	U	130	560
PCB-1248		560	U	140	560
PCB-1254		560	U	88	560
PCB-1260		560	U	110	560
Toxaphene		2900	U	200	2900

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: **BSLM000701**

Lab Sample ID: 680-11658-12
Client Matrix: Solid % Moisture: 40.5

Date Sampled: 12/13/2005 1434
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0710
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04054.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		55	U	5.0	55
4,4'-DDE		55	U	5.0	55
4,4'-DDT		55	U	4.5	55
Aldrin		29	U	2.3	29
alpha-BHC		29	U	8.7	29
beta-BHC		29	U	7.9	29
Chlordane (technical)		290	U	50	290
delta-BHC		29	U	3.9	29
Dieldrin		55	U	5.9	55
Endosulfan I		29	U	2.7	29
Endosulfan II		55	U	4.5	55
Endosulfan sulfate		55	U	6.2	55
Endrin		55	U	5.4	55
Endrin aldehyde		55	U	11	55
Endrin ketone		55	U	5.4	55
gamma-BHC (Lindane)		29	U	2.3	29
Heptachlor		29	U	5.4	29
Heptachlor epoxide		29	U	3.5	29
Methoxychlor		290	U	7.9	290
PCB-1016		550	U	110	550
PCB-1221		1100	U	110	1100
PCB-1232		550	U	100	550
PCB-1242		550	U	130	550
PCB-1248		550	U	130	550
PCB-1254		550	U	87	550
PCB-1260		550	U	110	550
Toxaphene		2900	U	200	2900

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000601

Lab Sample ID: 680-11658-13
Client Matrix: Solid % Moisture: 38.1

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0730
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04055.d
Initial Weight/Volume: 30.04 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		53	U	4.8	53
4,4'-DDE		53	U	4.8	53
4,4'-DDT		53	U	4.4	53
Aldrin		27	U	2.3	27
alpha-BHC		27	U	8.4	27
beta-BHC		27	U	7.6	27
Chlordane (technical)		270	U	48	270
delta-BHC		27	U	3.7	27
Dieldrin		53	U	5.6	53
Endosulfan I		27	U	2.6	27
Endosulfan II		53	U	4.4	53
Endosulfan sulfate		53	U	6.0	53
Endrin		53	U	5.2	53
Endrin aldehyde		53	U	10	53
Endrin ketone		53	U	5.2	53
gamma-BHC (Lindane)		27	U	2.3	27
Heptachlor		27	U	5.2	27
Heptachlor epoxide		27	U	3.4	27
Methoxychlor		270	U	7.6	270
PCB-1016		530	U	110	530
PCB-1221		1100	U	110	1100
PCB-1232		530	U	100	530
PCB-1242		530	U	120	530
PCB-1248		530	U	130	530
PCB-1254		530	U	84	530
PCB-1260		530	U	100	530
Toxaphene		2700	U	190	2700

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: NOIM000402

Lab Sample ID: 680-11658-14
Client Matrix: Solid % Moisture: 54.3

Date Sampled: 12/13/2005 1609
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0749
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04056.d
Initial Weight/Volume: 30.03 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		72	U	6.6	72
4,4'-DDE		72	U	6.6	72
4,4'-DDT		72	U	5.9	72
Aldrin		37	U	3.1	37
alpha-BHC		37	U	11	37
beta-BHC		37	U	10	37
Chlordane (technical)		370	U	66	370
delta-BHC		37	U	5.0	37
Dieldrin		72	U	7.7	72
Endosulfan I		37	U	3.5	37
Endosulfan II		72	U	5.9	72
Endosulfan sulfate		72	U	8.1	72
Endrin		72	U	7.0	72
Endrin aldehyde		72	U	14	72
Endrin ketone		72	U	7.0	72
gamma-BHC (Lindane)		37	U	3.1	37
Heptachlor		37	U	7.0	37
Heptachlor epoxide		37	U	4.6	37
Methoxychlor		370	U	10	370
PCB-1016		720	U	150	720
PCB-1221		1500	U	150	1500
PCB-1232		720	U	140	720
PCB-1242		720	U	160	720
PCB-1248		720	U	170	720
PCB-1254		720	U	110	720
PCB-1260		720	U	140	720
Toxaphene		3700	U	260	3700

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 009M000402

Lab Sample ID: 680-11658-15
Client Matrix: Solid % Moisture: 63.2

Date Sampled: 12/14/2005 1055
Date Received: 12/15/2005 0936

8081A_8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Method: 8081A_8082
Preparation: 3550B
Dilution: 10
Date Analyzed: 01/05/2006 0808
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04057.d
Initial Weight/Volume: 30.08 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4,4'-DDD		89	U	8.1	89
4,4'-DDE		89	U	8.1	89
4,4'-DDT		89	U	7.3	89
Aldrin		46	U	3.8	46
alpha-BHC		46	U	14	46
beta-BHC		46	U	13	46
Chlordane (technical)		460	U	81	460
delta-BHC		46	U	6.2	46
Dieldrin		89	U	9.5	89
Endosulfan I		46	U	4.3	46
Endosulfan II		89	U	7.3	89
Endosulfan sulfate		89	U	10	89
Endrin		89	U	8.7	89
Endrin aldehyde		89	U	18	89
Endrin ketone		89	U	8.7	89
gamma-BHC (Lindane)		46	U	3.8	46
Heptachlor		46	U	8.7	46
Heptachlor epoxide		46	U	5.7	46
Methoxychlor		460	U	13	460
PCB-1016		890	U	180	890
PCB-1221		1800	U	180	1800
PCB-1232		890	U	170	890
PCB-1242		890	U	200	890
PCB-1248		890	U	220	890
PCB-1254		890	U	140	890
PCB-1260		890	U	170	890
Toxaphene		4600	U	330	4600

Surrogate	%Rec		Acceptance Limits
DCB Decachlorobiphenyl	0	D	30 - 150
Tetrachloro-m-xylene	0	D	30 - 150

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000101

Lab Sample ID: 680-11658-1
Client Matrix: Solid % Moisture: 64.6

Date Sampled: 12/13/2005 1058
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0519
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.55 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		2.6	U	0.25	2.6
Aluminum		27000		12	51
Arsenic		15		1.7	2.6
Barium		30		0.77	2.6
Beryllium		1.5		0.044	1.0
Calcium		3100		6.2	130
Cadmium		1.3	U	0.56	1.3
Cobalt		7.4		0.44	2.6
Chromium		56	B	0.33	2.6
Copper		7.7		0.44	5.1
Iron		33000		11	13
Potassium		4200	B	3.3	260
Magnesium		7100		3.1	130
Manganese		240		0.54	2.6
Sodium		10000	B	130	260
Nickel		15		0.67	10
Lead		14		0.54	1.3
Antimony		5.1	U	1.2	5.1
Selenium		6.4	U	2.3	6.4
Thallium		6.4	U	3.3	6.4
Vanadium		61		0.36	2.6
Zinc		53		1.9	5.1

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0708
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.08 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.035	J	0.010	0.052

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000201

Lab Sample ID: 680-11658-2
Client Matrix: Solid % Moisture: 73.4

Date Sampled: 12/13/2005 1110
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0543
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.52 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		3.6	U	0.36	3.6
Aluminum		19000		16	72
Arsenic		11		2.4	3.6
Barium		27		1.1	3.6
Beryllium		1.0	J	0.061	1.4
Calcium		16000		8.7	180
Cadmium		1.8	U	0.80	1.8
Cobalt		8.4		0.61	3.6
Chromium		42	B	0.47	3.6
Copper		16		0.61	7.2
Iron		22000		15	18
Potassium		2800	B	4.7	360
Magnesium		6300		4.3	180
Manganese		180		0.76	3.6
Sodium		14000	B	180	360
Nickel		12	J	0.94	14
Lead		15		0.76	1.8
Antimony		7.2	U	1.6	7.2
Selenium		9.0	U	3.3	9.0
Thallium		9.0	U	4.7	9.0
Vanadium		43		0.51	3.6
Zinc		64		2.7	7.2

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0710
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.02 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.059	J	0.015	0.074

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000901

Lab Sample ID: 680-11658-3
Client Matrix: Solid % Moisture: 56.5

Date Sampled: 12/13/2005 1132
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0547
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.56 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		2.1	U	0.20	2.1
Aluminum		12000		9.2	41
Arsenic		5.2		1.4	2.1
Barium		16		0.62	2.1
Beryllium		0.51	J	0.035	0.82
Calcium		19000		4.9	100
Cadmium		1.0	U	0.45	1.0
Cobalt		3.9		0.35	2.1
Chromium		23	B	0.27	2.1
Copper		13		0.35	4.1
Iron		11000		8.6	10
Potassium		1500	B	2.7	210
Magnesium		3700		2.5	100
Manganese		140		0.43	2.1
Sodium		7900	B	100	210
Nickel		6.9	J	0.53	8.2
Lead		9.8		0.43	1.0
Antimony		4.1	U	0.92	4.1
Selenium		5.1	U	1.8	5.1
Thallium		5.1	U	2.7	5.1
Vanadium		25		0.29	2.1
Zinc		43		1.5	4.1

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0713
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.07 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.045		0.0086	0.043

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 054M000102

Lab Sample ID: 680-11658-4
Client Matrix: Solid % Moisture: 62.7

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0552
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.55 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		0.97	J	0.24	2.4
Aluminum		23000		11	49
Arsenic		11		1.6	2.4
Barium		48		0.73	2.4
Beryllium		1.0		0.041	0.97
Calcium		11000		5.8	120
Cadmium		0.54	J	0.54	1.2
Cobalt		10		0.41	2.4
Chromium		51	B	0.32	2.4
Copper		140		0.41	4.9
Iron		26000		10	12
Potassium		2200	B	3.2	240
Magnesium		6100		2.9	120
Manganese		390		0.51	2.4
Sodium		9600	B	120	240
Nickel		28		0.63	9.7
Lead		79		0.51	1.2
Antimony		4.9	U	1.1	4.9
Selenium		6.1	U	2.2	6.1
Thallium		6.1	U	3.2	6.1
Vanadium		49		0.34	2.4
Zinc		680		1.8	4.9

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0716
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.03 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.23		0.010	0.052

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000702

Lab Sample ID: 680-11658-5
Client Matrix: Solid % Moisture: 79.5

Date Sampled: 12/13/2005 1212
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0606
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.58 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		4.2	U	0.42	4.2
Aluminum		31000		19	84
Arsenic		19		2.8	4.2
Barium		93		1.3	4.2
Beryllium		1.4	J	0.071	1.7
Calcium		40000		10	210
Cadmium		2.1	U	0.93	2.1
Cobalt		9.1		0.71	4.2
Chromium		60	B	0.55	4.2
Copper		1200		0.71	8.4
Iron		33000		18	21
Potassium		4400	B	5.5	420
Magnesium		11000		5.0	210
Manganese		650		0.88	4.2
Sodium		27000	B	210	420
Nickel		25		1.1	17
Lead		26		0.88	2.1
Antimony		8.4	U	1.9	8.4
Selenium		11	U	3.8	11
Thallium		11	U	5.5	11
Vanadium		71		0.59	4.2
Zinc		600		3.2	8.4

7471A Mercury In Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0718
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.10 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.074	J	0.018	0.089

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 556M000502

Lab Sample ID: 680-11658-6
Client Matrix: Solid % Moisture: 81.8

Date Sampled: 12/13/2005 1225
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0611
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.57 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		4.8	U	0.48	4.8
Aluminum		35000		22	96
Arsenic		18		3.2	4.8
Barium		42		1.4	4.8
Beryllium		1.5	J	0.082	1.9
Calcium		29000		12	240
Cadmium		2.4	U	1.1	2.4
Cobalt		10		0.82	4.8
Chromium		69	B	0.63	4.8
Copper		44		0.82	9.6
Iron		34000		20	24
Potassium		5000	B	6.3	480
Magnesium		11000		5.8	240
Manganese		400		1.0	4.8
Sodium		29000	B	240	480
Nickel		20		1.3	19
Lead		26		1.0	2.4
Antimony		9.6	U	2.2	9.6
Selenium		12	U	4.3	12
Thallium		12	U	6.3	12
Vanadium		77		0.67	4.8
Zinc		120		3.6	9.6

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0721
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.07 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.077	J	0.021	0.10

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000401

Lab Sample ID: 680-11658-7
Client Matrix: Solid % Moisture: 30.6

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0616
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.52 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.4	U	0.14	1.4
Aluminum		1600		6.2	28
Arsenic		0.98	J	0.93	1.4
Barium		9.4		0.42	1.4
Beryllium		0.12	J	0.024	0.55
Calcium		3000		3.3	69
Cadmium		0.69	U	0.30	0.69
Cobalt		0.49	J	0.24	1.4
Chromium		4.5	B	0.18	1.4
Copper		1.1	J	0.24	2.8
Iron		1800		5.8	6.9
Potassium		240	B	1.8	140
Magnesium		530		1.7	69
Manganese		33		0.29	1.4
Sodium		2000	B	69	140
Nickel		1.1	J	0.36	5.5
Lead		2.7		0.29	0.69
Antimony		2.8	U	0.62	2.8
Selenium		3.5	U	1.2	3.5
Thallium		3.5	U	1.8	3.5
Vanadium		4.2		0.19	1.4
Zinc		9.7		1.0	2.8

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0723
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.15 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0053	J	0.0050	0.025

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000301

Lab Sample ID: 680-11658-8
Client Matrix: Solid % Moisture: 46.0

Date Sampled: 12/13/2005 1246
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0620
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.56 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.7	U	0.16	1.7
Aluminum		7700		7.4	33
Arsenic		3.8		1.1	1.7
Barium		9.7		0.50	1.7
Beryllium		0.35	J	0.028	0.66
Calcium		19000		4.0	83
Cadmium		0.83	U	0.36	0.83
Cobalt		1.8		0.28	1.7
Chromium		16	B	0.21	1.7
Copper		5.9		0.28	3.3
Iron		7900		6.9	8.3
Potassium		970	B	2.1	170
Magnesium		2200		2.0	83
Manganese		74		0.35	1.7
Sodium		5100	B	83	170
Nickel		5.2	J	0.43	6.6
Lead		6.7		0.35	0.83
Antimony		3.3	U	0.74	3.3
Selenium		4.1	U	1.5	4.1
Thallium		4.1	U	2.1	4.1
Vanadium		17		0.23	1.7
Zinc		25		1.2	3.3

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0726
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.13 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.031	J	0.0066	0.033

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM001001

Lab Sample ID: 680-11658-9
Client Matrix: Solid % Moisture: 32.6

Date Sampled: 12/13/2005 1315
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0625
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.52 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.4	U	0.14	1.4
Aluminum		5400		6.4	29
Arsenic		3.2		0.96	1.4
Barium		8.8		0.43	1.4
Beryllium		0.33	J	0.024	0.57
Calcium		15000		3.4	71
Cadmium		0.71	U	0.31	0.71
Cobalt		1.3	J	0.24	1.4
Chromium		13	B	0.19	1.4
Copper		2.4	J	0.24	2.9
Iron		5800		6.0	7.1
Potassium		830	B	1.9	140
Magnesium		1900		1.7	71
Manganese		58		0.30	1.4
Sodium		4200	B	71	140
Nickel		3.2	J	0.37	5.7
Lead		3.4		0.30	0.71
Antimony		2.9	U	0.64	2.9
Selenium		3.6	U	1.3	3.6
Thallium		3.6	U	1.9	3.6
Vanadium		12		0.20	1.4
Zinc		24		1.1	2.9

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0734
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.18 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.0078	J	0.0050	0.025

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000801

Lab Sample ID: 680-11658-10
Client Matrix: Solid % Moisture: 52.7

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0630
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.51 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		2.1	U	0.21	2.1
Aluminum		14000		9.3	41
Arsenic		9.0		1.4	2.1
Barium		25		0.62	2.1
Beryllium		0.67	J	0.035	0.83
Calcium		140000		5.0	100
Cadmium		1.0	U	0.46	1.0
Cobalt		3.4		0.35	2.1
Chromium		21	B	0.27	2.1
Copper		15		0.35	4.1
Iron		14000		8.7	10
Potassium		1800	B	2.7	210
Magnesium		3900		2.5	100
Manganese		160		0.44	2.1
Sodium		9900	B	100	210
Nickel		6.9	J	0.54	8.3
Lead		21		0.44	1.0
Antimony		4.1	U	0.93	4.1
Selenium		5.2	U	1.9	5.2
Thallium		5.2	U	2.7	5.2
Vanadium		32		0.29	2.1
Zinc		60		1.6	4.1

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0737
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.14 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.11		0.0074	0.037

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000501

Lab Sample ID: 680-11658-11
Client Matrix: Solid % Moisture: 41.2

Date Sampled: 12/13/2005 1408
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0635
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.53 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.6	U	0.16	1.6
Aluminum		7900		7.2	32
Arsenic		5.9		1.1	1.6
Barium		11		0.48	1.6
Beryllium		0.42	J	0.027	0.64
Calcium		40000		3.9	80
Cadmium		0.80	U	0.35	0.80
Cobalt		2.0		0.27	1.6
Chromium		17	B	0.21	1.6
Copper		4.3		0.27	3.2
Iron		8900		6.7	8.0
Potassium		1200	B	2.1	160
Magnesium		2800		1.9	80
Manganese		97		0.34	1.6
Sodium		6400	B	80	160
Nickel		4.8	J	0.42	6.4
Lead		4.9		0.34	0.80
Antimony		3.2	U	0.72	3.2
Selenium		4.0	U	1.4	4.0
Thallium		4.0	U	2.1	4.0
Vanadium		18		0.22	1.6
Zinc		21		1.2	3.2

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0740
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.08 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.016	J	0.0063	0.031

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000701

Lab Sample ID: 680-11658-12
Client Matrix: Solid % Moisture: 40.5

Date Sampled: 12/13/2005 1434
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0639
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.55 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.5	U	0.15	1.5
Aluminum		8300		6.9	31
Arsenic		3.6		1.0	1.5
Barium		18		0.46	1.5
Beryllium		0.36	J	0.026	0.61
Calcium		4800		3.7	76
Cadmium		0.76	U	0.34	0.76
Cobalt		1.9		0.26	1.5
Chromium		15	B	0.20	1.5
Copper		5.9		0.26	3.1
Iron		8600		6.4	7.6
Potassium		1000	B	2.0	150
Magnesium		2100		1.8	76
Manganese		57		0.32	1.5
Sodium		5300	B	76	150
Nickel		4.6	J	0.40	6.1
Lead		8.6		0.32	0.76
Antimony		3.1	U	0.69	3.1
Selenium		3.8	U	1.4	3.8
Thallium		3.8	U	2.0	3.8
Vanadium		21		0.21	1.5
Zinc		40		1.1	3.1

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0742
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.04 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.034		0.0065	0.032

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: BSLM000601

Lab Sample ID: 680-11658-13
Client Matrix: Solid % Moisture: 38.1

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0653
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.51 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.6	U	0.16	1.6
Aluminum		4300		7.1	32
Arsenic		2.4		1.1	1.6
Barium		18		0.48	1.6
Beryllium		0.23	J	0.027	0.63
Calcium		6400		3.8	79
Cadmium		0.79	U	0.35	0.79
Cobalt		1.2	J	0.27	1.6
Chromium		10	B	0.21	1.6
Copper		3.2		0.27	3.2
Iron		5000		6.7	7.9
Potassium		690	B	2.1	160
Magnesium		1600		1.9	79
Manganese		41		0.33	1.6
Sodium		4600	B	79	160
Nickel		2.4	J	0.41	6.3
Lead		4.3		0.33	0.79
Antimony		3.2	U	0.71	3.2
Selenium		4.0	U	1.4	4.0
Thallium		4.0	U	2.1	4.0
Vanadium		11		0.22	1.6
Zinc		18		1.2	3.2

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0745
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.17 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.018	J	0.0055	0.028

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: NOIM000402

Lab Sample ID: 680-11658-14
Client Matrix: Solid % Moisture: 54.3

Date Sampled: 12/13/2005 1609
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0658
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.57 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		1.9	U	0.19	1.9
Aluminum		9500		8.6	38
Arsenic		5.9		1.3	1.9
Barium		14		0.58	1.9
Beryllium		0.46	J	0.033	0.77
Calcium		2600		4.6	96
Cadmium		0.96	U	0.42	0.96
Cobalt		3.3		0.33	1.9
Chromium		20	B	0.25	1.9
Copper		15		0.33	3.8
Iron		11000		8.1	9.6
Potassium		1300	B	2.5	190
Magnesium		2400		2.3	96
Manganese		52		0.40	1.9
Sodium		5600	B	96	190
Nickel		5.6	J	0.50	7.7
Lead		23		0.40	0.96
Antimony		3.8	U	0.86	3.8
Selenium		4.8	U	1.7	4.8
Thallium		4.8	U	2.5	4.8
Vanadium		21		0.27	1.9
Zinc		100		1.4	3.8

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0747
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.08 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.14		0.0081	0.041

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Client Sample ID: 009M000402

Lab Sample ID: 680-11658-15
Client Matrix: Solid % Moisture: 63.2

Date Sampled: 12/14/2005 1055
Date Received: 12/15/2005 0936

6010B Inductively Coupled Plasma - Atomic Emission Spectrometry

Method: 6010B
Preparation: 3050B
Dilution: 1.0
Date Analyzed: 12/28/2005 0703
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.51 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Silver		2.7	U	0.26	2.7
Aluminum		14000		12	53
Arsenic		7.0		1.8	2.7
Barium		37		0.80	2.7
Beryllium		0.64	J	0.045	1.1
Calcium		20000		6.4	130
Cadmium		1.6		0.59	1.3
Cobalt		3.9		0.45	2.7
Chromium		160	B	0.35	2.7
Copper		54		0.45	5.3
Iron		15000		11	13
Potassium		1900	B	3.5	270
Magnesium		4900		3.2	130
Manganese		100		0.56	2.7
Sodium		8700	B	130	270
Nickel		19		0.69	11
Lead		71		0.56	1.3
Antimony		5.3	U	1.2	5.3
Selenium		6.7	U	2.4	6.7
Thallium		6.7	U	3.5	6.7
Vanadium		32		0.37	2.7
Zinc		230		2.0	5.3

7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique)

Method: 7471A
Preparation: 7471A
Dilution: 1.0
Date Analyzed: 12/22/2005 0750
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.04 g
Final Weight/Volume: 50 mL

Analyte	DryWt Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Mercury		0.15		0.010	0.052

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

General Chemistry

Client Sample ID: **BSLM000101**

Lab Sample ID: 680-11658-1
Client Matrix: Solid

Date Sampled: 12/13/2005 1058
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	65		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	35		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: **BSLM000201**

Lab Sample ID: 680-11658-2
Client Matrix: Solid

Date Sampled: 12/13/2005 1110
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	73		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	27		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: **BSLM000901**

Lab Sample ID: 680-11658-3
Client Matrix: Solid

Date Sampled: 12/13/2005 1132
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	57		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	44		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: **054M000102**

Lab Sample ID: 680-11658-4
Client Matrix: Solid

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

General Chemistry

Client Sample ID: 054M000102

Lab Sample ID: 680-11658-4
Client Matrix: Solid

Date Sampled: 12/13/2005 1158
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	63		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	37		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: 556M000702

Lab Sample ID: 680-11658-5
Client Matrix: Solid

Date Sampled: 12/13/2005 1212
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	80		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	21		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: 556M000502

Lab Sample ID: 680-11658-6
Client Matrix: Solid

Date Sampled: 12/13/2005 1225
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	82		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	18		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000401

Lab Sample ID: 680-11658-7
Client Matrix: Solid

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

General Chemistry

Client Sample ID: BSLM000401

Lab Sample ID: 680-11658-7
Client Matrix: Solid

Date Sampled: 12/13/2005 1238
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	31		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	69		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000301

Lab Sample ID: 680-11658-8
Client Matrix: Solid

Date Sampled: 12/13/2005 1246
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	46		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	54		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM001001

Lab Sample ID: 680-11658-9
Client Matrix: Solid

Date Sampled: 12/13/2005 1315
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	33		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	67		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000801

Lab Sample ID: 680-11658-10
Client Matrix: Solid

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

General Chemistry

Client Sample ID: BSLM000801

Lab Sample ID: 680-11658-10
Client Matrix: Solid

Date Sampled: 12/13/2005 1340
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	53		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	47		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000501

Lab Sample ID: 680-11658-11
Client Matrix: Solid

Date Sampled: 12/13/2005 1408
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	41		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	59		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000701

Lab Sample ID: 680-11658-12
Client Matrix: Solid

Date Sampled: 12/13/2005 1434
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	41		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	60		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: BSLM000601

Lab Sample ID: 680-11658-13
Client Matrix: Solid

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

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Analytical Data

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

General Chemistry

Client Sample ID: BSLM000601

Lab Sample ID: 680-11658-13
Client Matrix: Solid

Date Sampled: 12/13/2005 1450
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	38		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	62		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: NOIM000402

Lab Sample ID: 680-11658-14
Client Matrix: Solid

Date Sampled: 12/13/2005 1609
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	54		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	46		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

Client Sample ID: 009M000402

Lab Sample ID: 680-11658-15
Client Matrix: Solid

Date Sampled: 12/14/2005 1055
Date Received: 12/15/2005 0936

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	63		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				
Percent Solids	37		%	1.0	1.0	1.0	160.3
	Anly Batch: 680-31186	Date Analyzed	12/16/2005 0832				

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DATA REPORTING QUALIFIERS

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	U	Analyte was not detected at or above the reporting limit.
	*	LCS, LCSD, MS, MSD, MD, or Surrogate exceeds the control limits
	N	MS, MSD: Spike recovery exceeds upper or lower control limits.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
GC Semi VOA		
	U	Analyte was not detected at or above the reporting limit.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution will be flagged with a D.
	P	The lower of the two values is reported when the % difference between the results of two GC columns is greater than 40%
Metals		
	U	Analyte was not detected at or above the reporting limit.
	B	Compound was found in the blank and sample.
	N	MS, MSD: Spike recovery exceeds upper or lower control limits.
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
GC/MS Semi VOA				
Prep Batch: 680-32028				
LCS 680-32028/17-A	Lab Control Spike	Solid	3550B	
MB 680-32028/16-A	Method Blank	Solid	3550B	
680-11658-1	BSLM000101	Solid	3550B	
680-11658-2	BSLM000201	Solid	3550B	
680-11658-2MS	Matrix Spike	Solid	3550B	
680-11658-2MSD	Matrix Spike Duplicate	Solid	3550B	
680-11658-3	BSLM000901	Solid	3550B	
680-11658-4	054M000102	Solid	3550B	
680-11658-5	556M000702	Solid	3550B	
680-11658-6	556M000502	Solid	3550B	
680-11658-7	BSLM000401	Solid	3550B	
680-11658-8	BSLM000301	Solid	3550B	
680-11658-9	BSLM001001	Solid	3550B	
680-11658-10	BSLM000801	Solid	3550B	
680-11658-11	BSLM000501	Solid	3550B	
680-11658-12	BSLM000701	Solid	3550B	
680-11658-13	BSLM000601	Solid	3550B	
680-11658-14	NOIM000402	Solid	3550B	
680-11658-15	009M000402	Solid	3550B	
Analysis Batch:680-32923				
LCS 680-32028/17-A	Lab Control Spike	Solid	8270C	680-32028
MB 680-32028/16-A	Method Blank	Solid	8270C	680-32028
680-11658-1	BSLM000101	Solid	8270C	680-32028
680-11658-2	BSLM000201	Solid	8270C	680-32028
680-11658-2MS	Matrix Spike	Solid	8270C	680-32028
680-11658-2MSD	Matrix Spike Duplicate	Solid	8270C	680-32028
680-11658-4	054M000102	Solid	8270C	680-32028
680-11658-5	556M000702	Solid	8270C	680-32028
680-11658-6	556M000502	Solid	8270C	680-32028
680-11658-7	BSLM000401	Solid	8270C	680-32028
680-11658-8	BSLM000301	Solid	8270C	680-32028
680-11658-9	BSLM001001	Solid	8270C	680-32028
680-11658-12	BSLM000701	Solid	8270C	680-32028
680-11658-13	BSLM000601	Solid	8270C	680-32028
680-11658-14	NOIM000402	Solid	8270C	680-32028
680-11658-15	009M000402	Solid	8270C	680-32028
Analysis Batch:680-32997				
680-11658-3	BSLM000901	Solid	8270C	680-32028
680-11658-10	BSLM000801	Solid	8270C	680-32028
680-11658-11	BSLM000501	Solid	8270C	680-32028

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
GC Semi VOA				
Prep Batch: 680-32022				
LCS 680-32022/19-A	Lab Control Spike	Solid	3550B	
LCS 680-32022/24-A	Lab Control Spike	Solid	3550B	
MB 680-32022/18-A	Method Blank	Solid	3550B	
680-11658-1	BSLM000101	Solid	3550B	
680-11658-2	BSLM000201	Solid	3550B	
680-11658-3	BSLM000901	Solid	3550B	
680-11658-4	054M000102	Solid	3550B	
680-11658-5	556M000702	Solid	3550B	
680-11658-6	556M000502	Solid	3550B	
680-11658-7	BSLM000401	Solid	3550B	
680-11658-8	BSLM000301	Solid	3550B	
680-11658-9	BSLM001001	Solid	3550B	
680-11658-10	BSLM000801	Solid	3550B	
680-11658-11	BSLM000501	Solid	3550B	
680-11658-12	BSLM000701	Solid	3550B	
680-11658-13	BSLM000601	Solid	3550B	
680-11658-14	NOIM000402	Solid	3550B	
680-11658-15	009M000402	Solid	3550B	
Analysis Batch:680-33041				
LCS 680-32022/19-A	Lab Control Spike	Solid	8081A_8082	680-32022
LCS 680-32022/24-A	Lab Control Spike	Solid	8081A_8082	680-32022
MB 680-32022/18-A	Method Blank	Solid	8081A_8082	680-32022
680-11658-1	BSLM000101	Solid	8081A_8082	680-32022
680-11658-2	BSLM000201	Solid	8081A_8082	680-32022
680-11658-3	BSLM000901	Solid	8081A_8082	680-32022
680-11658-4	054M000102	Solid	8081A_8082	680-32022
680-11658-5	556M000702	Solid	8081A_8082	680-32022
680-11658-6	556M000502	Solid	8081A_8082	680-32022
680-11658-7	BSLM000401	Solid	8081A_8082	680-32022
680-11658-8	BSLM000301	Solid	8081A_8082	680-32022
680-11658-9	BSLM001001	Solid	8081A_8082	680-32022
680-11658-10	BSLM000801	Solid	8081A_8082	680-32022
680-11658-11	BSLM000501	Solid	8081A_8082	680-32022
680-11658-12	BSLM000701	Solid	8081A_8082	680-32022
680-11658-13	BSLM000601	Solid	8081A_8082	680-32022
680-11658-14	NOIM000402	Solid	8081A_8082	680-32022
680-11658-15	009M000402	Solid	8081A_8082	680-32022

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
Metals				
Prep Batch: 680-31189				
LCS 680-31189/17-A	Lab Control Spike	Solid	3050B	
MB 680-31189/16-A	Method Blank	Solid	3050B	
680-11658-1	BSLM000101	Solid	3050B	
680-11658-1MS	Matrix Spike	Solid	3050B	
680-11658-1MSD	Matrix Spike Duplicate	Solid	3050B	
680-11658-2	BSLM000201	Solid	3050B	
680-11658-3	BSLM000901	Solid	3050B	
680-11658-4	054M000102	Solid	3050B	
680-11658-5	556M000702	Solid	3050B	
680-11658-6	556M000502	Solid	3050B	
680-11658-7	BSLM000401	Solid	3050B	
680-11658-8	BSLM000301	Solid	3050B	
680-11658-9	BSLM001001	Solid	3050B	
680-11658-10	BSLM000801	Solid	3050B	
680-11658-11	BSLM000501	Solid	3050B	
680-11658-12	BSLM000701	Solid	3050B	
680-11658-13	BSLM000601	Solid	3050B	
680-11658-14	NOIM000402	Solid	3050B	
680-11658-15	009M000402	Solid	3050B	
Prep Batch: 680-31625				
LCS 680-31625/24-A	Lab Control Spike	Solid	7471A	
MB 680-31625/23-A	Method Blank	Solid	7471A	
680-11658-1	BSLM000101	Solid	7471A	
680-11658-2	BSLM000201	Solid	7471A	
680-11658-3	BSLM000901	Solid	7471A	
680-11658-4	054M000102	Solid	7471A	
680-11658-5	556M000702	Solid	7471A	
680-11658-6	556M000502	Solid	7471A	
680-11658-7	BSLM000401	Solid	7471A	
680-11658-8	BSLM000301	Solid	7471A	
680-11658-9	BSLM001001	Solid	7471A	
680-11658-10	BSLM000801	Solid	7471A	
680-11658-11	BSLM000501	Solid	7471A	
680-11658-12	BSLM000701	Solid	7471A	
680-11658-13	BSLM000601	Solid	7471A	
680-11658-14	NOIM000402	Solid	7471A	
680-11658-15	009M000402	Solid	7471A	

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
Metals				
Analysis Batch:680-32369				
LCS 680-31189/17-A	Lab Control Spike	Solid	6010B	680-31189
MB 680-31189/16-A	Method Blank	Solid	6010B	680-31189
680-11658-1	BSLM000101	Solid	6010B	680-31189
680-11658-1MS	Matrix Spike	Solid	6010B	680-31189
680-11658-1MSD	Matrix Spike Duplicate	Solid	6010B	680-31189
680-11658-2	BSLM000201	Solid	6010B	680-31189
680-11658-3	BSLM000901	Solid	6010B	680-31189
680-11658-4	054M000102	Solid	6010B	680-31189
680-11658-5	556M000702	Solid	6010B	680-31189
680-11658-6	556M000502	Solid	6010B	680-31189
680-11658-7	BSLM000401	Solid	6010B	680-31189
680-11658-8	BSLM000301	Solid	6010B	680-31189
680-11658-9	BSLM001001	Solid	6010B	680-31189
680-11658-10	BSLM000801	Solid	6010B	680-31189
680-11658-11	BSLM000501	Solid	6010B	680-31189
680-11658-12	BSLM000701	Solid	6010B	680-31189
680-11658-13	BSLM000601	Solid	6010B	680-31189
680-11658-14	NOIM000402	Solid	6010B	680-31189
680-11658-15	009M000402	Solid	6010B	680-31189
Analysis Batch:680-31970				
LCS 680-31625/24-A	Lab Control Spike	Solid	7471A	680-31625
MB 680-31625/23-A	Method Blank	Solid	7471A	680-31625
680-11658-1	BSLM000101	Solid	7471A	680-31625
680-11658-2	BSLM000201	Solid	7471A	680-31625
680-11658-3	BSLM000901	Solid	7471A	680-31625
680-11658-4	054M000102	Solid	7471A	680-31625
680-11658-5	556M000702	Solid	7471A	680-31625
680-11658-6	556M000502	Solid	7471A	680-31625
680-11658-7	BSLM000401	Solid	7471A	680-31625
680-11658-8	BSLM000301	Solid	7471A	680-31625
680-11658-9	BSLM001001	Solid	7471A	680-31625
680-11658-10	BSLM000801	Solid	7471A	680-31625
680-11658-11	BSLM000501	Solid	7471A	680-31625
680-11658-12	BSLM000701	Solid	7471A	680-31625
680-11658-13	BSLM000601	Solid	7471A	680-31625
680-11658-14	NOIM000402	Solid	7471A	680-31625
680-11658-15	009M000402	Solid	7471A	680-31625

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Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

QC Association Summary

Lab Sample ID	Client Sample ID	Client Matrix	Method	Prep Batch
General Chemistry				
Analysis Batch:680-31186				
680-11658-1	BSLM000101	Solid	160.3	
680-11658-2	BSLM000201	Solid	160.3	
680-11658-3	BSLM000901	Solid	160.3	
680-11658-4	054M000102	Solid	160.3	
680-11658-5	556M000702	Solid	160.3	
680-11658-6	556M000502	Solid	160.3	
680-11658-7	BSLM000401	Solid	160.3	
680-11658-8	BSLM000301	Solid	160.3	
680-11658-9	BSLM001001	Solid	160.3	
680-11658-10	BSLM000801	Solid	160.3	
680-11658-11	BSLM000501	Solid	160.3	
680-11658-12	BSLM000701	Solid	160.3	
680-11658-13	BSLM000601	Solid	160.3	
680-11658-14	NOIM000402	Solid	160.3	
680-11658-15	009M000402	Solid	160.3	

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Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Surrogate Recovery Report

8270C Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

Client Matrix: Solid

Lab Sample ID	Client Sample	(2FP) (%Rec)	(FBP) (%Rec)	(NBZ) (%Rec)	(PHL) (%Rec)	(TBP) (%Rec)	(TPH) (%Rec)
680-11658-2MS	BSLM000201	51	54	51	54	70	66
680-11658-2MSD	BSLM000201	45	47	45	48	62	58
LCS 680-32028/17-A	LCS	65	69	68	67	86	82
MB 680-32028/16-A	MB	67	68	65	66	68	79
680-11658-1	BSLM000101	52	51	50	53	68	59
680-11658-2	BSLM000201	52	53	51	56	71	64
680-11658-3	BSLM000901	56	57	54	56	71	69
680-11658-4	054M000102	48	48	47	50	62	61
680-11658-5	556M000702	54	54	53	57	75	61
680-11658-6	556M000502	50	50	49	51	66	61
680-11658-7	BSLM000401	53	54	51	54	69	67
680-11658-8	BSLM000301	57	53	55	58	69	67
680-11658-9	BSLM001001	43	45	42	46	61	61
680-11658-10	BSLM000801	50	48	45	50	61	64
680-11658-11	BSLM000501	51	49	49	53	70	70
680-11658-12	BSLM000701	43	47	45	44	65	66
680-11658-13	BSLM000601	51	53	51	53	67	69
680-11658-14	NOIM000402	54	56	53	55	71	68
680-11658-15	009M000402	45	46	43	47	61	58

Surrogate		Acceptance Limits
(2FP)	2-Fluorophenol	36 - 101
(FBP)	2-Fluorobiphenyl	38 - 104
(NBZ)	Nitrobenzene-d5	33 - 94
(PHL)	Phenol-d5	38 - 102
(TBP)	2,4,6-Tribromophenol	27 - 124
(TPH)	Terphenyl-d14	40 - 129

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Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Surrogate Recovery Report

8081A 8082 Organochlorine Pesticides & Polychlorinated Biphenyls by Gas Chromatography

Client Matrix: Solid

Lab Sample ID	Client Sample	(DCB 1) (%Rec)	(TCX 1) (%Rec)
LCS 680-32022/19-A	LCS	98	93
MB 680-32022/18-A	MB	88	76
680-11658-1	BSLM000101	0 D	0 D
680-11658-2	BSLM000201	0 D	0 D
680-11658-3	BSLM000901	0 D	0 D
680-11658-4	054M000102	0 D	0 D
680-11658-5	556M000702	0 D	0 D
680-11658-6	556M000502	0 D	0 D
680-11658-7	BSLM000401	0 D	0 D
680-11658-8	BSLM000301	0 D	0 D
680-11658-9	BSLM001001	0 D	0 D
680-11658-10	BSLM000801	0 D	0 D
680-11658-11	BSLM000501	0 D	0 D
680-11658-12	BSLM000701	0 D	0 D
680-11658-13	BSLM000601	0 D	0 D
680-11658-14	NOIM000402	0 D	0 D
680-11658-15	009M000402	0 D	0 D

Surrogate		Acceptance Limits
(DCB 1)	DCB Decachlorobiphenyl	30 - 150
(TCX 1)	Tetrachloro-m-xylene	30 - 150

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Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Method Blank - Batch: 680-32028

Method: 8270C
Preparation: 3550B

Lab Sample ID: MB 680-32028/16-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1102
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028
Units: ug/Kg

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1750.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	Result	Qual	MDL	RL
Phenol	330	U	30	330
Bis(2-chloroethyl)ether	330	U	28	330
2-Chlorophenol	330	U	27	330
1,3-Dichlorobenzene	330	U	26	330
1,4-Dichlorobenzene	330	U	22	330
1,2-Dichlorobenzene	330	U	23	330
2-Methylphenol	330	U	30	330
N-Nitrosodi-n-propylamine	330	U	28	330
Hexachloroethane	330	U	20	330
Nitrobenzene	330	U	35	330
Isophorone	330	U	22	330
2-Nitrophenol	330	U	20	330
2,4-Dimethylphenol	330	U	35	330
Bis(2-chloroethoxy)methane	330	U	24	330
2,4-Dichlorophenol	330	U	23	330
1,2,4-Trichlorobenzene	330	U	21	330
Naphthalene	330	U	19	330
4-Chloroaniline	660	U	26	660
Hexachlorobutadiene	330	U	20	330
4-Chloro-3-methylphenol	330	U	34	330
2-Methylnaphthalene	330	U	24	330
Hexachlorocyclopentadiene	330	U	83	330
2,4,6-Trichlorophenol	330	U	20	330
2,4,5-Trichlorophenol	330	U	32	330
2-Chloronaphthalene	330	U	24	330
2-Nitroaniline	1700	U	23	1700
Dimethyl phthalate	330	U	19	330
Acenaphthylene	330	U	17	330
3-Nitroaniline	1700	U	33	1700
Acenaphthene	330	U	19	330
2,4-Dinitrophenol	1700	U	170	1700
4-Nitrophenol	1700	U	210	1700
Dibenzofuran	330	U	19	330
2,4-Dinitrotoluene	330	U	19	330
2,6-Dinitrotoluene	330	U	33	330
3 & 4 Methylphenol	330	U	29	330
Diethyl phthalate	330	U	22	330
4-Chlorophenyl phenyl ether	330	U	19	330
Fluorene	330	U	22	330
4-Nitroaniline	1700	U	17	1700
4,6-Dinitro-2-methylphenol	1700	U	200	1700

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Method Blank - Batch: 680-32028

Method: 8270C
Preparation: 3550B

Lab Sample ID: MB 680-32028/16-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1102
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028
Units: ug/Kg

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1750.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	Result	Qual	MDL	RL
N-Nitrosodiphenylamine	330	U	23	330
4-Bromophenyl phenyl ether	330	U	31	330
Hexachlorobenzene	330	U	26	330
Pentachlorophenol	1700	U	83	1700
Phenanthrene	330	U	29	330
Anthracene	330	U	23	330
Di-n-butyl phthalate	330	U	28	330
Fluoranthene	330	U	26	330
Pyrene	330	U	20	330
Butyl benzyl phthalate	330	U	27	330
3,3'-Dichlorobenzidine	660	U	30	660
Benzo[a]anthracene	330	U	31	330
Bis(2-ethylhexyl) phthalate	330	U	38	330
Chrysene	330	U	25	330
Di-n-octyl phthalate	330	U	31	330
Benzo[b]fluoranthene	330	U	26	330
Benzo[k]fluoranthene	330	U	36	330
Benzo[a]pyrene	330	U	19	330
Indeno[1,2,3-cd]pyrene	330	U	26	330
Dibenz(a,h)anthracene	330	U	24	330
Benzo[g,h,i]perylene	330	U	23	330
Carbazole	330	U	28	330
bis(chloroisopropyl) ether	330	U	35	330

Surrogate	% Rec	Acceptance Limits
Phenol-d5	66	38 - 102
2-Fluorophenol	67	36 - 101
2,4,6-Tribromophenol	68	27 - 124
Nitrobenzene-d5	65	33 - 94
2-Fluorobiphenyl	68	38 - 104
Terphenyl-d14	79	40 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Laboratory Control Sample - Batch: 680-32028

Method: 8270C
Preparation: 3550B

Lab Sample ID: LCS 680-32028/17-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1750
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028
Units: ug/Kg

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1766.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Phenol	3330	2200	66	34 - 98	
Bis(2-chloroethyl)ether	3330	2100	63	30 - 98	
2-Chlorophenol	3330	2200	65	36 - 99	
1,3-Dichlorobenzene	3330	2000	60	34 - 90	
1,4-Dichlorobenzene	3330	2000	59	32 - 90	
1,2-Dichlorobenzene	3330	2100	62	35 - 93	
2-Methylphenol	3330	2300	69	38 - 107	
N-Nitrosodi-n-propylamine	3330	2300	69	24 - 108	
Hexachloroethane	3330	1700	51	31 - 88	
Nitrobenzene	3330	2200	67	33 - 106	
Isophorone	3330	2400	72	37 - 106	
2-Nitrophenol	3330	2300	68	38 - 104	
2,4-Dimethylphenol	3330	2400	73	40 - 112	
Bis(2-chloroethoxy)methane	3330	2400	72	38 - 106	
2,4-Dichlorophenol	3330	2400	73	43 - 108	
1,2,4-Trichlorobenzene	3330	2200	67	36 - 98	
Naphthalene	3330	2200	67	34 - 97	
4-Chloroaniline	3330	1800	55	7 - 103	
Hexachlorobutadiene	3330	2600	77	42 - 105	
4-Chloro-3-methylphenol	3330	2700	81	39 - 113	
2-Methylnaphthalene	3330	2400	72	39 - 104	
Hexachlorocyclopentadiene	3330	520	16	20 - 109	*
2,4,6-Trichlorophenol	3330	2500	75	44 - 113	
2,4,5-Trichlorophenol	3330	2600	78	46 - 116	
2-Chloronaphthalene	3330	2300	69	41 - 110	
2-Nitroaniline	3330	2700	80	38 - 124	
Dimethyl phthalate	3330	2600	77	43 - 114	
Acenaphthylene	3330	2500	75	41 - 112	
3-Nitroaniline	3330	2400	71	19 - 118	
Acenaphthene	3330	2400	72	36 - 108	
2,4-Dinitrophenol	3330	1200	37	1 - 131	J
4-Nitrophenol	3330	2800	83	21 - 132	
Dibenzofuran	3330	2500	74	44 - 108	
2,4-Dinitrotoluene	3330	2700	81	32 - 128	
2,6-Dinitrotoluene	3330	2600	79	38 - 128	
3 & 4 Methylphenol	3330	2300	69	37 - 106	
Diethyl phthalate	3330	2600	79	41 - 118	
4-Chlorophenyl phenyl ether	3330	2600	77	42 - 111	
Fluorene	3330	2600	77	37 - 113	
4-Nitroaniline	3330	2600	79	32 - 130	
4,6-Dinitro-2-methylphenol	3330	2200	65	11 - 142	
N-Nitrosodiphenylamine	3330	2600	78	16 - 113	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Laboratory Control Sample - Batch: 680-32028

Method: 8270C
Preparation: 3550B

Lab Sample ID: LCS 680-32028/17-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1750
Date Prepared: 12/23/2005 0815

Analysis Batch: 680-32923
Prep Batch: 680-32028
Units: ug/Kg

Instrument ID: GC/MS SemiVolatiles - T
Lab File ID: t1766.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 1.0 mL
Injection Volume:

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
4-Bromophenyl phenyl ether	3330	2300	68	38 - 106	
Hexachlorobenzene	3330	2600	79	46 - 115	
Pentachlorophenol	3330	2200	66	27 - 116	
Phenanthrene	3330	2600	77	47 - 114	
Anthracene	3330	2600	77	46 - 115	
Di-n-butyl phthalate	3330	2700	82	35 - 93	
Fluoranthene	3330	2800	84	41 - 124	
Pyrene	3330	2700	81	36 - 128	
Butyl benzyl phthalate	3330	2900	88	43 - 127	
3,3'-Dichlorobenzidine	3330	2500	76	1 - 118	
Benzo[a]anthracene	3330	2700	80	46 - 116	
Bis(2-ethylhexyl) phthalate	3330	2800	85	25 - 134	
Chrysene	3330	2600	79	46 - 118	
Di-n-octyl phthalate	3330	3100	93	43 - 129	
Benzo[b]fluoranthene	3330	2600	78	35 - 122	
Benzo[k]fluoranthene	3330	2600	78	36 - 124	
Benzo[a]pyrene	3330	2700	80	37 - 120	
Indeno[1,2,3-cd]pyrene	3330	2700	82	36 - 133	
Dibenz(a,h)anthracene	3330	2700	82	41 - 124	
Benzo[g,h,i]perylene	3330	2600	78	41 - 122	
Carbazole	3330	2600	79	47 - 118	
bis(chloroisopropyl) ether	3330	2200	65	16 - 116	

Surrogate	% Rec	Acceptance Limits
Phenol-d5	67	38 - 102
2-Fluorophenol	65	36 - 101
2,4,6-Tribromophenol	86	27 - 124
Nitrobenzene-d5	68	33 - 94
2-Fluorobiphenyl	69	38 - 104
Terphenyl-d14	82	40 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-32028

Method: 8270C
Preparation: 3550B

MS Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1767.d
Dilution:	1.0		Initial Weight/Volume: 30.00 g
Date Analyzed:	01/04/2006 1815		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

MSD Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1768.d
Dilution:	1.0		Initial Weight/Volume: 30.05 g
Date Analyzed:	01/04/2006 1841		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Phenol	50	46	34 - 98	10	50		
Bis(2-chloroethyl)ether	47	42	30 - 98	13	50		
2-Chlorophenol	51	45	36 - 99	14	50		
1,3-Dichlorobenzene	40	35	34 - 90	14	50		
1,4-Dichlorobenzene	41	36	32 - 90	14	50		
1,2-Dichlorobenzene	44	38	35 - 93	15	50		
2-Methylphenol	54	48	38 - 107	11	50		
N-Nitrosodi-n-propylamine	53	48	24 - 108	11	50		
Hexachloroethane	28	27	31 - 88	4	50	N	N
Nitrobenzene	50	44	33 - 106	12	50		
Isophorone	55	48	37 - 106	13	50		
2-Nitrophenol	50	44	38 - 104	11	50		
2,4-Dimethylphenol	59	50	40 - 112	15	50		
Bis(2-chloroethoxy)methane	54	48	38 - 106	13	50		
2,4-Dichlorophenol	58	51	43 - 108	13	50		
1,2,4-Trichlorobenzene	49	43	36 - 98	13	50		
Naphthalene	50	45	34 - 97	12	50		
4-Chloroaniline	50	45	7 - 103	11	50		
Hexachlorobutadiene	54	47	42 - 105	14	50		
4-Chloro-3-methylphenol	64	56	39 - 113	13	50		
2-Methylnaphthalene	54	48	39 - 104	12	50		
Hexachlorocyclopentadiene	0	0	20 - 109	NC	50	U N	U N
2,4,6-Trichlorophenol	60	54	44 - 113	12	50		
2,4,5-Trichlorophenol	63	56	46 - 116	12	50		
2-Chloronaphthalene	54	47	41 - 110	14	50		
2-Nitroaniline	64	58	38 - 124	11	50		
Dimethyl phthalate	61	55	43 - 114	10	50		
Acenaphthylene	59	51	41 - 112	14	50		
3-Nitroaniline	60	56	19 - 118	7	50		
Acenaphthene	57	50	36 - 108	12	50		

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-32028

Method: 8270C
Preparation: 3550B

MS Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1767.d
Dilution:	1.0		Initial Weight/Volume: 30.00 g
Date Analyzed:	01/04/2006 1815		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

MSD Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1768.d
Dilution:	1.0		Initial Weight/Volume: 30.05 g
Date Analyzed:	01/04/2006 1841		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
2,4-Dinitrophenol	55	51	1 - 131	7	50		
4-Nitrophenol	66	61	21 - 132	8	50		
Dibenzofuran	58	52	44 - 108	11	50		
2,4-Dinitrotoluene	66	59	32 - 128	11	50		
2,6-Dinitrotoluene	63	57	38 - 128	9	50		
3 & 4 Methylphenol	54	49	37 - 106	11	50		
Diethyl phthalate	64	58	41 - 118	11	50		
4-Chlorophenyl phenyl ether	61	53	42 - 111	14	50		
Fluorene	61	54	37 - 113	12	50		
4-Nitroaniline	61	57	32 - 130	7	50		
4,6-Dinitro-2-methylphenol	60	59	11 - 142	2	50		
N-Nitrosodiphenylamine	62	57	16 - 113	8	50		
4-Bromophenyl phenyl ether	54	50	38 - 106	8	50		
Hexachlorobenzene	61	56	46 - 115	8	50		
Pentachlorophenol	62	56	27 - 116	10	50		
Phenanthrene	61	55	47 - 114	10	50		
Anthracene	62	56	46 - 115	10	50		
Di-n-butyl phthalate	64	58	35 - 93	10	50		
Fluoranthene	65	60	41 - 124	8	50		
Pyrene	65	59	36 - 128	10	50		
Butyl benzyl phthalate	70	64	43 - 127	9	50		
3,3'-Dichlorobenzidine	73	67	1 - 118	9	50		
Benzo[a]anthracene	65	58	46 - 116	11	50		
Bis(2-ethylhexyl) phthalate	64	58	25 - 134	11	50		
Chrysene	63	57	46 - 118	10	50		
Di-n-octyl phthalate	70	63	43 - 129	10	50		
Benzo[b]fluoranthene	61	58	35 - 122	5	50		
Benzo[k]fluoranthene	64	52	36 - 124	21	50		
Benzo[a]pyrene	64	56	37 - 120	13	50		
Indeno[1,2,3-cd]pyrene	64	59	36 - 133	9	50		

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-32028

Method: 8270C
Preparation: 3550B

MS Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1767.d
Dilution:	1.0		Initial Weight/Volume: 30.00 g
Date Analyzed:	01/04/2006 1815		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

MSD Lab Sample ID:	680-11658-2	Analysis Batch: 680-32923	Instrument ID: GC/MS SemiVolatiles - T
Client Matrix:	Solid	Prep Batch: 680-32028	Lab File ID: t1768.d
Dilution:	1.0		Initial Weight/Volume: 30.05 g
Date Analyzed:	01/04/2006 1841		Final Weight/Volume: 1.0 mL
Date Prepared:	12/23/2005 0815		Injection Volume:

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Dibenz(a,h)anthracene	65	57	41 - 124	14	50		
Benzo[g,h,i]perylene	60	54	41 - 122	10	50		
Carbazole	62	57	47 - 118	8	50		
bis(chloroisopropyl) ether	49	43	16 - 116	11	50		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
Phenol-d5	54	48	38 - 102
2-Fluorophenol	51	45	36 - 101
2,4,6-Tribromophenol	70	62	27 - 124
Nitrobenzene-d5	51	45	33 - 94
2-Fluorobiphenyl	54	47	38 - 104
Terphenyl-d14	66	58	40 - 129

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Data Report - Batch: 680-32028

Method: 8270C
Preparation: 3550B

MS Lab Sample ID: 680-11658-2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1815
Date Prepared: 12/23/2005 0815

Units: ug/Kg

MSD Lab Sample ID: 680-11658-2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1841
Date Prepared: 12/23/2005 0815

Analyte	Sample Result/Qual		MS Spike Amount	MSD Spike Amount	MS Result/Qual		MSD Result/Qual	
Phenol	1200	U	12500	12500	6300		5700	
Bis(2-chloroethyl)ether	1200	U	12500	12500	6000		5200	
2-Chlorophenol	1200	U	12500	12500	6400		5600	
1,3-Dichlorobenzene	1200	U	12500	12500	5000		4300	
1,4-Dichlorobenzene	1200	U	12500	12500	5100		4500	
1,2-Dichlorobenzene	1200	U	12500	12500	5500		4700	
2-Methylphenol	1200	U	12500	12500	6800		6000	
N-Nitrosodi-n-propylamine	1200	U	12500	12500	6600		6000	
Hexachloroethane	1200	U	12500	12500	3500	N	3400	N
Nitrobenzene	1200	U	12500	12500	6300		5500	
Isophorone	1200	U	12500	12500	6900		6000	
2-Nitrophenol	1200	U	12500	12500	6200		5600	
2,4-Dimethylphenol	1200	U	12500	12500	7400		6300	
Bis(2-chloroethoxy)methane	1200	U	12500	12500	6800		6000	
2,4-Dichlorophenol	1200	U	12500	12500	7200		6400	
1,2,4-Trichlorobenzene	1200	U	12500	12500	6200		5400	
Naphthalene	1200	U	12500	12500	6300		5600	
4-Chloroaniline	2500	U	12500	12500	6300		5700	
Hexachlorobutadiene	1200	U	12500	12500	6800		5900	
4-Chloro-3-methylphenol	1200	U	12500	12500	8000		7100	
2-Methylnaphthalene	1200	U	12500	12500	6700		5900	
Hexachlorocyclopentadiene	1200	U	12500	12500	1200	U N	1200	U N
2,4,6-Trichlorophenol	1200	U	12500	12500	7600		6700	
2,4,5-Trichlorophenol	1200	U	12500	12500	7800		7000	
2-Chloronaphthalene	1200	U	12500	12500	6800		5900	
2-Nitroaniline	6400	U	12500	12500	8100		7300	
Dimethyl phthalate	1200	U	12500	12500	7600		6900	
Acenaphthylene	1200	U	12500	12500	7400		6400	
3-Nitroaniline	6400	U	12500	12500	7500		6900	
Acenaphthene	1200	U	12500	12500	7100		6300	
2,4-Dinitrophenol	6400	U	12500	12500	6900		6400	
4-Nitrophenol	6400	U	12500	12500	8200		7600	
Dibenzofuran	1200	U	12500	12500	7300		6500	
2,4-Dinitrotoluene	1200	U	12500	12500	8200		7400	
2,6-Dinitrotoluene	1200	U	12500	12500	7900		7200	
3 & 4 Methylphenol	1200	U	12500	12500	6800		6100	
Diethyl phthalate	1200	U	12500	12500	8100		7300	
4-Chlorophenyl phenyl ether	1200	U	12500	12500	7600		6600	
Fluorene	1200	U	12500	12500	7700		6800	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Data Report - Batch: 680-32028

Method: 8270C
Preparation: 3550B

MS Lab Sample ID: 680-11658-2 Units: ug/Kg
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1815
Date Prepared: 12/23/2005 0815

MSD Lab Sample ID: 680-11658-2
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/04/2006 1841
Date Prepared: 12/23/2005 0815

Analyte	Sample Result/Qual		MS Spike Amount	MSD Spike Amount	MS Result/Qual	MSD Result/Qual
4-Nitroaniline	6400	U	12500	12500	7600	7100
4,6-Dinitro-2-methylphenol	6400	U	12500	12500	7600	7400
N-Nitrosodiphenylamine	1200	U	12500	12500	7800	7200
4-Bromophenyl phenyl ether	1200	U	12500	12500	6800	6300
Hexachlorobenzene	1200	U	12500	12500	7700	7100
Pentachlorophenol	6400	U	12500	12500	7700	7000
Phenanthrene	1200	U	12500	12500	7600	6900
Anthracene	1200	U	12500	12500	7800	7000
Di-n-butyl phthalate	1200	U	12500	12500	8100	7300
Fluoranthene	110	J	12500	12500	8300	7600
Pyrene	170	J	12500	12500	8300	7500
Butyl benzyl phthalate	1200	U	12500	12500	8800	8000
3,3'-Dichlorobenzidine	2500	U	12500	12500	9100	8300
Benzo[a]anthracene	1200	U	12500	12500	8100	7300
Bis(2-ethylhexyl) phthalate	170	J	12500	12500	8200	7400
Chrysene	94	J	12500	12500	7900	7200
Di-n-octyl phthalate	1200	U	12500	12500	8700	7900
Benzo[b]fluoranthene	1200	U	12500	12500	7700	7300
Benzo[k]fluoranthene	1200	U	12500	12500	8000	6500
Benzo[a]pyrene	1200	U	12500	12500	8000	7100
Indeno[1,2,3-cd]pyrene	1200	U	12500	12500	8000	7400
Dibenz(a,h)anthracene	1200	U	12500	12500	8200	7100
Benzo[g,h,i]perylene	1200	U	12500	12500	7500	6800
Carbazole	1200	U	12500	12500	7700	7100
bis(chloroisopropyl) ether	1200	U	12500	12500	6100	5400

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Method Blank - Batch: 680-32022

Method: 8081A_8082
Preparation: 3550B

Lab Sample ID: MB 680-32022/18-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/05/2006 0238
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022
Units: ug/Kg

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04040.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Result	Qual	MDL	RL
4,4'-DDD	3.3	U	0.30	3.3
4,4'-DDE	3.3	U	0.30	3.3
4,4'-DDT	3.3	U	0.27	3.3
Aldrin	1.7	U	0.14	1.7
alpha-BHC	1.7	U	0.52	1.7
beta-BHC	1.7	U	0.47	1.7
Chlordane (technical)	17	U	3.0	17
delta-BHC	1.7	U	0.23	1.7
Dieldrin	3.3	U	0.35	3.3
Endosulfan I	1.7	U	0.16	1.7
Endosulfan II	3.3	U	0.27	3.3
Endosulfan sulfate	3.3	U	0.37	3.3
Endrin	3.3	U	0.32	3.3
Endrin aldehyde	3.3	U	0.65	3.3
Endrin ketone	3.3	U	0.32	3.3
gamma-BHC (Lindane)	1.7	U	0.14	1.7
Heptachlor	1.7	U	0.32	1.7
Heptachlor epoxide	1.7	U	0.21	1.7
Methoxychlor	17	U	0.47	17
PCB-1016	33	U	6.7	33
PCB-1221	67	U	6.8	67
PCB-1232	33	U	6.2	33
PCB-1242	33	U	7.5	33
PCB-1248	33	U	8.0	33
PCB-1254	33	U	5.2	33
PCB-1260	33	U	6.4	33
Toxaphene	170	U	12	170

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	88	30 - 150
Tetrachloro-m-xylene	76	30 - 150

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Laboratory Control Sample - Batch: 680-32022

Method: 8081A_8082
Preparation: 3550B

Lab Sample ID: LCS 680-32022/19-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/05/2006 0257
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022
Units: ug/Kg

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04041.d
Initial Weight/Volume: 30.00 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
4,4'-DDD	6.67	6.3	94	35 - 149	
4,4'-DDE	6.67	5.8	86	35 - 122	
4,4'-DDT	6.67	8.3	124	24 - 171	
Aldrin	3.33	3.4	101	26 - 139	
alpha-BHC	3.33	3.2	95	23 - 127	
beta-BHC	3.33	1.8	54	22 - 134	
delta-BHC	3.33	3.3	98	43 - 123	
Dieldrin	6.67	5.8	87	29 - 146	
Endosulfan I	3.33	2.9	87	31 - 124	
Endosulfan II	6.67	5.2	77	31 - 127	
Endosulfan sulfate	6.67	8.9	134	55 - 136	
Endrin	6.67	6.7	100	45 - 148	
Endrin aldehyde	6.67	6.3	94	36 - 123	
Endrin ketone	6.67	5.6	84	47 - 156	
gamma-BHC (Lindane)	3.33	3.0	89	16 - 144	
Heptachlor	3.33	3.5	106	19 - 150	
Heptachlor epoxide	3.33	3.2	97	43 - 132	
Methoxychlor	6.67	7.2	108	13 - 208	JP

Surrogate	% Rec	Acceptance Limits
DCB Decachlorobiphenyl	98	30 - 150
Tetrachloro-m-xylene	93	30 - 150

Laboratory Control Sample - Batch: 680-32022

Method: 8081A_8082
Preparation: 3550B

Lab Sample ID: LCS 680-32022/24-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 01/05/2006 0317
Date Prepared: 12/23/2005 0802

Analysis Batch: 680-33041
Prep Batch: 680-32022
Units: ug/Kg

Instrument ID: GC SemiVolatiles - M
Lab File ID: mja04042.d
Initial Weight/Volume: 30.01 g
Final Weight/Volume: 10 mL
Injection Volume:
Column ID: PRIMARY

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
PCB-1016	333	290	86	34 - 128	
PCB-1260	333	330	98	28 - 168	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Method Blank - Batch: 680-31189

Method: 6010B
Preparation: 3050B

Lab Sample ID: MB 680-31189/16-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/28/2005 0510
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189
Units: mg/Kg

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.50 g
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Silver	1.0	U	0.099	1.0
Aluminum	20	U	4.5	20
Arsenic	1.0	U	0.67	1.0
Barium	1.0	U	0.30	1.0
Beryllium	0.40	U	0.017	0.40
Calcium	50	U	2.4	50
Cadmium	0.50	U	0.22	0.50
Cobalt	1.0	U	0.17	1.0
Chromium	0.17	J	0.13	1.0
Copper	2.0	U	0.17	2.0
Iron	5.0	U	4.2	5.0
Potassium	2.6	J	1.3	100
Magnesium	50	U	1.2	50
Manganese	1.0	U	0.21	1.0
Sodium	70	J	50	100
Nickel	4.0	U	0.26	4.0
Lead	0.50	U	0.21	0.50
Antimony	2.0	U	0.45	2.0
Selenium	2.5	U	0.90	2.5
Thallium	2.5	U	1.3	2.5
Vanadium	1.0	U	0.14	1.0
Zinc	2.0	U	0.75	2.0

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Laboratory Control Sample - Batch: 680-31189

Method: 6010B
Preparation: 3050B

Lab Sample ID: LCS 680-31189/17-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/28/2005 0514
Date Prepared: 12/16/2005 0838

Analysis Batch: 680-32369
Prep Batch: 680-31189
Units: mg/Kg

Instrument ID: ICP/AES
Lab File ID: N/A
Initial Weight/Volume: 0.50 g
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Silver	5.00	4.4	88	75 - 125	
Aluminum	200	200	101	75 - 125	
Arsenic	200	190	93	75 - 125	
Barium	200	200	101	75 - 125	
Beryllium	5.00	4.9	98	75 - 125	
Calcium	500	500	99	75 - 125	
Cadmium	5.00	4.7	95	75 - 125	
Cobalt	50.0	49	98	75 - 125	
Chromium	20.0	20	100	75 - 125	
Copper	25.0	25	102	75 - 125	
Iron	109	100	96	75 - 125	
Potassium	500	490	97	75 - 125	
Magnesium	500	470	94	75 - 125	
Manganese	50.0	52	103	75 - 125	
Sodium	500	520	104	75 - 125	
Nickel	50.0	49	97	75 - 125	
Lead	50.0	48	96	75 - 125	
Antimony	50.0	46	92	75 - 125	
Selenium	200	180	90	75 - 125	
Thallium	200	190	97	75 - 125	
Vanadium	50.0	49	98	75 - 125	
Zinc	50.0	50	99	75 - 125	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-31189

Method: 6010B
Preparation: 3050B

MS Lab Sample ID:	680-11658-1	Analysis Batch:	680-32369	Instrument ID:	ICP/AES
Client Matrix:	Solid	Prep Batch:	680-31189	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	0.55 g
Date Analyzed:	12/28/2005 0533			Final Weight/Volume:	50 mL
Date Prepared:	12/16/2005 0838				

MSD Lab Sample ID:	680-11658-1	Analysis Batch:	680-32369	Instrument ID:	ICP/AES
Client Matrix:	Solid	Prep Batch:	680-31189	Lab File ID:	N/A
Dilution:	1.0			Initial Weight/Volume:	0.55 g
Date Analyzed:	12/28/2005 0538			Final Weight/Volume:	50 mL
Date Prepared:	12/16/2005 0838				

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Silver	84	87	75 - 125	3	20		
Aluminum	1630	1510	75 - 125	2	20	4	4
Arsenic	87	89	75 - 125	2	20		
Barium	97	99	75 - 125	2	20		
Beryllium	94	96	75 - 125	2	20		
Calcium	78	80	75 - 125	1	20		
Cadmium	93	97	75 - 125	4	20		
Cobalt	93	95	75 - 125	2	20		
Chromium	100	105	75 - 125	2	20	B	B
Copper	99	101	75 - 125	2	20		
Iron	645	1120	75 - 125	3	20	4	4
Potassium	88	84	75 - 125	1	20	B	B
Magnesium	91	102	75 - 125	2	20	4	4
Manganese	93	99	75 - 125	2	20		
Sodium	66	97	75 - 125	4	20	B 4	B 4
Nickel	92	95	75 - 125	3	20		
Lead	90	92	75 - 125	2	20		
Antimony	34	31	75 - 125	11	20	N	N
Selenium	86	88	75 - 125	2	20		
Thallium	93	95	75 - 125	2	20		
Vanadium	95	99	75 - 125	3	20		
Zinc	93	102	75 - 125	6	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Matrix Spike/
Matrix Spike Duplicate Data Report - Batch: 680-31189

Method: 6010B
Preparation: 3050B

MS Lab Sample ID: 680-11658-1 Units: mg/Kg
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/28/2005 0533
Date Prepared: 12/16/2005 0838

MSD Lab Sample ID: 680-11658-1
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/28/2005 0538
Date Prepared: 12/16/2005 0838

Analyte	Sample Result/Qual		MS Spike Amount	MSD Spike Amount	MS Result/Qual		MSD Result/Qual	
Silver	2.6	U	12.8	12.8	11		11	
Aluminum	27000		514	514	36000	4	35000	4
Arsenic	15		514	514	460		470	
Barium	30		514	514	530		540	
Beryllium	1.5		12.8	12.8	14		14	
Calcium	3100		1280	1280	4100		4100	
Cadmium	1.3	U	12.8	12.8	12		12	
Cobalt	7.4		128	128	130		130	
Chromium	56		51.4	51.4	110	B	110	B
Copper	7.7		64.2	64.2	71		73	
Iron	33000		257	257	35000	4	36000	4
Potassium	4200		1280	1280	5300	B	5200	B
Magnesium	7100		1280	1280	8300	4	8400	4
Manganese	240		128	128	360		360	
Sodium	10000		1280	1280	11000	B 4	11000	B 4
Nickel	15		128	128	130		140	
Lead	14		128	128	130		130	
Antimony	5.1	U	128	128	44	N	39	N
Selenium	6.4	U	514	514	440		450	
Thallium	6.4	U	514	514	480		490	
Vanadium	61		128	128	180		190	
Zinc	53		128	128	170		180	

Calculations are performed before rounding to avoid round-off errors in calculated results.

SEVERN TRENT STL®

Quality Control Results

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Method Blank - Batch: 680-31625

Method: 7471A
Preparation: 7471A

Lab Sample ID: MB 680-31625/23-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/22/2005 0702
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625
Units: mg/Kg

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.00 g
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Mercury	0.020	U	0.0040	0.020

Laboratory Control Sample - Batch: 680-31625

Method: 7471A
Preparation: 7471A

Lab Sample ID: LCS 680-31625/24-A
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 12/22/2005 0705
Date Prepared: 12/20/2005 1218

Analysis Batch: 680-31970
Prep Batch: 680-31625
Units: mg/Kg

Instrument ID: LEEMAN1
Lab File ID: N/A
Initial Weight/Volume: 1.00 g
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Mercury	0.125	0.11	88	80 - 120	

Calculations are performed before rounding to avoid round-off errors in calculated results.

ENSAFE / Spectratech

800-368-7362
MEMPHIS, TENNESSEE
CHARLESTON,SC; CINCINNATI,OH; DALLAS,TX; JACKSON,TN; KNOXVILLE,TN; LANCASTER,PA; NASHVILLE,TN; NORFOLK,VA; PADUCAH,KY; PENSACOLA,FL; RALEIGH,NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0164
COC NO:
PO NO:
REL NO:
LAB NAME: STL-Savannah

SEVERN TRENT STL®

CLIENT US Navy
PROJECT MANAGER Charlie Vernoy-Ensafe / Robb Unger-Spectratech
LOCATION Zone J-CNC
TELE/FAX NO. 865-483-7210/865-483-7262 (Spectra)
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	Metals								REMARKS
BSLM0001 01	12/13/05	1058	SD	8oz glass jar 250ml poly jar	4°C	None	2	X	X	X								
BSLM0002 01		1110					2	X	X	X								
BSLM0009 01		1132					2	X	X	X								
054M0001 02		1158					2	X	X	X								
556M0007 02		1212					2	X	X	X								
556M0005 02		1225					2	X	X	X								
BSLM0004 01		1238					2	X	X	X								
BSLM0003 01		1246					2	X	X	X								
BSLM0010 01		1315					2	X	X	X								
BSLM0008 01		1340					2	X	X	X								
BSLM0005 01		1408					2	X	X	X								
BSLM0007 01		1430					2	X	X	X								
BSLM0006 01		1450					2	X	X	X								
NOIM0004 02		1609					2	X	X	X								
009M0004 02	12/14/05	1055					2	X	X	X								680-11658

TEMP. 1.4/1.7

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Julie Shaffer	12/14/05					K Conner	12/15/05
PRINTED: Julie Shaffer	TIME 1500	PRINTED:	TIME	PRINTED:	TIME	PRINTED: K Conner	TIME 0936
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY: STL SAVANNAH	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO.
SEND RESULTS TO: Charlie Vernoy (EnSafe) + Robb Unger (Spectratech)

COMMENTS:

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

SEVERN TRENT STL®

LOGIN SAMPLE RECEIPT CHECK LIST

Client: Spectra Tech

Job Number: 680-11658-1
Sdg Number: SA0C02

Login Number: 11658

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present	True	
Samples do not require splitting or compositing	True	

CASE NARATIVE
Pesticide Fraction (8081A)
STL Lab Reference No. / SDG: 680-11658 / SAOC02
Project: AOC 721 and ZONE J

SEVERN TRENT STL

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.
B. Sample Analysis: All holding times were met.

III. METHODS

Preparation: SW-846 3550B
Cleanup: Florisil and copper
Analysis: SW-846 8081/8082A

IV. PREPARATION

Sample preparation proceeded normally. Samples were extracted in prep batch 680-32022.

V. ANALYSIS

A. Calibration: The initial calibration (ICAL) met all acceptance criteria.

The grand mean exception (GME) was applied to continuing calibration verification (CCV) standards in this package. This rule is described in Method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration (ICAL) may be used for quantitation if the average percent difference (%D) of all the compounds in the CCV is less than or equal to 15 %. The data are summarized on the Form VII for each clock. The Form VII includes the %D for each target compound and a calculation of the grand mean for that CCV.

B. Blanks: All acceptance criteria were met.

C. Surrogates: Due to the level of dilution required because of the presence of non-target matrix interferences, the surrogate recoveries could not be calculated for any of the samples in this package. These results have been denoted with an "0D" data qualifier on Form 2.

D. Spikes: A lab control standard (LCS) for organochlorine pesticides and an LCS for PCB (Aroclor 1016/1260) were extracted and analyzed along with the samples. All acceptance criteria were met.

E. Samples: Due to non-target matrix interferences, the samples in this package were analyzed and reported at a dilution of 10 (DF=10). The samples were subjected to Florisil and copper cleanups in an attempt to minimize the interferences and were analyzed initially at no dilution (DF=1). The capping CCV (CCV analyzed after the samples) for the "straight runs" (DF=1) exceeded the acceptance criteria for almost all of the pesticide target compounds. Endrin and DDT were especially affected by the samples' matrix interferences and the PCB capping CCV was also adversely impacted by the samples' matrices.

F. Other: None.

SEVERN TRENT STL

CASE NARRATIVE
TCL SEMI-VOLATILES (8270C) Fraction

STL Lab Reference No: 680-11658/ SDG No: SAOC02
CLIENT: ENSAFE

I. RECEIPT

The samples were received in good condition with cooler temperatures within acceptance criteria. No exceptions were encountered.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Preparation: SW-846 3520C
Cleanup: N/A
Analysis: SW-846 8270

IV. PREPARATION

Sample preparation proceeded normally.

V. ANALYSIS

A. Calibration: All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Surrogates: All acceptance criteria were met.

D. Spikes: Lab control sample was analyzed concurrently with client's samples. Spiking compound Hexachlorocyclopentadiene recovered outside of control limits in lab control sample 680-32028. This has been denoted on the LIMS report with a "*" data qualifier.

Sample 680-11685-2 was the batch matrix spike/matrix spike duplicate (MS/MSD). Compounds Hexachloroethane and Hexachlorocyclopentadiene recovered outside of control limits in MS/MSD. This has been denoted on the LIMS report with a "N" data qualifier.

E. Samples: In batch 32028 internal standards recovered outside of control limits in sample 680-11658-3. This has been denoted on the Form 8 with a "*" data qualifier.

F. Other: No additional exceptions were encountered during the analysis of the samples contained within this SDG.

CASE NARRATIVE
Metals Fraction

STL Lab Reference No: STL Log# 680-11658/ SDG# SA0C02

Project: Spectra Tech

I. RECEIPT

The samples were received in good condition with cooler temperatures within acceptance criteria. Please refer to attached custody cooler inspection form for exceptions.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Preparation: 3050B/7471A
Cleanup: N/A
Analysis: SW-846/ 6010B/7471A

IV. PREPARATION

Sample preparation proceeded normally.

V. ANALYSIS

A. Calibration: All acceptance criteria were met.

B. Blanks: Due to J values (results between the MDL and RL) in the method blank, all associated sample results were flagged with a "B" qualifier for chromium, potassium, and sodium. All other acceptance criteria were met.

C. Spikes/Duplicate: Sample 680-11658-1 (BSLM000101) was used as the batch matrix spike/ matrix spike duplicate (MS/MSD) for the ICP metals analysis. The MS/MSD percent recoveries were outside of control limits for antimony. This is indicated by an "N" qualifier on the Form 5A and in the LIMS report. Due to abundance, the MS/MSD percent recoveries were outside of control limits for aluminum, iron, and sodium. This is indicated by a "4" qualifier in the LIMS report. All other acceptance criteria were met. A non-client sample was used as the batch MS/MSD for the mercury analysis. Forms 5A and 6 have been provided, but do not impact the reported data.

D. Post Spike/ Serial Dilution: A non-client sample was used as the batch serial dilution and post-digestion spike for the mercury analysis. In the initial analysis, the batch post-digestion spike percent recovery was outside of control limits. The post-digestion spike was reprepped and reanalyzed. The post-digestion spike percent recovery was within control limits for the reanalysis. All other acceptance criteria were met.

E. Samples: All acceptance criteria were met.

F. Other: All other acceptance criteria were met.

ENSAFE / Spectratech

800-588-7862
MEMPHIS, TENNESSEE
CHARLESTON,SC; CINCINNATI,OH; DALLAS,TX; JACKSON,TN; KNOXVILLE,TN; LANCASTER,PA; NASHVILLE,TN; NORFOLK,VA; PADUCAH,KY; PENSACOLA,FL; RALEIGH,NC; COLOGNE, GERMANY

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1
PROJECT/JOB NO: 0164
COC NO:
PO NO:
REL NO:
LAB NAME: STL-Savannah

CLIENT US Navy
PROJECT MANAGER Charlie Vernoy - EnSafe / Robb Unger - Spectratech
LOCATION Zone J - CNC
TELE/FAX NO. 865-483-7210 / 865-483-7262 (Spectra)
SAMPLERS: (SIGNATURE) Julie Shaffer

ANALYSIS REQUIRED

FIELD SAMPLE NUMBER	DATE	TIME	SAMPLE TYPE	TYPE/SIZE OF CONTAINER	PRESERVATION TEMP.	PRESERVATION CHEMICAL	NO. OF CONTAINERS	SVOC	Pesticide/PCB	Metals								REMARKS
BSLM0001 01	12/13/05	1058	SD	8oz glass jar 250ml poly jar	4°C	None	2	X	X	X								
BSLM0002 01		1110					2	X	X	X								
BSLM0009 01		1132					2	X	X	X								
054M0001 02		1158					2	X	X	X								
556M0007 02		1212					2	X	X	X								
556M0005 02		1225					2	X	X	X								
BSLM0004 01		1238					2	X	X	X								
BSLM0003 01		1246					2	X	X	X								
BSLM0010 01		1315					2	X	X	X								TEMP. 1.4/1.7
BSLM0008 01		1340					2	X	X	X								
BSLM0005 01		1408					2	X	X	X								
BSLM0007 01		1430					2	X	X	X								
BSLM0006 01		1450					2	X	X	X								
NOIM0004 02		1609					2	X	X	X								
009M0004 02	12/14/05	1055					2	X	X	X								680-11658

RELINQUISHER:	DATE	RECEIVER:	DATE	RELINQUISHER:	DATE	RECEIVER:	DATE
Julie Shaffer	12/14/05					K Conner	12/15/05
PRINTED: Julie Shaffer	TIME 1500	PRINTED:	TIME	PRINTED:	TIME	PRINTED: K Conner	TIME 0936
COMPANY: EnSafe		COMPANY:		COMPANY:		COMPANY: STL SAVANNAH	

METHOD OF SHIPMENT: FED-EX
SHIPMENT NO.
SEND RESULTS TO: Charlie Vernoy (EnSafe) + Robb Unger (Spectratech)

COMMENTS:

ANALYTICAL DATA RECEIVED BY (INITIALS/DATE)

ENSCOC2
REV. 05/98

TRENT STL

COOLER RECEIPT AND INSPECTION FORM

Log Number: 680-11658

Number of Coolers Received: 2

Received By: KConner

Date: 12/15/2005

Project Manager: L. White

Client: EnSafe

Courier: ✓ Fed EX ___ UPS ___ Client ___ Other

Cooler Temperature(s) Upon Receipt: 1.4/1.7

	YES	NO*
Is cooler temperature ≤6°C, with no frozen samples? NOTE: If >6°C and/or samples are frozen AND multiple coolers are received, list all samples associated with out-of-temp cooler(s).	✓	
Circle One: Did the samples arrive on wet ice, blue ice, no ice, or other? If other, then list:		
Are custody seals intact, if used? If no seals are used, then write NA in space provided:	✓	
Did samples arrive in good condition with no breakage?	✓	
Circle One: Type of packing used is: vermiculite, bubble wrap, or other. If other, then list:		
Is there a COC?	✓	
Circle One: Is the COC an STL Savannah COC or a client COC?		
Is the COC filled out completely?	✓	
Is the COC filled out in ink and signed?	✓	
Are all sample containers labeled?	✓	
Are all sample labels legible?	✓	
Are all samples listed on COC included in cooler?	✓	
Are all samples included in cooler listed on COC?	✓	
Do sample IDs on containers match sample IDs on COC?	✓	
Do containers contain sufficient volumes?	✓	

** All boxes checked 'NO' require PM notification and completion of next 2 sections.*

CUSTODY STAFF:
Describe all anomalous receipt situations in detail (attach additional sheets if necessary): _____

PM STAFF:
Client Contacted: ___ YES ___ NO
Contact: _____ Date: _____
Resolution: _____

PM Signature: LW

FCU046:07.22.04:1

Appendix B
Data Validation Report

Spectra Tech Inc.

Engineering & Environmental Services

January 15, 2004

Robb Unger, Project Manager
SpectraTech, Inc.
132 Jefferson Court
Oak Ridge, TN 37830

Dear Mr. Unger,

The following narrative represents an Executive Summary of the Verification and Validation process for the Zone J Sampling Project Chemical Data Review.

Spectra Tech Inc. has performed 100% data verification and 100% data validation for chemical data that was collected to characterize the Zone J Sampling project. The original data deliverable included hard copy data packages and electronic data deliverables (EDDs) for single data package SAOCO2.

Analytical Chemistry Data

The following data from the Laboratory was used to complete a Level 4 Verification and Validation for Chemical parameters in accordance with the Zone J Sampling and Analysis Plan.

A common item noted in the report was the fact that matrix spike (MS) or matrix spike duplicates (MSDs) was not analyzed or reported for the Pesticide/PCB portion of the data package. The data packaged did contain matrix spike on the metals and semi-volatiles analytes and these are noted in the narrative of the validation report. The Sampling and Analysis Plan specified that a MS was to be provided for the SDGs although the MS/MSD sample was justified based on the matrix effects causing QC failure on the undiluted sample thus running a diluted sample to pass the QC for the sample column per-cent difference was justified. Also, where missing, there was no statement in the narrative section of the related laboratory reports explaining the absence of MS/MSD analyses and results.

Data Verification

100 % Verification was performed on the data package. The following data issues were documented on the attached Chemical Data Verification checklists.

- For polychlorinated biphenyls (PCBs), column confirmation percent difference (%D) form VIIs were included and reviewed with respect to the hard copy data packages,
- EDD and hard copy data package results and/or laboratory qualifier flags were provided and in agreement. Addition of Validation Qualifier codes were added as a deliverable on an Excel data base.

132 Jefferson Court • Oak Ridge, Tennessee 37830 (865)483-7210 • (865)483-7262 (fax)

www.spectratechinc.com

Data Validation

Data validation was performed for the data package. The following data issues were documented in the attached Data Validation report.

- For Pesticides/PCBs, there were two occurrences of the percent difference between the quantitation and confirmation GC columns was greater than the QC limit of 25%, and the Grand Mean Exception of SW-846 was used qualify the Continuing Calibration Verification (CCV);
- For total semi-volatile organics analysis (SVOAs), two compounds were disqualified due to low MS/MSD and LCS recoveries;
- For total metals, the Antimony results were qualified as UJ (Estimated undetected) due to MS/MSD recoveries that were outside QC limits.

Conclusion

Overall, the quality of the chemical and radiological analysis results for samples from this project were acceptable, with minimal qualification of results.

Sincerely,

Thomas G. Lee
QA Officer/Senior Engineer
Spectra Tech, Inc.

Chemical Analytical Data Validation Comments on Data for Sample Data Group (SDG) SAOCO2

Data for 15 soil samples was reported in this data package. The chain of custody was prepared by ENSAFE of Charleston, S.C. and transmitted with the samples to the STL in Savannah, GA. The soil samples were analyzed for polychlorinated biphenyls (PCBs), volatile organics analysis (VOAs), semi-volatile organics analysis (SVOAs), total metals, total mercury, and wet chemistry per-cent moisture content. All analyses were performed by Severn Trent Laboratories of Savannah. The analytical data were evaluated according to the guidance provided in the referenced methods from SW-846[1] for quality control issues, which could result in rejection of sample results. The validation was preformed in accordance with the specification and requirements of the Sampling and Analysis Plan for Zone J, Charleston Naval Facility (SAP). In addition, the Validation Specification used in the process include those contained in Spectra Tech Inc. procedure, STI-QA-100, *Data Validation Procedure* and the Data Verification Project Plan, *WESKEM WD-130*. Where there were discrepancies between the QC requirements in SW-846, the Spectra Tech, Inc. procedures, and the *WESKEM WD-130*, the QC requirements in STI-QA-100, *Data Validation Procedure* were followed.

The samples have the following Customer ID (Client sample) numbers:

1.	680-1658-1	(BSLM000101)
2.	680-1658-2	(BSLM000201)
3.	680-1658-3	(BSLM000901)
4.	680-1658-4	(054M000102)
5.	680-1658-5	(556M000702)
6.	680-1658-6	(556M000502)
7.	680-1658-7	(BSLM000401)
8.	680-1658-8	(BSLM000301)
9.	680-1658-9	(BSLM001001)
10.	680-1658-10	(BSLM000801)
11.	680-1658-11	(BSLM000501)
12.	680-1658-12	(BSLM000701)
13.	680-1658-13	(BSLM000601)
14.	680-1658-14	(NOIM000402)
15.	680-1658-15	(009M000402)

[1]"EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition.

Polychlorinated Biphenyl's by Gas Chromatography

The above Samples were analyzed for total PCBs.

Holding Times

The holding time requirements were met. No rejection of results is recommended.

Calibration

The initial calibration criteria were met in the SDG , however continuing calibration verification (CCV) recoveries were excepted due to low recoveries in the CCV. The sample required dilution to pass the required %D column criteria due to matrix inference, thus the Grand Mean Exception of SW-846 was used for the continuing calibration verification (CCV) in this data package. Form VIIs were reviewed for percent difference for the compounds in the CCV to assure acceptance criteria of < 15 % for each clock. %D Range for the linear and 2nd order curves was from -4.6% for Aroclor 1016 to 15.1% for Aroclor 1260 for instrument SGMECD1 and -2.7% to 12.9% for Aroclor 1016 for instrument SGMECD2. The 4th run for Aroclor 1260 and the surrogate Decachlorobiphenyl (DCB) were outside of the acceptance criteria, all other were acceptable. The grand means were calculated for SGECD1 (8.31% D) target run were acceptable as were target runs for SGECD2. Based on the CCV calculations the initial and continuing calibration criteria were met. No rejection of results is recommended.

Blank

Blank criteria were met. No rejection of results is recommended.

Surrogate Recovery

The surrogate recoveries were met. No rejection of results is recommended.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD recoveries were within acceptable limits. No rejection of results is recommended.

Laboratory Control Sample (LCS)

The LCS recoveries were acceptable. No rejection of results is recommended.

Organochlorine Pesticides by Gas Chromatography

The above Samples were analyzed for VOAs.

Holding Times

The holding time requirements were met. No rejection of results is recommended.

Calibration

Initial calibration was acceptable however matrix interference due to non target compounds caused the continuing calibration verification (CCV) to fail QC acceptance criteria (> 15% D) during undiluted sample runs, thus the sample was analyzed at a DF of 10. The Grand Mean Exception of SW-846 was used for the CCV in this data package. Form VIIs were reviewed for percent difference for the compounds in the CCV to assure acceptance criteria of < 15 % for each clock. %D Range for the linear and 2nd order curves was from -.5% for 4,4 DDE to 19.6% for Endrin aldehyde for instrument SGMECD1 and .8% Endrin to 17.0% for Endrin aldehyde for instrument SGMECD2. Compounds 4,4'-DDT, Endrin aldehyde, and Endrin keyton were outside of the acceptance criteria for instrument SGMEC2, all others were acceptable. Grand means were calculated for SGECD1 and SGECD2 target run (7.33% D) and were acceptable. Based on the CCV calculations the initial and continuing calibration criteria were met. No rejection of results is recommended.

Blank

Blank criteria were met. No rejection of results is recommended.

Surrogate Recovery

The surrogate recoveries were 0% due to dilution of the samples (DF=10) in this SDG. The undiluted samples were subjected to Florisil and Copper cleanup prior to the undiluted sample run without success. Acid cleanup was not attempted as this would have affected quantization of single peak pesticide compounds. Since the surrogates could not be evaluated due to dilution, no rejection of results is recommended.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Matrix Spike/ Matrix Spike Duplicate were not run with these samples due to dilution of the samples necessary as a result of Matrix interference. MS/MSD could not be evaluated. LCS recoveries were acceptable. No qualification of results is recommended.

Laboratory Control Sample (LCS)

The LCS recoveries were acceptable. No rejection of results is recommended.

SVOAs

The above Samples were analyzed for SVOAs.

Holding Times

The holding time requirements were met. No rejection of results is recommended.

Calibration

The initial and continuing calibration criteria were met. No rejection of results is recommended.

Blank

Blank criteria were met. No rejection of results is recommended.

Surrogate Recovery

The surrogate recoveries were acceptable. No rejection of results is recommended.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS/MSD recoveries and the RPDs were acceptable with the exception of Hexachloroethane and Hexachlorocyclopentadiene. See description under LCS. No rejection of results is recommended.

Laboratory Control Sample (LCS)

The LCS recoveries were acceptable except for two compounds (HCCPD and HCE). **LCS recoveries for Hexachlorocyclopentadiene (0, QC limit 20-109) and Hexachloroethane (28, QC limit 31-88) were outside the laboratory control limits for these compounds. Due to spike recoveries outside of the normal QC limits the Results for Hexachlorocyclopentadiene and Hexachloroethane are qualified as unusable (R) due to low LCS and MS/MSD recoveries. The remainder of the LCS recoveries were acceptable and no additional qualification is necessary.**

Metals and Total Mercury

All the samples identified in this SDG were analyzed for metals and total mercury.

Holding Times

The holding time requirements were met. No rejection of results is recommended.

Calibration

The initial and continuing calibration criteria were met. No rejection of results is recommended.

Blanks

The blank recoveries were acceptable. No rejection of results is recommended.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The MS recoveries were acceptable for all elements except Aluminum (1633%), Antimony (34%), Iron (645%), and Sodium (66%). The MSD recoveries were acceptable for all elements

except Aluminum (1511%), Antimony (31%), and Iron (1124%). The sample chosen for the MS/MSD was BLSM000101. **The analyte concentration in the MS sample for Al, Fe and Na exceeded the spike amount by at least a factor of 4, so limits are not applied, however the quantization of Antimony in the sample was < 4X the spike. The RPDs were acceptable for these samples. The Antimony, results for all samples should be qualified as estimated undetected (UJ) due to MS/MSD recovery outside the QC limits.**

Laboratory Control Sample (LCS)

The LCS recoveries were acceptable. No rejection of results is recommended.

Wet Chemistry

The above Samples were analyzed for per-cent moisture. The results were evaluated for holding times, calibrations, matrix spike recoveries, and duplicate and laboratory control sample recoveries where applicable. Based on professional judgment, no rejection of results is recommended.

PREPARED BY: _____ **DATE:** 2/2/06

Validation Review

Validation summaries for each analysis are provided in this report. Raw data for each analysis was reviewed against the validation recommendations. There were no causes for rejection of any of the data. Validation findings was reviewed and found to be correct.

REVIEWED BY: _____ **DATE:** 02-02-06

APPENDIX L

QUALITY ASSURANCE PROJECT PLAN FOR SUPPLEMENTAL RFI AT ZONE J

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Rev. 1
03/08

Quality Assurance Project Plan for Supplemental RCRA Facility Investigation of Zone J at

Charleston Naval Complex
Charleston, South Carolina

Contract Task Order 0017

March 2008

USEPA ID No. SC0170022560

BRAC Program Management Office Southeast
4130 Faber Place Drive, Suite 202
North Charleston, South Carolina 29405

TETRA TECH NUS, Inc.

Rev. 1
03/08

QUALITY ASSURANCE PROJECT PLAN
FOR
SUPPLEMENTAL RCRA FACILITY INVESTIGATION OF
ZONE J

CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
BRAC Program Management Office SE
4130 Faber Place Drive
Suite 202
North Charleston, South Carolina 29405

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0017

MARCH 2008

PREPARED UNDER THE SUPERVISION OF:

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FOREWORD

To meet its mission objectives, the United States Navy (Navy) performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through conventional methods of past disposal and through accidental spills and leaks, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense (DoD) has initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at DoD facilities.

One of these programs is the Installation Restoration (IR) Program. The goal of the IR Program is to reduce, in a cost-effective manner, the risk to human health and the environment from hazardous substance contamination resulting from past DoD activities in the United States and its territories. The program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, and the Hazardous and Solid Waste Amendments (HSWA) of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private-sector and federal facilities.

The RCRA and HSWA corrective action program addresses present management of hazardous material. RCRA ensures that solid and hazardous wastes are managed in an environmentally sound manner. The corrective action program is designed to identify and clean up releases of hazardous substances at RCRA-permitted facilities. The RCRA-HSWA program is conducted in four stages:

- RCRA Facility Assessment (RFA)
- RCRA Facility Investigation (RFI)
- Corrective Measures Study (CMS)
- Corrective Measures Implementation (CMI)

The Naval Facilities Engineering Command Southeast (NAVFAC SE) manages and the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC) oversee the Navy environmental program at the Charleston Naval Complex (CNC). All aspects of the program are conducted in compliance with State and federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding this document should be addressed to the Navy, Mr. Jeffrey Meyers, Remedial Project Manager, at (843) 743-2134.

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ACRONYM LIST

ALM	Adult Lead Model
AOC	Area of Concern
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BEHP	bis(2-ethylhexyl) phthalate
BRAC	Base Realignment and Closure
BSAF	Biota sediment accumulation factor
BW	Body weight
Cal EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
CNC	Charleston Naval Complex
COC	Chemical of concern
COPC	Chemical of potential concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central tendency exposure
CTO	Contract Task Order
DoD	Department of Defense
DoD QSM	Department of Defense Quality Systems Manual
DQO	Data Quality Objective
DVM	Data Validation Manager
ECT	Environmental Consulting & Testing
EDD	Electronic data deliverable
EPC	Exposure point concentration
ERA	Ecological risk assessment
ERM	Effects range median
ESDSOPQAM	Environmental Science Division, Standard Operating Procedures and Quality Assurance Manual
ESV	Ecological screening value
EU	Exposure Unit
FAQ	Frequently Asked Question
FD	Field duplicate

FI	Fraction ingested
FOL	Field Operations Leader
GIS	Geographical Information System
GPS	Global Positioning System
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Tables
HHRA	Human health risk assessment
HI	Hazard Index
HQ	Hazard quotient
ICP	Inductively coupled plasma
ICR	Incremental cancer risk
IDW	Investigation-derived waste
IR	Ingestion rate
IRIS	Integrated Risk Information System
LCS	Laboratory control sample
LQAP	Laboratory Quality Assurance Plan
MDL	Method detection limit
MPC	Measurement performance criterion
MRL	Minimal Risk Level
MS	Matrix spike
MSD	Matrix spike duplicate
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCEA	National Center for Environmental Assessment
NFESC	Naval Facilities Engineering Service Center
NIRIS	Naval Installation Restoration Information Solutions
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Act
PAH	Polynuclear aromatic hydrocarbon
PARCCS	Precision, accuracy, representativeness, comparability, completeness, sensitivity
PCB	Polychlorinated biphenyl
PDF	Portable document format
PDS	Post-digestion spike
PM	Project Manager
PPRTV	Provisional Peer Reviewed Toxicity Value
PQO	Project Quality Objective
PRG	Preliminary Remediation Goal

QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QA/QC	Quality assurance/quality control
QSM	Quality Systems Manual
%R	Percent recovery
RB	Rinsate blank
RBC	Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RME	Reasonable maximum exposure
RPD	Relative percent difference
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SDG	Sample Delivery Group
SIM	Selective ion monitoring
SLERA	Screening level ecological risk assessment
SOP	Standard Operating Procedure
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TB	Trip Blank
TCL	Target Compound List
TOC	Total organic carbon
TRV	Toxicity Reference Value
TRW	Technical Review Workgroup
TtNUS	Tetra Tech NUS, Inc.
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
USEPA	United States Environmental Protection Agency
UXO	Unexploded ordnance

1.0 PROJECT MANAGEMENT AND OBJECTIVES

This Quality Assurance Project Plan (QAPP) was prepared by Tetra Tech NUS, Inc. (TtNUS) for Naval Facilities Engineering Command Southeast (NAVFAC SE) under Contract Task Order (CTO) 0017 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055. This QAPP addresses supplemental investigation of Zone J located at Charleston Naval Complex (CNC), Charleston, South Carolina, as governed under the Resource Conservation and Recovery Act (RCRA) program and managed by the Navy's Base Realignment and Closure Program Management Office Southeast (BRAC PMO SE). Findings from the investigation will be documented in a RCRA Facility Investigation (RFI) Report.

The purpose of this QAPP is to ensure that data of the correct type, quantity, and quality are collected to support the attainment of project objectives. This plan meets the intent of the Uniform Federal Policy for QAPPs, hereafter referred to as UFP-QAPP (USEPA, 2006).

1.1 TITLE AND APPROVAL PAGE

The title and approval pages, which serve as the cover and signature page of this QAPP, identify the project to which this QAPP applies.

1.2 DOCUMENT FORMAT AND TABLE OF CONTENTS

This work plan consists of four sections: Section 1.0 is this introduction, which includes descriptions of the objectives and scope, project organization, and site history of Zone J. Section 2.0 provides measurement and data acquisition requirements and presents the sampling rationale. Sections 3.0 and 4.0 provide information on assessment and oversight and data review elements, respectively. Section 5.0 evaluates human health risk from fish ingestion and Section 6.0 evaluates ecological risk. Tables and figures referenced in a given section are provided at the end of that section. The appendices include the following: UFP-QAPP worksheet cross reference (Appendix A), TtNUS Field Forms (Appendix B), TtNUS Standard Operating Procedures (SOPs), site-specific health and Safety Plan (HASP) (Appendix D), analytical laboratory SOPs (Appendix E), ecological risk assessment supporting information, and minutes from meetings/conference calls (Appendix G).

1.2.1 Document Control Format

Document control procedures are used to identify the most current version of the QAPP and to help ensure that only the most current version of the QAPP is used by all project participants. To meet this goal, text, tables, and figures in this QAPP include a header indicating the revision number and date. The

footer indicates the page number within the section. Revision 0 with the month and year is used as part of the header for the draft, draft final, and final versions. Any revisions made after submittal of the initial final version will be indicated with appropriate sequential revision numbers and revision dates. Individual pages may be updated; in those cases only the updated pages will reflect a change in revision number and date.

1.2.2 Document Control Numbering System

A document control numbering system will not be used for this QAPP because this project has a distinct document distribution list. QAPP dates and revision numbers will identify which revision is received by each recipient. The QAPP and any revisions, addenda, or amendments will be provided in accordance with the QAPP distribution list (see Section 1.3.1).

1.2.3 QAPP Identifying Information

The QAPP identifying information (found on the QAPP cover and signature page) identifies the key project participants and the program for which the current project is being performed. The QAPP identifying information is provided on UFP-QAPP Worksheet 2 (Crosswalk) in Appendix A. Additional information such as a summary of previous site work, the applicable regulatory program, and scoping session dates may be found on UFP-QAPP Worksheet 2.

1.3 DISTRIBUTION LIST AND PROJECT PERSONNEL SIGN-OFF SHEET

1.3.1 Distribution List

The QAPP distribution list includes (one copy each unless otherwise noted):

- Dudley Patrick, Navy BRAC SE PMO (2 copies)
- Meredith Amick, South Carolina Department of Health and Environmental Control (SCDHEC) (3 copies)
- Susan Byrd, SCDHEC
- Dann Spariosu, USEPA
- Dean Williamson/Gary Foster/CH2MHill
- Gary Benfield, WPC
- Mike Whitten, TtNUS
- Linda Klink, TtNUS
- Andrea Colby, Katahdin Analytical
- Mr. Ed Duncan, Marine Resources Center
- Dr. Tom Dillon, National Oceanic and Atmospheric Administration (NOAA)
- Priscilla Wendt, South Carolina Department of Natural Resources (SCDNR)

- Diane Duncan, US Fish and Wildlife Service
- Barbara Neale, Office of Coastal Resource Management (OCRM)
- Van Whitehead, Office of General Counsel-OCRM Charleston

Each person listed above will receive copies of the QAPP and subsequent revisions. Revisions may be in the form of a complete document reissue or individual pages that have been changed depending on the extent of changes.

1.3.2 Project Personnel Sign-Off Sheet

The QAPP signature page and record of review will be signed by all key TtNUS personnel working on the project. A signature on these forms indicates that the person has read this QAPP and is familiar with the tasks they are to perform. The completed record of review will be maintained in the TtNUS project file under the control of the TtNUS Project Manager (PM). Also, a kickoff meeting will be held to ensure that all field personnel understood the tasks they are to perform prior to sign off.

1.4 PROJECT ORGANIZATION

1.4.1 Project Organization Chart

A project organization chart depicting the agencies and contracting personnel involved with the review and implementation of the QAPP is shown on Figure 1-1. The Navy, who is the lead agency for this site, and TtNUS (Navy Contractor) will implement this QAPP.

1.4.2 Communication Pathways

Pathways have been established for the exchange of project-related information and for making alterations to project methods, schedules, requirements, etc. that may be required because of unforeseen or changing circumstances. Communication pathways are as follows:

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1.4.3 Personnel Responsibilities and Qualifications

Qualified personnel will be employed for each task to be completed as part of the Zone J supplemental investigation. Resumes of TtNUS personnel are available on request through the PM.

1.4.4 Special Training Requirements and Certifications

All field personnel will have appropriate training to conduct the field activities to which they are assigned. Additionally, each site worker will be required to have completed a 40-hour course (and 8-hour refresher, if

applicable) in Health and Safety Training as described under Occupational Safety and Health Act (OSHA) 29 Code of Federal Regulations (CFR) 1910.120(b)(4).

Field personnel operating a boat for purposes of sediment sample collection will have up-to-date Watercraft Safety Certification.

The selected analytical laboratory, Katahdin Analytical of Maine has successfully completed the laboratory evaluation process required as part of the NFESC Quality Assurance (QA) Program and described in the Department of Defense Quality Systems Manual (DoD QSM) (January 2006).

1.5 PROJECT PLANNING AND PROBLEM DEFINITION

This section summarizes information on the project planning conducted to develop the problem definition. This section also includes site history and background information.

1.5.1 Project Planning

The following project planning meetings and conference calls were conducted as needed to prepare the QAPP. Minutes from the kickoff meeting and conference call are provided in Appendix G.

- Kickoff Meeting - November 16, 2006
- Conference Call - January 04, 2007
- Site Visit – July 10, 2007

1.5.2 Site History, Background, and Problem Definition

The remainder of this section provides a general description of Zone J, summarizes previous investigations conducted at Zone J, and provides the rationale for the subject supplemental investigation.

1.5.2.1 Zone J Description

CNC is on the western shore of the Cooper River in Charleston Harbor (Figure 1-2), which is formed by the confluence of the Cooper, Ashley, and Wando Rivers and their tributaries. For management purposes, CNC has been divided into 12 investigative zones that are identified as Zones A through L. Zone J consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek. Zone J lies within the Charleston Harbor estuary, which is a mixing zone where fresh water meets salt water. Zone J is also subjected to the twice-daily tidal ebb and flow, which mix salt water and fresh water and transport sediments and potential pollutants within the estuary.

The former Charleston Navy Base was the Navy's third largest home port, supporting more than 70 surface vessels and submarines until 1996 when the base was closed. During Navy operations, the facility performed various tasks related primarily to ship repair and maintenance. CNC currently supports several private and federal facilities that use the docks and piers, including Detyens Shipyards, Charleston International Port, Charleston Shipbuilders, Inc., National Oceanic and Atmospheric Administration (NOAA), and the U.S. Coast Guard (Ensafe, 2003a).

The CNC waterfront along the Cooper River is dominated by 25 piers and five dry docks, and is protected along most of its length by a wooden and/or concrete seawall. The U.S. Army Corps of Engineers maintains a navigation channel along the waterfront. The Cooper River and Noisette and Shipyard Creeks provide habitat for numerous aquatic organisms including a variety of fish, crustaceans, and mollusks.

Shipyard Creek discharges into the Cooper River at the southern end of Zone J (Figure 1-3). CNC occupies the eastern shoreline of Shipyard Creek. Portions of Zones G, H, and I drain to the creek. The Cooper River Marina is located at the confluence of Shipyard Creek and the Cooper River. Industrial facilities along the western shoreline of Shipyard Creek include the Macallow Corporation, Foster Wheeler Resource Recovery Plant, Chevron Products Co., and Kinder Morgan Bulk Terminal (known locally as Shipyard River Terminal) (Ensafe, 2003a). Most of the non-industrial portions of Shipyard Creek's shoreline consist of marsh vegetation, primarily cordgrass (*Spartina* spp.). The intertidal mudflats and marshy areas provide habitat for numerous aquatic and wildlife species including herons, egrets, and other birds, and presumably for a variety of mammals such as raccoons (*Procyon lotor*), rice rats (*Oryzomys palustris*), and marsh rabbits (*Sylvilagus aquaticus*).

Noisette Creek flows eastward into the Cooper River at the northern end of Zone J (Figure 1-3). Portions of the creek are bordered by undercut banks that are 3 to 6 feet above the water. Vegetation along the banks consists of various trees and shrubs. Vegetation in lower areas along the creek is dominated by smooth cordgrass (*Spartina alterniflora*), with patches of salt meadow cordgrass (*S. patens*) and black needlerush (*Juncus roemerianus*). Wildlife species associated with Noisette Creek are largely the same as mentioned above for Shipyard Creek but are probably fewer in number because the area encompassed by Noisette Creek is smaller than that of Shipyard Creek.

1.5.2.2 Contaminant Sources Associated with Zone J

The Zone J water bodies (Cooper River, Noisette Creek, and Shipyard Creek) receive storm water runoff and other inputs from numerous point and nonpoint discharges, including several National Pollutant Discharge Elimination System (NPDES) outfalls. Several onshore sites that previously contributed contaminants to Zone J have been remediated; such sites no longer pose potential risks to human health

or the environment and have been closed under the RCRA process. Final decisions regarding the following Areas of Concern (AOCs), however, have not been resolved pending evaluation of Zone J:

AOC 517 - Indoor Firing Range, Building M-192

AOC 517 consists of Building M192 and a one-story 80' x 40' concrete block structure built in 1959. The building was originally used as an indoor pistol range from 1959 until 1974. It was then converted into a classroom and storage building in 1974. The lead bullets fired at the range were contained within the structure.

AOC 555 - Former Latrine & Substation, Building 1119

AOC 555 is former Building 29, which served as a latrine and substation when constructed in 1922. It was used until 1967, and aerial photos show that the facility do not exist after 1967. During operation, it is believed that its waste stream was diverted directly into the Cooper River. No other information was found regarding the size, design features, or operating practices of the site. It is currently a flat, paved area near the junction of Pier D and the quaywall.

AOC 556 - Dry Dock Discharge Areas

AOC 556 consists of the Drydock (DD) drains and areas around the mouth of each of the five drydocks. The five drydocks were constructed in the following years: DD 1 in 1907, DD 2 in 1942, DDs 3 and 4 in 1943, and DD 5 in 1964. A large grated drain runs along the middle of the entire length of each drydock. Underground pumps remove the water collected in the drain and direct it to the sanitary sewer system after the drydock is sealed and pumped dry. Outfalls adjacent to the drydock are used to de-water the drydock immediately following the sealing of the caisson.

AOC 557 - Former Latrine, south of Dry Dock #1

AOC 557 consists of former Building 1020 and a latrine constructed in 1909 and used until 1939. During operation, wastes are believed to have been discharged into the Cooper River. No other information was found during this assessment regarding the size, design features, or operating practices of this site. Currently, this site is covered with asphalt.

AOC 691- Waterfront

AOC 691 consists of approximately 21,600 feet of the riverfront along the Cooper River, approximately 2,500 feet of riverfront along the Noisette Creek, and approximately 4,800 feet of riverfront along the Shipyard Creek. These waterfront areas extend along areas controlled by CNSY, the Naval Supply

Center, and Naval Station Charleston, which comprise the three primary tenants at Naval Base Charleston. Activities and operations include ship and equipment repair, painting, cleaning, transporting, manufacturing, and general maintenance tasks. Waste generation activities associated with these activities are the primary concern for this unit. More than 20 piers are located along the Cooper River waterfront. Activities on these piers include refueling, repair, ship docking, and loading/unloading of ship materials. These activities are potential sources of waterfront contamination. Additionally, building drains and storm drains underlying Naval Base Charleston have the potential to discharge contaminants from other sections into the Cooper River.

AOC 692 - Free Product along Cooper River

AOC 692 consists of areas along Cooper River where excavations have revealed free product consisting primarily of petroleum products. Naval Base Charleston monitors the area of the river from Pier Alpha to the southern portion of the Base. Base personnel responded to general oil or petroleum product spills along the Cooper River, but remediations were usually performed by an outside contractor. Most petroleum product spills on or into the river were reported and cleaned up. The size of the average spill was approximately 50 to 100 gallons. Extremely large spills are handled by the Coast Guard.

Spill cleanup crews logged all reported spills so they were able to identify potential problems. Based on oil spill logs from 1990 to date, at least 7,940 gallons of various petroleum products have been spilled into the Cooper River. Spills associated with specific tasks or vessels were examined closely. Because the cleanup crews did not have baseline characteristics or random sampling procedures, a spill that went unreported may not have been detected unless visible. Naval Base Charleston personnel have reportedly encountered pockets of free product during excavations along the Cooper River.

No separate investigations are planned for the above sites. However, pertinent information regarding the sites and their relation to Zone J will be documented in the Zone J RFI report.

1.5.2.3 Previous Investigations

Several investigations of AOCs and Solid Waste Management Units (SWMUs) were conducted prior to the scope of the Zone J RFI being defined as the assessment of Noisette and Shipyard Creeks and the Cooper River. The BRAC Cleanup Team eventually initiated the large-scale Zone J investigation to ensure a consolidated data set.

The Navy completed preliminary sampling of Zone J water bodies in September 1997 (EnSafe, 1997).

Hydrodynamic modeling was conducted and a tidal excursion zone was described for Charleston Harbor (ECT, 1999). The tidal excursion zone defines the area that could potentially be impacted by CNC discharges to the water bodies of Zone J.

A screening-level ecological risk assessment (SLERA) was provided in the Zone J Draft RFI Report - Part One (EnSafe, 2000). Regulatory comments indicated the need for the RFI to include a more detailed evaluation of linkages between CNC sites and Zone J, including a thorough evaluation of potential contaminant migration pathways. The following scenarios were subsequently evaluated to determine if contaminants released from sites at CNC could migrate to Zone J:

- Transport to Zone J via storm water drainage systems and outfalls (EnSafe, 2003a)
- Overland transport to Zone J via sheet flow (CH2M-Jones, 2003)
- Transport to Zone J via groundwater discharge to surface water (Ensafe, 2004)

SLERAs for the Cooper River, Noisette Creek, and Shipyard Creek were conducted in 2003 (EnSafe, 2003b; 2000c; and 2003d). Based on the outcome of the SLERAs, a technical memorandum was generated that evaluated the potential for upland source linkages to sediment contamination in Zone J (EnSafe, 2004). Based on ecological evaluations in the SLERAs and the "linkage" document, five areas with elevated Effects Range Median (ERM) quotients and CNC source linkages were identified for additional sampling. The five areas consisted of three locations in the Cooper River, one location in Shipyard Creek and one location in Noisette Creek.

The latest round of sampling occurred in December 2005 when sediment samples were collected from 15 locations (Spectra Tech, 2006). Ten of the 15 locations had been pre-approved by SCDHEC and South Carolina Department of Natural Resources (SCDNR) representatives as locations representing regional baseline (reference) conditions. The other five locations were those with elevated ERM quotients and CNC source linkages (see previous paragraph). MDLs exceeded ecological screening values for numerous analytes in the five samples collected from the Cooper River, Shipyard Creek, and Noisette Creek. This was especially problematic for pesticides and polychlorinated biphenyls (PCBs), and some polynuclear aromatic hydrocarbon (PAH) compounds. The elevated MDLs precluded conclusions regarding sediment-related ecological risk. Therefore, the collection and analysis of additional sediment samples are required to address this situation.

1.5.2.4 Summary and Problem Definition

Zone J requires additional project tasking in order to complete the RFI report. Prior sediment sampling at Zone J utilized method detection limits (MDLs) that exceeded ecological screening values. These elevated MDLs precluded conclusions regarding sediment-related ecological risk. Additional sediment

samples are required to address this situation and to satisfy regulatory agency concerns and comments as related to the site RFI.

Several interim reports have been generated for Zone J during the previous 10 years, and the Navy has worked closely with SCDHEC throughout the entire investigation, and other Natural Resource Trustees such as SCDNR, NOAA, and the U.S Environmental Protection Agency (USEPA) have also been involved in the decision-making process to date. The RFI report has not been completed. MDLs in the most recent sediment sampling at Zone J exceeded ecological screening values for numerous analytes and precluded conclusions regarding sediment-related ecological risk. The collection and analysis of additional sediment samples are required to address this situation. In addition, the previous investigations and extensive data set need to be compiled into a comprehensive document that describes hydrological dynamics, dredging operations, etc., and summarizes previous technical memoranda and evaluations.

Each Zone J water body, although part of the same dynamic watershed, is distinctly different in size, flow, and level of near-shore industrialization. Therefore, the Cooper River, Shipyard Creek, and Noisette Creek will be evaluated as separate entities. A human health risk assessment (HHRA) and an ecological risk assessment (ERA) will be conducted for each of the three Zone J water bodies. The ecological risk assessment methodology is presented in Section 5.0 and human health risk assessment methodology is presented in Section 6.0.

1.6 PROJECT QUALITY OBJECTIVES AND MEASUREMENT PERFORMANCE CRITIERIA

This section summarizes the Project Quality Objectives (PQOs) for this sediment investigation, which were developed in accordance with the USEPA Guidance for the Data Quality Objective (DQO) Process, commonly known as QA/G-4 (USEPA, 2006). The following discussion provides information on the project planning conducted to develop the DQOs, project definition, PQOs, and measurement performance criteria identified based on the DQOs.

1.6.1 Development of Project Quality Objectives Using the Systematic Planning Process

The PQOs are outlined in this section. The data will be used to determine changes in concentrations of contaminants of concern (COCs) in sediment at Zone J. A fixed-based laboratory will be used. Nine sediment samples will be collected. Five samples will be collected from the same locations as in the December 2005 sampling event conducted by Spectra Tech, and two additional samples each will be collected at Noisette Creek and Shipyard Creek. In addition, three quality assurance/quality control (QA/QC) samples (one duplicate sample and two rinsate blanks) will also be collected. All samples will be collected by TtNUS and analyzed for Target Compound List (TCL) semivolatile organic compounds (SVOC)s, pesticides, and polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals, and

total organic carbon (TOC) with analyses by Katahdin Analytical of Maine. Chemical data will be delivered in Contract Laboratory Program (CLP)-like Sample Delivery Groups (SDGs). The chemical data will also be received in an electronic data deliverable. After the data are validated, they will be uploaded to the master CNC database. Hardcopy data packages will be stored by a data storage contractor until they are relinquished to the Navy.

1.6.2 Measurement Performance Criteria

Measurement performance criteria (MPCs) are the PARCCS parameters (i.e. precision, accuracy, representativeness, comparability, completeness, sensitivity), which are qualitative and quantitative statements regarding the quality characteristics of the data used to support project objectives and ultimately, environmental decisions. Each of these parameters is described below and are displayed for each analytical group and concentration level in Table 1-1 (corresponds with UFP-QAPP Worksheet 12).

1.6.2.1 Precision

Precision is a measure of the degree to which two or more measurements are in agreement and describes the reproducibility of measurements of the same parameter for samples analyzed under similar conditions.

Unless otherwise specified, two samples collected as close by as possible in space and time by repeating the sample collection process are referred to as *co-located* field duplicates. Two samples generated by removing representative portions from a single mass or volume of material are called *subsampling* field duplicates. If two portions or a single sample received by the laboratory are removed from that sample and analyzed, the two portions are called laboratory duplicates. If a single portion of a sample is prepared and then the prepared sample is analyzed in duplicate, the repeat analyses are called analytical duplicates. In all cases, if more than two samples (portions) are generated or analyzed, the first portion is called the original sample and the additional portion is referred to as the replicate. Duplicates are the first replicates.

Field precision is assessed by collecting and measuring field duplicates at a rate of 1 duplicate per 10 environmental samples. Acceptance limits for field duplicate precision are provided in Table 1-1. These precision estimates encompass the combined uncertainty associated with sample collection, homogenization, splitting, handling, laboratory and field storage (as applicable), preparation for analysis, and analysis. In contrast, precision estimates obtained from analyzing duplicate laboratory samples incorporate only homogenization, subsampling, preparation for analysis, laboratory storage (if applicable), and analysis uncertainties. Consequently, the field precision estimates [i.e., relative percent difference (RPD) values] should equal or exceed the laboratory precision estimates, on average, for each analyte. If

field duplicate precision is significantly different than laboratory duplicate precision, the underlying cause will be investigated to determine whether the observed difference could be an artifact of sampling and analysis.

Laboratory precision QC samples [i.e., laboratory duplicates for inorganic chemicals and matrix spike duplicates (MSDs) for organic chemicals] will be analyzed at a minimum frequency of 5 percent (i.e., 1 QC sample per 20 environmental samples). Laboratory precision is measured by comparing RPD values to precision control limits specified in Table 1-1.

Field duplicate sample results, laboratory duplicate results, sampling procedures, sample transport problems (if any), sample matrix problems (if any), and sample heterogeneity will be considered, as appropriate, to evaluate overall data precision. Field duplicate precision, expressed as RPD for soil and sediment samples *(solid matrices)*, must be less than 50 percent and must be less than 30 percent for surface water or groundwater *(aqueous matrices)*. For example, field duplicate precision will be compared to laboratory precision. The RPD between a sample or matrix spike (MS) (Sample 1) and its duplicate or MSD (Sample 2) is calculated for chemical analyses using the following formula:

$$\text{RPD} = \frac{|\text{Amount in Sample 1} - \text{Amount in Sample 2}|}{0.5\,(\text{Amount in Sample 1} + \text{Amount in Sample 2})} \text{ X } 100\,\%$$

1.6.2.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference value. This parameter is assessed by measuring spiked samples (e.g., surrogate spikes or MSs) or well-characterized samples of certified analyte concentrations [e.g., laboratory control samples (LCSs)] and by measuring laboratory and field blanks for accuracy measurements are designed to detect biases resulting from sample handling and analysis. The data validation process during which these evaluations are made is described in Section 4.2. Calculation of accuracy is described below.

Accuracy requirements for field measurements are ensured through control of sample collection and handling processes and through routine instrument calibration. Accuracy is also monitored through the use of blanks to detect cross-contamination and by monitoring adherence to procedures that prevent sample contamination or degradation. Two equipment rinsate blanks will be collected for reusable equipment (one per day) for this investigation to assess cross-contamination via sample collection equipment. Accuracy will also be assured qualitatively through adherence to all sample handling, preservation, and holding time requirements.

Accuracy in the laboratory is measured through the comparison of spiked sample or LCS results to known or calculated values and is expressed as a percent recovery (%R). It is also assessed by monitoring the analytical recovery of select surrogate compounds added to samples that are analyzed by select chromatographic methods. MS and surrogate compound analyses measure the combined accuracy effects of the sample matrix, sample preparation, and sample measurement. LCSs are used to assess the accuracy of laboratory operations with minimal sample matrix effects. Post-digestion spikes (PDSs) are used to assess the accuracy of the analytical measurement on the sample extract or digestate and are only used when initial inorganic MS results are suspect. Each spike sample will be spiked with representative project target analytes for the analysis being performed to ensure that accuracy measures are obtained for each target analyte. Spiking concentrations will equal or approximate the default concentrations detailed in the applicable sample preparation or analysis standard operating procedures (SOPs). LCS and MS analyses are performed at a frequency no less than 1 per 20 associated samples of like matrix.

The %R for a spiked sample (including surrogate compounds) is calculated by using the following formula:

$$\%R = \frac{\text{Amount in Spiked Sample} - \text{Amount in Sample}}{\text{Known Amount Added}} \times 100\,\%$$

LCSs are also analyzed to assess accuracy. The %R calculation for LCS is as follows:

$$\%R = \frac{\text{Experimental Concentration}}{\text{Certified or Known Concentration}} \times 100\,\%$$

Control charts are plotted by the laboratory for each target analyte and are kept on a matrix- and analyte-specific basis. These control charts are used to calculate the upper and lower QC limits for evaluating precision and bias.

During data validation, any data not meeting accuracy specifications will be identified to the data user through the use of data qualifiers. The field and laboratory blanks provide indications of the potential for having contaminated samples before or during analysis, respectively. Each type of blank will be evaluated for its impact on the sampling or the analytical processes, as appropriate. Laboratory control standards and check standards indicate whether analyte quantitation is accurate and whether the analytical system was capable of generating results within the project accuracy specifications. MS recoveries indicate and will be evaluated to assess the impact of specific sample matrices on the accuracy of project data.

1.6.2.3 Sensitivity and Quantitation Limits

Sensitivity is the ability of the method or instrument to detect the target analytes at the level of interest. The quantitation limit is the minimum concentration of an analyte that can be routinely identified and quantified above the MDL by a laboratory. The MDL is the minimum concentration of an analyte that can be reliably distinguished from background noise for a specific analytical method.

Analytical methods were chosen for their ability to achieve the appropriate sensitivity for a specific matrix at this site. Analyte MDLs and quantitation limits were compared to project action limits (Region 4 Waste Management Division Sediment Screening Values for Hazardous Waste Sites) to determine whether the chosen analytical methods are sensitive enough to meet the project action limits. Project action limits are the minimum screening number among various available standards and criteria available for a given matrix. Table 1-2 (which corresponds to UFP-QAPP Worksheet 15) displays the comparison of Katahdin Analytical MDLs and quantitation limits to project action limits by method and matrix.

1.6.2.4 Sample Representativeness

Representativeness is a qualitative term that describes the extent to which a sampling design, collected samples, and associated data reflect the environmental conditions of a site. Sampling and analysis methods and procedures were selected during project planning to provide data representing environmental media (only sediment in this case) at locations selected without bias. Adherence to standardized sample collection, handling, preparation, analysis, and data reporting procedures ensures that the final data accurately represent the desired populations. To evaluate representativeness, the actual samples collected will be compared to the samples that were intended to be collected. Furthermore, data verifications and validations will be reviewed to ensure that data have met project specifications for precision and accuracy. The degree to which project specifications have been met will provide a qualitative assessment of the representativeness of the data collected.

1.6.2.5 Comparability

Comparability is defined as the confidence with which one data set can be compared to another (e.g., between sampling points and between sampling events). Comparability is achieved by using standardized sampling and analysis methods and data reporting formats (including use of consistent units of measure), and by ensuring that quantitation limits and MDLs are sufficiently low to satisfy project action limits for the duration of the project. The quantitation limits and MDLs anticipated for this project are presented in Table 1-2. Additionally, consideration was given to seasonal conditions and other environmental variations that could exist to influence analytical results, but no such influences appear to exist for this

investigation that would indicate a need to collect samples at times other than those planned for this investigation.

1.6.2.6 Completeness

Completeness will be computed in accordance with the following equation:

$$\% \text{ Completeness} = \frac{(\text{number of valid measurements})}{(\text{number of measurements planned})} \times 100\%$$

Completeness is a measure of the amount of valid data obtained from the measurement program compared to the total amount collected. Valid data are defined as data that have not been rejected or considered unusable during validation or data review. For relatively clean, homogeneous matrices, 100 percent completeness is expected. However, as matrix complexity and heterogeneity increase, completeness may decrease. In addition, simple accidents, such as loss of samples during shipment can result in less than 100 percent completeness. Completeness will be reported for each matrix (number of samples collected versus planed) and analytical group (percent of results that are valid). Completeness will not be reported for various concentration levels because all concentration levels are equally important for attaining project objectives.

Where PQOs are compromised by unavailable data, the ability to achieve project objectives will be evaluated. Whether any particular sample result is critical (i.e., absolutely necessary for the attainment of project objectives) to the investigation will be evaluated in terms of the sample location, parameter in question, intended data use, and effects of an incomplete data set on the attainment of project objectives.

Critical data points may not be identified until all the analytical results are evaluated. If in the evaluation of results it becomes apparent that the data for a specific medium (only sediment in this case) are of insufficient quality (i.e., less than 95 percent completeness), either with respect to the number of samples or an individual analysis, resampling to replace the deficient data points may be necessary.

1.7 SECONDARY DATA EVALUATION

Secondary data are data that were collected previously by external and/or independent parties that are subsequently transmitted to the current data user. Table 1-3 presents sediment data collected during previous rounds of investigation as relevant to the current investigation. Sediment data were collected from five locations by EnSafe between 1994 and 1997 and at five of these locations (i.e., locations of potential concern with linkages to contamination from CNC land-side sites) by Spectra Tech in December 2003.

1.8 PROJECT OVERVIEW AND SCHEDULE

The section summarizes project activities and provides the schedule for each task.

1.8.1 Project Overview

Sediment samples will be collected from the same five locations as in the December 2005 sampling event conducted by Spectra Tech, and an additional two sediment samples will be collected at Noisette Creek and two at Shipyard Creek. QA/QC field samples will include one duplicate and two equipment rinsate blanks. MS/MSD samples will also be collected. Proper chain of custody procedures will be implemented as well. All samples will be collected by TtNUS and analyzed for TCL SVOCs, TCL pesticides, TCL PCBs, TAL metals, and TOC in a fixed based laboratory. Data qualifiers will be assigned, sample IDs will be verified, and data will be transferred to the project database for safekeeping. An accurate and neat field logbook will be kept, and all field data will be recorded in the logbook and on associated field forms. Routine audits of field personnel and field procedures will be conducted. Complete 100 percent data validation and database QA will also be completed.

1.8.2 Project Schedule

No firm schedule of deliverables has been established for this project. The schedule will be based on finalization of the planning documents and TtNUS has developed a preliminary schedule that projects completion of the draft RFI report in June 2008. The anticipated schedule of major milestones and deliverables associated with this project is as follows:

- 02/29/08 – Resolve draft QAPP comments
- 03/10/08 – Finalize QAPP
- 03/24/08 – Complete mobilization
- 03/31/08 – Complete fieldwork
- 04/30/08 – Complete laboratory analysis
- 05/30/08 – Complete data validation/database entry
- 08/29/08 – Complete draft RFI Report

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL PCBs
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	SW-846 8082 SOP-4	Data Completeness	95% Overall	Data Completeness Check	S + A
		Comparability	Values > 5X QL: Field Replicates + 50%	Comparability Check	S + A
		Precision-Overall	Values> 5X QL: Field Replicates ± 50%	Field Duplicates	S + A
		Precision-Laboratory	± 50%	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No target analytes ≥ QL; with the exception of common field/laboratory contaminants	Equipment Blanks, Method Blanks & Instrument Blanks	S + A
		Sensitivity	± 100 % TV at QL	Laboratory Fortified Blank/Low Calibration Standard at QL	A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Pesticides
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	SW-846 8081/ SOP-3	Data Completeness	95% Overall	Data Completeness Check	S + A
		Comparability	Not Applicable	Not Applicable	S + A
		Precision-Overall	Values> 5X QL: Field Duplicates RPD < 50%	Field Duplicates	S + A
		Precision-Laboratory	RPD $\leq$ 50% (calculated using concentration)	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No analyte detected $\geq$ QL	Equipment Blanks, Method Blanks	S + A
		Sensitivity	± 100 % TV at QL	Laboratory Fortified Blank/Low Calibration Standard at QL	A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL SVOCs
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	SW-846 8270C/ SOP-1 and SOP-2	Comparability	95% Overall	Data Completeness Check	S + A
		Comparability	All Values> 5X QL, Field Replicates ± 100%	Comparability Check	S + A
		Precision-Overall	All Values> 5X QL, RPD <50%	Field Duplicates	S + A
		Precision-Laboratory	RPD ≤ 50% when native conc. ≤ 50% analytical spike	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Statistically derived limits	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No target analytes ≥ QL; with the exception of common field/laboratory contaminants	Equipment Blanks, Method Blanks & Instrument Blanks	S + A
		Sensitivity	±100% at QL	Low Calibration Standard at QL	A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TAL Metals
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	SW-846 6010B/ SOP-11	Data Completeness	95% Overall	Data Completeness Check	S + A
		Comparability	Values 3X QL: Field Duplicates; RPD < 100%	Comparability Check	S + A
		Precision-Overall	Values 3X QL:RPD < 50%	Field Duplicates	S + A
		Precision-Laboratory	Values 3X QL: RPD < 20	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	± 25% when sample concentration ≤ 4X the spike concentration	Matrix Spike/Matrix Spike Duplicates	A
		Accuracy/Bias	Recovery within reference limits supplied by SRM vendor.	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No target analytes ≥ QL; with the exception of common field/laboratory contaminants and/or Na, K, and Ca	Equipment Blanks, Method Blanks & Instrument Blanks	S + A
		Sensitivity	± 100% at QL	Low Calibration Standard at QL	A
		Comparability	Values 3X QL: Field Duplicates; RPD < 100%	Comparability Check	S + A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	Mercury
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	SW-846 7471A/ SOP-12	Data Completeness	95% Overall	Data Completeness Check	S + A
		Comparability	Values 3X QL: Field Duplicates; RPD < 100%	Comparability Check	S + A
		Precision-Overall	Values ≥ 3X QL: Field Duplicates RPD < 50%	Field Duplicates	S + A
		Precision-Laboratory	Values 3X QL: RPD < 20 % calculated using concentration	Matrix Spike/Matrix Spike Duplicate	A
		Accuracy/Bias	± 25% TV when sample concentration ≤ 4X the spike concentration	Matrix Spike/Matrix Spike Duplicate	A
		Accuracy/Bias	Recovery within reference limits supplied by SRM vendor.	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No target analytes ≥ QL	Equipment Blanks, Method Blanks & Instrument Blanks	S + A
		Sensitivity	± 100% TV at QL	Laboratory Fortified Blank/Low Calibration Standard at QL	A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-1 (CORRESPONDS TO UFP-QAPP WORKSHEET#12)

MEASUREMENT PERFORMANCE CRITERIA TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TOC
Concentration Level	Low

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S&A)
	TOC-Lloyd Kahn/ SOP-13	Data Completeness	95% Overall	Data Completeness Check	S + A
		Comparability	All Values> 5X QL, Field Replicates ± 100%	Comparability Check	S + A
		Precision-Overall	Values ≥ 3X QL: Field Duplicates RPD < 50%	Field Duplicates	S + A
		Precision-Laboratory	Values 3X QL: RPD < 20 % calculated using concentration	Matrix Spike/Matrix Spike Duplicate	A
		Accuracy/Bias	± 25% TV when sample concentration ≤ 4X the spike concentration	Matrix Spike/Matrix Spike Duplicate	A
		Accuracy/Bias	± 20% of TV	Laboratory Control Samples	A
		Accuracy/ Bias-Contamination	No target analytes ≥ QL;	Equipment Blanks, Method Blanks & Instrument Blanks	S + A
		Sensitivity	± 100% TV at QL	Laboratory Fortified Blank/Low Calibration Standard at QL	A

QL – Quantitation Limit
RPD- Relative Percent Difference
TV – True Value
SRM – Standard Reference Material

TABLE 1-2

REFERENCE LIMITS AND EVALUATION TABLE (CORRESPONDS TO UFP-QAPP WORKSHEET 15)
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Analyte	Project Action Limit (mg/kg)[1]	Project Quantitation Limit (mg/kg)	Katahdin Achievable Laboratory IDL (mg/kg)	Katahdin Achievable Laboratory Quantitation Limit (mg/kg)
TAL Metals SW-846 6010B				
ALUMINUM	NA	1.90	1.90	30
ANTIMONY	2	0.09	0.09	0.80
ARSENIC	7.24	0.08	0.08	0.80
BARIUM	NA	0.05	0.05	0.50
BERYLLIUM	NA	0.01	0.01	0.50
CADMIUM	0.676	0.01	0.01	1.0
CALCIUM	NA	0.77	0.77	5.0
CHROMIUM	52.3	0.03	0.03	1.5
COBALT	NA	0.03	0.03	3.0
COPPER	18.7	0.02	0.02	2.5
IRON	NA	0.52	0.52	10
LEAD	30.2	0.09	0.09	0.5
MAGNESIUM	NA	0.49	0.49	5.0
MANGANESE	NA	0.06	0.06	0.50
MERCURY	0.13	0.0020	0.0020	0.040
NICKEL	15.9	0.04	0.04	4.0
POTASSIUM	NA	8.60	8.60	100
SELENIUM	NA	0.15	0.15	1.0
SILVER	0.733	0.05	0.05	1.5
SODIUM	NA	1.30	1.30	100
THALLIUM	NA	0.07	0.07	1.5
ZINC	124	0.02	0.02	2.5

TABLE 1-2

REFERENCE LIMITS AND EVALUATION TABLE (CORRESPONDS TO UFP-QAPP WORKSHEET 15)
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Analytes	Project Action Limit (ug/kg)[1]	Project Quantitation Limit (ug/kg)	Katahdin Achievable Laboratory MDL (ug/kg)	Katahdin Achievable Laboratory Quantitation Limit (ug/kg)
TCL Pesticides SW-846 8081A				
4,4'-DDD	1.22	0.33	0.112	0.33
4,4'-DDE	2.07	0.33	0.081	0.33
4,4'-DDT	1.19	0.33	0.084	0.33
ALDRIN	NA	0.17	0.069	0.17
ALPHA-BHC	NA	0.17	0.058	0.17
ALPHA-CHLORDANE	0.5	0.17	0.085	0.17
BETA-BHC	NA	0.17	0.073	0.17
DELTA-BHC	NA	0.17	0.045	0.17
DIELDRIN	**0.02**	**0.33**	**0.076**	**0.33**
ENDOSULFAN I	NA	0.17	0.056	0.17
ENDOSULFAN II	NA	0.33	0.061	0.33
ENDOSULFAN SULFATE	NA	0.33	0.091	0.33
ENDRIN	**0.02**	**0.33**	**0.136**	**0.33**
ENDRIN ALDEHYDE	NA	0.33	0.071	0.33
ENDRIN KETONE	NA	0.33	0.095	0.33
GAMMA-BHC (LINDANE)	0.32	0.17	0.073	0.17
GAMMA-CHLORDANE	0.5	0.17	0.082	0.17
HEPTACHLOR	NA	0.17	0.068	0.17
HEPTACHLOR EPOXIDE	NA	0.17	0.157	0.17
TOXAPHENE	NA	1.7	0.346	1.7
METHOXYCHLOR	NA	0.33	0.112	0.33

Analytes	Project Action Limit (ug/kg)[1]	Project Quantitation Limit (ug/kg)	Katahdin Achievable Laboratory MDL (ug/kg)	Katahdin Achievable Laboratory Quantitation Limit (ug/kg)
TCL PCBs SW-846 8082				
AROCLOR-1016	**2**	**16**	**1.6**	**16**
AROCLOR-1221	**2**	**8.99**	**0.899**	**8.99**
AROCLOR-1232	**2**	**5.3**	**0.528**	**5.3**
AROCLOR-1242	**2**	**6.7**	**0.673**	**6.7**
AROCLOR-1248	**2**	**5.7**	**0.572**	**5.7**
AROCLOR-1254	**2**	**13**	**1.285**	**13**
AROCLOR-1260	**2**	**14**	**1.4**	**14**

TABLE 1-2

REFERENCE LIMITS AND EVALUATION TABLE (CORRESPONDS TO UFP-QAPP WORKSHEET 15)
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Analytes	Project Action Limit (ug/kg)[1]	Project Quantitation Limit (ug/kg)	Katahdin Achievable Laboratory MDL (ug/kg)	Katahdin Achievable Laboratory Quantitation Limit (ug/kg)
TCL Semivolatiles SW-846 8270C/SIM				
1,1-BIPHENYL	NA	330	148	330
2,4,5-TRICHLOROPHENOL	NA	820	301	820
2,4,6-TRICHLOROPHENOL	NA	330	235	330
2,4-DICHLOROPHENOL	NA	330	285	330
2,4-DIMETHYLPHENOL	NA	330	247	330
2,4-DINITROPHENOL	NA	820	648	820
2,4-DINITROTOLUENE	NA	330	248	330
2,6-DINITROTOLUENE	NA	330	211	330
2-CHLORONAPHTHALENE	NA	330	186	330
2-CHLOROPHENOL	NA	330	252	330
2-METHYLNAPHTHALENE	20.2	20	2.8	20
2-METHYLPHENOL	NA	330	256	330
2-NITROANILINE	NA	820	223	820
2-NITROPHENOL	NA	330	225	330
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	330	119	330
3,3'-DICHLOROBENZIDINE	NA	330	220	330
3-NITROANILINE	NA	820	245	820
4,6-DINITRO-2-METHYLPHENOL	NA	820	588	820
4-BROMOPHENYL PHENYL ETHER	NA	330	148	330
4-CHLOROPHENYL PHENYL ETHER	NA	330	136	330
4-CHLORO-3-METHYLPHENOL	NA	330	269	330
4-CHLOROANILINE	NA	330	95	330
4-METHYLPHENOL	NA	330	284	330
4-NITROANILINE	NA	820	253	820
4-NITROPHENOL	NA	820	645	820
ACENAPHTHENE	**6.7**	**20**	**1.5**	**20**
ACENAPHTHYLENE	**5.87**	**20**	**1.3**	**20**
ACETOPHENONE	NA	330	270	330
ANTHRACENE	46.9	20	2.6	20
ATRAZINE	NA	330	183	330
BENZALDEHYDE	NA	330	175	330
BENZO(A)ANTHRACENE	74.8	20	2.5	20
BENZO(A)PYRENE	88.8	20	2.1	20
BENZO(B)FLUORANTHENE	655	20	2.2	20
BENZO(G,H,I)PERYLENE	655	20	3.3	20
BENZO(K)FLUORANTHENE	655	20	1.9	20
BIS(2-CHLOROETHOXY)METHANE	NA	330	120	330

TABLE 1-2

REFERENCE LIMITS AND EVALUATION TABLE (CORRESPONDS TO UFP-QAPP WORKSHEET 15)
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Analytes	Project Action Limit (ug/kg)(1)	Project Quantitation Limit (ug/kg)	Katahdin Achievable Laboratory MDL (ug/kg)	Katahdin Achievable Laboratory Quantitation Limit (ug/kg)
TCL Semivolatiles SW-846 8270C/SIM (continued)				
BIS(2-CHLOROETHYL)ETHER	NA	330	170	330
BIS(2-ETHYLHEXYL)PHTHALATE	182	100	2.3	100
BUTYL BENZYL PHTHALATE	NA	330	162	330
CAPROLACTAM	NA	330	207	330
CARBAZOLE	NA	330	208	330
CHRYSENE	108	20	2.6	20
DIBENZO(A,H)ANTHRACENE	**6.22**	**20**	**3.8**	**20**
DIBENZOFURAN	NA	330	171	330
DIETHYL PHTHALATE	NA	330	143	330
DIMETHYL PHTHALATE	NA	330	141	330
DI-N-BUTYL PHTHALATE	NA	330	187	330
DI-N-OCTYL PHTHALATE	NA	330	245	330
FLUORANTHENE	113	20	4.0	20
FLUORENE	21.2	20	1.6	20
HEXACHLOROBENZENE	NA	330	135	330
HEXACHLOROBUTADIENE	NA	330	127	330
HEXACHLOROCYCLOPENTADIENE	NA	330	163	330
HEXACHLOROETHANE	NA	330	140	330
INDENO(1,2,3-CD)PYRENE	655	20	4.3	20
ISOPHORONE	NA	330	140	330
NAPHTHALENE	34.6	20	1.8	20
NITROBENZENE	NA	330	130	330
N-NITROSO-DI-N-PROPYLAMINE	NA	330	138	330
N-NITROSODIPHENYLAMINE	NA	330	255	330
PENTACHLOROPHENOL	NA	820	425	820
PHENANTHRENE	86.7	20	4.3	20
PHENOL	NA	330	269	330
PYRENE	153	20	6.9	20

(1) Region 4 Waste Management Division Sediment Screening Values for Hazardous Waste Sites. Bolded values indicate that the project action limit is less than the project quantitation limit.

IDL = Instrument detection limit.
MDL = Method detection limit.
NA = Not applicable.
TAL = Target Analyte List.

TABLE 1-3

ZONE J HISTORICAL SEDIMENT DATA
CHARLESTON NAVAL COMPLEX, SOUTH CAROLINA

Chemical Name	Reference Range (a)	Screening Value (b)	MDL (c)	Shipyard Creek		Cooper River						Noisette Creek	
				Sep-94	Dec-05	Nov-95	Dec-05	Nov-95	Dec-05	Nov-95	Dec-05	Jun-97	Dec-05
				009M000401	009M000402	054M000101	054M000102	556M000501	556M000502	556M00701	556M000702	NOIM00401	NOIM000402
Inorganics (mg/kg)													
Aluminum	1600-27000	NSV	12	20600	14000	2140	23000	2770	35000	8770	31000	7830	9500
Antimony	ND	12	1.2	2.7J	5.3U	1.8J	4.9U	1.7J	9.6U	1.6U	8.4U	1.1J	3.8U
Arsenic	0.98-15	7.24	1.7	11.9	7	3.7	11	5.4	18	9.1	19	10.7	5.9
Barium	8.8-30	NSV	0.77	29.1	37	19.5J	48	27.4	42	15J	93	44.4J	14
Beryllium	0.12-1.5	NSV	0.044	0.94	0.64J	0.26J	1	0.49J	1.5J	0.59J	1.4J	1.9	0.46J
Cadmium	ND	1	0.56	0.64J	1.6	0.3J	0.54J	0.29J	2.4U	0.41U	2.1U	0.45J	0.96U
Calcium	3000-140000	NSV	6.2	35400	20000	8800	11000	25300	29000	19800	40000	51200	2600
Chromium	4.5-56	52.3	0.33	291	160	28.4	51	36.7	69	20.9	60	25.3	20
Cobalt	0.49-8.4	NSV	0.44	5.7	3.9	2.9J	10	6.8	10	4.4J	9.1	10.6J	3.3
Copper	1.1-16	18.7	0.44	141	54	83.1	140	1930	44	26.9	1200	127	15
Iron	1800-33000	NSV	11	26000	15000	7170	26000	20300	34000	13300	33000	19200	11000
Lead	2.7-21	30.2	0.54	107	71	87J	79	220	26	13.4	26	126	23
Magnesium	530-7100	NSV	3.1	7200	4900	2080	6100	1820	11000	4460	11000	2400	2400
Manganese	33-240	NSV	0.54	274	100	47.1	390	162	400	230	650	140	52
Nickel	1.1-15	15.9	0.67	37.3	19	19.7	28	32.6J	20	7.3J	25	20.5	5.6J
Potassium	240-4200	NSV	3.3	2470	1900	592U	2200	656J	5000	2190J	4400	1050J	1300
Selenium	ND	NSV	2.3	0.56J	6.7U	0.64U	6.1U	0.6	12U	2U	11U	0.91U	4.8U
Silver	ND	2	0.25	0.46U	2.7U	0.26U	0.97J	0.24U	4.8U	0.81U	4.2U	0.98U	1.9U
Sodium	2000-14000	NSV	130	10600	8700	1350	9600	1060	29000	8530	27000	4420J	5600
Thallium	ND	NSV	3.3	0.52U	6.7U	0.64U	6.1U	0.6U	12U	2U	11U	1.6U	4.8U
Vanadium	4.2-61	NSV	0.36	52.2	32	7.4	49	6.3J	77	25.3J	71	22.2	21
Zinc	9.7-64	124	1.9	387	230	211J	680	774	120	55.4	600	718	100
Mercury	0.0053-0.11	0.13	0.01	0.69	0.15	0.52	0.23	0.05	0.077J	0.09	0.074J	0.16	0.14
Pesticides (µg/kg)													
4,4'-DDD	ND	3.3	8.5	41J	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
4,4'-DDE	ND	3.3	8.5	110	89U	NA	88U	7600	180U	10U	160U	5.65U	72U
4,4'-DDT	ND	3.3	7.6	50U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Aldrin	ND	NSV	3.9	18J	46U	NA	45U	1700U	93U	5.2U	83U	2.91U	37U
alpha-BHC	ND	NSV	15	20U	46U	NA	45U	1700U	93U	5.2U	83U	2.91U	37U
beta-BHC	ND	NSV	13	20U	46U	NA	45U	1700U	93U	5.2U	83U	2.91U	37U
Chlordane (technical)	ND	1.7	85	20U	460U	NA	450U	1700U	930U	5.2U	830U	2.91U	370U
delta-BHC	ND	NSV	6.5	20U	46U	NA	45U	1700U	93U	5.2U	83U	2.91U	37U
Dieldrin	ND	3.3	9.9	20U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Endosulfan I	ND	NSV	4.5	20U	46U	NA	45U	1700U	93U	5.2U	83U	2.91U	37U
Endosulfan II	ND	NSV	7.6	50U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Endosulfan sulfate	ND	NSV	10	50U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Endrin	ND	3.3	9	20U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Endrin aldehyde	ND	3.3	18	50U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
Endrin ketone	ND	3.3	9	50U	89U	NA	88U	3200U	180U	10U	160U	5.65U	72U
gamma-BHC (Lindane)	ND	3.3	3.9	20UJ	46U	NA	45U	1.7U	93U	5.2U	83U	2.91U	37U
Heptachlor	ND	NSV	9	20U	46U	NA	45U	1.7U	93U	5.2U	83U	2.91U	37U
Heptachlor epoxide	ND	NSV	5.9	20U	46U	NA	45U	1.7U	93U	5.2U	83U	2.91U	37U
Methoxychlor	ND	NSV	13	200U	460U	NA	450U	45	930U	52U	830U	29.1U	370U
PCB-1016	ND	33	190	200U	890U	NA	880U	43U	1800U	130U	1600U	56.5U	720U
PCB-1221	ND	67	190	200U	1800U	NA	1800U	43U	3700U	130U	3300U	115U	1500U
PCB-1232	ND	33	170	200U	890U	NA	880U	43U	1800U	130U	1600U	56.5U	720U
PCB-1242	ND	33	210	200	890U	NA	880U	43U	1800U	130U	1600U	56.5U	720U
PCB-1248	ND	33	230	3000	890U	NA	880U	43U	1800U	130U	1600U	56.5U	720U
PCB-1254	ND	33	150	690	890U	NA	880U	87U	1800U	270U	1600U	56.5U	720U
PCB-1260	ND	33	180	770	890U	NA	880U	87U	1800U	270U	1600U	56.5U	720U
Toxaphene	ND	NSV	340	900U	4600U	NA	4500U	110U	9300U	330U	8300U	291U	3700U
Semivolatile Organic Compounds (µg/kg)													
1,2,4-Trichlorobenzene	ND	NSV	59	NA	900U	850U	880U	NA	1800U	NA	1600U	570U	720U
1,2-Dichlorobenzene	ND	NSV	65	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
1,3-Dichlorobenzene	ND	NSV	73	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
1,4-Dichlorobenzene	ND	NSV	62	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2,4,5-Trichlorophenol	ND	NSV	90	91000U	900U	4100U	880U	8300U	1800U	13000U	1600U	1400U	720U
2,4,6-Trichlorophenol	ND	NSV	56	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2,4-Dichlorophenol	ND	NSV	65	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2,4-Dimethylphenol	ND	NSV	99	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2,4-Dinitrophenol	ND	NSV	480	91000U	4600U	4100U	4500U	8300U	9300U	13000U	8300U	1400U	3700U
2,4-Dinitrotoluene	ND	NSV	54	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2,6-Dinitrotoluene	ND	NSV	93	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U

TABLE 1-3

ZONE J HISTORICAL SEDIMENT DATA
CHARLESTON NAVAL COMPLEX, SOUTH CAROLINA

Chemical Name	Reference Range (a)	Screening Value (b)	MDL (c)	Shipyard Creek		Cooper River						Noisette Creek	
				Sep-94	Dec-05	Nov-95	Dec-05	Nov-95	Dec-05	Nov-95	Dec-05	Jun-97	Dec-05
				009M000401	009M000402	054M000101	054M000102	556M000501	556M000502	556M00701	556M000702	NOIM00401	NOIM000402
Semivolatile Organic Compounds (µg/kg)													
2-Chloronaphthalene	ND	NSV	68	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2-Chlorophenol	ND	NSV	76	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2-Methylnaphthalene	ND	20.23	68	3600U	900U	220J	880U	1700U	1800U	2600U	130J	570U	720U
2-Methylphenol	ND	NSV	85	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
2-Nitroaniline	ND	NSV	65	91000U	4600	4100U	4500U	8300U	9300U	13000U	8300U	1400U	3700U
2-Nitrophenol	ND	NSV	56	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
3 & 4 Methylphenol	ND	NSV	82	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
3,3'-Dichlorobenzidine	ND	NSV	85	36000U	1800U	1700U	1800U	3400U	3600U	5300U	3200U	570U	1400U
3-Nitroaniline	ND	NSV	93	91000U	4600U	4100U	4500U	8300U	9300U	13000U	8300U	1400U	3700U
4,6-Dinitro-2-methylphenol	ND	NSV	560	91000U	4600U	4100U	4500U	8300U	9300U	13000U	8300U	1400U	3700U
4-Bromophenyl phenyl ether	ND	NSV	87	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
4-Chloro-3-methylphenol	ND	NSV	96	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
4-Chloroaniline	ND	NSV	73	18000U	1800U	850U	1800U	1700U	3600U	2600U	3200U	570U	1400U
4-Chlorophenyl phenyl ether	ND	NSV	54	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
4-Nitroaniline	ND	NSV	48	91000U	4600U	NA	4500U	8300U	9300U	13000U	8300U	1400U	3700U
4-Nitrophenol	ND	NSV	590	91000U	4600U	NA	4500U	8300U	9300U	13000U	8300U	1400U	3700U
Acenaphthene	ND	6.71	54	3600U	900U	640J	880U	260J	1800U	690J	190J	570U	720U
Acenaphthylene	69	5.87	48	3600U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Anthracene	88	46.9	65	3600U	900U	1400	880U	1200J	280J	1200J	680J	610	150J
Benzo[a]anthracene	230	74.8	87	18000U	100J	2600	880U	4300	520J	1800J	870J	1000	290J
Benzo[a]pyrene	140-380	88.8	54	18000U	120J	2200	78J	3600	770J	1500J	670J	990	320J
Benzo[b]fluoranthene	170-420	NSV	73	18000U	230J	850U	99J	4300	880J	2600U	670J	1200	400J
Benzo[g,h,i]perylene	69-200	NSV	65	18000U	100J	1200	880U	1800	300J	710J	290J	210J	240J
Benzo[k]fluoranthene	140-330	NSV	100	18000UJ	110J	3600	880U	3200	790J	2200J	700J	760	330J
Bis(2-chloroethoxy)methane	ND	NSV	68	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Bis(2-chloroethyl)ether	ND	NSV	79	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Bis(2-ethylhexyl) phthalate	58-180	182	110	18000U	230J	850U	230J	1700U	510J	2600U	780J	570U	460J
bis(chloroisopropyl) ether	ND	NSV	99	NA	900U	NA	880U	NA	1800U	NA	1600U	NA	720U
Butyl benzyl phthalate	ND	NSV	76	18000U	900U	850U	880U	1700	1800U	2600U	1600U	570U	720U
Carbazole	ND	NSV	79	NA	900U	NA	880U	NA	1800U	NA	1600U	570U	720U
Chrysene	94-360	108	71	18000U	150J	2900	100J	5600	1000J	1900J	1100J	1500	380J
Dibenz(a,h)anthracene	ND	6.22	68	18000U	900U	720J	880U	820J	1800U	360J	1600U	150J	66J
Dibenzofuran	ND	NSV	54	18000U	900U	590J	880U	1700U	1800U	2600U	1600U	570U	720U
Diethyl phthalate	ND	NSV	62	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Dimethyl phthalate	ND	NSV	54	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Di-n-butyl phthalate	ND	NSV	79	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Di-n-octyl phthalate	ND	NSV	87	18000U	900U	850U	880U	1700U	1800U	290J	1600U	570U	720U
Fluoranthene	52-380	113	73	9500J	230J	6700	150J	14000	640J	4600	2000	1500	650J
Fluorene	ND	21.2	62	3600U	900U	760J	880U	1700U	1800U	520J	1600U	570U	720U
Hexachlorobenzene	ND	NSV	73	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Hexachlorobutadiene	ND	NSV	56	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Hexachlorocyclopentadiene	ND	NSV	230	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Hexachloroethane	ND	NSV	56	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Indeno[1,2,3-cd]pyrene	61-190	NSV	73	18000U	86J	1100	880U	1800	320J	690J	270J	270J	230J
Isophorone	ND	NSV	62	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Naphthalene	ND	34.6	54	18000U	900U	590J	880U	1700U	1800U	2600U	1600U	570U	720U
Nitrobenzene	ND	NSV	99	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
N-Nitrosodi-n-propylamine	ND	NSV	79	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
N-Nitrosodiphenylamine	ND	NSV	65	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Pentachlorophenol	ND	NSV	230	18000U	4600U	4100	4500U	8300	9300U	13000U	8300U	1400U	3700U
Phenanthrene	ND	86.7	82	18000U	900U	6900	880U	5700	1800U	2400J	370J	83J	110J
Phenol	ND	NSV	85	18000U	900U	850U	880U	1700U	1800U	2600U	1600U	570U	720U
Pyrene	50-510	153	56	6400J	230J	5600	200J	10000	1300J	4400	1400J	950	540J
Percent Moisture					63		63		82		80		54

Notes:

This table was adapted from Spectra Tech (2006).
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
J = Estimated.
U = Non Detect at detection limit shown.
MDL = Method Detection Limit.
ND = Nondetect.
NSV = No Screening Value.

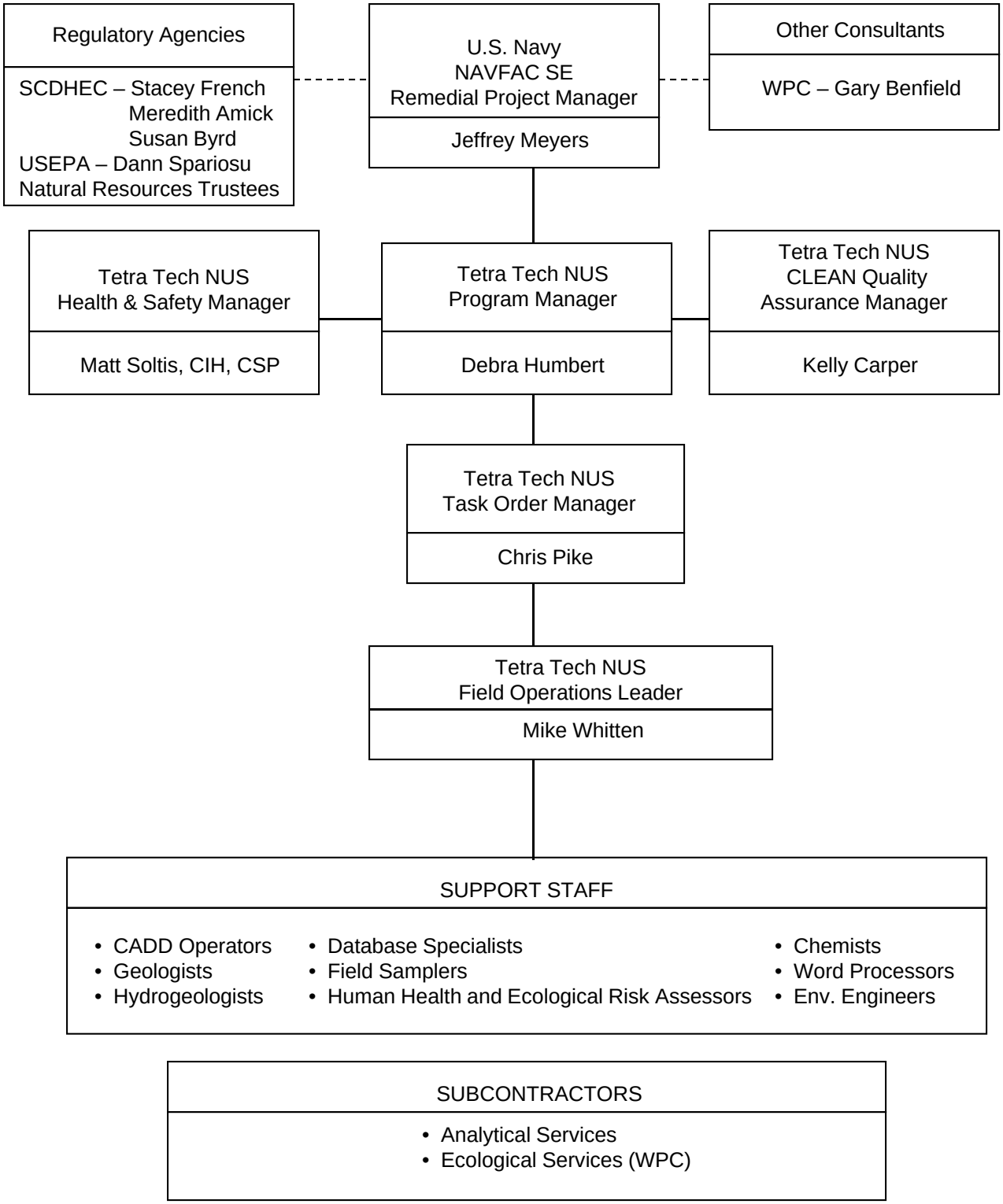
a. Reference Range refers to the range of detected concentrations in 10 sediment samples collected in December 2005 to represent regional baseline (reference) conditions. ND indicates nondetect based on MDL.

b. Screening values from: Supplemental Guidance to RAGS, Region 4 Bulletins, Ecological Risk Assessment (USEPA, 2001).

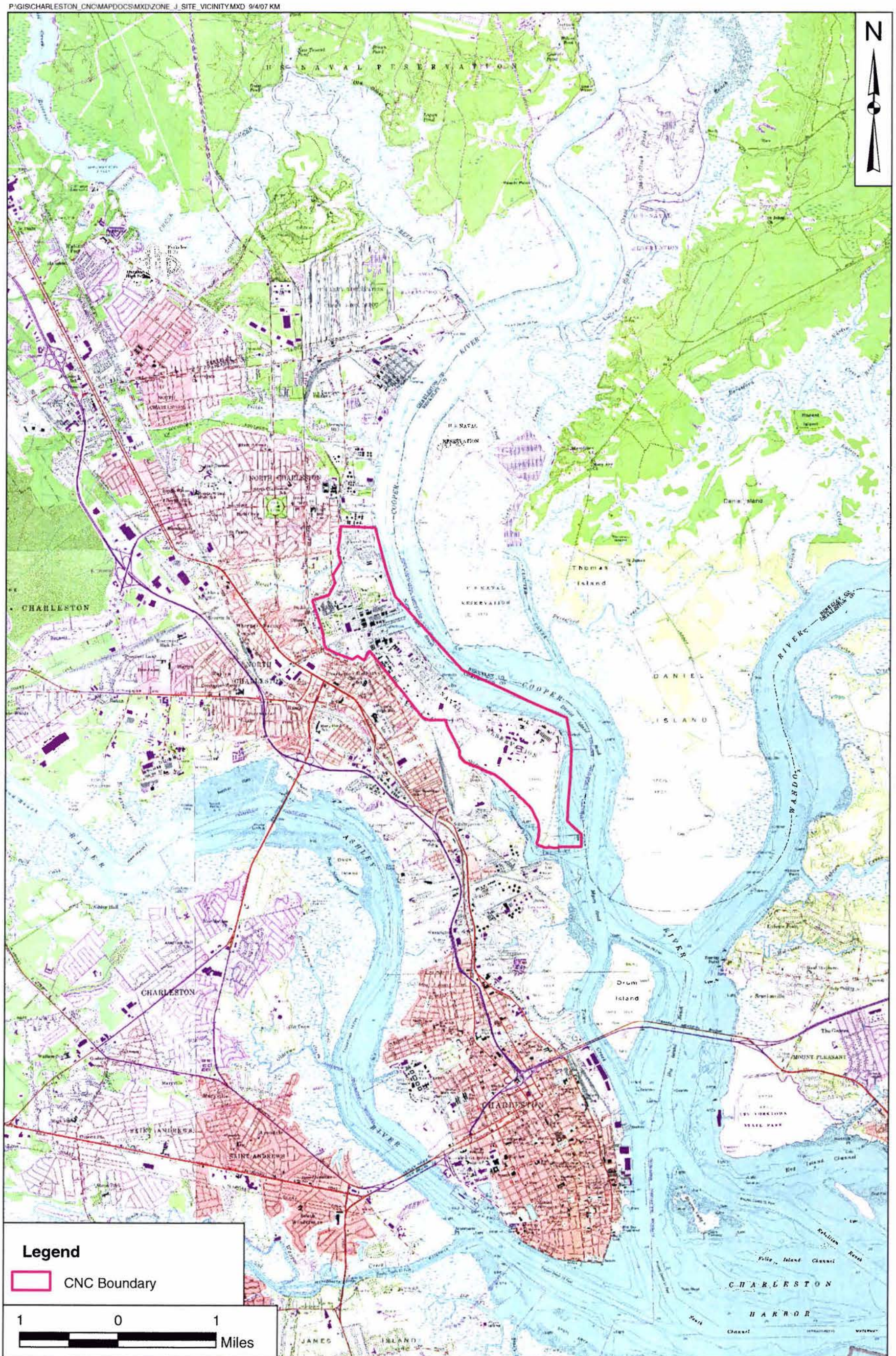
c. MDLs presented are from the December 2005 sampling event.

FIGURE 1-1

PROJECT ORGANIZATION CHART
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, SOUTH CAROLINA



P:\GIS\CHARLESTON_CNC\MAPDOCS\MXD\ZONE_J_SITE_VICINITY.MXD 9/4/07 KM



DRAWN BY	DATE
K. MOORE	7/2/07
CHECKED BY	DATE
L. KLINK	9/4/07
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

ZONE J SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	
CTO 017	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 1-2	0

P:\GIS\CHARLESTON_CNC\MAPDOCS\MXD\ZONE_J_SITE_PLAN.MXD 9/4/07 KM

DRAWN BY	DATE
K. MOORE	7/2/07
CHECKED BY	DATE
L. KLINK	9/4/07
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

ZONE J SITE PLAN
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	
CTO 017	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 1-3	0

2.0 MEASUREMENT/DATA ACQUISITION

2.1 SAMPLING TASKS

TtNUS will conduct sediment sampling to provide supplemental data for the Zone J RFI. The planned field activities consist of mobilization, sediment sample collection, and demobilization, and will be completed in one field effort.

This section of the QAPP describes how representative samples will be collected in an appropriate and consistent manner to meet the project objectives specified in Section 1.0. The section figures and tables referenced are provided at the end the section.

2.1.1 Sampling Process Design and Rationale

Nine sediment samples are proposed to be collected from water bodies comprising Zone J. Three of the samples will be collected from Noisette Creek in the northern portion of Zone J. Three samples will be collected from the Cooper River to the east, and three from Shipyard Creek in the southern portion of the site. Five of the nine sampling locations (009M0004, 054M0001, 556M0005, 556M0007, and NOIM0004) were previously sampled and are to be re-sampled during this investigation. The additional four sampling locations (009M0016, 009M0017, NOIM0011, and NOIM0012) are proposed in the more ecologically sensitive areas of Shipyard Creek and Noisette Creek to provide additional data to support the ecological risk assessment. Table 2-1 provides a summary of the sample locations, sample identifications, sampling depths, and rationale. The site vicinity and proposed sampling locations are shown on Figure 2-1. A Global Positioning System (GPS) unit will be used to locate the sampling locations in the field.

2.1.2 Sample Identification System

This section describes the project specific sample identification scheme, which is based on existing nomenclature and is used to maintain consistency between sampling rounds. TtNUS Standard Operating Procedure (SOP) CT-04 provides additional guidance regarding sample identification schemes.

2.1.2.1 Environmental Samples

All environmental samples collected in Site Zone J will be properly labeled with a sample label affixed to the sample container. Each sample will be assigned a unique sample tracking number. The sample tracking number will consist of a 10-digit alphanumeric code that identifies the sample's associated site, sample type, location, and round.

The alphanumeric coding to be used for Zone J sample system is as follows:

AAA or NNN	**A**	**NNNN**	**NN**
Site Number	Sample Type	Location	Round Identifier

Character Type:

A = Alpha
N = Numeric

Site:

009 = Shipyard Creek (Zone J)
054 = Site 054 (Cooper River Zone J)
556 = Site 556 (Cooper River Zone J)
NOI = Noisette Creek (Zone J)

Sample Type:

M = Sediment sample

Location:

The sample location code is the assigned sediment sample location number.

Round Identifier:

The two-digit round identifier will be increased by one for each sampling round. For this field effort, all samples will use 03 for the round identifier. See Table 2-1 for sample identifications.

Example of Sample Nomenclature

A sample collected on January 7, 2008 from Noisette Creek location NOIM0004 would be designated as NOIM000403.

2.1.2.2 Field Quality Assurance/Quality Control

Field QA/QC samples will be designated using a different coding system. The QC code will consist of a 10-digit alphanumeric code that identifies the sample QC type, date the sample was collected, and number of this type of QC sample collected for the field event.

AA	NNNNNN	NN
QC Type	Date	Sequence Number (per day)

The QC types are identified as:

RB = Rinsate blank (equipment blank)
FD = Field duplicate

The sampling times recorded on the chain-of-custody form and sample labels for duplicate samples will be 0000 so that the samples are "blind" to the laboratory. Notes detailing the duplicate sample number, time, date, and type will be recorded on the sample log sheets and will document the location of the duplicate sample (sample log sheets are not provided to the laboratory).

Example of Field QA/QC Nomenclature

The first duplicate of the project field event collected on January 7, 2008 from Noisette Creek would be designated as NOIFD01070801.

2.1.3 Sampling Procedures and Requirements

TtNUS field forms for this project are provided in Appendix B. SOPs for conducting the field investigation are listed in Table 2-2 which provides the applicable TtNUS SOPs, and the SOPs are provided in Appendix C.

2.1.3.1 Sampling Collection Procedures

Sediment sample collection will be conducted in accordance with TtNUS SOP SA-1.2, with additional guidance provided in Section 11 of the Environmental Science Division, SOPs and Quality Assurance Manual (ESDSOPQAM), which lists several acceptable sampling techniques (e.g., dredging, scooping, coring) for collecting sediment samples from surface water bodies and dry land areas, depending upon sampling objectives. The samples will be collected using either a scope sampler or a petite ponar dredge depending on site conditions. Based on previous sampling efforts at the CNC “Zone J” the likely method will be dredge sampling. Sediment samples will be collected to an approximate depth of 6 inches. Sediment sampling locations may be reached by wading or by boat, depending on water depth and the nature of the substrate. If wading to the sample location, the location will be approached from downstream to minimize disturbance. Specific procedures for sediment sampling with a petite ponar dredge are discussed below.

The petite ponar sampler is a stainless steel, clam-shell-type scoop activated by a cantilevered system. Procedures for operating the ponar grab sampler are as follows.

- Lock open the jaws of the decontaminated sampler.
- Lower the sampler into the sediment.
- Release tension on the rope and close sampler jaws.
- Retrieve the sampler, slowly decant the excess water, and open the jaws to empty the dredge contents into a decontaminated stainless steel bowl.
- Drain off the excess water still remaining in the stainless steel bowl prior to mixing the sediment until homogenous.
- Apportion sediment to appropriate sample containers for shipment to the laboratory. Decant excess water in the sample jars after the sample is placed in the jar.

2.1.3.2 Sample Containers, Volume, and Preservation

A list of sample volumes, containers, preservation requirements, and holding times is presented in Table 2-3.

2.1.3.3 Equipment/Sample Containers Cleaning and Decontamination Procedures

All reusable equipment will be decontaminated in accordance with TtNUS SOP-7.1 (except isopropyl alcohol will not be used) between uses to ensure that samples are not contaminated by the sampling equipment. The SOPs are provided in Appendix C.

Sample containers will be shipped certified clean from the analytical laboratory.

2.1.3.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures

Each field crew member must inspect equipment prior to use to ensure it is capable of meeting its intended use. More casual inspections for equipment integrity must be made routinely to ensure that the equipment is intact, all applicable parts are operating correctly, and the equipment is suitably clean to perform its task. Calibration log field forms will be completed daily and are provided in Appendix B.

Calibration and maintenance will be done in accordance with TtNUS SOPs SA-2.2 provided in Appendix C.

2.1.3.5 Sampling Supply Inspection and Acceptance Requirements.

Each person using sampling equipment must ensure that the equipment is capable of adequately serving its intended use. This includes a verification of equipment cleanliness, as described in Section 2.1.3.3, and a verification that the equipment is in good working order and that all accessories necessary for performing the work have been provided by the vendor. If questions arise, the Field Operations Leader (FOL) will be contacted for guidance.

2.1.4 Investigation-Derived Waste

Investigation-derived waste (IDW) will not be generated for this project.

2.1.5 Health and Safety Requirements

.Appendix D provides the health and safety plan (HASP) detailing health and safety requirements during field activities.

2.2 ANALYTICAL TASKS

This section provides information with regard to the analytical SOPs, calibration procedures, instrument/equipment maintenance, testing, and inspection procedures for the selected laboratories. During this project, 12 samples (9 sediment samples, 1 field duplicate, and 2 rinsate blanks) will be collected and sent to Katahdin Analytical for the following analysis:

- TCL SVOCs via SW-846 8270C [with polynuclear aromatic hydrocarbon (PAH) and bis(2-ethylhexyl)phthalate (BEHP) analysis being performed in selective ion monitoring (SIM) mode].

- TCL pesticides and PCBs via SW-846 8081A and 8082, respectively (these methods are being modified to allow the final concentration sample volume to 1 mL to achieve lower detection limits).

- TAL metals via SW-846 6010B trace ICP with mercury via SW-846 7471A.

- TOC via Lloyd Kahn.

2.2.1 Analytical SOPs

All relevant analytical SOPs are summarized in Table 2-4 (which corresponds to UFP-QAPP Worksheet 23). These laboratory SOPs are provided in Appendix E (on compact disc).

2.2.2 Analytical Instrument Calibration Procedures

All instrument calibration procedures, frequencies of calibration, acceptance criteria, corrective actions, and personnel responsible for corrective action are presented in Table 2-5 (which corresponds to UFP-QAPP Worksheet 24). The SOPs listed are designed to ensure that laboratory equipment meets the sensitivity, accuracy, and precision requirements of this QAPP.

2.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures

All instrument and equipment maintenance, testing, and inspection procedures are presented in Table 2-6 (which corresponds to UFP-QAPP Worksheet 25). These procedures are designed to ensure that all necessary equipment is continually available to prevent project delays caused by missing or broken equipment.

2.2.4 Analytical Supply Inspection and Acceptance Procedures

The laboratory must be able to demonstrate that all supplies needed for analytical work will be available when needed and be free of target compounds and any interference. This information can be supplied upon request.

2.2.5 Analytical Quality Control Samples

Analytical QC samples to be used during this sediment investigation are provided in Table 2-7 (which corresponds with UFP-QAPP Worksheet 28).

2.3 SAMPLE COLLECTION DOCUMENTATION, HANDLING, TRACKING, AND CUSTODY PROCEDURES

The following sections provide the procedures that will be used by field personnel to document project activities and sample collection procedures. Detailed and accurate documentation is necessary to ensure data integrity. Also refer to Tables 2-8 and 2-9 (corresponds to UFP Worksheets 26 and 27), respectively, for sample handling and sample custody requirements.

2.3.1 Field Documentation

Documentation of field observations will be recorded in a field logbook and/or on field log sheets including sample collection logs. Field logbooks utilized for this project will consist of bound, water-resistant logbooks. Field logbooks will be maintained according to TtNUS SOP SA-6.3. Field sample log sheets will be used to document sample collection details, and other observations and activities will be recorded in the field logbook. Field forms are provided in Appendix B.

For sampling and field activities, the following types of information will be recorded in the field logbook, as appropriate:

Site name and location
Date and time of logbook entries
Personnel and their affiliations
Weather conditions
Activities involved with sampling
Site observations including site entry and exit times
Site sketches made on site
Visitor names, affiliations, arrival and departure times
Health and safety issues
Log of photographs, if any

The field logbooks and sample log sheets will remain on site for the duration of the investigation. After the investigation is completed, the field sampling log sheets will be organized by date and medium and placed in the project file. The field logbooks for this project will be used only for this site and will also be categorized and maintained in the project file after the completion of the field program.

2.3.2 Sample Custody

Sample custody procedures are designed to provide documentation of preparation, handling, storage, and shipping of all samples collected. Additional guidance is provided in TtNUS SOPs SA-6.1 and SA-6.3.

2.3.2.1 Field Custody

The FOL is responsible for the care and custody of the samples collected until they are delivered to the laboratory or are entrusted to a carrier.

Sample logs or other records will be signed and dated by the personnel making the entries.

Chain-of-custody forms will be completed to the fullest extent possible before sample shipment. They will include the following information: project name, sample identification, date and time of sample collection, analyses to be conducted, matrix, type of sample, grab or composite designation, preservative, and name of sampler. These forms will be filled out in a legible manner using ink and will be signed by the sampler. Similar information will be provided on the sample label that will be securely attached to each sample bottle. The label will also include the general analyses to be conducted. Examples of all forms to be used during field activities are provided in Appendix B.

2.3.2.2 Transfer of Custody

Sample coolers will be custody-sealed for security and accompanied by chain-of-custody forms. When transferring samples, the individuals relinquishing and receiving them will sign, date, and note the time on each chain-of-custody form. This record documents sample custody transfer from the sampler to the laboratory, often through another person or agency (common carrier).

2.3.2.3 Sample Shipment Procedures

The following procedures will be followed when shipping samples for laboratory analysis:

- Samples requiring cooling to 4 degrees Celsius will be promptly chilled with ice or blue ice and will be packaged in an insulated cooler for transport to the laboratory. A temperature blank will be included in each cooler to be used as a temperature indicator. Each temperature blank will be clearly identified by the field sampling team.

- The field chain-of-custody form will be placed inside the shipping container in a sealed, plastic envelope. Shipping containers will be sealed with nylon strapping tape, and custody seals will be signed, dated, and affixed in a manner that will allow the receiver to quickly identify any tampering that may have occurred during transport to the laboratory.

- Samples to be delivered to the laboratory will be transported by a public courier (e.g., Federal Express). After samples have been collected, they will be shipped to the laboratory overnight for next day delivery.

2.3.2.4 Laboratory Sample Custody

To ensure the integrity of a sample from collection through analysis, it is necessary to have an accurate, written record that traces the possession and handling of the sample. This documentation is referred to as the chain-of-custody form.

A sample is under custody if:

The sample is in the physical possession of an authorized person
The sample is in view of an authorized person after being in his/her possession
The sample is placed in a secure area by an authorized person after being in his/her possession
The sample is in a secure area restricted to authorized personnel only

When samples are received, the chain-of-custody form will be signed and dated to acknowledge sample receipt. The sample custodian will examine the shipping containers and verify that the correct number of containers was received. The shipping containers will then be opened and the enclosed sample paperwork removed. Samples will be removed from the shipping containers, and the bottle condition, temperature of the temperature blank, and sample salinity will be noted. The information on the chain-of-custody form, airbill, containers, and laboratory request will be reviewed, and any discrepancies will be noted.

The laboratory will be required to fax the chain-of-custody forms and sample log-in information to the TtNUS project manager (PM) after every shipment.

All samples received by the laboratory must be stored at 4° Celsius until analysis. Laboratory holding times are specified by the contract and presented in Table 2-3.

2.4 QUALITY CONTROL SAMPLES

2.4.1 Quality Control Samples

Several types of QC samples will be collected or generated during environmental sampling activities including field duplicates, equipment rinsate blanks from the Ponar dredge, and temperature blanks. One duplicate sample will be collected per 10 units of a medium sampled. One equipment rinsate blank will be collected per day of sampling. Temperature blanks will be included in each cooler submitted to the laboratory to monitor sample storage conditions prior to arrival at the laboratory. With the exception of temperature blanks, each type of field QC sample will undergo the same preservation, analysis, and

reporting procedures as the related environmental samples. A summary of QA/QC sample requirements is provided in Table 2-10. The four types of field QC samples are defined below:

Field Duplicates. Field duplicates are obtained during a single act of sampling and are used to assess the overall precision of the sampling and analysis program. Field duplicates will be collected at a frequency of 10 percent per sampling matrix (only sediment for this project). Duplicates will be analyzed by the laboratory for the same parameters as their environmental sample counterparts.

Equipment Rinsate Blanks. Equipment rinsate blanks are obtained under representative field conditions by running analyte-free water through decontaminated sample collection equipment (Ponar dredge). Equipment blanks will be used to assess the effectiveness of decontamination procedures. Equipment blanks will be collected and submitted at a frequency of one per day per medium (only sediment for this project). Equipment rinsate blanks will be analyzed for the same suite of analytical parameters as the associated environmental samples and will be collected in the appropriate sample containers.

Temperature Blank - Temperature blanks are vials of water inserted into each sample cooler prior to shipment from the field. The temperature of the temperature blank is measured prior to shipment and upon receipt at the laboratory to assess whether samples were properly cooled during transit.

2.5 DATA MANAGEMENT TASKS

This section describes how all project information will be managed, organized, and maintained for efficient use by project personnel. The information management process is outlined from the point of data generation to ultimate storage.

2.5.1 Project Documentation and Records

A summary of project documentation and records to be generated and stored in TtNUS project files is provided in Table 2-11 (which corresponds to UFP-QAPP Worksheet 29); these records will be included in the appendices of the subject report.

2.5.2 Data Package Deliverables

The section describes both field and fixed-base analytical data.

2.5.2.1 Sample Collection and Field Measurement Data Package Deliverables

Sample collection data will be recorded as required by the sample collection SOPs in Appendix C. In addition, calibration data for any field instruments will be recorded in accordance with the field SOPs in Appendix C. The data packages to be provided for these data are the completed field forms.

2.5.2.2 On-Site Analysis Data Package Deliverables

This project does not involve on-site analyses beyond the field screening associated with personnel protection. Therefore, this section is not applicable.

2.5.2.3 Off-Site Laboratory Data Package Deliverables

Data package deliverable requirements are detailed in Table 2-12, entitled Analytical Data Deliverable Elements and Table 2-13 Analytical Service Summary (which corresponds with UFP QAPP Worksheet 30 Analytical Services).

Data packages will require all the elements specified in Table 2-1. Data packages will be provided as both hard copies and in portable document format (PDF). The analytical laboratory will provide a Naval Installation Restoration Information Solutions (NIRIS) compatible electronic data deliverable (EDD). Data packages will be contract laboratory program (CLP)-equivalent (i.e. they will contain CLP-equivalent summary forms and raw data). The standard turnaround time for analytical services is 28 calendar days. Turnaround time will be measured from the laboratory receipt of the last samples in a sample delivery group (SDG). SDGs must contain 20 samples (no more than 20 and only less if the entire sampling event was comprised of less than 20 samples). Data will be stored by the analytical laboratory for 5 years.

2.5.3 Data Reporting Formats

Field data will be recorded in the field logbooks and on field forms. All logbook and log sheet entries must be made in indelible ink (black pen is preferred). No erasures, liquid paper, or white out are permitted. If an incorrect entry is made, the data will be crossed out with a single strike mark, initialed, and dated. The field personnel will sign and date the logbook pages and field forms. Examples of the forms to be used in the field are presented in Appendix B of this QAPP.

2.5.4 Data Handling and Management

The data-handling procedures to be followed by the analytical laboratory will meet the requirements in the laboratory subcontract. All analytical and field data will be maintained in the project files. The project files will contain hard copies of the chain-of-custody forms, sample log forms, and sample location maps and documentation of QA of data manipulation. These forms are included in the applicable SOPs of Appendix B of this QAPP.

The overall field data flow is as follows:

1. Field personnel calibrate sampling equipment and document calibrations in accordance with applicable SOPs in Appendix C.

2. Field personnel use Section 2.1 and 2.3 of this QAPP to identify sampling locations.

3. As applicable, sampling locations are evaluated to ensure they are safe for personnel to collect samples, and the evaluations are documented in accordance with SOPs in Appendix C and the health and safety plan (HASP) in Appendix D.

4. If applicable, sampling conditions are monitored with field instruments to ensure that sampling conditions are representative of the intended populations. These measurements are made and documented in accordance with SOPs in Appendix C.

5. Samples are collected and documented and sampling equipment is decontaminated in accordance with SOPs in Appendix C.

6. Samples are shipped to the laboratory for analysis and shipping documentation, including chain of custody records, are compiled for later transfer to the PM.

7. Sampling locations will be located using a Global Positioning System (GPS) to establish sample locations within the desired precision and accuracy.

8. Field conditions are recorded throughout the field work.

9. During demobilization, field records are collected, double checked for completeness, and forwarded to the TtNUS project manager (PM) for inclusion in the project database and the appropriate site report.

The overall laboratory data flow is as follows:

1. Samples are received and inspected, and the conditions of the samples are logged.

2. Analytical equipment is calibrated for analysis, and calibrations are documented.

3. Samples are analyzed, and the analyses are documented.

4. The resulting data are reviewed and incorporated into the laboratory information management system.

5. Hardcopy data packages are assembled, and EDDs are prepared to match the hardcopy data packages.

6. The hardcopy and electronic data are transmitted to TtNUS.

The overall TtNUS data flow is as follows:

1. EDDs and hardcopy data packages are received from the laboratory. These data are reviewed for accuracy and are validated.

2. A validation report is prepared to document the data quality.

3. Data qualifiers are assigned to electronic data, and the data are transferred, with qualifiers, to the TtNUS project database.

4. Corresponding field data are transferred to the project database.

5. Data are now available for use by TtNUS project personnel. A data usability assessment is performed to ensure the data will be useful as intended. Data usability is assessed continually as various data users have the opportunity to work with the data.

6. Validated data are transferred to the Geographical Information System (GIS) for plotting and other manipulations.

Additional details are provided in the subsections below.

2.5.5 Data Tracking and Control

A “cradle-to-grave” sample tracking system will be used from the beginning to the end of the investigation. Before field mobilization, the FOL will coordinate/initiate the sample tracking process. The PM will ensure that sample jar labels are printed before field sampling, as necessary. The FOL and PM or PM designee will review the labels for completeness of information and adherence to QAPP requirements, as well as for accuracy. The PM will coordinate with the analytical laboratory to ensure that they are aware of the number and type of samples and analyses that are about to be requested.

When field sampling is underway, the FOL will forward the chain-of-custody forms to the PM or designee via facsimile at the end of each day. The PM or designee will compare the entries on the chain-of-custody forms to the sample tracking database and enter the sample date and other sample information as appropriate. The PM or designee will also confirm that the chain-of-custody forms provide the information required by the QAPP. This will allow for early detection of errors made in the field so that adjustments can be made while the crew is mobilized. After successful completion of all requested analyses, the laboratory will submit an electronic deliverable for every SDG. When all electronic deliverables have been received from the laboratory, the PM will ensure that the laboratory performed all the requested analyses. Ideally, discrepancies can be noted early enough so that any samples that were not analyzed as requested can be analyzed within the prescribed holding times.

2.5.5.1 Sample Information

Data from field measurements will be recorded directly in field notebooks or on sample logs. Reduction of field data entails the summarization and presentation of these data in tabular form. The reduction of laboratory data entails the manipulation of raw data instrument output into reportable results. Field data will be verified on a daily basis by the FOL. Laboratory data will be verified by the laboratory group supervisor and then by the laboratory's QC/Documentation Department.

Before electronic files are received from the laboratory, all sample-specific information will be entered into the CNC data management system. The sample information file will allow the analytical results to be grouped together properly for statistical purposes. The data will be managed in one data structure. For field data, the FOL will coordinate with the GIS lead to ensure that all survey technical specifications are consistent with the underlying coordinate system in the GIS.

Electronic data arriving from the laboratory will pass through to the Data Validation Manager (DVM) for database compilation and validation. The DVM will compile all the formatted laboratory electronic deliverables into a working project database. Data that are to be validated will be printed as data packages, which include the samples as part of each SDG and the appropriate analytical fraction. The data packages will be distributed to the appropriate data validators. The data validators will enter all data qualifiers and qualifier codes into the database and print out a hard copy of the database and return it to the DVM. The DVM will check the data qualifiers and qualifier codes in the project database and print the final validated data for incorporation into the data validation letter. When all samples and analyses have been accounted for and validated, the PM will ensure that the analytical data are incorporated into the project database.

2.5.5.2 Project Data Compilation

The analytical laboratory subcontractor(s) will generate a PDF file of the analytical data packages and EDDs. The electronic database will be checked against the PDF file provided by the laboratory and updated as required based on data qualifier flags applied during the data validation process. The data generated during the implementation of this QAPP will be incorporated into the project database and GIS. All data, such as units of measure and chemical nomenclature, will be manipulated to maintain consistency with the project database.

2.5.5.3 Geographical Information System

Data management systems consist of a relational database and GIS that are used to manage environmental information pertaining to CNC. The relational database stores chemical, geological, hydrogeological, and other environmental data collected during environmental investigations. The GIS is built from the relational database and contains subsets of the larger data pool. Using the GIS, environmental data can be posted on base mapping to provide a graphical representation of the information.

TABLE 2-1

SEDIMENT SAMPLING LOCATIONS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Sampling Location	Sample ID	Depth (inches bgs)	Rationale for Location	Analysis	Rationale for Analysis
NOIM0004	NOIM000403	0 - 6	Determine if CNC activities have adversely impacted Noisette Creek sediments.	TCL SVOCs TCL Pesticides TCL PCBs TAL metals TOC	Based on historical evaluation that identified contaminants of potential concern (Spectra Tech, 2005)
NOIM0011	NOIM001103		Approximately 50 feet upstream of NOIM0004 to determine if CNC activities have adversely impacted Noisette Creek and to provide additional data for the ecological risk assessment.		
NOIM0012	NOIM001203		Approximately 50 feet downstream of NOIM0004, to determine if CNC activities have adversely impacted Noisette Creek and to provide additional data for the ecological risk assessment.		
009M0004	009M000403		Determine if CNC activities have adversely impacted Shipyard Creek sediments.		
009M0016	009M001603		Approximately 50 feet upstream of 009M0004 to determine if CNC activities have adversely impacted Shipyard Creek and to provide additional data for the ecological risk assessment.		
009M0017	009M001703		Approximately 50 feet downstream of 009M0004 to determine if CNC activities have adversely impacted Shipyard Creek and to provide additional data for the ecological risk assessment.		
054M0001	054M000103		Determine if CNC activities have adversely impacted Cooper River sediments.		
556M0007	556M000703				
556M0005	556M000503				

bgs = below ground surface.
CNC = Charleston Naval Complex.
PCBs = Polychlorinated biphenyls.
SVOCs = Semivolatile organic compounds.
TAL = Target Analyte List.
TOC = Total organic carbon.

TABLE 2-2

LIST OF STANDARD OPERATING PROCEDURES FOR FIELD WORK
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

SA-1.2 SURFACE WATER AND SEDIMENT SAMPLING

SA-7.1 DECONTAMINATION OF FIELD EQUIPMENT AND WASTE HANDLING

SA-6.3 FIELD DOCUMENTATION

SA-6.1 NON-RADIOLOGICAL SAMPLE HANDLING

CT-04 SAMPLE NOMENCLATURE

CT-05 DATABASE RECORDS AND QUALITY ASSURANCE

TABLE 2-3 (CORRESPONDS WITH UFP-QAPP WORKSHEET #19)

BOTTLEWARE, PRESERVATION, AND HOLDING TIME REQUIREMENTS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Solid	TAL Metals	Low	SW-846 3050, 6010B/SOP-10, SOP-11, SOP-12	4 oz.	(1) 4 oz. soil jar	4° C	6 months/28 days (Hg)
Solid	TCL Pesticides	Low	SW8-46 3540, 3550, 8081A/SOP-5, SOP-7, SOP-3	4 oz.	(1) 4 oz. soil jar	4° C	14 days to extraction/ 40 days to analysis
Solid	TCL PCBs	Low	SW-846 3540, 3550, 8082/SOP-5, SOP-7, SOP-4	4 oz.	(1) 4 oz. soil jar	4° C	14 days to extraction/ 40 days to analysis
Solid	TCL SVOCs	Low	SW-846 3540, 3550, 8270C/SOP-6, SOP-8, SOP-1, SOP-2	4 oz.	(1) 4 oz. soil jar	4° C	14 days to extraction/ 40 days to analysis
Solid	TOC	Low	Lloyd Kahn/SOP-13	4 oz.	(1) 4 oz. soil jar	4° C	14 days to analysis

TABLE 2-4 (CORRESPONDS TO UFP-QAPP WORKSHEET #23)

ANALYTICAL SOP REFERENCES TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
SOP-1	"Analysis of SVOAs by Capillary Column GC/MS: SW-846 Method 8270" SOP No. CA-204, Revision 8, 04/06.	Definitive	TCL Semivolatiles	GC/MS	Katahdin Analytical Services	No
SOP-2	"Analysis of Semivolatile Organic Compounds by: SW 846 Method 8270 - Modified for Selected Ion Monitoring (SIM)", SOP No. CA-213, Revision 3, 04/06.	Definitive	TCL Semivolatiles	GC/MS	Katahdin Analytical Services	Yes; PAHs and bis(2-ethylhexyl) phthalate being analyzed in the SIM mode
SOP-3	"Analysis of Pesticides By Gas Chromatography/Electron Capture Detector (GC/ECD): SW-846 Method 8081," SOP No. CA-302, Revision 8, 06/07.	Definitive	TCL Pesticides	GC/ECD	Katahdin Analytical Services	Yes; Final extract being concentrated to 1 mL to achieve lower detection limits
SOP-4	"Analysis Of PCBs As Total Aroclors By Gas Chromatography/Electron Capture Detector (GC/ECD): SW-846 Method 8082," SOP No. CA-329, Revision 6, 04/06.	Definitive	TCL PCBs	GC/ECD	Katahdin Analytical Services	Yes; Final extract being concentrated to 1 mL to achieve lower detection limits
SOP-5	"Preparation of Sediment/Soil Samples by Sonication using Method 3550 for subsequent Pesticides/PCBs Analysis," SOP No. CA-500, Revision 3, 04/06.	Definitive	TCL PCBs and Pesticides	Ultrasonic Extractions	Katahdin Analytical Services	No
SOP-6	"Preparation of Sediment/Soil Samples by Sonication using Method 3550 for subsequent Extractable Semi-Volatile Analysis," SOP No. CA-512, Revision 4, 04/06.	Definitive	TCL Semivolatiles	Ultrasonic Extraction	Katahdin Analytical Services	Yes; PAHs and bis(2-ethylhexyl) phthalate being analyzed in the SIM mode

TABLE 2-4 (CORRESPONDS TO UFP-QAPP WORKSHEET #23)

ANALYTICAL SOP REFERENCES TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
SOP-7	"Preparation of Sediment/Soil Samples by Soxhlet Extraction Using Method 3540 for Pesticide/PCB Analysis," SOP No. CA-524, Revision 3, 04/06 .	Definitive	TCL PCBs and Pesticides (soil)	Soxhlet Extraction	Katahdin Analytical Services	No
SOP-8	"Preparation of Sediment/Soil Samples by Soxhlet Extraction for Subsequent Extractable Semivolatile Analysis," SOP No. CA-526, Revision 3, 04/06.	Definitive	TCL Semivolatiles	Soxhlet Extraction	Katahdin Analytical Services	No
SOP-9	"Acid Digestion of Aqueous Samples by EPA Method3010 for ICP Analysis of Total or Dissolved Metals" SOP No. CA-604, Revision 3, 04/06.	Definitive	TAL Metals	Acid Digestion	Katahdin Analytical Services	No
SOP-10	"Acid Digestion of Solid Samples by USEPA Method 3050 for Metals by ICP-AES and GFAA," 3050B, SOP No. CA-605, Revision 2, 03/06.	Definitive	TAL Metals	Acid Digestion	Katahdin Analytical Services	No
SOP-11	"Trace Metals Analysis By ICP-AES Using EPA Method 6010," SOP No. CA-608, Revision 4, 05/06.	Definitive	TAL Metals	ICP	Katahdin Analytical Services	No
SOP-12	"Digestion And Analysis Of Aqueous Samples For Mercury By USEPA Method 7470," SOP No. CA-615, Revision 1, 04/06.	Definitive	Mercury	CVAA	Katahdin Analytical Services	No
SOP-13	"Determination of Total Organic Carbon in Solids using the EPA Region II Lloyd Kahn Method", SOP No. CA-741, Revision 1, 01/07	Definitive	TOC	TOC Analyzer	Katahdin Analytical Services	No

TABLE 2-4 (CORRESPONDS TO UFP-QAPP WORKSHEET #23)

ANALYTICAL SOP REFERENCES TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?
SOP-14	Digestion and Analysis of Solid Samples for Mercury by USEPA Method 7471 – CA-611-03, Revision 05/04	Definitive	Mercury	CVAA	Katahdin Analytical Services	No
SOP-15	Sample Receipt and Internal Control	Definitive	Various	Various	Katahdin Analytical Services	No

GC/MS – Gas Chromatography/Mass Spectroscopy
GC/ECD - Gas Chromatography/Electron Capture Detector
ICP – Inductively Coupled Plasma
PAH – Polynuclear aromatic hydrocarbon
PCB – Polychlorinated biphenyl
SIM – Selective ion monitoring
SOP – Standard Operating Procedure
TCL – Target Compound List
TAL – Target Compound List
TOC – Total organic carbon
CVAA – Cold Vapor Atomic Absorption

TABLE 2-5 (CORRESPONDS TO UFP-QAPP WORKSHEET #24)

ANALYTICAL INSTRUMENT CALIBRATION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
TAL Metals - ICP	Initial calibration	At the beginning of each day or if QC is out of criteria	One point calibration per manufacturer's guidelines; analytes run at their calibration levels must fall within 95-105% of True Values	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards	Analyst, Supervisor	SOP-11
	Continuing calibration	At the beginning and end of each run sequence and every 10 samples	90-110% of True Values	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Analyst, Supervisor	SOP-11
Mercury Analyzer	Initial calibration	IC-instrument receipt, major instrument change, at the start of each day	Correlation coefficient ≥ 0.995.	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards	Analyst, Supervisor	SOP-12
	Continuing calibration	CCV-at beginning and end of each run sequence and every 10 samples	80-120% of True Value	Check problem, recalibrate and reanalyze any samples not bracketed by passing CCVs.	Analyst, Supervisor	SOP-12

TABLE 2-5 (CORRESPONDS TO UFP-QAPP WORKSHEET #24)

ANALYTICAL INSTRUMENT CALIBRATION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
TCL Pesticides - GC	Initial Calibration	IC-instrument receipt, major instrument change, when CC does not meet criteria	6 pt calibration of all pesticides except for toxaphene and chlordane - correlation coefficient ≥ 0.990. Mid-point cal of toxaphene and chlordane	Repeat Initial calibration and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst, Supervisor	SOP-3
	Continuing calibration	After every 10 samples; If calibration curve previously analyzed, analyze daily before samples	%D ≤ 15 for both the quantitation and confirmation columns	Evaluate the samples: If the %D >+15% and sample results are <PQL, narrate. If %D >±15% only on one channel, narrate. If %D >±15% for closing CV, and is likely a result of matrix interference, narrate. Otherwise, reanalyze all samples back to last acceptable CV	Analyst, Supervisor	SOP-3
TCL PCB – GC		IC-instrument receipt, major instrument change, when CC does not meet criteria	6 pt calibration of Aroclor 1660 - correlation coefficient ≥ 0.990 Mid-point cal of other Aroclors	Repeat Initial calibration and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data. If single pt cal Aroclor is identified in analysis of sample, 6-pt calibration run of identified compound with reanalysis of sample.	Analyst, Supervisor	SOP-4

TABLE 2-5 (CORRESPONDS TO UFP-QAPP WORKSHEET #24)

ANALYTICAL INSTRUMENT CALIBRATION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
TCL PCB – GC (continued0		After every 10 samples; if calibration curve previously analyzed, analyze daily before samples.	%D ≤ 15 for both the quantitation and confirmation columns	Evaluate the samples: If the %D >+15% and sample results are <PQL, narrate. If %D >±15% only on one channel, narrate. If %D >±15% for closing CV, and is likely a result of matrix interference, narrate. Otherwise, reanalyze all samples back to last acceptable CV.	Analyst, Supervisor	SOP-4
TOC analyzer	Initial calibration	Initial Calibration-initially, when the daily CCV does not pass, but no longer than every 3 months	Correlation coefficient ≤ 0.995	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards	Analyst, Supervisor	SOP-13
	Continuing calibration	CCV-every 10 samples and at the end of the run	80-120% of true value for 415.1 75-125% of true value for Lloyd Kahn	If the CCV fails high, report samples that are <PQL. Recalibrate and/or reanalyze samples back to last acceptable CCV recovery.	Analyst, Supervisor	SOP-13

TABLE 2-5 (CORRESPONDS TO UFP-QAPP WORKSHEET #24)

ANALYTICAL INSTRUMENT CALIBRATION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS – TCL Semivolatiles	Initial Calibration	IC – Instrument receipt, instrument change (new column, source cleaning, etc.), when CCC is out of criteria or when manual tune performed	IC – minimum RF of ≥ 0.050 for each SPCC, % RSD of ≤ 30% for each CCC. If RSD for an analyte is > 15% apply linear or quadratic method for quantitation	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst, Supervisor	SOP-1, SOP-2
	Calibration Check	CV – at the beginning of each 12 hour shift immediately after DFTPP tune	CV – minimum RF of each SPCC ≥ 0.050, % RSD ≤ 20% for each CCC.	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst, Supervisor	SOP-1, SOP-2
	DFTPP Tune	Every 12 hours	Criteria listed in section 7.4 current rev. of SOP CA-204	Retune and/or clean source	Analyst, Supervisor	SOP-1, SOP-2

CC – Continuing calibration
CV – Calibration verification
%D – percent difference
RSD – Relative Standard Deviation
IC- Initial calibration
DFTPP - Decafluorotriphenylphosphine
QC – Quality control
TOC – Total organic carbon
QC – Quality Control
CCC- Continuing calibration compound
RSD – Relative Standard Deviation
CCV – Continuing calibration verification
SPCC – System performance check compounds

TABLE 2-5 (CORRESPONDS TO UFP-QAPP WORKSHEET #24)

ANALYTICAL INSTRUMENT CALIBRATION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

SOP – Standard Operating Procedure
SVOC – Semivolatile Organic Compounds
RF – Response factor
PCB – Polychlorinated biphenyl
MS – Mass Spectroscopy
Hg – Mercury
R – Correlation Coeffiecient
ICV – Initial calibration verification
GC/MS – Gas Chromatography/Mass Spectroscopy
GC/ECD - Gas Chromatography/Electron Capture Detector
ICP – Inductively Coupled Plasma
TCL – Target Compound List
TAL – Target Compound List
CVAA – Cold Vapor Atomic Absorption
PQL – Practical Quantitation Limit

TABLE 2-6 (CORRESPONDS TO UFP-QAPP WORKSHEET #25)

ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS –TCL Semivolatiles	Check pressure and gas supply daily. Manual tune if DFTPP not in criteria, change septa as needed, change liner as needed, cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP	QC standards	Ion source, injector liner, column, column flow.	Prior to initial calibration and/or as necessary	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-1, SOP-2

TABLE 2-6 (CORRESPONDS TO UFP-QAPP WORKSHEET #25)

ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
ICP – TAL Metals	Clean torch assembly and spray chamber when discolored or when degradation in data quality is observed. Clean nebulizer, check argon, replace peristaltic pump tubing as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Torch, nebulizer chamber, pump, pump tubing	Prior to initial calibration and as necessary	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-11

TABLE 2-6 (CORRESPONDS TO UFP-QAPP WORKSHEET #25)

ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
CVAA - Mercury	Replace peristaltic pump tubing, replace mercury lamp, replace drying tube, clean optical cell, and/or clean liquid/gas separator as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Tubing, sample probe, optical cell	Prior to initial calibration and as necessary	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-12, SOP-14
TOC Combustion Analyzer	Check level of dilution water, drain vessel water, humidifier water, autosampler rinse water, and phosphoric acid vessel and fill as needed. Replace oxygen cylinder.	QC standards	Tubing, sample boat, syringe, humidifier, rinse reservoir, phosphoric acid vessel, and oxygen pressure	Prior to initial calibration and as necessary	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-13

TABLE 2-6 (CORRESPONDS TO UFP-QAPP WORKSHEET #25)

ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
TCL Pesticides - GC	Check pressure and gas supply daily. Change septa and/or liner as needed, replace or cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP.	QC standards	Injector liner, septa, column, column flow	Prior to initial calibration and/or as necessary	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-3
TCL PCB -GC	Check pressure and gas supply daily. Change septa and/or liner as needed, replace or cut column as needed. Other maintenance specified in lab Equipment Maintenance SOP	QC standards	Injector liner, septa, column, column flow.	Prior to initial calibration and/or as necessary.	Refer to SOP	Refer to SOP	Analyst, Department Manager	SOP-4

DFTPP - Decafluorotriphenylphosphine
QC – Quality control
TOC – Total organic carbon
SOP – Standard Operating Procedure
SVOC – Semivolatile Organic Compounds

TABLE 2-6 (CORRESPONDS TO UFP-QAPP WORKSHEET #25)

ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

PCB – Polychlorinated biphenyls
ICV – Initial calibration verification
GC/MS – Gas Chromatography/Mass Spectroscopy
GC/ECD - Gas Chromatography/Electron Capture Detector
ICP – Inductively Coupled Plasma
TCL – Target Compound List
TAL – Target Compound List
CVAA – Cold Vapor Atomic Absorption

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Semivolatiles
Concentration Level	Low
Sampling SOP	See Appendix C
Analytical Method/ SOP Reference	SW846 8270C\SIM SOP-1, SOP-2
Sampler's Name	TBD
Field Sampling Organization	TtNUS
Analytical Organization	Katahdin Analytical Services
No. of Sample Locations	9 plus 1 duplicate

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blank	One per prep batch of 20 or fewer samples of similar matrix	No analytes detected > PQL; up to 5 times PQL for phthalate esters..	(1) Investigate source of contamination (2) Reprep and analyze method blank and all samples processed with the contaminated blank	Analyst, Supervisor QA Manager	Accuracy/bias Contamination	No analytes detected > PQL; up to 5 times PQL for phthalate esters
Matrix Spike (MS)	One per prep batch of 20 or fewer samples of similar matrix	Statistically derived acceptance limits.	CA will not be taken for samples when recoveries are outside limits and surrogate and LCS criteria are met. If both the LCS and MS/MSD are unacceptable, reprep the samples and QC.	Analyst Supervisor QA Manager	Accuracy/bias	Statistically derived acceptance limits

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Semivolatiles

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike Duplicate (MSD)	One per prep batch of 20 or fewer samples of similar matrix	≤ 50% RPD.	CA will not be taken for samples when recoveries are outside limits and surrogate and LCS criteria are met. If both the LCS and MS/MSD are unacceptable, reprep the samples and QC.	Analyst Supervisor QA Manager	Accuracy/bias Precision	≤ 50% RPD
Laboratory Control Spike (LCS)	One per prep batch of 20 or fewer samples of similar matrix.	Statistically derived acceptance limits.	(1) Evaluate the samples and associated QC: i.e.If an MS/MSD was performed and acceptable, narrate. If an LCS/LCSD was performed and only one was unacceptable, narrate. If the surrogate recoveries in the LCS are low but are acceptable in the blank and samples, narrate. If the LCS rec. is high but the sample results are <PQL, narrate. Otherwise, reprep a blank and the remaining samples.	Analyst Supervisor QA Manager	Accuracy/bias	Statistically derived acceptance limits
Surrogate spike	Every sample, control, standard, and method blank	Statistically derived acceptance limits.	(1) File Katahdin CA report (2) Check chromatogram for interference; if found, flag data (3) If not found, check instrument performance; if problem is found, correct and reanalyze(4) If still out, reextract and analyze sample (5) If reanalysis is out, flag data	Analyst Supervisor QA Manager	Accuracy/bias	NA

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Semivolatiles

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal Standards	Every sample, control, standard, and method blank	Retention time ± 30 seconds; EICP area within -50% to +100% of last calibration verification (12 hours) for each internal standard	Inspect Mass spectrometer or GC for malfunctions: mandatory reanalysis of samples analyzed while system was malfunctioning. If reanalysis confirms matrix interference, report sample and narrate.	Analyst Supervisor QA Manager	Accuracy/bias	NA

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TOC
Concentration Level	Low
Sampling SOP	See Appendix C
Analytical Method/ SOP Reference	Lloyd Kahn/ SOP-11
Sampler's Name	TBD
Field Sampling Organization	TtNUS
Analytical Organization	Katahdin Analytical Services
No. of Sample Locations	9 plus 1 duplicate

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per 20 samples	No analyte > PQL	Investigate source of contamination. Report all sample results > 10 x the blank result and flag results with "B." Reprep and analyze method blank and all other samples processed with the contaminated blank.	Analyst, Supervisor, QA Manager	Accuracy/bias Contamination	No analyte > PQL
Instrument Blank	After each ICV and CCV	No analyte >PQL	Samples analyzed before or after an unacceptable blank will be reanalyzed.	Analyst, Supervisor, QA Manager	Accuracy/bias Contamination	No analyte > PQL
Laboratory Quadruplicate	One sample quadruplicate per 20 samples.	RSD < 30%	If lab QC in criteria and matrix interference suspected, flag data. Else, reanalyze.	Analyst, Supervisor, QA Manager	Precision	RSD < 30%
Matrix Spike (MS)	One per 10 samples	75-125 % recovery	If LCS in criteria and matrix interference suspected, flag data. Otherwise, reanalyze.	Analyst, Supervisor, QA Manager	Accuracy/bias	75-125 % recovery

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TOC
Concentration Level	Low

Laboratory Control Sample(LCS)	One per 20 samples	80-120%	Investigate source of problem. If the LCS fails high, report samples that are < PQL. Reprep the remaining samples.	Analyst, Supervisor, QA Manager	Accuracy/bias	80-120%
QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action (CA)**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**
Low-Level Calibration Sample	With each initial calibration	Low-level calibration standard in the initial calibration is spiked at or below the QL. Initial calibration acceptance criteria is a correlation coefficient of > 0.995.	Reanalyze sample	Analyst, Supervisor, QA Manager	Accuracy/bias	Low-level calibration standard in the initial calibration is spiked at or below the QL. Initial calibration acceptance criteria is a correlation coefficient of > 0.995.

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Pesticides
Concentration Level	Low
Sampling SOP	See Appendix C
Analytical Method/ SOP Reference	SW846 8081A\ SOP-3
Sampler's Name	TBD
Field Sampling Organization	TtNUS
Analytical Organization	Katahdin Analytical Services
No. of Sample Locations	9 plus 1 duplicate

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix	No analyte detected >QL	(1) Investigate source of contamination (2) Evaluate the samples and associated QC: (i.e., if the blank results are above the QL, report sample results which are <QL or > 10X the blank concentration). Otherwise, reprep a blank and samples >QL and <10XQL.	(1) Analyst/ Supervisor (2) Supervisor (3) Analyst	Accuracy/bias-Contamination	No target > QL
Reagent Blank	1 per Lot	No analyte detected ≥ QL	(1) Investigate source of contamination (2) If required replace Lot	Analyst/ Supervisor	Accuracy/bias-Contamination	No target ≥ QL

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Pesticides

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	One per prep batch of 20 or fewer samples of similar matrix	Statistically derived limits	(1) No CA will be taken for Samples where recoveries are outside limits and surrogate and LCS criteria are met. (2) Where LCS is low outside criteria, a LCS, MS (sample <2.5 ug/L), and MSD may be re-extracted if Project Completeness < Completeness Criteria	Analyst/ Supervisor	Accuracy/bias	Statistically derived limits
Matrix Spike Duplicate	One per prep batch of 20 or fewer samples of similar matrix	≤ 50% RPD	(1) In the event that the MS or MSD surrogates are outside criteria, the MS/MSD will be re-extracted and reanalyzed, else no CA will be taken when both MS and MSD surrogates are in criteria	Analyst/ Supervisor	Accuracy/bias Precision	Statisically derived acceptance limits, Precision RPD≤ 50%
LCS	One per prep batch of 20 or fewer samples of similar matrix	Statistically derived acceptance limits.	(1) If an MS/MSD was performed and acceptable, narrate. (2) If the surrogate recoveries in the LCS are also low but are acceptable in the blank and samples, narrate. (3) If the LCS recovery is high but the sample results are <QL, narrate. Otherwise, re-extract blank and affected sample batch.	Analyst/ Supervisor	Accuracy/bias	Statistically derived acceptance limits

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL Pesticides

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogates	2 per Sample	Statistically derived acceptance limits.	(1) No CA will be taken when one surrogate is within criteria. (2) If surrogates are outside high and sample is <QL no CA taken. (3) If surrogates are outside low the affected samples are re-extracted and reanalyzed.	Analyst/ Supervisor	Accuracy/bias	Statistically derived acceptance limits

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL PCBs
Concentration Level	Low
Sampling SOP	See Appendix C
Analytical Method/ SOP Reference	SW846 8082/ SOP-3
Sampler's Name	TBD
Field Sampling Organization	TtNUS
Analytical Organization	Katahdin Analytical Services
No. of Sample Locations	9 plus 1 duplicate

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix	No analyte detected >QL	(1) Investigate source of contamination (2) Evaluate the samples and associated QC: i.e. If the blank results are above the QL, report sample results which are <QL or > 10X the blank concentration. Otherwise, reprep a blank and samples >QL and <10XQL.	(1) Analyst/ Supervisor (2) Supervisor (3) Analyst	Accuracy/bias-Contamination	No target > QL
Reagent Blank	1 per Lot	No analyte detected ≥ QL	(1) Investigate source of contamination (2) If required replace Lot	Analyst/ Supervisor	Accuracy/bias Contamination	No target ≥ QL

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	TCL PCBs

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Matrix Spike	One per prep batch of 20 or fewer samples of similar matrix	Statistically derived limits	(1) No CA will be taken for Samples where recoveries are outside limits and surrogate and LCS criteria are met. (2) Where LCS is low outside criteria, a LCS, MS (sample <2.5 ug/L), and MSD may be re-extracted if Project Completeness < Completeness Criteria	Analyst/ Supervisor	Accuracy/bias	Statistically derived limits
Matrix Spike Duplicate	One per prep batch of 20 or fewer samples of similar matrix	≤ 50% RPD	(1) In the event that the MS or MSD surrogates are outside criteria, the MS/MSD will be re-extracted and reanalyzed else no CA will be taken when both MS and MSD surrogates are in criteria	Analyst/ Supervisor	Accuracy/bias Precision	Statisically derived acceptance limits, Precision RPD≤ 50%
LCS	One per prep batch of 20 or fewer samples of similar matrix	Statistically derived acceptance limits.	(2) If an MS/MSD was performed and acceptable, narrate. (2) If the surrogate recoveries in the LCS are also low but are acceptable in the blank and samples, narrate. (3) If the LCS recovery is high but the sample results are <QL, narrate. Otherwise, re-extract blank and affected sample batch.	Analyst/ Supervisor	Accuracy/bias	Statistically derived acceptance limits.

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment					
Analytical Group	TCL PCBs					
Surrogates	2 per Sample	Statistically derived acceptance limits.	(1) No CA will be taken when one surrogate is within criteria. (2) If surrogates are outside high and sample is <QL no CA taken. (3) If surrogates are outside low the affected samples are re-extracted and reanalyzed.	Analyst/ Supervisor	Accuracy/bias	Statistically derived acceptance limits

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment
Analytical Group	Metals
Concentration Level	Low
Sampling SOP	See Appendix C
Analytical Method/ SOP Reference	SW846 7471A/ SOP-14
Sampler's Name	TBD
Field Sampling Organization	TtNUS
Analytical Organization	Katahdin Analytical Services
No. of Sample Locations	9 plus 1 duplicate

QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Independent Calibration Verification (ICV)	Immediately after calibration	± 10 %	Correct problem, recalibrate and reanalyze ICV	Analyst/Supervisor QA Manager	Accuracy/bias	± 10 %
Initial Calibration Blank (ICB)	Immediately after the ICV	≤ PQL	Correct problem, recalibrate and reanalyze ICV and ICB	Analyst/Supervisor QA Manager	Accuracy/bias Contamination	≤ PQL
PQL Standard for ICP (PQL)	At the beginning of a sample run, after every 20 samples and at the end of the run	Recovery within 50% - 150 % of true value.	1. Reanalyze immediately for failing elements only. 2. Terminate analysis, correct problem, recalibrate and reanalyze all analytical samples analyzed since last good PQL Std.	Analyst/Supervisor QA Manager	Sensitivity	Recovery within 50% - 150 % of true value

TABLE 2-7 (CORRESPONDS TO UFP-QAPP WORKSHEET #28)

QC SAMPLES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Sediment					
Analytical Group	Metals					
Preparation Blank (PBS)	One per prep batch of 20 or fewer samples of similar matrix	Absolute value < PQL.	1. If blank value > PQL report sample results if < PQL or > 10 x the blank value; otherwise redigest. 2. If blank value is less than negative PQL, report sample results if > 10x the absolute value of the blank result, otherwise redigest.	Analyst/Supervisor QA Manager	Accuracy/bias	Absolute value < PQL.sample results if > 10x the absolute value of the blank result, otherwise redigest
QC Sample:	**Frequency/ Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action (CA)**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**	**Measurement Performance Criteria**
Serial Dilution (L)	One per prep batch of 20 or fewer samples of similar matrix	If original sample result is at least 50x internal standard, 5-fold dilution must agree within ± 10% of the original result.	Flag results for affected analytes for all associated samples with “E”.	Analyst/Supervisor QA Manager	Accuracy/bias Precision	If original sample result is at least 50x internal standard, 5-fold dilution must agree within ± 10% of the original result
Laboratory Control Sample (LCSS)	One per prep batch of 20 or fewer samples of similar matrix	Recovery within reference limits supplied by SRM vendor.	Redigest and reanalyze all associated samples for affected analyte (except Ag and Sb)	Analyst/Supervisor QA Manager	Accuracy/bias	Recovery within reference limits supplied by SRM vendor
Matrix Spike Sample (MS)	One per prep batch of 20 or fewer samples of similar matrix	Recovery ± 25 % of true value if sample < 4x spike value	Flag results for affected analytes for all associated samples with ”N”, Perform postdigestion spike for all failing elements, except Ag, at 2x the indigenous level or 2x the PQL, whichever is greater.	Analyst/Supervisor QA Manager	Accuracy/bias	Recovery ± 25 % of true value if sample < 4x spike value
Matrix Spike Sample Duplicate (MSD)	One per prep batch of 20 or fewer samples of similar matrix	RPD ± 20%	Flag results for affected analytes for all associated samples with “*”.	Analyst/Supervisor QA Manager	Accuracy/bias Precision	RPD ± 20%

Ag - Silver

CC – Continuing calibration
EICP – Extracted ion current profile
ICP – Inductively coupled plasma
Pb – Lead
PCB – Polychlorinated biphenyl
PQL – Practical Quantitation Limit
QA – Quality Assurance
RPD Relative Percent Difference
Sb – Tin
SRM – Standard Reference Material
TBD – To be determined
TOC – Total organic carbon

TABLE 2-8 (CORRESPONDS TO UFP-QAPP WORKSHEET #26)

SAMPLE HANDLING SYSTEM
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): TBD/TtNUS - See QAPP Section 2.3
Sample Packaging (Personnel/Organization): TBD/TtNUS - See QAPP Section 2.3
Coordination of Shipment (Personnel/Organization): TBD/TtNUS - See QAPP Section 2.3
Type of Shipment/Carrier: Overnight/Federal Express
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Katahdin Analytical Services, Inc.
Sample Custody and Storage (Personnel/Organization): Katahdin Analytical Services, Inc.
Sample Preparation (Personnel/Organization): Katahdin Analytical Services, Inc.
Sample Determinative Analysis (Personnel/Organization): Katahdin Analytical Services, Inc.
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): See QAPP Section 2.3
Sample Extract/Digestate Storage (No. of days from extraction/digestion): See Table 2-3
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Katahdin Analytical Services, Inc.
Number of Days from Analysis: Samples may be disposed of 2 months after laboratory deliverable date.

TABLE 2-9 (CORRESPONDS TO UFP-QAPP WORKSHEET #27)

SAMPLE CUSTODY REQUIREMENTS
ZONE J RF QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): See Section 2.3
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): Refer to Katahdin Analytical Services SOP SD-902
Sample Identification Procedures: Refer to Katahdin Analytical Services SOP SD-902
Chain-of-Custody Procedures: Refer to Katahdin Analytical Services SOP SD-902

TABLE 2-10

ENVIRONMENTAL AND QA/QC SAMPLING AND ANALYSIS PROGRAM
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Parameter	Method	Number of Samples	QA/QC		Total Samples
			Field Duplicates[1]	Rinsate Blanks[2]	
TCL SVOCs	SW846 8270C	9	1	2	12
TCL Pesticides	SW846 8081A	9	1	2	12
TCL PCBs	SW846 8082	9	1	2	12
TOC	Lloyd Kahn	9	1	0	10
TAL Metals	SW846 6010B	9	1	2	12

PCBs Polychlorinated biphenyls.
TAL Target Analyte List.
TCL Target Compound List.
QA/QC Quality assurance/quality control.
SVOCs Semivolatile organic compounds.

1 Duplicates - Obtained at a frequency of 10 percent of the number of samples.
2 Equipment Rinsate Blanks - Obtained at frequency of 1 per day per medium per analysis (2-day span of sediment sampling assumed).

TABLE 2-11 (CORRESPONDS TO UFP-QAPP WORKSHEET 29)

PROJECT DOCUMENTS AND RECORDS TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Sample Collection Documents and Records	On-Site Analysis Documents and Records	Off-Site Analysis Documents and Records	Data Assessment Documents and Records	Other
Field Logbook Field Sample Forms Chain of Custody Records Airbills Sampling Instrument Calibration Logs Sample Location and Sampling Plan Sampling Notes and Drilling Logs Sampling Report Photographs Field Task Modification Forms	Field Sample Data Field Logbook Field Sample Forms Sampling Instrument Calibration Logs Field Sample Data	-Sample receipt, custody, and tracking record -Standards tracability logs -Equipment calibration logs -Sample preparation logs -Run logs -Equipment maintenance, testing, and inspection logs -Corrective action forms -Reported field sample results -Reported results for standards, qc checks, and qc samples -Data completeness checklists -Sample storage and disposal records -Telephone logs -Extraction/clean-up records -raw (stored electronically)	Field Sampling Audit Checklist (if audit is conducted) Analytical Audit Checklist (if Audit is conducted) Data Review Reports Tabulated Data Summary Forms Data Validation Memoranda	

TABLE 2-12

LABORATORY DATA PACKAGE ELEMENTS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA
PAGE 1 OF 3

DATA PACKAGE ELEMENTS	Semi-Volatiles /PAHs	Pestcides / PCBs/	Metals	TOC[1]
♦ **NARRATIVE (Org. Narrative, Inorg. Cover Page)**	X	X	X	X
♦ **SHIPPING/RECEIVING DOCUMENTS AND INTERNAL LABORATORY COC RECORDS:**				
- Airbills	X	X	X	X
- Chain-of-Custody Records/Forms (Traffic Report)	X	X	X	X
- Sample Log-In Sheet (Org. and Inorg. DC-1 Form)	X	X	X	X
- Miscellaneous Shipping/Receiving Records	X	X	X	X
- Internal Lab. Sample Transfer Records and Tracking Sheets	X	X	X	X
♦ **SAMPLE DATA:**				
- Tabulated Summary Form for Field Sample, Method Blanks, and PE Sample Results (Org. and Inorg. Form I)	X	X	X	X
- Tentatively Identified Compounds Tabulate Summary Form (Org. Form I TIC)				
- Reconstructed Total Ion Chromatogram (RIC) for each sample	X			
- Raw spectra of target compound and background subtracted spectrum of target compound for each sample	X			
- Mass spectra of all reported TICs/three best library matches for each sample				
- Chromatograms from both columns for each sample		X (pesticides)		
- GC Integration report or data system printouts and calibration plots for each sample	X	X		
- Pesticide/PCB Identification Tabulated Summary Form (Org. Form X)		X		
- For Pest/PCB or Dioxin/Furan results confirmed by GC/MS, copies of raw spectra and background subtracted spectrum of target compounds		X		
- GPC sample chromatograms (if necessary)	X	X		
- Sample preparation/extraction/digestion log (Inorg. Form XIII) and logbook pages	X	X	X	X
- Sample analysis run log (Inorg. Form XIV) and logbook pages	X	X	X	X
- ICP Raw Data			X	
- Furnace AA Raw Data				
- Mercury Raw Data			X	

TABLE 2-12

LABORATORY DATA PACKAGE ELEMENTS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

DATA PACKAGE ELEMENTS	Semi-Volatiles /PAHs	Pestcides / PCBs/	Metals	TOC[1]
- Cyanide Raw Data				
- Other Analytical Raw Data	X	X	X	X
♦ **STANDARDS DATA:**				
- Method Detection Limit Study Tabulated Summary Form	X	X	X	X
- Initial Calibration Tabulated Summary Form (Org. Form VI, Inorg. Form IIA)	X	X	X	X
- Continuing Calibration Tabulated Summary Form (Org. Form VII, Inorg. Form IIA)	X	X	X	
- RICs and quantitation reports for all GC/MS Standards	X			
- Pesticides Analyte Resolution tabulated Summary Form (Org. Form VI, Pest-4)		X		
- Pesticides Calibration Verification Tabulated Summary Form (Org. Form VII, Pest-1 and Pest-2)		X		
- Pesticide Analytical Sequence Tabulated Summary Form (Org. Form VIII-Pest)		X		
- GC Chromatograms and data system printouts for all GC standards		X		
- For Pesticides/Aroclors confirmed by GC/MS, copies of spectra for standards data		X		
- GPC Calibration Tabulated Summary Form (Org. Form IX, Pest-2)		X		
- Florisil Cartridge Check Tabulated Summary Form (Org. Form IX, Pest-1)		X		
- Instrument Detection Limits Tabulated Summary Form (Inorg. Form X)			X	
- ICP Interelement Correction Factors Tabulated Summary Form (Inorg. Form XIA and XIB)			X	
- ICP Linear Ranges Tabulated Summary Form (Inorg. Form XII)			X	
- CRDL Standards for AA and ICP Tabulated Summary Form (Inorg. Form IIB)			X	
- Standards preparation logbook pages	X	X	X	
♦ **QC DATA:**				
- Tuning and Mass Calibration Tabulated Summary Form (Org. Form V)	X			
- Window defining mixture				
- Chromatographic resolution				
- Surrogate Percent Recovery Tabulated Summary Form (Org. Form II)	X	X		
- MS/MSD Recovery Tabulated Summary Form (Org. Form III)	X	X		

TABLE 2-12

LABORATORY DATA PACKAGE ELEMENTS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

DATA PACKAGE ELEMENTS	Semi-Volatiles /PAHs	Pestcides / PCBs/	Metals	TOC[1]
- Method Blank Tabulated Summary Form (Org. Form IV and Inorg. Form III)	X	X	X	X
- Internal Standard Area and RT Tabulated Summary Form (Org. Form VIII)	X			
- Labeled Compound Recovery Summary Form				
- QC Raw Data – RICs, Chromatograms, Quan Reports, Integration Reports, Mass Spectra, etc.	X	X		
- Spike Sample Recovery Tabulated Summary Form (Inorg. Form IV)			X	
- Duplicates Tabulated Summary Form (Inorg. Form VI)			X	
- Internal Laboratory Control Sample Tabulated Summary Form (Org Form III and Inorg. Form VII)			X	
- Standard Addition Results Tabulated Summary Form (Inorg. Form VIII)			X	
- ICP Interference Check Sample Tabulated Summary Form (Inorg. Form IV)			X	
- Post Digestion Spike Tabulated Summary Form (Inorg. Form VB)			X	
- ICP Serial Dilutions Tabulated Summary Form (Inorg. Form IV)			X	
- QC Raw Data – ICP, Furnace, Mercury computer printouts, etc.			X	
- QC sample preparation logbook pages	X	X	X	
- Toxicity Equivalence Factor				
- Compound Identification Criteria				
♦ **MISCELLANEOUS DATA:**				
- Original preparation and analysis forms or copies of preparation and analysis logbook pages	X	X	X	
- Screening records	X	X	X	
- All instrument output, including strip charts from screening activities	X	X	X	
- Instrument stability				
- Preparation Logs Raw Data	X	X	X	
- Percent Solids Determination Log	X	X	X	
- Other Records (ex. Telephone Communication Log)	X	X	X	

1. Miscellaneous data package will include information as applicable to the method.

TABLE 2-13 (CORRESPONDS TO UFP-QAPP WORKSHEET 30)
ANALYTICAL SERVICES TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

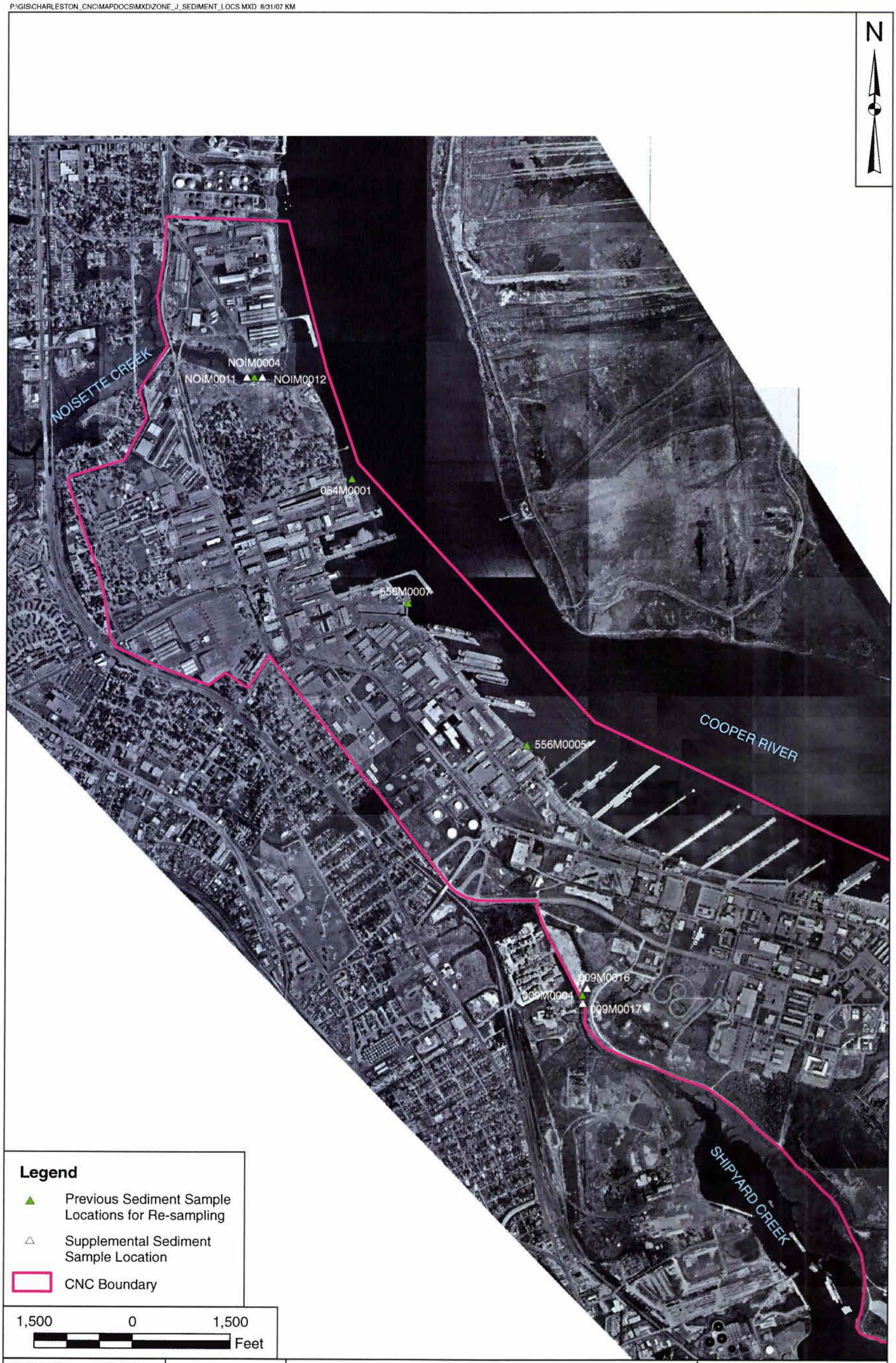
Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number
Soil	TAL Metals	Low	See Section 2.1	SW-846 3050, 6010B/ SOP-10, SOP-11, SOP-12	28 calendar days	Andrea Colby Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 Telephone: (207) 874-2400 Fax: (207) 775-4029	Leslie Diamond
Soil	TCL Semivolatiles	Low	See Section 2.1	SW-846 3540, 3550, 8270C/ SOP-6, SOP-8, SOP-1, SOP-2	28 calendar days	Andrea Colby Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 Telephone: (207) 874-2400 Fax: (207) 775-4029	Leslie Diamond
Soil	TCL Pesticides	Low	See Section 2.1	SW8-46 3540, 3550, 8081A/ SOP-5, SOP-7, SOP-3	28 calendar days	Andrea Colby Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 Telephone: (207) 874-2400 Fax: (207) 775-4029	Leslie Diamond
Soil	TCL PCBs	Low	See Section 2.1	SW-846 3540, 3550, 8082/ SOP-5, SOP-7, SOP-4	28 calendar days	Andrea Colby Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 Telephone: (207) 874-2400 Fax: (207) 775-4029	Leslie Diamond

TABLE 2-13 (CORRESPONDS TO UFP-QAPP WORKSHEET 30)
ANALYTICAL SERVICES TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number
Soil	TOC	Low	See Section 2.1	Lloyd Kahn/ SOP-13	28 calendar days	Andrea Colby Katahdin Analytical Services 600 Technology Way Scarborough, ME 04074 Telephone: (207) 874-2400 Fax: (207) 775-4029	Leslie Diamond

PCBs - Polychlorinated biphenyls.
SOP - Standard Operating Procedure.
TAL - Target Analyte List.
TCL - Target Compound List.
TOC - Total Organic Carbon.
SIM - Selective Ion Monitoring.
NA - Not applicable.

P:\GIS\CHARLESTON_CNC\MAPDOCS\MXD\ZONE_J_SEDIMENT_LOCS.MXD 8/31/07 KM



DRAWN BY	DATE
K. MOORE	7/2/07
CHECKED BY	DATE
L. KLINK	8/31/07
REVISED BY	DATE
----	---
SCALE	
AS NOTED	

NAVFAC

ZONE J SEDIMENT SAMPLE LOCATION MAP
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	
CTO 017	
APPROVED BY	DATE
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APPROVED BY	DATE
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FIGURE NO.	REV
FIGURE 2-1	0

3.0 ASSESSMENT AND OVERSIGHT

3.1 ASSESSMENT AND RESPONSE ACTIONS

Assessment activities ensure that planned project activities are implemented as described in this QAPP, and that appropriate corrective actions are implemented to address nonconformances and deviations from the QAPP. These activities help to ensure that data are adequate for their intended use.

3.1.1 Planned Assessments

The planned assessments are system audits and field audits. System audits will be performed as appropriate to ensure that work is being implemented in accordance with the approved project Standard Operating Procedures (SOPs) and in an overall satisfactory manner. These audits will be performed in the following manner:

- The TtNUS Field Operations Leader (FOL) will supervise and check on a daily basis that field measurements are made accurately, equipment is thoroughly decontaminated, samples are collected and handled properly, and fieldwork is accurately and neatly documented. Documentation includes verifying that the sample names on sample log sheets, field notes, chain-of-custody records, and sample labels are identical matches to sample names in the QAPP. The FOL will update the TtNUS Project Manager (PM) of field activities on a daily basis.

- System audits for the laboratory will be performed regularly and in accordance with Naval Facilities Engineering Service Center (NFESC) guidance and Department of Defense Quality Systems Manual (DoD QSM) (January, 2006), as provided in the Laboratory Quality Assurance Plan (LQAP).

- The data validator will review the chemical analytical data packages submitted by the laboratory. The data validator will check that the data were obtained through use of the approved methodologies that the appropriate level of QC effort and reporting was conducted, and whether or not the results are in conformance with QC criteria. On the basis of these factors, the data validator will generate a report describing data limitations that will be reviewed internally by the DVM before submittal to the PM.

- The PM will maintain contact with the FOL and DVM to ensure that management of the acquired data proceeds in an organized and expeditious manner.

Additionally, an independent performance audit of field activities may be conducted at the discretion of and under the direction of the QA Officer. If a formal field audit is conducted, the QA Officer will check

that sample collection, handling, and shipping protocols, as well as equipment decontamination and field documentation procedures, are being performed in accordance with the approved project planning documents and SOPs. These field audits and laboratory systems audits will identify the following:

- The assessed entity (e.g., field crew, office personnel, etc. and the associated project, field event, office, etc.).
- Whether the audit is internal, external, or USEPA..
- Location and date(s) of assessment.
- Assessment team members.
- Type of assessment.
- Scope of assessment.
- Documents reviewed.
- Notification dates.
- Proposed assessment schedule.
- Assessment number.
- Contract number/

Performance audits of laboratories are coordinated through NFESC and are conducted every 18 months by NFESC's independent QA contractor.

3.1.2 Assessment Findings and Corrective Action Responses

Assessment findings that require corrective action initiate a sequence of events that includes documentation of deficiencies, notification of findings, request for corrective action, implementation of corrective action, and follow-up assessment of the corrective action effectiveness. Table 3-1 provides a summary of the procedures for handling any QAPP deviations and project deficiencies that are identified through the planned project assessments.

Potential problems may involve nonconformance with the SOPs and/or analytical procedures established for the project or other unforeseen difficulties. Any person identifying a condition adverse to project quality will notify the PM. The PM, with the assistance of the QA Officer, will be responsible for developing and initiating appropriate corrective action. If the identified deficiencies involve field work, corrective action will be conducted through the FOL; if the deficiencies involve the laboratory, corrective action will be conducted through the laboratory Project Manager. The corrective actions will require follow through to the point of verifying that the corrective action has been effective. Corrective actions may include resampling and/or reanalyzing samples or amending or adjusting project procedures. If warranted by the severity of the problem (e.g., if a change in the approved plan is required), the Navy will be notified in writing and the

Navy's approval will be obtained before any change is implemented. Minor changes will be documented for the main file by the TtNUS PM. Additional work that depends on a nonconforming activity will not be performed until the problem has been eliminated. The overall corrective action responsibility for system audits will reside with the PM. The overall corrective action responsibility for field audits will reside with the QA Officer.

For QA issues involving the analytical laboratory to be used for the project, the laboratory also maintains an internal closed-loop corrective action system that operates under the direction of the laboratory QA Coordinator.

3.2 QA MANAGEMENT REPORTS

This section presents the activities that will be performed to keep management updated on the project status. Open communication pathways will benefit the project by allowing all appropriate personnel to be aware of activities and have the ability to provide input in a timely manner. Input from these parties will be used to make necessary corrective actions so that project quality objectives (PQOs) are met.

The information to be included in each of the QA Management Reports is summarized as follows.

Field Status Reports

The FOL will give verbal status reports to the PM on a daily basis during field activities or more frequently if needed. The status reports will include the field activities completed for the day, personnel who completed each activity, anticipated activities to be completed during the next day, and any issues or problems identified. A summary of significant progress in project activities will be sent by the FOL via electronic mail, facsimile transmission, or other agreed upon mode of documentation to the PM.

Data Validation Reports

Data validation reports will be prepared and formatted as described in Section 4.2. The data validation reports will be included as an appendix to the Zone J RFI Report.

When requested by the PM, additional reports regarding data may be generated. For example, detailed data usability assessments may be documented in usability reports. However, other data assessments are planned to be included directly in the Zone J RFI Report. Therefore, the appropriate sections of the report will identify the following:

- Summary of project QA/QC programs and training conducted during the project.
- Conformance of project activities with QAPP requirements and procedures.
- Status of project and schedule delays.
- Deviations from the approved QAPP or QAPP amendments and the impact of such deviations on the attainment of project objectives. Results and trends of PT sample analyses performed by the analytical laboratory (per analytical group, matrix, and concentration level).
- Description and findings of assessments.
- Required corrective actions and effectiveness of corrective actions.
- Limitations on data usability.

3.3 FINAL PROJECT REPORT

Table 3-2 provides a list of documents or reports that may be generated for this project as per this project specific QAPP.

TABLE 3-1
ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Assessment Type	Nature of Deficiency Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Time Frame of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Time Frame for Response
Field sampling system audit	Audit checklist and written audit finding summary	PM TtNUS, FOL TtNUS, and Program management TtNUS	Dependant on findings, if major a stop work maybe issued immediately, however if minor within 1 week of audit	Written memo	QAM manager TtNUS, Auditor TtNUS, Program Manger TtNUS	Within 48 hours of notification
Laboratory systems Audit	Written audit report	Laboratory QA Managaer	Not specified by NFESC	Letter	NFESC	Specified by NFESC

FOL Field Operations Leader
NFESC Naval Facilities Engineering Service Center.
QAM Quality Assurance Manager.

TABLE 3-2
FIELD AND LABORATORY PROJECT DOCUMENTS AND RECORDS
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Sample Collection Documents and Records	On-Site Analysis Documents and Records	Off-Site Analysis Documents and Records	Data Assessment Documents and Records
Field Logbook Field Sample Forms Chain of Custody Records Airbills Sampling Instrument Calibration Logs Sample Location and Sampling Plan Sampling Notes Field Task Modification Forms	Field Sample Data Field Logbook Field Sample Forms Sampling Instrument Calibration Logs Field Sample Data	-Sample receipt, custody, and tracking record -Standards tracability logs -Equipment calibration logs -Sample preparation logs -Run logs -Equipment maintenance, testing, and inspection logs -Corrective action forms -Reported field sample results -Reported results for standards, qc checks, and qc samples -Data completeness checklists -Sample storage and disposal records -Telephone logs -Extraction/clean-up records -raw (stored electronically)	Field Sampling Audit Checklist Analytical Audit Checklist Data Review Reports Laboratory QA Plan Tabulated Data Summary Forms Data Validation Memoranda

4.0 DATA REVIEW ELEMENTS

4.1 OVERVIEW

Data review is the process by which data are examined and evaluated by various personnel at various levels of detail. This process includes data verification, data validation, and data usability assessment. Data verification is a process of evaluating the completeness, correctness, and contractual compliance of a data compared to the method standards, SOPs, and/or contract requirements documented in this QAPP. Data validation is an analyte- and sample-specific process that extends the qualification of data beyond data verification to determine the quality of a specific data set relative to analytical QC requirements. Data usability assessment extends these other review processes to examine the data in the context of the project objectives to determine whether the data are suitable for supporting the attainment of these objectives.

The internal data verification requirements for this project include the maintenance and periodic review of field documentation (site logbooks, instrument calibration logs, chain-of-custody forms, field summary reports, and field modification records) and laboratory analytical data packages.

Data validation is a systematic review of the analytical data package with respect to sample receipt and handling, compliance with required analytical methods, data reporting and deliverables, and document control. A qualified chemist will review the analytical data packages using USEPA procedures.

Usability assessment will be performed by project level personnel who understand the intended uses of the data. These personnel include but are not necessarily limited to project chemists, geologists, and risk assessors.

4.2 DATA REVIEW STEPS

Upon receipt of analytical laboratory results, TtNUS database personnel will evaluate electronic and hardcopy deliverables for conformance with data format specifications and for completeness. TtNUS validation chemists will also perform a completeness verification and will then perform data validation according to the most current data validation guidelines to ensure that the analytical results meet the data quality objectives (DQOs). The validation guidance documents that will be used include the following:

- National Functional Guidelines for Organic Data Review, (USEPA, 1999) October EPA-540/R-99-008.

- National Functional Guidelines for Inorganic Data Review, (USEPA, 2004) October OSWER 9240.1-45 EPA540-R-04-004.

- DoD QSM (January 2006).

- Test Methods for Evaluating Solid Waste; Physical/Chemical Methods (SW-846), 3rd edition, up to and including Update III. Office of Solid Waste and Emergency Response, Washington, DC. 1986.

The TtNUS Data Validation Manager (DVM) remains current with updated available guidelines to ensure that the appropriate validation guidelines are used.

After the data are validated, a list of nonconformities will be generated. Nonconformities require data qualifiers, which are used to alert the data user to inaccurate or imprecise data. For situations in which several QC criteria are out of specification with regard to the limits specified in the DoD QSM (January, 2006), the data validator may make professional judgments and/or comments on the validity of the overall data package. In situations where the validity of an entire data package is in question, it may be necessary for the sample(s) to be reanalyzed. The reviewer will then prepare a technical memorandum presenting changes in the data, if necessary, and the rationale for making such changes.

The net result of the data validation process is a data package that has been carefully reviewed for its adherence to prescribed requirements. Data validation therefore plays a major role in determining the confidence with which key technical evaluations may be made.

Data validation reports for all parameters will be generated according to the requirements described above. The final data validation reports will include a technical memorandum, qualified analytical results, results reported by the laboratory, and documentation to support data qualification. All data will be flagged with qualifying symbols, as appropriate. Data qualified during validation will be reviewed to assess the impact of the qualifiers on the attainment of project objectives.

The data and field records will also be reviewed by project personnel to ensure that the samples represent the intended sampling conditions and populations.

4.2.1 Step I Data Review: Verification

Verification includes field data verification and laboratory data verification. Verification inputs as per Table 4-1 (which corresponds to UFP-QAPP Worksheet 34) will be checked.

4.2.2 Step II Data Review: Validation

Validation of field measurements and laboratory analytical data is discussed in this section. Validation of field data will be limited to real-time checks in the field as data are generated, whereas laboratory analytical data will be validated in accordance with current applicable USEPA guidance. Step IIa, Validation Activities (i.e., compliance with methods, procedures and contracts) is discussed in Section 4.2.2.1. Step IIb, Validation Activities [i.e., comparison of results to measurement performance criteria (MPCs) in this QAPP] is discussed in Section 4.2.2.2.

4.2.2.1 Step IIa: Validation Activities

One hundred percent of the laboratory data from chemical analyses will be validated. Validation of analytical data will be conducted by TtNUS or a data validation subcontractor. Final review and approval of validation deliverables will be completed by the DVM. All parameters will be reviewed using applicable sections of the aforementioned guidelines and laboratory SOPs. Each analysis will be validated in accordance with Table 4-2 (which corresponds to UFP-QAPP Worksheet 36).

As part of the validation process, the validator will check that the laboratory has provided all the documentation required to support the reported analytical results. If any documentation is missing from the data package, the data validator will contact the laboratory to request a resubmittal. If the laboratory fails to resubmit the requested information, the data validator will note this on the data validation cover letter. The usability of such data will then be determined by the PM and the Navy.

Data validation will be completed to ensure that the data are of evidentiary quality. Particular emphasis will be placed on holding time compliance, equipment calibration, spike recoveries, and blank results, although all required elements of the validation process will be considered.

4.2.2.2 Step IIb: Validation Activities

Table 4-3 (which corresponds to UFP QAPP Worksheet 35) summarizes the Step IIb data validation activities.

4.2.3 Step III: Usability Assessment

Section 1.7.2 contains a PARCCS description, and Tables 1-1, 1-2, 2-8, (which correspond to UFP-QAPP Worksheets 12, 15, and 28) provide project specific MPCs.

After completion of data validation and an overall review of data quality indicators, the data will be reconciled with MPCs to determine whether sufficient data of acceptable quality are available for decision making. A series of inspections and analyses will be performed to estimate several of the data set characteristics. The evaluations will include simple summary statistics for target analytes, such as the maximum and minimum concentrations, frequency of samples exhibiting detectable analytes, and proportions of samples with elevated results. The data will be presented in a tabular format. These inspections and statistical analyses will be designed to:

- Identify deviations, if any, from the field sampling SOPs.
- Identify deviations, if any, from the laboratory analytical methods.
- Identify deviations, if any, from the QAPP.
- Identify deviations, if any, from the data validation process.
- Evaluate effects of the above-listed deviations from planned procedures and processes on the interpretation and utility of the data.
- Identify elevated detection limits and explain their impacts on the attainment of project objectives.
- Identify unusable data (i.e., data qualified as “R”).
- Evaluate project assumptions.
- Identify unanticipated data set characteristics such as a laboratory variance greater than the sampling variance (i.e., ANOVA, *t*-test) if enough data are available, as warranted.
- Identify and evaluate potential data outliers (using 95 percent confidence goodness-of-fit test on probability plot data). The plotted data will be transformed, if necessary, depending on the observed distribution.
- Evaluate adherence to investigation objectives and decision rules.
- Ensure completion of corrective actions.
- Identify the existence of remaining data gaps.

For statistical comparisons and mathematical manipulations, non-detect values will be represented by a concentration equal to one-half the sample-specific reporting limit. Duplicate results (original and duplicate) will not be averaged for the purpose of representing ranges of concentrations. However, the average of the original and duplicate will be used to represent the concentration at that sample location.

Statistical tests for outliers will be conducted using standard statistical techniques appropriate for this task. Potential outliers will be removed if a review of field and laboratory documents indicates that the results are true outliers. If no physical cause for a statistical outlier can be identified, the data point will not be removed from the data set. However, if the data point is found to truly represent a physical quantity that is different from the rest of the data set, it will be removed.

The suitability of any given statistical test will be assessed based on the completeness of the data sets and the conditions observed at the site. For example, when a single data value is available for soils or water samples at a given sampling location, statistical tests cannot be conducted for that individual sampling location. However, pooling of data across sampling locations may be possible and, if logical to do so, may be implemented at the discretion of the TtNUS PM. Statistical testing will generally be conducted at the5 percent significance level. Statistical testing at other significance levels may also be warranted to provide perspective on the results of testing at five percent significance. If other significance levels are used, they will be supported with rationales for their use.

4.2.3.1 Data Limitations and Actions from Usability Assessment

After all data evaluations are completed, any limitations on the use of data will be known and the limitations will be considered during decision making. If necessary, investigation objectives may be revised in anticipation of additional data collection in order to meet project quality objectives (PQOs) for the site.

Because analytical performance is generally similar for groundwater and surface water and for soil and sediment, two matrix groups (solids and aqueous) may be used when discussing bias and precision. These groupings also cause the number of samples within a group to be greater than when the matrices are discussed separately. The increased number of samples in a group better supports statistical analyses of the data.

4.2.3.1.1 Precision

Field and laboratory precision indicators will be reviewed. In general, laboratory precision should be no worse than field precision because laboratory replicate samples have had an additional opportunity to be

homogenized beyond the homogenization applied to field samples. If laboratory precision is worse than field precision, and the difference is judged to be significant, the cause of the difference will be investigated and an appropriate corrective action will be devised. In general, RPD values (see Section 1.6.2.1) from laboratory and field duplicates will be used for this evaluation.

4.2.3.1.2 Accuracy/Bias

Overall contamination (both field and laboratory) will be reviewed and assessed for impact to the project. In general, this will be reflected in the assignment of data validation qualifiers that have accounted for the effects of blank contamination.

Laboratory control sample (LCS) and duplicate (LCSD) and matrix spike (MS) and duplicate (MSD) percent recovery results (see Section 1.6.2.2) will also be used to assess the degree of bias to be expected for various analyte groups and, to the extent that it is warranted, for individual analytes. Whether review and discussion to the analyte level is warranted depends on which analytes exhibit unacceptable bias and whether they are of importance to this project. In general, MS and MSD data will be used as a more accurate indication of bias in site samples than LCS and LCSD data.

Percent recovery values between 75 and 125% will generally be considered not be significant. Biases between 40 and 75 percent or 125 to 160 percent will be considered to be moderate. Biases between 10 and 40 percent or 160 to 190 percent will generally be considered to be severe. Biases less than 10 percent or greater than 190 percent will generally be considered to be extreme.

If enough data are available and multiple field events are conducted, precision may be compared for the multiple field events at the discretion of the TtNUS PM. The usability assessment will strive to indicate limitations of the data caused by positive or negative bias and will attempt to do so based on logical groupings such as individual or multiple sample delivery groups (SDGs), matrices, etc.

4.2.3.1.3 Representativeness

Representativeness (see Section 1.6.2.4) will be evaluated by reviewing field logs and analytical results to verify that project requirements were satisfied for these operations. Special emphasis will be placed on determining whether all intended samples were collected from the intended locations. If they were not, an assessment of the attainment of project objectives will be made. Based on this assessment, a qualitative value judgment will be made concerning the representativeness of the samples and associated data. Representativness may also be assessed during the evaluation of precision and accuracy and will be summarized in the precision and accuracy assessments as applicable. An inclusion of representativeness of data for risk assessment may also be made when, for example, chemicals may be

partitioned between various physical phases of a sample such as the dissolved and suspended solid portions of a groundwater or surface water sample.

4.2.3.1.4 Comparability

Comparability (see Section 1.6.2.5) will be assessed by first ensuring that QAPP requirements were satisfied. In addition, the comparability of data from one sample group to another may be assessed if the precision, accuracy, or sensitivity indicates that the data are not or may not be comparable in terms of those quality indicators. If multiple sampling rounds are conducted, the comparability of multiple sets of data for the same chemical parameters and matrices will be assessed in terms of precision, accuracy, sensitivity, and representativeness.

In the case of upgradient data, comparability of the upgradient and site data sets will be described in terms of their representativeness for the intended populations, and any other factors such as precision, accuracy, and sensitivity of analytical results that either support or inhibit comparisons of the two types of data.

4.2.3.1.5 Sensitivity and Quantitation Limits

The range of non-detect values, which represent the sensitivities of the analytical measurements, will be compared to QAPP target detection and quantitation limits. This comparison will identify if actual sensitivity was sufficient enough to meet QAPP targets. If the targets were not met, a discussion will be presented in the final report to establish the impact of not meeting the targets on the attainment of project objectives.

4.2.3.1.6 Completeness

Completeness will be evaluated on the following levels:

- Number of samples collected compared to number of samples scheduled for collection, by matrix.
- Number of valid results compared to number of planned results, by matrix, by analytical group.

In addition, a tally of the rejected values and reasons for rejection will be presented. Where rejections are identified, the impact on attainment of project objectives will be described.

Special emphasis will be placed on discussing completeness deficiencies that have the greatest impact on the project. Completeness deficiencies that are inconsequential to the attainment of project objectives will be identified but will receive little discussion.

4.2.3.2 Activities

Several activities to be undertaken by the project team to assess data usability are described above. When the usability assessment is completed, the project team will be able to:

- Establish whether intended samples were collected for each matrix and whether the samples and associated data are of sufficient quality to support the attainment of project objectives.
- If data for any scheduled samples are not available (e.g., because the samples were not analyzed or the data were rejected for use), identify the impact of the missing data on the project.
- Identify all PARCSS parameters that were not satisfied and in which samples, matrices, analytical groups, etc. were not satisfied.
- Identify data use restrictions for any data that did not meet PQOs or otherwise are insufficient to support the attainment of project objectives.
- Identify corrective actions necessary to recover missing data or data of insufficient quality.

4.3 STREAMLINING DATA REVIEW

Streamlining data review is not an applicable task for this project.

4.3.1 Data Review Steps to be Streamlined

Streamlining data review is not an applicable task for this project; therefore, no steps can be presented for streamlining.

4.3.2 Criteria for Streamlining

Streamlining data review is not an applicable task for this project; therefore, criteria for streamlining are not needed.

4.3.3 Amounts and Types of Data Appropriate for Streamlining

Streamlining data review is not an applicable task for this project; therefore, no data reviews will be streamlined.

TABLE 4-1 (CORRESPONDS TO UFP-QAPP WORKSHEET 34)
VERIFICATION (STEP I) PROCESS TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Sample Tables	Proposed samples are verified to have been collected and documented on the chain of custody forms	Internal	TtNUS FOL or designee
Sample Coordinates	Sample locations are verified to be correct and in accordance with the QAPP (overlay maps of proposed locations against actual locations)	Internal	TtNUS FOL, PM, or designee
Data Package	Verify that the data package contains all the elements required by the scope of work; this occurs as part of the data validation process.	Internal	TtNUS Data validator
Sample Log Sheets	Log sheets completed as samples are collected in the field are verified for completeness and are compiled for inclusion in the RFI	Internal	TtNUS PM or designee
Audit Report	Audit checklist and narrative noting any deficiencies (if an audit is performed)	Internal	TtNUS QAM, FOL, PM

FOL Field Operations Leader
PM Project Manager
QAM Quality Assurance Manager
QAPP Quality Assurance Project Plan
RFI RCRA Facility Investigation

TABLE 4-2 (CORRESPONDS TO UFP-QAPP WORKSHEET 36)

VALIDATION (STEPS IIA AND IIB) SUMMARY TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa and IIb	Soil	TAL Metals	Low	SW-846, DoD QSM, National Functional Guidelines for Inorganic Data Review, (USEPA, 2004) October OSWER 9240.1-45 EPA540-R-04-004 and QAPP Worksheets 12, 15, and 28.	TtNUS Staff Chemist
IIa and IIb	Soil	TCL Semivolatiles	Low	SW-846, DoD QSM, National Functional Guidelines for Organic Data Review, (USEPA, 1999) October EPA-540/R-99-008and QAPP Worksheets 12, 15, and 28.	TtNUS Staff Chemist
IIa and IIb	Soil	TCL Pesticides	Low	SW-846, DoD QSM, National Functional Guidelines for Organic Data Review, (USEPA, 1999) October EPA-540/R-99-008and QAPP Worksheets 12, 15, and 28.	TtNUS Staff Chemist
IIa and IIb	Soil	TCL PCBs	Low	SW-846, DoD QSM, National Functional Guidelines for Organic Data Review, (USEPA, 1999) October EPA-540/R-99-008and QAPP Worksheets 12, 15, and 28.	TtNUS Staff Chemist
IIa and IIb	Soil	TOC	Low	Method-specific, DoD QSM, and Worksheets 12, 15, and 18.	TtNUS Staff Chemist

PCBs - Polychlorinated biphenyls.
TAL - Target Analyte List.
TCL - Target Compound List.
TOC - Total Organic Carbon.

TABLE 4-3 (CORRESPONDS TO UFP-QAPP WORKSHEET 35)

VALIDATION (STEPS IIA AND IIB) PROCESS TABLE
ZONE J RFI QAPP
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Step Number	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	Data package	Validator will verify that elements of the data package that are required for validation are present and if not the lab will be contacted and the missing info will be requested. validation will be performed as per Table 4 (worksheet 36).	TtNUS Validator
IIa	Field logs/sample coordinates	Verify that the sampling plan was implemented and carried out as written and any deviations are documented	TtNUS PM
IIa	Electronic Data	Verify all data have been transferred correctly and completely to the final SQL database	TtNUS PM or designee
IIa	QAPP, SOPs/Field Logs, chains of custody	Verify that deviations have been documented and MPCs have been achieved.	TtNUS PM, FOL, or designee

FOL Field Operations Leader
MPC Measurement Performance Criterion
PM Project Manager
QAPP Quality Assurance Project Plan
SOP Standard Operating Procedure

5.0 ECOLOGICAL RISK ASSESSMENT METHODOLOGY

A screening level ecological risk assessment (ERA) will be conducted for Zone J. A description of Zone J and previous investigations at the site were presented in Section 1.5.2. As mentioned in that section, separate ERAs will be completed for the Cooper River, Shipyard Creek, and Noisette Creek. Unless otherwise noted, however, the methodology described herein will be applicable to all three water bodies.

The goal of the ecological risk assessment will be to evaluate the potential for adverse ecological impacts of CNC-related contamination and to determine the path forward (e.g., no further action, monitoring, etc.). The ecological risk assessment will be conducted in accordance with USEPA and Navy guidance (USEPA, 1997; 2000a; and 2001; Department of Navy, 1999). The ecological risk assessment will consist of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ecological risk assessment process described by USEPA (1997). The first two steps will comprise the preliminary (i.e., screening level) ecological risk assessment. USEPA (1997) suggests a Scientific/Management Decision Point at the end of Step 2. Decision points throughout the ecological risk assessment process serve to maintain consensus among the Navy, regulators, and Natural Resource Trustees on scientific and managerial decisions. USEPA Region 4 recognizes that most ecological risk assessments will proceed into Step 3, and facilities are encouraged to submit the results of Steps 1 through 3 as a single deliverable document (USEPA, 2000a). With this in mind and because previous evaluations of Zone J sediments indicate a potential for adverse effects, the initial portion of Step 3 (hereinafter referred to as Step 3A) will be included in the ecological risk assessment without post-Step 2 Scientific/Management Decision Point. Step 3A equates to the initial portion of Tier 2 of the Navy's three- tier ecological risk assessment process.

Steps 1 through 3A consist of the following:

Step 1	Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2	Screening-Level Exposure Estimate and Risk Calculation
Step 3A	Refinement of Preliminary Chemicals of Potential Concern

The remainder of Step 3, as well as Steps 4 through 7, consist of additional site-specific investigations and are not included in this methodology section because it is not anticipated that additional site-specific studies will be needed. Step 8 (Risk Management) is incorporated throughout the ecological risk assessment process in cooperation with the BRAC team.

5.1 SCREENING LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

The problem formulation phase will include descriptions of the three water bodies (Cooper River, Shipyard Creek, and Noisette Creek) with emphasis on the habitats and ecological receptors present. Problem formulation will also include a characterization of site-related chemicals, chemical sources, migration routes, an evaluation of routes of chemical exposure, and the selection of assessment and measurement endpoints. A conceptual model will be developed that describes how chemicals associated with the sites in question may come into contact with ecological receptors. Because several investigations have been conducted at Zone J over more than 10 years, most of the information needed for problem formulation has already been collected. The ecological risk assessment will therefore provide a comprehensive compilation of existing information that will summarize previously collected data sets and describe habitats, ecological receptors, chemical sources, migration routes, routes of chemical exposure, hydrological dynamics, dredging operations, and other pertinent information.

Previous reports have indicated that surface water contaminants at Zone J do not pose significant ecological risks; the ecological risk assessment will summarize previous surface water evaluations for substantiation.

Based on a preliminary evaluation of available information, the primary assessment endpoint will be the protection of benthic invertebrates (i.e., invertebrate organisms that live on or in sediment) from adverse effects of site-related contaminants on growth, survival, and reproduction. Measurement endpoints for benthic invertebrates will be represented by USEPA Region 4 ecological screening values (ESVs) for sediment (USEPA, 2001). The sediment ESVs are based on conservative endpoints and sensitive ecological effects data, and thus the screening values represent chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. For this reason, USEPA Region 4 considers their screening values to be protective of invertebrates as well as upper level receptors such as birds and mammals. In the screening level ERA, therefore, a distinction is not made between measurement endpoints associated with direct toxicity to invertebrates and measurement endpoints associated with food-chain effects.

5.2 SCREENING LEVEL EXPOSURE ESTIMATE

Previous ecological evaluations have indicated that a potential for adverse ecological effects potentially linked to CNC landside sites exists in five areas at Zone J, and thus a more thorough assessment is warranted for these five areas. A Sampling and Analysis Plan was previously developed (Spectra Tech, 2005) with concurrence of SCDHEC and other Natural Resource Trustees in which it was determined that one sediment sample would be collected from each of the five areas. The five areas consist of three

locations in the Cooper River, one location in Shipyard Creek and one location in Noisette Creek (Figure 1-3). Sediment samples were collected at the five locations in December 2005, but method detection limits (MDLs) exceeded ESVs for numerous analytes (Table 1-3). Therefore, the same five locations will be resampled as part of this supplemental RFI.

Because Shipyard Creek and Noisette Creek provide ecological habitat for numerous receptors, the Navy has decided to collect two additional sediment samples in each of the two creeks, one approximately 50 feet upstream from the December 2005 location, and one approximately 50 feet downstream from the December 2005 location (Figure 2-1). Thus, three samples total will be collected from Shipyard Creek, and three samples total will be collected from Noisette Creek.

A total of three samples will be collected in the Cooper River, one sample at each of the locations sampled in December 2005. The river in the vicinity of the three sample locations is heavily industrialized, and although it does provide habitat for some aquatic organisms, the habitat is of considerably less quality than that provided by Shipyard and Noisette Creeks. Therefore, a single sample at each of the three locations sampled in December 2005 was deemed sufficient for risk assessment purposes, in accordance with the BRAC team's previous decision (refer to Appendix G).

The sampling approach described above will result in three samples to be collected in each of the three water bodies.

5.3 SCREENING LEVEL RISK CALCULATION

Many years of anthropogenic activities (especially industrial and commercial activities) in the vicinity of CNC have contributed metals, pesticides, polynuclear aromatic hydrocarbons (PAHs), and other contaminants to the environment at Zone J and throughout Charleston Harbor. In addition, some inorganics occur naturally in sediment. With this in mind, a sediment data set representing regional baseline reference (background) conditions has been developed and approved by representatives of SCDHEC and other Natural Resource Trustees. The reference sediment samples were collected by Spectra Tech in December 2005 from 10 locations in Charleston Harbor that had been pre-approved by the BRAC team (Figure 1-3).

The comparison of site concentrations to background values is usually conducted in Step 3A of the ecological risk assessment process, but to focus the evaluation on site-related analytes, SCDHEC representatives on the BRAC team have decided that analytes with maximum concentrations less than their respective background concentrations will not be considered to be ecological chemicals of potential concern (COPCs). Therefore, the selection of ecological COPCs will be based on comparing a chemical's maximum detected concentration in samples to be collected in the upcoming field effort (see

following paragraph) to its USEPA Region 4 sediment ESV and to its background value. Specifically, if the maximum concentration is equal to or less than the ESV [i.e., the hazard quotient (HQ) is less than or equal to 1], the chemical will be eliminated from further consideration. If the maximum concentration exceeds the ESV (i.e., HQ is greater than 1), or if a screening value is not available, the chemical will then be compared to twice the average background concentration. A chemical with a maximum concentration less than or equal to twice the average background concentration will be eliminated from further consideration, and a chemical with a maximum concentration that exceeds twice the background concentration will be considered to be a ecological COPC and will be retained for further evaluation.

This screening process will utilize only the samples that will be collected in the upcoming field effort. Sediment data from samples collected in 1994/1995 and December 2005 at the same five areas under investigation will not be used in the initial COPC screening process. However, the previous data will be presented in the RFI Report alongside the upcoming data.

As described above, the “background” value for an analyte will initially be represented by twice the average reference concentration in the data set of 10 samples collected in December 2005 (Spectra Tech, 2006). Although comparing Zone J concentrations to this “background” value has less statistical rigor than other comparisons (e.g., parametric or non-parametric tests), it is a simple approach that is often used as an initial screening tool, and this approach was approved by SCDHEC representatives during the November 16, 2006 BRAC team meeting, during which the general approach for the ecological risk assessment was discussed. COPCs retained for evaluation after comparisons to ESVs and the initial background comparison will be evaluated using statistical analyses described in USEPA (2002a and b) guidance.

Calcium, magnesium, potassium, and sodium will not be retained as COPCs. These essential nutrients can be tolerated by most organisms even at relatively high concentrations and are not typically considered to be COPCs. There are no ESVs for these nutrients, and there have been no activities at sites near Zone J that have resulted in known releases of high concentrations of these nutrients.

5.4 REFINEMENT OF PRELIMINARY CHEMICALS OF POTENTIAL CONCERN

Previous evaluations of Zone J sediments indicated a potential for adverse ecological effects. Therefore, it is anticipated that the initial portion of Step 3 (referred to as Step 3A) will be included in the Zone J ecological risk assessment. Step 3A of USEPA’s ecological risk assessment process consists of a refinement of the conservative exposure assumptions to more realistically estimate potential risks to ecological receptors.

In accordance with USEPA Region 4, food-chain modeling is conducted (when applicable) during Step 3A (USEPA, 2000a). Shipyard and Noisette Creeks provide habitat for a variety of birds and mammals. Bioaccumulative chemicals such as organochlorine pesticides could potentially accumulate in benthic invertebrates and could then be transferred through ingestion to higher trophic level organisms such as birds and mammals. To the extent that this pathway is complete, birds and mammals that forage in Shipyard and Noisette Creeks could be exposed to bioaccumulative chemicals through the food chain. The areas of contamination in Shipyard and Noisette Creeks appear to be small in size, so the potential risk via the food chain might be minor. Similarly, the Cooper River at CNC is heavily industrialized, so usage of this portion of the river by most bird and mammal species is probably minor. Nevertheless, as a conservative measure, the protection of piscivorous birds and mammals from adverse effects of site-related contaminants on growth, survival, and reproduction will be an assessment endpoint for bioaccumulative COPCs. The term “piscivorous” is used here in a broad sense to describe birds and mammals that prey not only upon fish but on a variety of crustaceans and mollusks. Measurement endpoints for piscivorous birds and mammals will be chemical doses associated with adverse impacts on survival, growth, and reproduction. Specifically, estimated ingested doses of bioaccumulative COPCs in sediment and food items will be compared to threshold oral toxicity values. The mink and green heron were selected as representative ecological receptors for food-chain modeling for this project (Appendix F).

USEPA Region 4 considers bioaccumulative chemicals to consist of those so designated in USEPA’s (2000b) Appendix to Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs, Chemical-Specific Summary Tables, with the exception of PAHs. Region 4 considers the potential toxicity of PAHs via bioaccumulation in the food web to be generally negligible unless PAHs are present at extremely high concentrations [i.e., percent levels: (greater than 10,000 mg/kg)] in soil or sediment. Potential risks to piscivorous birds and mammals from sediment analytes that are bioaccumulative will be evaluated for bioaccumulative analytes that exceed sediment ESVs.

Representative receptors, methods used to model the doses that representative receptors could receive, as well as the selection of toxicity reference values (TRVs), are presented in Appendix F.

During the refinement of Preliminary COPCs phase, potential ecological risks will be evaluated using a weight-of-evidence approach in accordance with USEPA guidance (1997 and 2000a) guidance. Uncertainties will be discussed where applicable.

6.0 HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

This section presents the general methodologies and procedures that will be used to conduct the human health risk assessment (HHRA) for Zone J. The HHRA focuses specifically on the potential ingestion of fish by a recreational fisherman assumed to catch and eat fish from the Cooper River, Shipyard Creek, and/or Noisette Creek. The objective of the HHRA is to determine whether detected concentrations of chemicals pose a significant threat to potential human receptors under current and/or future land use. The potential risks to human receptors will be estimated based on the assumption that no further actions are taken to control contaminant releases.

The following current USEPA and United States Navy risk assessment guidance documents were used to develop the framework for the HHRA:

- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (USEPA, December 1989).

- Human Health Risk Assessment Bulletins-- Supplement to RAGS (USEPA Region 4, May 2000).

- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors (USEPA, March 1991).

- Distribution of Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure (USEPA, May 1993).

- Exposure Factors Handbook. Office of Health and Environmental Assessment (USEPA, August 1997).

- Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA, December 2001).

- Navy Final Policy on the Use of Background Chemical Levels (Navy, December 2004).

- Conducting Human Health Risk Assessments under the Environmental Restoration Program (Navy, February 2001).

An HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections 6.1 through 6.5 contain detailed discussions of the five components of the HHRA.

Three major aspects of chemical contamination and environmental fate and transport must be considered to evaluate potential risks: (1) contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of these factors is absent for a site, the exposure route is regarded as incomplete, and no potential risks are considered to exist for human receptors.

6.1 DATA EVALUATION

Data evaluation, the first component of an HHRA, involves the compilation and evaluation of analytical data. The main objective of data evaluation is to develop a medium-specific list of chemical of potential concern (COPCs) that will be used to quantitatively determine potential human health risks for site media. A “data evaluation/useability” section will precede the actual risk assessment in the report. The evaluation will address such issues as the adequacy of detection limits achieved in the environmental investigation.

6.1.1 Data Usability

Data collected during the proposed field investigation will be used to assess risks to potential human receptors. A discussion of the locations and samples to be collected is provided in Section 2.1 and 5.2. The analytical data used in the quantitative estimation of potential risks will be subjected to data validation. Analytical results from the target analyte lists for the proposed field investigation will be used in the risk evaluation. Field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process) will not be used in the quantitative risk assessment. However, these data may be used to substantiate the conclusions of the quantitative risk analysis.

6.1.2 Selection of Chemicals of Potential Concern

COPCs are selected through a qualitative screening process in order to limit the number of chemicals and exposure routes quantitatively evaluated in the HHRA to only those site-related constituents that dominate overall potential risks.

In general, a chemical will be selected as a COPC and retained for further quantitative risk evaluation if: (1) the maximum detection in a sampled medium exceeds the lowest risk-based concentration and (2) the

chemical is determined to be present at concentrations exceeding background. Chemicals eliminated from further evaluation during this process are assumed to present nominal risks to potential human receptors.

For this HHRA, COPC selection for human health will be based on the ecological COPC selection as described in Section 5.0, i.e., the chemicals selected as COPCs for sediment for the ecological risk assessment will be evaluated as COPCs for fish ingestion in the HHRA.

6.1.2.1 Determination of Site-Related Chemicals Background Evaluation

The elimination of chemicals as site-related COPCs on the basis of background comparisons will follow Navy Policy on the Use of Background Chemical Levels (Department of the Navy, January 2004). This document also presents the Navy's interpretation of USEPA guidance provided in the document titled Role of Background in the CERCLA Cleanup Program (USEPA, April 2002) and details the methodology to be used in evaluating background under the Navy's Environmental Restoration and BRAC programs.

Chemicals detected in sediment at concentrations greater than the screening levels but eliminated as COPCs on the basis of background comparisons will be further discussed in the risk characterization and uncertainty sections of the risk assessment.

6.2 EXPOSURE ASSESSMENT

The exposure assessment portion of the HHRA defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and applicable exposure pathways, to calculate concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios.

A complete exposure pathway has three components: a source of chemicals that can be released to the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

6.2.1 Conceptual Site Model

The development of a Conceptual Site Model (CSM) is an essential component of the exposure assessment. The CSM integrates information regarding the physical characteristics of the site, exposed populations, sources of contamination, and contaminant mobility (fate and transport) to identify potential exposure routes and receptors to be evaluated in the risk assessment. The CSM for Zone J will include

descriptions of the three water bodies (Cooper River, Shipyard Creek, and Noisette Creek) and it will also include a characterization of site-related chemicals, chemical sources, migration routes, and an evaluation of pathways/routes of chemical exposure.

6.2.1.1 Potential Current and Future Receptors of Concern and Exposure Pathways

The HHRA for Zone J will evaluate risks to a recreational fisherman who is assumed to catch and eat fish periodically from the study area. Because actual fish tissue samples will not be collected, the chemical concentrations in fish tissue will be derived from sediment data, as described in the ecological risk assessment. This assumes that chemicals in sediment are bioaccumulated and bioconcentrated in fish tissue, most likely by bottom dwelling fish such as catfish.

6.2.2 Central Tendency Exposure versus Reasonable Maximum Exposure

Traditionally, exposures evaluated in the HHRA were based on the concept of a reasonable maximum exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, December 1989). However, subsequent risk assessment guidance (USEPA, February 1992) indicates the need to address an average case or central tendency exposure (CTE).

To provide a full characterization of potential exposure, both RME and CTE scenarios will be evaluated in the HHRA for Zone J fish ingestion. The available guidance (USEPA, May 1993) concerning the evaluation of CTE is limited and at times vague. Therefore, professional judgment will be exercised when defining CTE conditions for a particular receptor.

6.2.3 Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for COPCs only, is an estimate of the chemical concentration within an exposure unit (EU) likely to be contacted over time by a receptor and is used to estimate exposure intakes. An EU is defined as the area typically encountered/traversed by a receptor under a particular land use scenario. The EPCs used in risk assessment calculations will be the values for fish tissue developed in the ERA. The fish tissue EPCs will be presented in the RAGS Part D Table 3s included in the appendices to the risk assessment.

6.2.4 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Intakes for the identified potential receptor groups will be calculated using current USEPA risk assessment guidance (e.g., USEPA, December 1989, August 1997, and USEPA Region 4, May 2000)

and presented in the risk assessment spreadsheets. Quantitative risk assessment results will be presented in RAGS Part D format tables and included in the appendices to the risk assessment.

Noncarcinogenic intakes are estimated using the concept of an average annual exposure. Carcinogenic intakes are calculated as an incremental lifetime exposure, which assume a life expectancy of 70 years. Assumptions regarding exposure will be presented for both the RME and CTE scenarios. The majority of the exposure assumptions used to estimate chemical intakes are based on assumptions described in several USEPA guidance documents (e.g., USEPA, August 1997 and Region 4, May 2000) and professional judgment). The following paragraphs discuss the exposure assumptions to be used in risk assessment calculations for Zone J.

6.2.4.1 Fish Ingestion

The fish/crabs consumption exposure pathway will be evaluated for recreational fisherman assumed to be exposed for a period of 30 years. Intakes for the fish ingestion exposure route will be estimated using the following equation (USEPA, December 1989):

$$\text{Intake} = \frac{(C_{sed} \times BSAF \times IR \times FI \times EF \times ED)}{(BW \times AT)}$$

where:

Intake	=	ingestion intake (mg/kg-day)
C_{sed}	=	chemical concentration in sediment (mg/kg)
BSAF	=	chemical-specific biota sediment accumulation factor (unitless)
IR	=	ingestion rate (kg/meal)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (meals/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365 days/yr;
		for carcinogens, AT = 70 yrs x 365 days/yr

The ingestion rates of contaminants in fish will be assumed to be the average daily intakes of 0.025 kilogram per meal (kg/meal) for the RME and 0.008 kg/meal for the CTE (USEPA, August 1997) 350 days per year for 30 and 9 years, respectively. The fraction ingested (FI) from the contaminated source will depend on the areas from which the fish/crabs are taken. A FI of 0.1(10 percent) will be used for fish/crabs caught in the Cooper River. A FI of 0.01(1 percent) will be used for fish/crabs caught in small creeks and streams. This assumes that 1 or 10 percent of the fish/crabs caught and ingested by

the recreational fisherman come from the study area. Fish/crabs tissue concentrations (dry weight) will be calculated as described in the ecological risk assessment. Table 6-1 presents the exposure parameters used for the RME and CTE scenarios.

6.2.4.2 Exposure to Lead in Fish Tissue

If lead is selected as a COPC for Zone J, the following methodology will be used to evaluate risks for the recreational fisherman assumed to ingest lead in fish tissue. The equations and methodology presented in Section 6.2.4.1 cannot be used to evaluate exposure to lead because of the absence of published dose-response parameters. Exposure to lead in fish will be assessed using a version of the USEPA's Technical Review Workgroup (TRW) Adult Lead Model (ALM) (January 2003) adapted for fish ingestion. This model is typically used to evaluate exposure to lead in soil only assuming a non-residential land use scenario. It was adapted to fish ingestion according to guidance presented in Frequently Asked Questions (FAQs) on the Adult Lead Model (USEPA, online, August 2007). The FAQ guidance for ingestion of lead in fish states the following:

> "The ALM analysis could be performed to evaluate the local fish contribution to lead exposure. A fish advisory could also be developed by applying the ALM in reverse to derive an upper-bound ingestion rate for a given lead concentration in fish tissue, using an increasing intake of fish to determine an intake corresponding to a target risk level (e.g., P10 of five per cent). For bioavailable fraction of lead in fish (AFF), a protective estimate of 12% would be appropriate. Site-specific information should be used along with the NHANES guidance and the Exposure Factors Handbook in developing the site-specific exposure scenario."

The equation from the ALM can be used (with the following modifications) to calculate overall risk posed by consuming fish that are contaminated with lead:

$$PbB = (Pb_F \times BKSF \times IR_F \times AF_F \times EF_F/AT_F) + PbB_0$$

where: PbB = Adult blood lead level for fish ingestion calculated by the model (µg/dL) where blood-lead levels greater than 10 µg/dL are considered to be a "concern."

F= media I(Fish[$_F$])

Pb_F = Fish lead concentration (µg/g) (appropriate average concentration)

IR_F = Fish intake rate (g/day)

AF_F = Absolute gastrointestinal absorption fraction for ingested lead in media (unitless)

EF_F = Exposure frequency (days/year)

PbB_0 = Baseline blood lead (µg/dL)

BKSF = Biokinetic slope factor

AT_F = Averaging time (days/year)"

Table 6-2 presents an example of the ALM adapted for fish ingestion.

6.3 TOXICITY ASSESSMENT

The objective of the toxicity assessment is to identify the potential health hazards and adverse effects in exposed populations. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified COPCs. Quantitative toxicity values determined during this component of the risk assessment will be integrated with outputs of the exposure assessment to characterize the potential for the occurrence of adverse health effects for each receptor group.

The toxicity value used to evaluate noncarcinogenic health effects is the RfD; carcinogenic effects are quantified using the CSF.

6.3.1 Toxicity Criteria

RfDs and CSFs used in the HHRA for Zone J will be obtained from the following primary literature sources:

- Integrated Risk Information System (IRIS).

- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.

- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, July 1997).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database is the preferred source of toxicity values. This database is continuously updated, and values presented have been verified by USEPA. The USEPA Region 9 Preliminary Remediation Goal (PRG) tables and Region 3 Risk Based Concentration (RBC) tables will be used as sources of toxicity criteria when these criteria are not available from the aforementioned references.

6.3.2 Toxicity Criteria for Chromium

Toxicity criteria are available for different forms of chromium, which is considered to be more toxic in the hexavalent state. Because there is no evidence to support the conclusion that hexavalent chromium is present in sediment at Zone J, speciation analyses will not be performed. However, risks associated with this chemical will be assessed by conservatively assuming that 100 percent of the reported total chromium result is hexavalent chromium. The uncertainty associated with this assumption will be discussed in the uncertainty section of the HHRA.

6.4 RISK CHARACTERIZATION

Potential risks (noncarcinogenic and carcinogenic) for human receptors resulting from the exposures outlined in the exposure assessment are quantitatively determined during the risk characterization component of the HHRA.

A summary and interpretive discussion of the quantitative risk estimates will be provided in the text of the risk assessment. During the interpretive risk discussion, COPCs that contribute significantly to elevated risks will be identified as "risk drivers" or chemicals of concern (COCs). The numerical estimates of risk will be contained in the risk assessment spreadsheets that will be appended to the risk assessment as support documentation.

6.4.1 Quantitative Analysis

Quantitative estimates of risk will be calculated according to risk assessment methods outlined in U.S. EPA guidance (U.S. EPA, December, 1989). Lifetime cancer risks will be expressed in the form of dimensionless probabilities, referred to as incremental cancer risks (ICRs), based on CSFs. Noncarcinogenic risk estimates will be presented in the form of Hazard Quotients (HQs) that are determined through a comparison of intakes with published RfDs.

ICR estimates will be generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$ICR = (\text{Estimated Exposure Intake})(CSF)$$

If the above equation results in an ICR greater than 0.01, the following equation (U.S. EPA, 1989) will be used:

$$ICR = 1-[\exp(-\text{Estimated Exposure Intake})(CSF)]$$

An ICR of $1x10^{-6}$ indicates that the exposed receptor has a one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people.

As mentioned previously, noncarcinogenic risks will be assessed using the concept of HQs and Hazard Indices (HIs). The HQ for a COPC is the ratio of the estimated intake to the RfD, as follows:

$$HQ = (\text{Estimated Exposure Intake}) / (RfD)$$

An HI will be generated by summing the individual HQs for the COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

6.4.2 Comparison of Quantitative Risk Estimates to Benchmarks

Quantitative risk estimates will be compared to typical benchmarks to interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site. Calculated ICRs will be interpreted using the U.S. EPA's "target range" ($1x10^{-4}$ to $1x10^{-6}$) and HIs will be evaluated using a value of 1.0.

The U.S. EPA has defined the range of $1x10^{-4}$ to $1x10^{-6}$ as the ICR "target range" for most hazardous waste facilities addressed under CERCLA and RCRA. Individual or cumulative ICRs greater than $1x10^{-4}$ are typically not considered as protective of human health, while ICRs less than $1x10^{-6}$ will typically be regarded as protective. Risk management decisions are necessary when the ICR is within the $1x10^{-4}$ to $1x10^{-6}$ cancer risk range. Risks greater than $1x10^{-6}$ will be discussed in the HHRA.

An HI exceeding unity (1.0) indicates that there may be potential noncarcinogenic health risks associated with exposure. If an HI exceeds unity, a segregation of target organs effects associated with exposure to COPCs will be performed. Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) will be regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but have no anticipated adverse health effects if the COPCs do not affect the same target organ or exhibit the same critical effect.

6.5 UNCERTAINTY ANALYSIS

The goal of the uncertainty analysis is to identify important uncertainties and limitations associated with the baseline HHRA. Uncertainties related to each component of the assessment (i.e., data evaluation, exposure assessment, toxicity assessment, and risk characterization) will be presented. In addition, the

effect of a particular uncertainty on the outcome of the assessment (i.e., risk estimates) will also be discussed, where possible. The following subsections present an overview of uncertainties that may be addressed in the risk assessment uncertainty section.

6.5.1 Uncertainty in Data Evaluation

This section may discuss uncertainties in the risk assessment associated with analytical data and data quality. This section may also involve a discussion of uncertainty in the COPC selection process, the inclusion or exclusion of COPCs in the risk assessment on the basis of background concentrations, the uncertainty in COPC screening levels, and the omission of constituents for which health criteria are not available. The discussion will be based, in part, on the evaluation in the "Data Useability Worksheet" as suggested RAGS Part D (EPA, December, 2001).

6.5.2 Uncertainty in the Exposure Assessment

This section will include a discussion of the following: assumptions related to current and future land use; the uncertainty in EPCs, for example, the use of maximum concentrations to estimate risks; uncertainty in the selection of potential receptors and exposure scenarios; and uncertainty in the selection of exposure parameters (RME versus CTE). If predictive models are used in the risk estimation, the uncertainty associated with the model and modeling parameters will be evaluated.

6.5.3 Uncertainty in the Toxicity Assessment

The uncertainties inherent in RfDs and CSFs and use of available criteria will be discussed. A discussion of the uncertainty in hazard assessment that deals with characterizing the nature and strength of the evidence of causation, or the likelihood that a chemical that induces adverse effects in animals, will also induce adverse effects in humans, will be provided. This section will also discuss uncertainty in the dose-response evaluations for the COPCs that relates to the determination of a CSF for the carcinogenic assessment and derivation of RfDs or Reference Concentrations (RfCs) for the noncarcinogenic assessment. In addition, a discussion of the uncertainty in the toxicity of specific constituents such as arsenic, chromium, aluminum, iron, and copper will be presented, if applicable.

6.5.4 Uncertainty in the Risk Characterization

This section will discuss the uncertainty in risk characterization that results primarily from assumptions made regarding additivity/synergism of effects from exposure to multiple COPCs affecting different target organs across various exposure routes. The risk assessment will discuss the uncertainty inherent in summing risks for several substances across different exposure pathways. Probabilistic risk assessment techniques may also be used to further define the uncertainty attached to the risk characterization results.

However, the exposure assumptions (e.g., probability distributions) used to prepare the probabilistic risk assessment will be reviewed with the regulatory reviewers before they are incorporated into the uncertainty section of the baseline risk assessment.

TABLE 6-1
ZONE J VALUES OF EXPOSURE PARAMETERS FOR
ADULT RECREATIONAL USERS BY INGESTION OF FISH
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Fish tissue
Exposure Point: Zone J
Receptor Population: Recreational Users
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference[2]	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CFish	Chemical Concentration in Fish	mg/kg	Calculated by multiplying maximum sediment concentration by BASF	See Section 5.0	Calculated by multiplying maximum sediment concentration by BASF	See Section 5.0	Intake (mg/kg-day) = Cfish x IR x FI x EF x ED / BW x AT
	IR	Ingestion Rate of fish	kg/meal	0.025	USEPA, August 1997	0.008	USEPA, August 1997	
	FI	Fraction ingested from source	unitless	0.1 (0.01)*	Professional Judgement	0.1 (0.01)*	Professional Judgement	
	EF	Exposure Frequency	meals/year	350	USEPA Region 4, May 2000	350	USEPA Region 4, May 2000	
	ED	Exposure Duration	years	30	USEPA Region 4, May 2000	9	USEPA Region 4, May 2000	
	BW	Body Weight	kg	70	USEPA Region 4, May 2000	70	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

A FI of 0.1 (10 percent) will be used for fish taken for the Cooper River. A FI of 0.01 (1 percent) will be used for fish taken from small creek and streams such as Noisette and Shipyard Creek.
BSAF = Biota sediment accumulation factor.

TABLE 6-2
ZONE J CALCULATIONS OF BLOOD LEAD CONCENTRATIONS - INGESTION OF FISH BY A RECREATIONAL FISHERMAN
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Calculations of Blood Lead Concentrations (PbBs) - Ingestion of Fish by a Recreational Fisherman - Zone J

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario	
			GSDi = Hom	GSDi = Het
PbF	Lead concentration in Fish Tissue (wet weight)	ug/g or ppm	0.62	0.62
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	2.1	2.3
PbB_0	Baseline PbB	ug/dL	1.4	1.4
IR_f	Fish ingestion rate	g/day	25	25
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--
AF_f	Absorption fraction (from ingested fish)	--	0.12	0.12
EF_f	Exposure frequency	days/yr	350	350
AT_f	Averaging time	days/yr	365	365
PbB_{adult}		**ug/dL**	**2.1**	**2.1**
$P(PbB_{fetal} > PbB_t)$		**%**	**1.2%**	**2.3%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

Equation based on "Frequently Asked Questions" on EPA Lead Website at

http://www.epa.gov/superfund/programs/lead/almfaq.htm

$$PbB_{adult} = (PbF*BKSF*IR_f*AF_f*EF_f/AT_f) + PbB_0$$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

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APPENDIX A

UFP-QAPP CHECKLIST

APPENDIX B

TtNUS FIELD FORMS

ZONE J FIELD FORMS

- SEDIMENT SAMPLE LOG SHEET
- QA/QC SAMPLE LOG SHEET
- EQUIPMENT CALIBRATION LOG SHEET

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____ Sample ID Number: _____
Project Number: _____ Sampled By: _____
Sample Location: _____ C.O.C. Number: _____
QA Sample Type:

[] Trip Blank [] Rinsate Blank
[] Source Water Blank [] Other Blank _____

SAMPLING DATA:

Date: _____
Time: _____
Method: _____

WATER SOURCE:

[] Laboratory Prepared [] Tap
[] Purchased [] Fire Hydrant
[] Other _____

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: _____
Supplier: _____
Manufacturer: _____
Order Number: _____
Lot Number: _____
Expiration Date: _____

RINSATE INFORMATION (If Applicable):

Media Type: _____
Equipment Used: _____
Equipment Type:

[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Signature(s):

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : _____

INSTRUMENT NAME/MODEL: PID

SITE NAME: _____

MANUFACTURER: _____

PROJECT No.: _____

SERIAL NUMBER: _____

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Zero Reading		Span Reading		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

APPENDIX C

TTnus FIELD STANDARD OPERATING PROCEDURES

ZONE J FIELD STANDARD OPERATING PROCEDURES (SOPs)

- SA-1.2 SURFACE WATER AND SEDIMENT SAMPLING
- SA-7.1 DECONTAMINATION OF FIELD EQUIPMENT AND WASTE HANDLING
- SA-6.3 FIELD DOCUMENTATION
- SA-6.1 NON-RADIOLOGICAL SAMPLE HANDLING
- CT-04 SAMPLE NOMENCLATURE
- CT-05 DATABASE RECORDS AND QUALITY ASSURANCE

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A SURFACE WATER SAMPLE LOG SHEET 11
B SOIL & SEDIMENT SAMPLE LOG SHEET 12

1.0 PURPOSE

This procedure describes methods and equipment commonly used for collecting environmental samples of surface water and aquatic sediment for either onsite examination and chemical testing, or for subsequent laboratory analysis.

2.0 SCOPE

The information presented in this guideline is generally applicable to all environmental sampling of surface waters (Section 5.3) and aquatic sediments (Section 5.5), except where the analyte(s) may interact with the sampling equipment. The collection of concentrated sludges or hazardous waste samples from disposal or process lagoons often requires methods, precautions and equipment different from those described herein.

3.0 GLOSSARY

Environmental Sample - a sample containing (or suspected to contain) low-level concentrations of contaminants, which does not require special handling or transport considerations as detailed in SOP SA-6.1.

Hazardous Waste Sample - a sample containing (or suspected to contain) higher concentrations of contaminants thus requiring special handling and/or transport considerations per SOP SA-6.1.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager has the overall responsibility for seeing that all surface water and sediment sampling activities are properly conducted by appropriately trained personnel.

Field Operations Leader - The Field Operations Leader (FOL) is responsible for the supervision of onsite water quality analyses, ensuring proper sample collection, handling, and the completion and accuracy of all field documentation, and making sure that custody of all samples obtained is maintained according to proper procedures.

5.0 PROCEDURES

5.1 Introduction

Collecting a representative sample from surface water or sediments is difficult because of water movement, stratification, or patchiness. To collect representative samples, one must standardize sampling bias related to site selection, sampling frequency, sample collection, sampling devices, and sample handling, preservation, and identification.

Representativeness is a qualitative description of the degree to which an individual sample accurately reflects population characteristics or parameter variations at a sampling point. It is therefore an important characteristic not only of assessment and quantification of environmental threats posed by the site, but also for providing information for engineering design and construction. Proper sample location selection and proper sample collection methods are important to ensure that a truly representative sample has been taken. Regardless of quality control applied during laboratory analyses and subsequent scrutiny of analytical data packages, reported data are no better than the confidence that can be placed in the representativeness of the samples.

5.2 Defining the Sampling Program

Many factors must be considered in developing a sampling program for surface water or sediments including study objectives, accessibility, site topography, physical characteristics of the water body (such as flow and mixing), point and diffuse sources of contamination, and personnel and equipment available to conduct the study. For waterborne constituents, dispersion depends on the vertical and lateral mixing within the body of water. For sediments, dispersion depends on bottom current or flow characteristics, sediment characteristics (density, size) and geochemical properties (which affect adsorption/desorption). The hydrogeologist developing the sampling plan must therefore know not only the mixing characteristics of streams and lakes, but also must understand the role of fluvial-sediment transport, deposition, and chemical sorption.

5.2.1 Sampling Program Objectives

The objective of surface water sampling is to determine the surface water quality entering, leaving or remaining within the site. The scope of the sampling program must consider the sources and potential pathways for transport of contamination to or within a surface water body. Sources may include point sources (leaky tanks, outfalls, etc.) or nonpoint sources (e.g., spills). The major pathways for surface water contamination (not including airborne deposition) are overland runoff, leachate influx to the waterbody, direct waste disposal (solid or liquid) into the water body; and groundwater flow influx from upgradient. The relative importance of these pathways, and therefore the design of the sampling program, is controlled by the physiographic and hydrologic features of the site, the drainage basin(s) which encompass the site, and the history of site activities.

Physiographic and hydrologic features to be considered include slopes and runoff direction, areas of temporary flooding or pooling, tidal effects, artificial surface runoff controls such as berms or drainage ditches (and when they were constructed relative to site operation), and locations of springs, seeps, marshes, etc. In addition, the obvious considerations such as the location of man-made discharge points to the nearest stream (intermittent or flowing), pond, lake, estuary, etc., shall be considered.

A more subtle consideration in designing the sampling program is the potential for dispersion of dissolved or sediment-associated contaminants away from the source. The dispersion could lead to a more homogeneous distribution of contamination at low or possibly non-detectable concentrations. Such dispersion does not, however, always readily occur. For example, obtaining a representative sample of contamination from a main stream immediately below an outfall or a tributary is difficult because the inflow frequently follows a stream bank with little lateral mixing for some distance. Sampling alternatives to overcome this situation are: (1) move the site far enough downstream to allow for adequate mixing, or (2) collect integrated samples in a cross section. Also, nonhomogeneous distribution is a particular problem with regard to sediment-associated contaminants, which may accumulate in low-energy environments (coves, river bends, deep spots, or even behind boulders) near or distant from the source while higher-energy areas (main stream channels) near the source may show no contaminant accumulation.

The distribution of particulates within a sample itself is an important consideration. Many organic compounds are only slightly water soluble and tend to adsorb onto particulate matter. Nitrogen, phosphorus, and the heavy metals may also be transported by particulates. Samples must be collected with a representative amount of suspended material; transfer from the sampling device shall include transferring a proportionate amount of the suspended material.

5.2.2 Location of Sampling Stations

Accessibility is the primary factor affecting sampling costs. The desirability and utility of a sample for analysis and consideration of site conditions must be balanced against the costs of collection as controlled

by accessibility. Bridges or piers are the first choice for locating a sampling station on a stream, because bridges provide ready access and also permit the sampling technician to sample any point across the stream. A boat or pontoon (with an associated increase in cost) may be needed to sample locations on lakes and reservoirs, as well as those on larger rivers. Frequently, however, a boat will take longer to cross a water body and will hinder manipulation of the sampling equipment. Wading for samples is not recommended unless it is known that contaminant levels are low so that skin contact will not produce adverse health effects. This provides a built in margin of safety in the event that wading boots or other protective equipment should fail to function properly. If it is necessary to wade into the water body to obtain a sample, the sampler shall be careful to minimize disturbance of bottom sediments and must enter the water body downstream of the sampling location. If necessary, the sampling technician shall wait for the sediments to settle before taking a sample.

Sampling in marshes or tidal areas may require the use of an all-terrain vehicle (ATV). The same precautions mentioned above with regard to sediment disturbance apply.

Under ideal and uniform contaminant dispersion conditions in a flowing stream, the same concentrations of each would occur at all points along the cross section. This situation is most likely downstream of areas of high turbulence. Careful site selection is needed in order to ensure, as nearly as possible, that samples are taken where uniform flow or deposition and good mixing conditions exist.

The availability of streamflow and sediment discharge records can be an important consideration in choosing sampling sites in streams. Streamflow data in association with contaminant concentration data are essential for estimating the total contaminant loads carried by the stream. If a gaging station is not conveniently located on a selected stream, the project hydrogeologist shall explore the possibility of obtaining streamflow data by direct or indirect methods.

5.2.3 Frequency of Sampling

The sampling frequency and the objectives of the sampling event will be defined by the project plan documents. For single-event site or area characterization sampling, both bottom material and overlying water samples shall be collected at the specified sampling stations. If valid data are available on the distribution of the contaminant between the solid and aqueous phases, it may be appropriate to sample only one phase, although this is not often recommended. If samples are collected primarily for monitoring purposes (i.e., consisting of repetitive, continuing measurements to define variations and trends at a given location), water samples shall be collected at a pre-established and constant interval as specified in the project plans (often monthly or quarterly, and during droughts and floods). Samples of bottom material shall be collected from fresh deposits at least yearly, and preferably seasonally, during both spring and fall.

The variability in available water-quality data shall be evaluated before determining the number and collection frequency of samples required to maintain an effective monitoring program.

5.3 Surface Water Sample Collection

5.3.1 Streams, Rivers, Outfalls and Drainage Features (Ditches, Culverts)

Methods for sampling streams, rivers, outfalls, and drainage features at a single point vary from the simplest of hand-sampling procedures to the more sophisticated multi-point sampling techniques known as the equal-width-increment (EWI) method or the equal-discharge-increment (EDI) methods (see below).

Samples from different depths or cross-sectional locations in the watercourse taken during the same sampling episode, shall be composited. However, samples collected along the length of the watercourse or at different times may reflect differing inputs or dilutions and therefore shall not be composited.

Generally, the number and type of samples to be taken depend on the river's width, depth, discharge and on the suspended sediment the stream or river transports. The greater the number of individual points that are sampled, the more likely that the composite sample will truly represent the overall characteristics of the water.

In small streams less than about 20 feet wide, a sampling site can generally be found where the water is well mixed. In such cases, a single grab sample taken at mid-depth in the center of the channel is adequate to represent the entire cross section.

For larger streams, at least one vertical composite shall be taken with one sample each from just below the surface, at mid-depth, and just above the bottom. The measurement of DO, pH, temperature, conductivity, etc., shall be made on each aliquot of the vertical composite and on the composite itself. For rivers, several vertical composites shall be collected, as directed in the project plan documents.

5.3.2 Lakes, Ponds and Reservoirs

Lakes, ponds, and reservoirs have a much greater tendency to stratify than rivers and streams. The relative lack of mixing requires that more samples be obtained.

The number of water sampling sites on a lake, pond, or impoundment will vary with the size and shape of the basin. In ponds and small lakes, a single vertical composite at the deepest point may be sufficient. Similarly, the measurement of DO, pH, temperature, etc., is to be conducted on each aliquot of the vertical composite and on the composite itself. In naturally-formed ponds, the deepest point may have to be determined empirically; in impoundments, the deepest point is usually near the dam.

In lakes and larger reservoirs, several vertical composites shall be composited to form a single sample. These verticals are often taken along a transect or grid. In some cases, it may be of interest to form separate composites of epilimnetic and hypolimnetic zones. In a stratified lake, the epilimnion is the thermocline which is exposed to the atmosphere. The hypolimnion is the lower, "confined" layer which is only mixed with the epilimnion and vented to the atmosphere during seasonal "overturn" (when density stratification disappears). These two zones may thus have very different concentrations of contaminants if input is only to one zone, if the contaminants are volatile (and therefore vented from the epilimnion but not the hypolimnion), or if the epilimnion only is involved in short-term flushing (i.e., inflow from or outflow to shallow streams). Normally, however, a composite consists of several verticals with samples collected at various depths.

In lakes with irregular shape and with bays and coves that are protected from the wind, separate composite samples may be needed to adequately represent water quality since it is likely that only poor mixing will occur. Similarly, additional samples are recommended where discharges, tributaries, land use characteristics, and other such factors are suspected of influencing water quality.

Many lake measurements are now made in-situ using sensors and automatic readout or recording devices. Single and multi-parameter instruments are available for measuring temperature, depth, pH, oxidation-reduction potential (ORP), specific conductance, dissolved oxygen, some cations and anions, and light penetration.

5.3.3 Estuaries

Estuarine areas are by definition, zones where inland freshwaters (both surface and ground) mix with oceanic saline waters. Estuaries are generally categorized into three types dependent upon freshwater inflow and mixing properties. Knowledge of the estuary type is necessary to determine sampling locations. Each type of estuarine area is described below:

- Mixed Estuary - characterized by the absence of a vertical halocline (gradual or no marked increase in salinity in the water column) and a gradual increase in salinity seaward. Typically this type of estuary is shallow and is found in major freshwater sheetflow areas. Being well mixed, the sampling locations are not critical in this type of estuary.

- Salt Wedge Estuary - characterized by a sharp vertical increase in salinity and stratified freshwater flow along the surface. In these estuaries, the vertical mixing forces cannot override the density differential between fresh and saline waters. In effect, a salt wedge tapering inland moves horizontally, back and forth, with the tidal phase. If contamination is being introduced into the estuary from upstream, water sampling from the salt wedge may miss it entirely.

- Oceanic Estuary - characterized by salinities approaching full-strength oceanic waters. Seasonally, freshwater inflow is small with the preponderance of the fresh-saline water mixing occurring near, or at, the shore line.

Sampling in estuarine areas is normally based upon the tidal phases, with samples collected on successive slack tides (i.e., when the tide turns). Estuarine sampling programs shall include vertical salinity measurements at 1- to 5-foot increments, coupled with vertical dissolved oxygen and temperature profiles.

5.3.4 Surface Water Sampling Equipment

The selection of sampling equipment depends on the site conditions and sample type to be acquired. The most frequently used samplers are:

- Open tube.
- Dip sampler.
- Weighted bottle.
- Hand pump.
- Kemmerer.
- Depth-Integrating Sampler.

The dip sampler and the weighted bottle sampler are used most often, and detailed discussions for these devices only (and the Kemmerer sampler) are addressed subsequently in this section.

The criteria for selecting a sampler include:

1. Disposability and/or easy decontamination.
2. Inexpensive cost (if the item is to be disposed).
3. Ease of operation.
4. Nonreactive/noncontaminating properties - Teflon-coated, glass, stainless-steel or PVC sample chambers are preferred (in that order).

As specified above, each sample (grab or each aliquot collected for compositing) shall be measured for but not limited to:

- Specific conductance.
- Temperature.
- pH.
- Dissolved oxygen (optional).

Sample measurements shall be conducted as soon as the sample is acquired. Measurement techniques described in SOP SA-1.1 shall be followed. All pertinent data and results shall be recorded in a field

notebook or on sample logsheets (see Attachment A). These analyses will provide information on water mixing/stratification and potential contamination.

Dip Sampling

Water is often sampled by filling a container either attached to a pole or held directly, from just beneath the surface of the water (a dip or grab sample). Constituents measured in grab samples are only indicative of conditions near the surface of the water and may not be a true representation of the total concentration that is distributed throughout the water column and in the cross section. Therefore, whenever possible, it is recommended to augment dip samples with samples that represent both dissolved and suspended constituents and both vertical and horizontal distributions.

Weighted Bottle Sampling

A grab sample can also be taken using a weighted holder that allows a bottle to be lowered to any desired depth, opened for filling, closed, and returned to the surface. This allows discrete sampling with depth. Several of these samples can be combined to provide a vertical composite. Alternatively, an open bottle can be lowered to the bottom and raised to the surface at a uniform rate so that the bottle collects sample throughout the total depth and is just filled on reaching the surface. The resulting sample using either method will roughly approach what is known as a depth-integrated sample.

A closed weighted bottle sampler consists of a stopped glass or plastic bottle, a weight and/or holding device, and lines to open the stopper and lower or raise the bottle. The procedure for sampling with this device is:

- Gently lower the sampler to the desired depth so as not to remove the stopper prematurely (watch for bubbles).
- Pull out the stopper with a sharp jerk of the stopper line.
- Allow the bottle to fill completely, as evidenced by the absence of air bubbles.
- Raise the sampler and cap the bottle.
- Decontaminate the outside of the bottle. This bottle can be used as the sample container as long as the bottle is an approved container type.

Kemmerer

If samples are desired at a specific depth, and the parameters to be measured do not require a Teflon coated sampler, a standard Kemmerer sampler may be used. The Kemmerer sampler is a brass, stainless-steel or acrylic cylinder, with rubber stoppers that leave the ends open while being lowered in a vertical position (thus allowing free passage of water through the cylinder). A "messenger" is sent down the line when the sampler is at the designated depth, to cause the stoppers to close the cylinder, which is then raised. Water is removed through a valve to fill sample bottles.

5.3.5 Surface Water Sampling Techniques

Most samples taken during site investigations are grab samples. Typically, surface water sampling involves immersing the sample container in the body of water; however, the following suggestions are made to help ensure that the samples obtained are representative of site conditions:

- The most representative samples are obtained from mid-channel at a 0.6 foot stream depth in a well-mixed stream.
- Even though the containers used to obtain the samples are previously laboratory cleaned, it is suggested that the sample container be rinsed at least once with the water to be sampled before the sample is taken. This is not applicable when sample containers are provided "pre-preserved."
- For sampling moving water, it is suggested that the farthest downstream sample be obtained first, and that subsequent samples be taken as one works upstream. In general, work from zones suspected of low contamination to zones of high contamination.
- To sample a pond or other standing body of water, the surface area may be divided into grids. A series of samples taken from each grid node is combined into one sample, or several grid nodes are selected at random.
- Care should be taken to avoid excessive agitation of the water, as loss of volatile constituents could result.
- When obtaining samples in 40 mL septum vials for volatile organics analysis, it is important to exclude any air space in the top of the bottle and to be sure that the Teflon liner of the septum faces in after the vial is filled and capped. The vial can be turned upside down to check for air bubbles.
- Do not sample at the surface, unless sampling specifically for a known constituent which is immiscible and on top of the water. Instead, the sample container should be inverted, lowered to the approximate depth, and held at about a 45-degree angle with the mouth of the bottle facing upstream. When sample containers are provided "pre-preserved," use a dedicated, clean, un-preserved bottle for sampling and transfer to an appropriately-preserved container.

5.4 Onsite Water Quality Testing

Onsite water quality testing shall be conducted as described in SOP SA-1.1.

5.5 Sediment Sampling

5.5.1 General

Sediment samples are usually collected at the same verticals at which water samples were collected. If only one sediment sample is to be collected, the sampling location shall be approximately at the center of the water body.

Generally, the coarser grained sediments are deposited near the headwaters of the reservoir. Bed sediments near the center of a water body will be composed of fine-grained materials which may, because of their lower porosity and greater surface area available for adsorption, contain greater concentrations of contaminants. The shape, flow pattern, bathometry (i.e., depth distribution), and water circulation patterns must all be considered when selecting sediment sampling sites. In streams, areas likely to have sediment accumulation (e.g., bends, behind islands or boulders, quiet shallow areas or very deep, low-velocity areas) shall be sampled while areas likely to show net erosion (i.e., high-velocity, turbulent areas) and suspension of fine solid materials, shall be avoided.

Chemical constituents associated with bottom material may reflect an integration of chemical and biological processes. Bottom samples reflect the historical input to streams, lakes, and estuaries with respect to time, application of chemicals, and land use. Bottom sediments (especially fine-grained material) may act as a sink or reservoir for adsorbed heavy metals and organic contaminants (even if

water column concentrations are below detection limits). Therefore, it is important to minimize the loss of low-density "fines" during any sampling process.

All relevant information pertaining to sediment sampling shall be documented as applicably described in SOP SA-6.3 and Attachment B.

5.5.2 Sampling Equipment and Techniques

A bottom-material sample may consist of a single scoop or core, or may be a composite of several individual samples in the cross section. Sediment samples may be obtained using onshore or offshore techniques.

The following health and safety provisions apply when working on/over/near water.

Size of Work Team:

1) Never less than 2 persons [who are wearing USCG approved Personal Flotation Devices (PFDs)]

2) A minimum of 3 persons if *any* of the following conditions are anticipated or observed:

- Depth is greater than 3 feet
- Involves a waterway that is turbulent *or* swift
- The underwater walking surface (e.g., stream/river bed) is suspected or observed to involve conditions that increase the potential for a worker to fall into the water. Examples would include large/uneven rocks or boulders, dense mud or sediment that could entrap worker's feet, etc.)
- Waterway is tidal, and conditions such as those listed above could change

The third person in the above condition must be equipped and prepared to render emergency support [e.g., lifeline, tethered PFD (life saver), skiff, means to contact external emergency response support, etc.]

The following samplers may be used to collect bottom materials:

- Scoop sampler.
- Dredge samplers.

Each type of sampler is discussed subsequently.

Scoop Sampler

A scoop sampler consists of a pole to which a jar or scoop is attached. The pole may be made of bamboo, wood, PVC, or aluminum and be either telescoping or of fixed length. The scoop or jar at the end of the pole is usually attached using a clamp.

If the water body can be sampled from the shore or if it can be waded, the easiest and best way to collect a sediment sample is to use a scoop sampler. This reduces the potential for cross-contamination. This method is accomplished by reaching over or wading into the water body and, while facing upstream (into the current), scooping the sampler along the bottom in an upstream direction. It is very difficult not to disturb fine-grained materials of the sediment-water interface when using this method.

Dredges

Dredges are generally used to sample sediments which cannot easily be obtained using coring devices (i.e., coarse-grained or partially-cemented materials) or when large quantities of sample are required. Dredges generally consist of a clam shell arrangement of two buckets. The buckets may either close upon impact or be activated by use of a "messenger". Some dredges are heavy and may require use of a winch and crane assembly for sample retrieval. There are three major types of dredges: Peterson, Eckman and Ponar dredges.

The Peterson dredge is used when the bottom is rocky, in very deep water, or when the flow velocity is high. The Peterson dredge shall be lowered very slowly as it approaches bottom, because it can force out and miss lighter materials if allowed to drop freely.

The Eckman dredge has only limited usefulness. It performs well where bottom material is unusually soft, as when covered with organic sludge or light mud. It is unsuitable, however, for sandy, rocky, and hard bottoms and is too light for use in streams with high flow velocities.

The Ponar dredge is a Peterson dredge modified by the addition of side plates and a screen on the top of the sample compartment. The screen over the sample compartment permits water to pass through the sampler as it descends thus reducing the "shock wave". The Ponar dredge is easily operated by one person in the same fashion as the Peterson dredge. The Ponar dredge is one of the most effective samplers for general use on all types of substrates.

6.0 REFERENCES

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U.S. EPA, 1980. Standard Operating Procedures and Quality Assurance Manual. Water Surveillance Branch, USEPA Surveillance and Analytical Division, Athens, Georgia.

U.S. Geological Survey, 1977. National Handbook of Recommended Methods for Water-Data Acquisition. Office of Water Data Coordination, USGS, Reston, Virginia.

ATTACHMENT A
SURFACE WATER SAMPLE LOG SHEET

Tetra Tech NUS, Inc. **SURFACE WATER SAMPLE LOG SHEET**

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date:								
Time:								
Depth:								
Method:								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES | **MAP**

Circle If Applicable

MS/MSD	Duplicate ID No.:	Signature(s):

ATTACHMENT B
SOIL & SEDIMENT SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date:	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

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1.0 PURPOSE

Decontamination is the process of removing and/or neutralizing site contaminants that have contacted and/or accumulated on equipment. The objective/purpose of this SOP is intended to protect site personnel, general public, and the sample integrity through the prevention of cross contamination onto unaffected persons or areas. It is further intended through this procedure to provide guidelines regarding the appropriate procedures to be followed when decontaminating drilling equipment, monitoring well materials, chemical sampling equipment and field analytical equipment.

2.0 SCOPE

This procedure applies to all equipment including drilling equipment, heavy equipment, monitoring well materials, as well as chemical sampling and field analytical equipment decontamination that may be used to provide access/acquire environmental samples. Where technologically and economically feasible, single use sealed disposable equipment will be employed to minimize the potential for cross contamination. This procedure also provides general reference information on the control of contaminated materials.

3.0 GLOSSARY

Acid - For decontamination of equipment when sampling for trace levels of inorganics, a 10% solution of nitric acid in deionized water should be used. Due to the leaching ability of nitric acid, it should not be used on stainless steel.

Alconox/Liquinox - A brand of phosphate-free laboratory-grade detergent.

Decontamination Solution - Is a solution selected/identified within the Health and Safety Plan or Project-Specific Quality Assurance Plan. The solution is selected and employed as directed by the project chemist/health and safety professional.

Deionized Water (DI) - Deionized water is tap water that has been treated by passing through a standard deionizing resin column. This water may also pass through additional filtering media to attain various levels of analyte-free status. The DI water should meet CAP and NCCLS specifications for reagent grade, Type I water.

Potable Water - Tap water used from any municipal water treatment system. Use of an untreated potable water supply is not an acceptable substitute for tap water.

Pressure Washing - Employs high pressure pumps and nozzle configuration to create a high pressure spray of potable water. High pressure spray is employed to remove solids.

Solvent - The solvent of choice is pesticide-grade Isopropanol. Use of other solvents (methanol, acetone, pesticide-grade hexane, or petroleum ether) may be required for particular projects or for a particular purpose (e.g. for the removal of concentrated waste) and must be justified in the project planning documents. As an example, it may be necessary to use hexane when analyzing for trace levels of pesticides, PCBs, or fuels. In addition, because many of these solvents are not miscible in water, the equipment should be air dried prior to use. Solvents should not be used on PVC equipment or well construction materials.

Steam Pressure Washing - This method employs a high pressure spray of heated potable water. This method through the application of heat provides for the removal of various organic/inorganic compounds.

4.0 RESPONSIBILITIES

Project Manager - Responsible for ensuring that all field activities are conducted in accordance with approved project plan(s) requirements.

Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved Standards Operating Procedures or as otherwise dictated by the approved project plan(s).

Site Health and Safety Officer (SHSO) - The SHSO exercises shared responsibility with the FOL concerning decontamination effectiveness. All equipment arriving on-site (as part of the equipment inspection), leaving the site, moving between locations are required to go through a decontamination evaluation. This is accomplished through visual examination and/or instrument screening to determine the effectiveness of the decontamination process. Failure to meet these objectives are sufficient to restrict equipment from entering the site/exiting the site/ or moving to a new location on the site until the objectives are successfully completed.

5.0 PROCEDURES

The process of decontamination is accomplished through the removal of contaminants, neutralization of contaminants, or the isolation of contaminants. In order to accomplish this activity a level of preparation is required. This includes site preparation, equipment selection, and evaluation of the process. Site contaminant types, concentrations, media types, are primary drivers in the selection of the types of decontamination as well as where it will be conducted. For purposes of this SOP discussion will be provided concerning general environmental investigation procedures.

The decontamination processes are typically employed at:

- Temporary Decontamination Pads/Facilities
- Sample Locations
- Centralized Decontamination Pad/Facilities
- Combination of some or all of the above

The following discussion represents recommended site preparation in support of the decontamination process.

5.1 Decontamination Design/Constructions Considerations

5.1.1 Temporary Decontamination Pads

Temporary decontamination pads are constructed at satellite locations in support of temporary work sites. These structures are generally constructed to support the decontamination of heavy equipment such as drill rigs and earth moving equipment but can be employed for smaller articles.

The purpose of the decontamination pad is to contain wash waters and potentially contaminated soils generated during decontamination procedures. Therefore, construction of these pads should take into account the following considerations

- Site Location – The site selected should be within a reasonable distance from the work site but should avoid:

  - Pedestrian/Vehicle thoroughfares
  - Areas where control/custody cannot be maintained
  - Areas where a potential releases may be compounded through access to storm water transport systems, streams or other potentially sensitive areas.
  - Areas potentially contaminated.

- Pad – The pad should be constructed to provide the following characteristics

  - Size – The size of the pad should be sufficient to accept the equipment to be decontaminated as well as permitting free movement around the equipment by the personnel conducting the decontamination.

  - Slope – An adequate slope will be constructed to permit the collection of the water and potentially contaminated soils within a trough or sump constructed at one end. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks.

  - Sidewalls – The sidewalls should be a minimum of 6-inches in height to provide adequate containment for wash waters and soils. If splash represents a potential problem, splash guards should be constructed to control overspray. Sidewalls maybe constructed of wood, inflatables, sand bags, etc. to permit containment.

  - Liner – Depending on the types of equipment and the decontamination method the liner should be of sufficient thickness to provide a puncture resistant barrier between the decontamination operation and the unprotected environment. Care should be taken to examine the surface area prior to placing the liner to remove sharp articles (sticks, stones, debris) that could puncture the liner. Liners are intended to form an impermeable barrier. The thickness may vary from a minimum recommended thickness of 10 mil to 30 mil. Achieving the desired thickness maybe achieved through layering lighter constructed materials. It should be noted that various materials (rubber, polyethylene sheeting) become slippery when wet. To minimize this potential hazard associated with a sloped liner a light coating of sand maybe applied to provide traction as necessary.

  - Wash/drying Racks – Auger flights, drill/drive rods require racks positioned off of the ground to permit these articles to be washed, drained, and dried while secured from falling during this process. A minimum ground clearance of 2-feet is recommended.

  - Maintenance – The work area should be periodically cleared of standing water, soils, and debris. This action will aid in eliminating slip, trip, and fall hazards. In addition, these articles will reduce potential backsplash and cross contamination. Hoses should be gathered when not in use to eliminate potential tripping hazards.

~~5.1.2~~ Decontamination Activities at Drill Rigs/DPT Units

~~During subsurface sampling activities including drilling and direct push activities decontamination of drive rods, Macro Core Samplers, split spoons, etc. are typically conducted at an area adjacent to the operation. Decontamination is generally accomplished using a soap/water wash and rinse utilizing buckets and brushes. This area requires sufficient preparation to accomplish the decontamination objectives.~~

Buckets shall be placed within mortar tubs or similar secondary containment tubs to prevent splash and spills from reaching unprotected media. Drying racks will be employed as directed for temporary pads to permit parts to dry and be evaluated prior to use/re-use.

5.1.3 Decontamination Activities at Remote Sample Locations

When sampling at remote locations sampling devices such as trowels, pumps/tubing should be evacuated of potentially contaminated media to the extent possible. This equipment should be wrapped in plastic for transport to the temporary/centralized decontamination location for final cleaning and disposition.

5.2 Equipment Decontamination Procedures

The following represents procedures to be employed for the decontamination of equipment that may have contacted and/or accumulated contamination through site investigation activities.

5.2.1 Monitoring Well Sampling Equipment

5.2.1.1 Groundwater sampling pumps – This includes pumps inserted into the monitoring well such as Bladder pumps, Whale pumps, Redi-Flo, reusable bailers, etc.

1) Evacuate to the extent possible, any purge water within the pump.

2) Scrub using soap and water and/or steam clean the outside of the pump and tubing, where applicable.

3) Insert the pump and tubing into a clean container of soapy water. Pump a sufficient amount of soapy water through the pump to flush any residual purge water. Once flushed, circulate soapy water through the pump to ensure the internal components are thoroughly flushed.

4) Remove the pump and tubing from the container, rinse external components using tap water. Insert the pump and tubing into a clean container of tap water. Pump a sufficient amount of tap water through the pump to evacuate all of the soapy water (until clear).

5) Rinse equipment with pesticide grade isopropanol

6) Repeat item #4 using deionized water through the hose to flush out the tap water and solvent residue as applicable*.

7) Drain residual deionized water to the extent possible, allow components to air dry.

8) Wrap pump in aluminum foil or a clear clean plastic bag for storage.

5.2.1.2 Electronic Water Level Indicators/Sounders/Tapes

During water level measurements, rinsing with the extracted tape and probe with deionized water and wiping the surface of the extracted tape is acceptable. However, periodic full decontamination should be conducted as indicated below.

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* - The solvent should be employed when samples contain oil, grease, PAHs, PCBs, and other hard to remove materials. If these are not of primary concern, the solvent step may be omitted. In addition, do not rinse PE, PVC, and associated tubing with solvents.

1) Wash with soap and water
2) Rinse with tap water
3) Rinse with deionized water

Note: In situations where oil, grease, free product, other hard to remove materials are encountered probes and exposed tapes should be washed in hot soapy water.

5.2.1.3 Miscellaneous Equipment

Miscellaneous equipment including analytical equipment (water quality testing equipment) should be cleaned per manufacturer's instructions. This generally includes wiping down the sensor housing and rinsing with tap and deionized water.

Coolers/Shipping Containers employed to ship samples are received from the lab in a variety of conditions from marginal to extremely poor. Coolers should be evaluated prior to use for

- Structural integrity – Coolers missing handles or having breaks within the outer housing should be removed and not used. Notify the laboratory that the risk of shipping samples will not be attempted and request a replacement unit.

- Cleanliness – As per protocol only volatile organic samples are accompanied by a trip blank. If a cooler's cleanliness is in question (visibly dirty/stained) or associated with noticeable odors it should be decontaminated prior to use.

  1) Wash with soap and water
  2) Rinse with tap water
  3) Dry

If these measures fail to clean the cooler to an acceptable level, remove the unit from use as a shipping container and notify the laboratory to provide a replacement unit.

5.2.2 Down-Hole Drilling Equipment

This includes any portion of the drill rig that is over the borehole including auger flights, drill stems, rods, and associated tooling that would extend over the borehole. This procedure is to be employed prior to initiating the drilling/sampling activity, then between locations.

1) Remove all soils to the extent possible using shovels, scrapers, etc. to remove loose soils.
2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.
3) Rinse with tap water.
4) Rinse equipment with pesticide grade isopropanol
5) To the extent possible allow components to air dry.
6) Wrap or cover equipment in clear plastic until it is time to be used.

5.2.3 Soil/Sediment Sampling Equipment

This consists of soil sampling equipment including but not limited to hand augers, stainless steel trowels/spoons, bowls, dredges, scoops, split spoons, Macro Core samplers, etc.

1) Remove all soils to the extent possible.

2) Through a combination of scrubbing using soap and water and/or steam cleaning remove visible dirt/soils.

3) Rinse with tap water.

4) Rinse equipment with pesticide grade isopropanol

5) Rinse with deionized water

6) To the extent possible allow components to air dry.

7) If the device is to be used immediately, screen with a PID/FID to insure all solvents (if they were used) and trace contaminants have been adequately removed.

8) Once these devices have been dried wrap in aluminum foil for storage until it is time to be used.

5.3 Contact Waste/Materials

During the course of field investigations disposable/single use equipment becomes contaminated. These items include tubing, trowels, PPE (gloves, overboots, splash suits, etc.) broken sample containers.

With the exception of the broken glass, single use articles should be cleaned (washed and rinsed) of visible materials and disposed of as normal refuse. The exception to this rule is that extremely soiled materials that cannot be cleaned should be containerized for disposal in accordance with applicable federal state and local regulations.

5.3.1 Decontamination Solutions

All waste decontamination solutions and rinses must be assumed to contain the hazardous chemicals associated with the site unless there are analytical or other data to the contrary. The waste solution volumes could vary from a few gallons to several hundred gallons in cases where large equipment required cleaning.

Containerized waste rinse solutions are best stored in 55-gallon drums (or equivalent containers) that can be sealed until ultimate disposal at an approved facility. These containers must be appropriately labeled.

5.4 Decontamination Evaluation

Determining the effectiveness of the decontamination process will be accomplished in the following manner

- Visual Evaluation – A visual evaluation will be conducted to insure the removal of particulate matter. This will be done to insure that the washing/rinsing process is working as intended.

- Instrument Screening – A PID and/or an FID should be used to evaluate the presence of the contaminants or solvents used in the cleaning process. The air intake of the instrument should be passed over the article to be evaluated. A positive detection requires a repeat the decontamination process. It should be noted that the instrument scan is only viable if the contaminants are detectable within the instruments capabilities.

- Rinsate Blanks – It is recommended that Rinsate samples be collected to
  - Evaluate the decontamination procedure representing different equipment applications (pumps versus drilling equipment) and different decontamination applications.
  - Single use disposable equipment – The number of samples should represent different types of equipment as well as different Lot Numbers of single use articles.

The collection and the frequency of collection of rinsate samples are as follows:

- Per decontamination method
- Per disposable article/Batch number of disposable articles

It is recommended that an initial rinsate sample be collected early in the project to ensure that the decontamination process is functioning properly and in an effort to avoid using a contaminated batch of single use articles. It is recommended that a follow up sample be collected during the execution of the project to insure those conditions do not change. Lastly, rinsate samples collection may be driven by types of and/or contaminant levels. Hard to remove contaminants, oils/greases, some PAHs/PCBs, etc. may also support the collection of additional rinsates due to the obvious challenges to the decontamination process. This is a field consideration to be determined by the FOL.

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to identify and designate the field data record forms, logs and reports generally initiated and maintained for documenting Tetra Tech NUS field activities.

2.0 SCOPE

Documents presented within this procedure (or equivalents) shall be used for all Tetra Tech NUS field activities, as applicable. Other or additional documents may be required by specific client contracts or project planning documents.

3.0 GLOSSARY

None

4.0 RESPONSIBILITIES

Project Manager (PM) - The Project Manager is responsible for obtaining hardbound, controlled-distribution logbooks (from the appropriate source), as needed. In addition, the Project Manager is responsible for placing all field documentation used in site activities (i.e., records, field reports, sample data sheets, field notebooks, and the site logbook) in the project's central file upon the completion of field work.

Field Operations Leader (FOL) - The Field Operations Leader is responsible for ensuring that the site logbook, notebooks, and all appropriate and current forms and field reports illustrated in this guideline (and any additional forms required by the contract) are correctly used, accurately filled out, and completed in the required time-frame.

5.0 PROCEDURES

5.1 Site Logbook

5.1.1 General

The site logbook is a hard-bound, paginated, controlled-distribution record book in which all major onsite activities are documented. At a minimum, the following activities/events shall be recorded or referenced (daily) in the site logbook:

- All field personnel present
- Arrival/departure of site visitors
- Time and date of H&S training
- Arrival/departure of equipment
- Time and date of equipment calibration
- Start and/or completion of borehole, trench, monitoring well installation, etc.
- Daily onsite activities performed each day
- Sample pickup information
- Health and Safety issues (level of protection observed, etc.)
- Weather conditions

A site logbook shall be maintained for each project. The site logbook shall be initiated at the start of the first onsite activity (e.g., site visit or initial reconnaissance survey). Entries are to be made for every day

that onsite activities take place which involve Tetra Tech NUS or subcontractor personnel. Upon completion of the fieldwork, the site logbook must become part of the project's central file.

The following information must be recorded on the cover of each site logbook:

- Project name
- Tetra Tech NUS project number
- Sequential book number
- Start date
- End date

Information recorded daily in the site logbook need not be duplicated in other field notebooks (see Section 5.2), but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). An example of a typical site logbook entry is shown in Attachment A.

If measurements are made at any location, the measurements and equipment used must either be recorded in the site logbook or reference must be made to the field notebook in which the measurements are recorded (see Attachment A).

All logbook, notebook, and log sheet entries shall be made in indelible ink (black pen is preferred). No erasures are permitted. If an incorrect entry is made, the entry shall be crossed out with a single strike mark, and initialed and dated. At the completion of entries by any individual, the logbook pages used must be signed and dated. The site logbook must also be signed by the Field Operations Leader at the end of each day.

5.1.2 Photographs

When movies, slides, or photographs are taken of a site or any monitoring location, they must be numbered sequentially to correspond to logbook/notebook entries. The name of the photographer, date, time, site location, site description, and weather conditions must be entered in the logbook/notebook as the photographs are taken. A series entry may be used for rapid-sequence photographs. The photographer is not required to record the aperture settings and shutter speeds for photographs taken within the normal automatic exposure range. However, special lenses, films, filters, and other image-enhancement techniques must be noted in the logbook/notebook. If possible, such techniques shall be avoided, since they can adversely affect the accuracy of photographs. Chain-of-custody procedures depend upon the subject matter, type of camera (digital or film), and the processing it requires. Film used for aerial photography, confidential information, or criminal investigation require chain-of-custody procedures. Once processed, the slides of photographic prints shall be consecutively numbered and labeled according to the logbook/notebook descriptions. The site photographs and associated negatives and/or digitally saved images to compact disks must be docketed into the project's central file.

5.2 Field Notebooks

Key field team personnel may maintain a separate dedicated field notebook to document the pertinent field activities conducted directly under their supervision. For example, on large projects with multiple investigative sites and varying operating conditions, the Health and Safety Officer may elect to maintain a separate field notebook. Where several drill rigs are in operation simultaneously, each site geologist assigned to oversee a rig must maintain a field notebook.

5.3 Field Forms

All Tetra Tech NUS field forms (see list in Section 6.0 of this SOP) can be found on the company's intranet site (http://intranet.ttnus.com) under Field Log Sheets. Forms may be altered or revised for project-specific needs contingent upon client approval. Care must be taken to ensure that all essential information can be documented. Guidelines for completing these forms can be found in the related sampling SOP.

5.3.1 Sample Collection, Labeling, Shipment, Request for Analysis, and Field Test Results

5.3.1.1 Sample Log Sheet

Sample Log Sheets are used to record specified types of data while sampling. The data recorded on these sheets are useful in describing the sample as well as pointing out any problems, difficulties, or irregularities encountered during sampling. A log sheet must be completed for each sample obtained, including field quality control (QC) samples.

5.3.1.2 Sample Label

A typical sample label is illustrated in Attachment B. Adhesive labels must be completed and applied to every sample container. Sample labels can usually be obtained from the appropriate Program source electronically generated in-house, or are supplied from the laboratory subcontractor.

5.3.1.3 Chain-of-Custody Record Form

The Chain-of-Custody (COC) Record is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as they are transferred from person to person. This form must be used for any samples collected for chemical or geotechnical analysis whether the analyses are performed on site or off site. One carbonless copy of the completed COC form is retained by the field crew, one copy is sent to the Project Manager (or designee), while the original is sent to the laboratory. The original (top, signed copy) of the COC form shall be placed inside a large Ziploc-type bag and taped inside the lid of the shipping cooler. If multiple coolers are sent but are included on one COC form, the COC form should be sent with the cooler containing vials for VOC analysis or the cooler with the air bill attached. The air bill should then state how many coolers are included with that shipment. An example of a Chain-of-Custody Record form is provided as Attachment C. Once the samples are received at the laboratory, the sample cooler and contents are checked and any problems are noted on the enclosed COC form (any discrepancies between the sample labels and COC form and any other problems that are noted are resolved through communication between the laboratory point-of-contact and the Tetra Tech NUS Project Manager). The COC form is signed and copied. The laboratory will retain the copy while the original becomes part of the samples' corresponding analytical data package.

5.3.1.4 Chain-of-Custody Seal

Attachment D is an example of a custody seal. The Custody seal is an adhesive-backed label. It is part of a chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transport to the laboratory. The COC seals are signed and dated by the sampler(s) and affixed across the lid and body of each cooler (front and back) containing environmental samples (see SOP SA-6.1). COC seals may be available from the laboratory; these seals may also be purchased from a supplier.

5.3.1.5 Geochemical Parameters Log Sheets

Field Analytical Log Sheets are used to record geochemical and/or natural attenuation field test results.

5.3.2 Hydrogeological and Geotechnical Forms

5.3.2.1 Groundwater Level Measurement Sheet

A Groundwater Level Measurement Sheet must be filled out for each round of water level measurements made at a site.

5.3.2.2 Data Sheet for Pumping Test

During the performance of a pumping test (or an in-situ hydraulic conductivity test), a large amount of data must be recorded, often within a short time period. The Pumping Test Data Sheet facilitates this task by standardizing the data collection format for the pumping well and observation wells, and allowing the time interval for collection to be laid out in advance.

5.3.2.3 Packer Test Report Form

A Packer Test Report Form must be completed for each well upon which a packer test is conducted.

5.3.2.4 Boring Log

During the progress of each boring, a log of the materials encountered, operation and driving of casing, and location of samples must be kept. The Summary Log of Boring, or Boring Log is used for this purpose and must be completed for each soil boring performed. In addition, if volatile organics are monitored on cores, samples, cuttings from the borehole, or breathing zone, (using a PID or FID), these readings must be entered on the boring log at the appropriate depth. The "Remarks" column can be used to subsequently enter the laboratory sample number, the concentration of key analytical results, or other pertinent information. This feature allows direct comparison of contaminant concentrations with soil characteristics.

5.3.2.5 Monitoring Well Construction Details Form

A Monitoring Well Construction Details Form must be completed for every monitoring well, piezometer, or temporary well point installed. This form contains specific information on length and type of well riser pipe and screen, backfill, filter pack, annular seal and grout characteristics, and surface seal characteristics. This information is important in evaluating the performance of the monitoring well, particularly in areas where water levels show temporal variation, or where there are multiple (immiscible) phases of contaminants. Depending on the type of monitoring well (in overburden or bedrock, stick-up or flush mount), different forms are used.

5.3.2.6 Test Pit Log

When a test pit or trench is constructed for investigative or sampling purposes, a Test Pit Log must be filled out by the responsible field geologist or sampling technician.

~~5.3.2.7 Miscellaneous Monitoring Well Forms~~

~~Monitoring Well Materials Certificate of Conformance should be used as the project directs to document all materials utilized during each monitoring well installation.~~

~~The Monitoring Well Development Record should be used as the project directs to document all well development activities.~~

5.3.2.8 Miscellaneous Field Forms - QA and Checklists

Container Sample and Inspection Sheet should be used as the project directs each time a container (drum, tank, etc.) is sampled and/or inspected.

QA Sample Log Sheet should be used at the project directs each time a QA sample is colleted, such as Rinsate Blank, Source Blank, etc.

Field Task Modification Request (FTMR) will be prepared for all deviations from the project planning documents. The FOL is responsible for initiating the FTMRs. Copies of all FTMRs will be maintained with the onsite planning documents and originals will be placed in the final evidence file.

The Field Project Daily Activities Check List and Field Project Pre-Mobilization Checklist should be used during both the planning and field effort to assure that all necessary tasks are planned for and completed. These two forms are not a requirement but a useful tool for most field work.

5.3.3 Equipment Calibration and Maintenance Form

The calibration or standardization of monitoring, measuring or test equipment is necessary to assure the proper operation and response of the equipment, to document the accuracy, precision or sensitivity of the measurement, and determine if correction should be applied to the readings. Some items of equipment require frequent calibration, others infrequent. Some are calibrated by the manufacturer, others by the user.

Each instrument requiring calibration has its own Equipment Calibration Log which documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device. An Equipment Calibration Log must be maintained for each electronic measuring device used in the field; entries must be made for each day the equipment is used or in accordance with the manufacturer's recommendations.

5.4 Field Reports

The primary means of recording onsite activities is the site logbook. Other field notebooks may also be maintained. These logbooks and notebooks (and supporting forms) contain detailed information required for data interpretation or documentation, but are not easily useful for tracking and reporting of progress. Furthermore, the field logbook/notebooks remain onsite for extended periods of time and are thus not accessible for timely review by project management.

5.4.1 Daily Activities Report

To provide timely oversight of onsite contractors, Daily Activities Reports are completed and submitted as described below.

5.4.1.1 Description

The Daily Activities Report (DAR) documents the activities and progress for each day's field work. This report must be filled out on a daily basis whenever there are drilling, test pitting, well construction, or other related activities occurring which involve subcontractor personnel. These sheets summarize the work performed and form the basis of payment to subcontractors. The DAR form can be found on the TtNUS intranet site.

5.4.1.2 Responsibilities

It is the responsibility of the rig geologist to complete the DAR and obtain the driller's signature acknowledging that the times and quantities of material entered are correct.

5.4.1.3 Submittal and Approval

At the end of the shift, the rig geologist must submit the Daily Activities Report to the Field Operations Leader (FOL) for review and filing. The Daily Activities Report is not a formal report and thus requires no further approval. The DAR reports are retained by the FOL for use in preparing the site logbook and in preparing weekly status reports for submission to the Project Manager.

5.4.2 Weekly Status Reports

To facilitate timely review by project management, photocopies of logbook/notebook entries may be made for internal use.

It should be noted that in addition to summaries described herein, other summary reports may also be contractually required.

All Tetra Tech NUS field forms can be found on the company's intranet site at http://intranet.ttnus.com under Field Log Sheets.

6.0 LISTING OF TETRA TECH NUS FIELD FORMS FOUND ON THE TTNUS INTRANET SITE. HTTP://INTRANET.TTNUS.COM CLICK ON FIELD LOG SHEETS

Groundwater Sample Log Sheet
Surface Water Sample Log Sheet
Soil/Sediment Sample Log Sheet
Container Sample and Inspection Sheet
Geochemical Parameters (Natural Attenuation)
Groundwater Level Measurement Sheet
Pumping Test Data Sheet
Packer Test Report Form
Boring Log
Monitoring Well Construction Bedrock Flush Mount
Monitoring Well Construction Bedrock Open Hole
Monitoring Well Construction Bedrock Stick Up
Monitoring Well Construction Confining Layer
Monitoring Well Construction Overburden Flush Mount
Monitoring Well Construction Overburden Stick Up
Test Pit Log
Monitoring Well Materials Certificate of Conformance
Monitoring Well Development Record

Daily Activities Record
Field Task Modification Request
Hydraulic Conductivity Test Data Sheet
Low Flow Purge Data Sheet
QA Sample Log Sheet
Equipment Calibration Log
Field Project Daily Activities Checklist
Field Project Pre-Mobilization Checklist

ATTACHMENT A
TYPICAL SITE LOGBOOK ENTRY

START TIME: _____ DATE: _____

SITE LEADER: _____

PERSONNEL:

TtNUS	DRILLER	SITE VISITORS
_____	_____	_____
_____	_____	_____
_____	_____	_____

WEATHER: Clear, 68EF, 2-5 mph wind from SE

ACTIVITIES:

1. Steam jenney and fire hoses were set up.
2. Drilling activities at well ____ resumes. Rig geologist was _____. See Geologist's Notebook, No. 1, page 29-30, for details of drilling activity. Sample No. 123-21-S4 collected; see sample logbook, page 42. Drilling activities completed at 11:50 and a 4-inch stainless steel well installed. See Geologist's Notebook, No. 1, page 31, and well construction details for well _____.
3. Drilling rig No. 2 steam-cleaned at decontamination pit. Then set up at location of well _____.
4. Well _____ drilled. Rig geologist was _____. See Geologist's Notebook, No. 2, page ____ for details of drilling activities. Sample numbers 123-22-S1, 123-22-S2, and 123-22-S3 collected; see sample logbook, pages 43, 44, and 45.
5. Well _____ was developed. Seven 55-gallon drums were filled in the flushing stage. The well was then pumped using the pitcher pump for 1 hour. At the end of the hour, water pumped from well was "sand free."
6. EPA remedial project manger arrives on site at 14:25 hours.
7. Large dump truck arrives at 14:45 and is steam-cleaned. Backhoe and dump truck set up over test pit _____.
8. Test pit _____ dug with cuttings placed in dump truck. Rig geologist was _____. See Geologist's Notebook, No. 1, page 32, for details of test pit activities. Test pit subsequently filled. No samples taken for chemical analysis. Due to shallow groundwater table, filling in of test pit ___ resulted in a very soft and wet area. A mound was developed and the area roped off.
9. Express carrier picked up samples (see Sample Logbook, pages 42 through 45) at 17:50 hours. Site activities terminated at 18:22 hours. All personnel off site, gate locked.

_____

Field Operations Leader

ATTACHMENT B

Tetra Tech NUS, Inc. 661 Andersen Drive Pittsburgh, 15220 (412)921-7090	**Project:** **Site:** **Location:**	
Sample No:		**Matrix:**
Date:	**Time:**	**Preserve:**
Analysis:		
Sampled by:	**Laboratory:**	

ATTACHMENT C

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 3413 | PAGE ___ OF ___

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		CARRIER/WAYBILL NUMBER		CITY, STATE

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)
PRESERVATIVE USED
TYPE OF ANALYSIS

DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS									COMMENTS

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

ATTACHMENT D

CHAIN-OF-CUSTODY SEAL

CUSTODY SEAL	**CUSTODY SEAL**
Date	**Date**
Signature	**Signature**

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide information on sample preservation, packaging, and shipping procedures to be used in handling environmental samples submitted for chemical constituent, biological, or geotechnical analysis. Sample chain-of-custody procedures and other aspects of field documentation are addressed in SOP SA-6.3. Sample identification is addressed in SOP CT-04.

2.0 SCOPE

This procedure describes the appropriate containers to be used for samples depending on the analyses to be performed, and the steps necessary to preserve the samples when shipped off site for chemical analysis.

3.0 GLOSSARY

Hazardous Material - A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. Under 49 CFR, the term includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials, as well as materials designated as hazardous under the provisions of ∋172.101 and ∋172.102 and materials that meet the defining criteria for hazard classes and divisions in Part 173. With slight modifications, IATA has adopted DOT "hazardous materials" as IATA "Dangerous Goods."

Hazardous Waste - Any substance listed in 40 CFR, Subpart D (∋261.30 et seq.), or otherwise characterized as ignitable, corrosive, reactive, or toxic (as defined by Toxicity Characteristic Leaching Procedure, TCLP, analysis) as specified under 40 CFR, Subpart C (∋261.20 et seq.), that would be subject to manifest requirements specified in 40 CFR 262. Such substances are defined and regulated by EPA.

Marking - A descriptive name, identification number, instructions, cautions, weight, specification or UN marks, or combination thereof required on outer packaging of hazardous materials.

n.o.i - Not otherwise indicated (may be used interchangeably with n.o.s.).

n.o.s. - Not otherwise specified.

Packaging - A receptacle and any other components or materials necessary for compliance with the minimum packaging requirements of 49 CFR 174, including containers (other than freight containers or overpacks), portable tanks, cargo tanks, tank cars, and multi-unit tank-car tanks to perform a containment function in conformance with the minimum packaging requirements of 49 CFR 173.24(a) & (b).

Placard - Color-coded, pictorial sign which depicts the hazard class symbol and name and which is placed on the side of a vehicle transporting certain hazardous materials.

Common Preservatives:

- Hydrochloric Acid - HCl
- Sulfuric Acid - H_2SO_4
- Nitric Acid - HNO_3
- Sodium Hydroxide - NaOH

Other Preservatives

- Zinc Acetate
- Sodium Thiosulfate - $Na_2S_2O_3$

Normality (N) - Concentration of a solution expressed as equivalent per liter, an equivalent being the amount of a substance containing 1 gram-atom of replaceable hydrogen or its equivalent.

Reportable Quantity (RQ) - For the purposes of this SOP, means the quantity specified in column 3 of the Appendix to DOT 49 CFR ›172.101 for any material identified in column 1 of the appendix. A spill greater than the amount specified must be reported to the National Response Center.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the location and time of collection.

4.0 RESPONSIBILITIES

Field Operations Leader - Directly responsible for the bottling, preservation, labeling, packaging, shipping, and custody of samples up to and including release to the shipper.

Field Samplers - Responsible for initiating the Chain-of-Custody Record (per SOP SA-6.3), implementing the packaging and shipping requirements, and maintaining custody of samples until they are relinquished to another custodian or to the shipper.

5.0 PROCEDURES

Sample identification, labeling, documentation, and chain-of-custody are addressed by SOP SA-6.3.

5.1 Sample Containers

Different types of chemicals react differently with sample containers made of various materials. For example, trace metals adsorb more strongly to glass than to plastic, whereas many organic chemicals may dissolve various types of plastic containers. Attachments A and B show proper containers (as well as other information) per 40 CFR 136. In general, the sample container shall allow approximately 5-10 percent air space ("ullage") to allow for expansion/vaporization if the sample warms during transport. However, for collection of volatile organic compounds, head space shall be omitted. The analytical laboratory will generally provide certified-clean containers for samples to be analyzed for chemical constituents. Shelby tubes or other sample containers are generally provided by the driller for samples requiring geotechnical analysis. Sufficient lead time shall be allowed for a delivery of sample container orders. Therefore, it is critical to use the correct container to maintain the integrity of the sample prior to analysis.

Once opened, the container must be used at once for storage of a particular sample. Unused but opened containers are to be considered contaminated and must be discarded. Because of the potential for introduction of contamination, they cannot be reclosed and saved for later use. Likewise, any unused containers which appear contaminated upon receipt, or which are found to have loose caps or a missing Teflon liner (if required for the container), shall be discarded.

5.2 Sample Preservation

Many water and soil samples are unstable and therefore require preservation to prevent changes in either the concentration or the physical condition of the constituent(s) requiring analysis. Although complete and irreversible preservation of samples is not possible, preservation does retard the chemical and biological

changes that inevitably take place after the sample is collected. Preservation techniques are usually limited to pH control, chemical addition(s), and refrigeration/ freezing (certain biological samples only).

5.2.1 Overview

The preservation techniques to be used for various analytes are listed in Attachments A and B. Reagents required for sample preservation will either be added to the sample containers by the laboratory prior to their shipment to the field or be added in the field (in a clean environment). Only high purity reagents shall be used for preservation. In general, aqueous samples of low-concentration organics (or soil samples of low- or medium-concentration organics) are cooled to 4EC. Medium-concentration aqueous samples, high-hazard organic samples, and some gas samples are typically not preserved. Low-concentration aqueous samples for metals are acidified with HNO_3, whereas medium-concentration and high-hazard aqueous metal samples are not preserved. Low- or medium-concentration soil samples for metals are cooled to 4EC, whereas high-hazard samples are not cooled.

The following subsections describe the procedures for preparing and adding chemical preservatives. Attachments A and B indicate the specific analytes which require these preservatives.

The FOL is responsible for ensuring that an accurate Chemical Inventory is created and maintained for all hazardous chemicals brought to the work site (see Section 5 of the TtNUS Health and Safety Guidance Manual). Furthermore, the FOL must ensure that a corresponding Material Safety Data Sheet (MSDS) is collected for every substance entered on the site Chemical Inventory, and that all persons using/handling/ disposing of these substances review the appropriate MSDS for substances they will work with. The Chemical Inventory and the MSDSs must be maintained at each work site in a location and manner where they are readily-accessible to all personnel.

5.2.2 Preparation and Addition of Reagents

Addition of the following acids or bases may be specified for sample preservation; these reagents shall be analytical reagent (AR) grade or purer and shall be diluted to the required concentration with deionized water before field sampling commences. To avoid uncontrolled reactions, be sure to Add Acid to water (not vice versa). A dilutions guide is provided below.

Acid/Base	Dilution	Concentration	Estimated Amount Required for Preservation
Hydrochloric Acid (HCl)	1 part concentrated HCl: 1 part double-distilled, deionized water	6N	5-10 mL
Sulfuric Acid (H_2SO_4)	1 part concentrated H_2SO_4: 1 part double-distilled, deionized water	18N	2 - 5 mL
Nitric Acid (HNO_3)	Undiluted concentrated HNO_3	16N	2 - 5 mL
Sodium Hydroxide (NaOH)	400 grams solid NaOH dissolved in 870 mL double-distilled, deionized water; yields 1 liter of solution	10N	2 mL

The amounts required for preservation shown in the above table assumes proper preparation of the preservative and addition of the preservative to one liter of aqueous sample. This assumes that the sample is initially at pH 7, is poorly buffered, and does not contain particulate matter; as these conditions vary, more preservative may be required. Consequently, the final sample pH must be checked using narrow-range pH paper, as described in the generalized procedure detailed below:

- Pour off 5-10 mL of sample into a dedicated, clean container. Use some of this sample to check the initial sample pH using wide range (0-14) pH paper. Never dip the pH paper into the sample; always apply a drop of sample to the pH paper using a clean stirring rod or pipette.

- Add about one-half of the estimated preservative required to the original sample bottle. Cap and invert gently several times to mix. Check pH (as described above) using medium range pH paper (pH 0-6 or pH 7.5-14, as applicable).

- Cap sample bottle and seal securely.

Additional considerations are discussed below:

- To test if ascorbic acid must be used to remove oxidizing agents present in the sample before it can be properly preserved, place a drop of sample on KI-starch paper. A blue color indicates the need for ascorbic acid addition.

  If required, add a few crystals of ascorbic acid to the sample and retest with the KI-starch paper. Repeat until a drop of sample produces no color on the KI-starch paper. Then add an additional 0.6 grams of ascorbic acid per each liter of sample volume.

  Continue with proper base preservation of the sample as described above.

- Samples for sulfide analysis must be treated by the addition of 4 drops (0.2 mL) of 2N zinc acetate solution per 100 ml of sample.

  The 2N zinc acetate solution is made by dissolving 220 grams of zinc acetate in 870 mL of double-distilled, deionized water to make 1 liter of solution.

  The sample pH is then raised to 9 using the NaOH preservative.

- Sodium thiosulfate must be added to remove residual chlorine from a sample. To test the sample for residual chlorine use a field test kit specially made for this purpose.

  If residual chlorine is present, add 0.08 grams of sodium thiosulfate per liter of sample to remove the residual chlorine.

  Continue with proper acidification of the sample as described above.

For biological samples, 10% buffered formalin or isopropanol may also be required for preservation. Questions regarding preservation requirements should be resolved through communication with the laboratory <u>before</u> sampling begins.

5.3 Field Filtration

At times, field-filtration may be required to provide for the analysis of dissolved chemical constituents. Field-filtration must be performed <u>prior to</u> the preservation of samples as described above. General procedures for field filtration are described below:

- The sample shall be filtered through a non-metallic, 0.45-micron membrane filter, immediately after collection. The filtration system shall consist of dedicated filter canister, dedicated tubing, and a peristaltic pump with pressure or vacuum pumping squeeze action (since the sample is filtered by mechanical peristalsis, the sample travels only through the tubing).

- To perform filtration, thread the tubing through the peristaltic pump head. Attach the filter canister to the discharge end of the silicon tubing (note flow direction arrow); attach the aqueous sample container to the intake end of the silicon tubing. Turn the peristaltic pump on and perform filtration. Run approximately 100 ml of sample through the filter and discard prior to sample collection.

- Continue by preserving the filtrate (contained in the filter canister), as applicable and generally described above.

5.4 Sample Packaging and Shipping

Only employees who have successfully completed the TtNUS "Shipping Hazardous Materials" training course are authorized to package and ship hazardous substances. These trained individuals are responsible for performing shipping duties in accordance with this training.

Samples collected for shipment from a site shall be classified as either environmental or hazardous material samples. Samples from drums containing materials other than Investigative Derived Waste (IDW) and samples obtained from waste piles or bulk storage tanks are generally shipped as hazardous materials. A distinction must be made between the two types of samples in order to:

- Determine appropriate procedures for transportation of samples (if there is any doubt, a sample shall be considered hazardous and shipped accordingly.)

- Protect the health and safety of transport and laboratory personnel receiving the samples (special precautions are used by the shipper and at laboratories when hazardous materials are received.)

Detailed procedures for packaging environmental samples are outlined in the remainder of this section.

5.4.1 Environmental Samples

Environmental samples are packaged as follows:

- Place properly identified sample container, with lid securely fastened, in a plastic bag (e.g. Ziploc baggie), and seal the bag.

- Place sample in a cooler constructed of sturdy material which has been lined with a large, plastic bag (e.g. "garbage" bag). Drain plugs on coolers must be taped shut.

- Pack with enough cushioning materials such as bubble wrap (shoulders of bottles must be iced if required) to minimize the possibility of the container breaking.

- If cooling is required (see Attachments A and B), place ice around sample container shoulders, and on top of packing material (minimum of 8 pounds of ice for a medium-size cooler).

- Seal (i.e., tape or tie top in knot) large liner bag.

- The original (top, signed copy) of the COC form shall be placed inside a large Ziploc-type bag and taped inside the lid of the shipping cooler. If multiple coolers are sent but are included on one COC form, the COC form should be sent with the cooler containing the vials for VOC analysis. The COC form should then state how many coolers are included with that shipment.

- Close and seal outside of cooler as described in SOP SA-6.3. Signed custody seals must be used.

Coolers must be marked as containing "Environmental Samples." The appropriate side of the container must be marked "This End Up" and arrows placed appropriately. No DOT marking or labeling is required; there are no DOT restrictions on mode of transportation.

6.0 REFERENCES

American Public Health Association, 1981. Standard Methods for the Examination of Water and Wastewater, 15th Edition. APHA, Washington, D.C.

International Air Transport Association (latest issue). Dangerous Goods Regulations, Montreal, Quebec, Canada.

U.S. Department of Transportation (latest issue). Hazardous Materials Regulations, 49 CFR 171-177.

U.S. EPA, 1984. "Guidelines Establishing Test Procedures for the Analysis of Pollutants under Clean Water Act." Federal Register, Volume 49 (209), October 26, 1984, p. 43234.

U.S. EPA, 1979. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020, U.S. EPA-EMSL, Cincinnati, Ohio.

ATTACHMENT A

GENERAL SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS

Sample Type and Concentration			Container[1]	Sample Size	Preservation[2]	Holding Time[2]
WATER						
Organics (GC&GC/MS)	VOC	Low	Borosilicate glass	2 x 40 mL	Cool to 4EC HCl to # 2	14 days[9]
	Extractables SVOCs and pesticide/PCBs)	(Low	Amber glass	2x2 L or 4x1 L	Cool to 4EC	7 days to extraction; 40 days after extraction
	Extractables SVOCs and pesticide/PCBs)	(Medium	Amber glass	2x2 L or 4x1 L	None	7 days to extraction; 40 days after extraction
Inorganics	Metals	Low	High-density polyethylene	1 L	HNO_3 to pH #2	6 months (Hg-28 days)
		Medium	Wide-mouth glass	16 oz.	None	6 months
	Cyanide	Low	High-density polyethylene	1 L	NaOH to pH>12	14 days
	Cyanide	Medium	Wide-mouth glass	16 oz.	None	14 days
Organic/ Inorganic	High Hazard		Wide-mouth glass	8 oz.	None	14 days
SOIL						
Organics (GC&GC/MS)	VOC		EnCore Sampler	(3) 5 g Samplers	Cool to 4EC	48 hours to lab preservation
	Extractables SVOCs and pesticides/PCBs)	(Low	Wide-mouth glass	8 oz.	Cool to 4EC	14 days to extraction; 40 days after extraction
	Extractables SVOCs and pesticides/PCBs)	(Medium	Wide-mouth glass	8 oz.	Cool to 4EC	14 days to extraction; 40 days after extraction
Inorganics	Low/Medium		Wide-mouth glass	8 oz.	Cool to 4EC	6 months (Hg - 28 days) Cyanide (14 days)
Organic/Inorganic	High Hazard		Wide-mouth glass	8 oz.	None	NA
Dioxin/Furan	All		Wide-mouth glass	4 oz.	None	35 days until extraction; 40 days after extraction
TCLP	All		Wide-mouth glass	8 oz.	None	7 days until preparation; analysis as per fraction
AIR						
Volatile Organics	Low/Medium		Charcoal tube -- 7 cm long, 6 mm OD, 4 mm ID	100 L air	Cool to 4EC	5 days recommended

1 All glass containers should have Teflon cap liners or septa.
2 See Attachment E. Preservation and maximum holding time allowances per 40 CFR 136.

ATTACHMENT B

ADDITIONAL REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter Number/Name	Container[1]	Preservation[2][3]	Maximum Holding Time[4]
INORGANIC TESTS:			
Acidity	P, G	Cool, 4EC	14 days
Alkalinity	P, G	Cool, 4EC	14 days
Ammonia - Nitrogen	P, G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Biochemical Oxygen Demand (BOD)	P, G	Cool, 4EC	48 hours
Bromide	P, G	None required	28 days
Chemical Oxygen Demand (COD)	P, G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Chloride	P, G	None required	28 days
Chlorine, Total Residual	P, G	None required	Analyze immediately
Color	P, G	Cool, 4EC	48 hours
Cyanide, Total and Amenable to Chlorination	P, G	Cool, 4EC; NaOH to pH 12; 0.6 g ascorbic acid[5]	14 days[6]
Fluoride	P	None required	28 days
Hardness	P, G	HNO_3 to pH 2; H_2SO_4 to pH 2	6 months
Total Kjeldahl and Organic Nitrogen	P, G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Nitrate - Nitrogen	P, G	None required	48 hours
Nitrate-Nitrite - Nitrogen	P, G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Nitrite - Nitrogen	P, G	Cool, 4EC	48 hours
Oil & Grease	G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Total Organic Carbon (TOC)	P, G	Cool, 4EC; HCl or H_2SO_4 to pH 2	28 days
Orthophosphate	P, G	Filter immediately; Cool, 4EC	48 hours
Oxygen, Dissolved-Probe	G Bottle & top	None required	Analyze immediately
Oxygen, Dissolved-Winkler	G Bottle & top	Fix on site and store in dark	8 hours
Phenols	G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Phosphorus, Total	P, G	Cool, 4EC; H_2SO_4 to pH 2	28 days
Residue, Total	P, G	Cool, 4EC	7 days
Residue, Filterable (TDS)	P, G	Cool, 4EC	7 days
Residue, Nonfilterable (TSS)	P, G	Cool, 4EC	7 days
Residue, Settleable	P, G	Cool, 4EC	48 hours
Residue, Volatile (Ash Content)	P, G	Cool, 4EC	7 days
Silica	P	Cool, 4EC	28 days
Specific Conductance	P, G	Cool, 4EC	28 days
Sulfate	P, G	Cool, 4EC	28 days

ATTACHMENT B
ADDITIONAL REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES
PAGE TWO

Parameter Number/Name	Container[1]	Preservation[2][3]	Maximum Holding Time[4]
INORGANIC TESTS (Cont'd):			
Sulfide	P, G	Cool, 4EC; add zinc acetate plus sodium hydroxide to pH 9	7 days
Sulfite	P, G	None required	Analyze immediately
Turbidity	P, G	Cool, 4EC	48 hours
METALS:[7]			
Chromium VI (Hexachrome)	P, G	Cool, 4EC	24 hours
Mercury (Hg)	P, G	HNO_3 to pH 2	28 days
Metals, except Chromium VI and Mercury	P, G	HNO_3 to pH 2	6 months
ORGANIC TESTS:[8]			
Purgeable Halocarbons	G, Teflon-lined septum	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]	14 days
Purgeable Aromatic Hydrocarbons	G, Teflon-lined septum	Cool, 4EC; 0.008% $Na_2S_2O_3$[5] HCl to pH 2 [9]	14 days
Acrolein and Acrylonitrile	G, Teflon-lined septum	Cool, 4EC; 0.008% $Na_2S_2O_3$[5] adjust pH to 4-5 [10]	14 days
Phenols[11]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]	7 days until extraction; 40 days after extraction
Benzidines[11],[12]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]	7 days until extraction[13]
Phthalate esters[11]	G, Teflon-lined cap	Cool, 4EC	7 days until extraction; 40 days after extraction
Nitrosamines[11],[14]	G, Teflon-lined cap	Cool, 4EC; store in dark; 0.008% $Na_2S_2O_3$[5]	7 days until extraction; 40 days after extraction
PCBs[11]	G, Teflon-lined cap	Cool, 4EC	7 days until extraction; 40 days after extraction
Nitroaromatics & Isophorone[11]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]; store in dark	7 days until extraction; 40 days after extraction
Polynuclear Aromatic Hydrocarbons (PAHs)[11],[14]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]; store in dark	7 days until extraction; 40 days after extraction
Haloethers[11]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]	7 days until extraction; 40 days after extraction
Dioxin/Furan (TCDD/TCDF)[11]	G, Teflon-lined cap	Cool, 4EC; 0.008% $Na_2S_2O_3$[5]	7 days until extraction; 40 days after extraction

ATTACHMENT B
ADDITIONAL REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES
PAGE THREE

(1) Polyethylene (P): generally 500 ml or Glass (G): generally 1L.
(2) Sample preservation should be performed immediately upon sample collection. For composite chemical samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4EC until compositing and sample splitting is completed.
(3) When any sample is to be shipped by common carrier or sent through the United States Mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172).
(4) Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer periods, and has received a variance from the Regional Administrator.
(5) Should only be used in the presence of residual chlorine.
(6) Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before pH adjustments are made to determine if sulfide is present. If sulfide is present, it can be removed by the addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.
(7) Samples should be filtered immediately on site before adding preservative for dissolved metals.
(8) Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.
(9) Sample receiving no pH adjustment must be analyzed within 7 days of sampling.
(10) The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.
(11) When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to 4EC, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for 7 days before extraction and for 40 days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re: the requirement for thiosulfate reduction of residual chlorine) and footnotes 12, 13 (re: the analysis of benzidine).
(12) If 1,2-diphenylthydrazine is likely to be present, adjust the pH of the sample to 4.0∀0.2 to prevent rearrangement to benzidine.
(13) Extracts may be stored up to 7 days before analysis if storage is conducted under an inert (oxidant-free) atmosphere.
(14) For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.
(15) The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

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1.0 PURPOSE

The purpose of this document is to specify a consistent sample nomenclature system that will facilitate subsequent data management in a cost-effective manner. The sample nomenclature system has been devised such that the following objectives can be attained:

- Sorting of data by matrix.
- Sorting of data by depth.
- Maintenance of consistency (field, laboratory, and data base sample numbers).
- Accommodation of all project-specific requirements.
- Accommodation of laboratory sample number length constraints (maximum of 20 characters).

2.0 SCOPE

The methods described in this procedure shall be used consistently for all projects requiring electronic data.

3.0 GLOSSARY

None.

4.0 RESPONSIBILITIES

Program Manager - It shall be the responsibility of the Program Manager (or designee) to inform contract-specific Project Managers of the existence and requirements of this Standard Operating Procedure.

Project Manager - It shall be the responsibility of the Project Manager to determine the applicability of this Standard Operating Procedure based on: (1) program-specific requirements, and (2) project size and objectives. It shall be the responsibility of the Project Manager (or designee) to ensure that the sample nomenclature is thoroughly specified in the relevant project planning document (e.g., sampling and analysis plan) and is consistent with this Standard Operating Procedure if relevant. It shall be the responsibility of the project manager to ensure that the Field Operations Leader is familiar with the sample nomenclature system.

Field Operations Leader - It shall be the responsibility of the Field Operations Leader to ensure that all field technicians or sampling personnel are thoroughly familiar with this Standard Operating Procedure and the project-specific sample nomenclature system. It shall be the responsibility of the Field Operations Leader to ensure that the sample nomenclature system is used during all project-specific sampling efforts.

5.0 PROCEDURES

5.1 Introduction

The sample identification (ID) system can consist of as few as 8 but not more than 20 distinct alpha-numeric characters. The sample ID will be provided to the laboratory on the sample labels and chain-of-custody forms. The basic sample ID provided to the lab has three segments and shall be as follows where "A" indicates "alpha," and "N" indicates "numeric":

A or N 3- or 4-Characters	AAA 2- or 3-Characters	A or N 3- to 6-Characters
Site Identifier	Sample Type	Sample Location

Additional segments may be added as needed. For example:

(1) Soil and Sediment Sample ID

A or N 3- or 4-Characters	AAA 2- or 3-Characters	A or N 3- to 6-Characters	NNNN 4-Characters
Site Identifier	Sample Type	Sample Location	Sample Depth

(2) Aqueous (groundwater or surface water) Sample ID

A or N 3- or 4-Characters	AAA 2- or 3-Characters	A or N 3- to 6-Characters	NN 2-Characters	-A
Site Identifier	Sample type	Sample Location	Round Number	Filtered Sample only

(3) Biota Sample ID

A or N 3- or 4-Characters	AAA 2- or 3-Characters	A or N 3- to 6-Characters	AA 2-Characters	NNN 3-Characters
Site Identifier	Sample Type	Sample Location	Species Identifier	Sample Group Number

5.2 Sample Identification Field Requirements

The various fields in the sample ID will include but are not limited to the following:

- Site Identifier
- Sample Type
- Sample Location
- Sample Depth
- Sampling Round Number
- Filtered
- Species Identifier
- Sample Group Number

The site identifier must be a three- or four-character field (numeric characters, alpha characters, or a mixture of alpha and numeric characters may be used). A site number is necessary since many facilities/sites have multiple individual sites, SWMUs, operable units, etc. Several examples are presented in Section 5.3 of this SOP.

The sample type must be a two- or three-character alpha field. Suggested codes are provided in Section 5.3 of this SOP.

The sample location must be at least a three-character field but may have up to six-characters (alpha, numeric, or a mixture). The six-characters may be useful in identifying a monitoring well to be sampled or describing a grid location.

The sample depth field is used to note the depth below ground surface (bgs) at which a soil or sediment sample is collected. The first two numbers of the four-number code specify the top interval, and the third and fourth specify the bottom interval in feet bgs of the sample. If the sample depth is equal to or greater than 100, then only the top interval would be represented and the sampling depth would be truncated to

three-characters. The depths will be noted in whole numbers only; further detail, if needed, will be recorded on the sample log sheet, boring log, logbook, etc.

A two-digit round number will be used to track the number of aqueous samples taken from a particular aqueous sample location. The first sample collected from a location will be assigned the round identifier 01, the second 02, etc. This applies to both existing and proposed monitoring wells and surface water locations.

Aqueous samples that are field filtered (dissolved analysis) will be identified with an "-F" in the last field segment. No entry in this segment signifies an unfiltered (total) sample.

The species identifier must be a two-character alpha field. Several suggested codes are provided in Section 5.3 of this SOP.

The three digit sample group number will be used to track the number of biota sample groups (a particular group size may be determined by sample technique, media type, the number of individual caught, weight issues, time, etc.) by species and location. The first sample group of a particular species collected from a given location will be assigned the sample group number 001 and the second sample group of the same species collected from the same location will be assigned the sample group number 002.

5.3 Example Sample Field Designations

Examples of each of the fields are as follows:

Site Identifier - Examples of site numbers/designations are as follows:

A01 - Area of Concern Number 1
125 - Solid Waste Management Unit Number 125
000 - Base or Facility Wide Sample (e.g., upgradient well)
BBG - Base Background

The examples cited are only suggestions. Each Project Manager (or designee) must designate appropriate (and consistent) site designations for their individual project.

Sample Type - Examples of sample types are as follows:

AH - Ash Sample
AS - Air Sample
BM - Building Material Sample
BSB - Biota Sample Full Body
BSF - Biota Sample Fillet
CP - Composite Sample
CS - Chip Sample
DS - Drum Sample
DU - Dust Sample
FP - Free Product
IDW - Investigation Derived Waste Sample
LT - Leachate Sample
MW - Monitoring Well Groundwater Sample
OF - Outfall Sample
RW - Residential Well Sample
SB - Soil Boring Sample
SD - Sediment Sample
SC - Scrape Sample

SG - Soil Gas Sample
SL - Sludge Sample
SP - Seep Sample
SS - Surface Soil Sample
ST - Storm Sewer Water Sample
SW - Surface Water Sample
TP - Test Pit Sample
TW - Temporary Well Sample
WC - Well Construction Material Sample
WP - Wipe Sample
WS - Waste/Solid Sample
WW - Wastewater Sample

Sample Location - Examples of the location field are as follows:

001 - Monitoring Well 1
N32E92 - Grid location 32 North and 92 East
D096 - Investigation derived waste drum number 96

Species Identifier - Examples of species identifier are as follows:

BC - Blue Crab
GB - Blue Gill
CO - Corn
SB - Soybean

5.4 Examples of Sample Nomenclature

The first round monitoring well groundwater sample collected from existing monitoring well 001 at SWMU 16 for a filtered sample would be designated as 016MW00101-F.

The second round monitoring well groundwater sample collected from existing monitoring well C20P2 at Site 23 for an unfiltered sample would be designated as 023MWC20P202.

The second surface water sample collected from point 01 at SWMU 130 for an unfiltered sample would be designated as 130SW00102.

A surface soil sample collected from grid location 32 North and 92 East at Site 32 at the 0- to 2-foot interval would be designated as 032SSN32E920002.

A subsurface soil sample from soil boring 03 at SWMU 32 at an interval of 4 to 5 feet bgs would be designated as 032SB0030405.

A sediment sample collected at SWMU 19 from 0 to 6 inches at location 14 would be designated as 019SD0140001. The sample data sheet would reflect the precise depth at which this sample was collected.

During biota sampling for full body analysis the first time a minnow trap was checked at grid location A25 of SWMU 1415 three small blue gills were captured, collected and designated with the sample ID of 1415BSBA25BG001. The second time blue gill were collected at the same location (grid location A25 at SWMU 1415) the sample ID designation given was 1415BSBA25BG002.

Note: No dash (-) or spacing is used between the segments with the exception of the filtered segment. The "F" used for a filtered aqueous sample is preceded by a dash "-F".

5.5 Field Quality Assurance/Quality Control (QA/QC) Sample Nomenclature)

Field QA/QC will be designated using a different coding system. The QC code will consist of a three- to four-segment alpha-numeric code that identifies the sample QC type, the date the sample was collected, and the number of this type of QC sample collected on that date.

AA	NNNNNN	NN	-F
QC Type	Date	Sequence Number (per day)	Filtered (aqueous only, if needed)

The QC types are identified as:

TB = Trip Blank
RB = Rinsate Blank (Equipment Blank)
FD = Field Duplicate
AB = Ambient Conditions Blank
WB = Source Water Blank

The sampling time recorded on the Chain-of-Custody Form, labels, and tags for duplicate samples will be 0000 so that the samples are "blind" to the laboratory. Notes detailing the sample number, time, date, and type will be recorded on the routine sample log sheets and will document the location of the duplicate sample (sample log sheets are not provided to the laboratory). Documentation for all other QC types (TB, RB, AB, and WB) will be recorded on the QC Sample Log sheet (see SOP on Field Documentation).

5.6 Examples of Field QA/QC Sample Nomenclature

The first duplicate of the day for a filtered ground water sample collected on June 3, 2000 would be designated as FD06030001-F.

The third duplicate of the day taken of a subsurface soil sample collected on November 17, 2003 would be designated as FD11170303.

The first trip blank associated with samples collected on October 12, 2000 would be designated as TB10120001.

The only rinsate blank collected on November 17, 2001 would be designated as RB11170101.

6.0 DEVIATIONS

Any deviation from this SOP must be addressed in detail in the site specific planning documents.

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1.0 PURPOSE

The purpose of this document is to specify a consistent procedure for the quality assurance review of electronic and hard copy databases. This SOP outlines the requirements for establishment of a Database Record File, Quality Assurance review procedures, and documentation of the Quality Assurance Review Process.

2.0 SCOPE

The methods described in this Standard Operating Procedure (SOP) shall be used consistently for all projects managed by Tetra Tech NUS (TtNUS).

3.0 GLOSSARY

Chain-of-Custody Form - A Chain-of-Custody Form is a printed form that accompanies a sample or a group of samples from the time of sample collection to the laboratory. The Chain-of-Custody Form is retained with the samples during transfer of samples from one custodian to another. The Chain-of-Custody Form is a controlled document that becomes part of the permanent project file. Chain-of-Custody and field documentation requirements are addressed in SOP SA-6.1.

Electronic Database - A database provided on a compact laser disk (CD). Such electronic databases will generally be prepared using public domain software such as DBase, RBase, Oracle, Visual FoxPro, Microsoft Access, Paradox, etc.

Hardcopy Database - A printed copy of a database prepared using the software discussed under the definition of an electronic database.

Form I - A printed copy of the analytical results for each sample.

Sample Tracking Summary - A printed record of sample information including the date the samples were collected, the number of samples collected, the sample matrix, the laboratory to which the samples were shipped, the associated analytical requirements for the samples, the date the analytical data were received from the laboratory, and the date that validation of the sample data was completed.

4.0 RESPONSIBILITIES

Database Records Custodian - It shall be the responsibility of the Database Records Custodian to update and file the Sample Tracking Summaries for all active projects on a weekly basis. It shall be the responsibility of the Database Records Custodian to ensure that the most recent copies of the Sample Tracking Summaries are placed in the Database Records file. It shall be the responsibility of the Database Records Custodian to ensure that a copy of all validation deliverables is provided to the Project Manager (for placement in the project file). It shall be the responsibility of the Database Records Custodian to ensure that photocopies of all validation deliverables and historical data and reports (as applicable) are placed in the Database Records file.

Data Validation Coordinator - It shall be the responsibility of the Data Validation Coordinator (or designee) to ensure that the Sample Tracking Summaries are maintained by the Database Records Custodian. It shall be the responsibility of the Data Validation Coordinator (or designee) to ensure that photocopies of all data validation deliverables are placed in the applicable Database Records file by the Database Records Custodian.

Earth Sciences Department Manager - It shall be the responsibility of the Earth Sciences Department Manager (or equivalent) to ensure that all field personnel are familiar with the requirements of this Standard Operating Procedure (specifically Section 5.5).

FOL - It shall be the responsibility of the FOL (FOL) of each project to ensure that all field technicians or sampling personnel are thoroughly familiar with this SOP, specifically regarding provision of the Chain-of-Custody Forms to the Database Records Custodian. Other responsibilities of the FOL are described in Sections 5.4 and 5.5.

Management Information Systems (MIS) Manager - It shall be the responsibility of the MIS Manager to ensure that copies of original electronic deliverables (CDs) are placed in both the project files and the Database Records File. It shall be the responsibility of the MIS Manager (or designee) to verify the completeness of the database (presence of all samples) in both electronic and hardcopy form in the Database Records File. It shall be the responsibility of the MIS Manager to ensure that Quality Assurance Reviews are completed and are attested to by Quality Assurance Reviewers. It shall be the responsibility of the MIS Manager to ensure that records of the Quality Assurance review process are placed in the Database Records File. It shall be the responsibility of the MIS Manager to ensure that both electronic and hardcopy forms of the final database are placed in both the project and the Database Record File. It shall be the responsibility of the MIS Manager to ensure that data validation qualifiers are entered in the database.

Furthermore, it shall be the responsibility of the MIS Manager to participate in project planning at the request of the Project Manager, specifically with respect to the generation of level of effort and schedule estimates. To support the project planning effort, the MIS Manager shall provide a copy of the MIS Request From included as Attachment A to the project manager. It shall be the responsibility of the MIS Manager to generate level of effort and budget estimates at the time database support is requested if a budget does not exist at the time of the request. The MIS Request Form shall be provided to the Project Manager at the time of any such requests. It shall be the responsibility of the MIS Manager to notify the Project Manager of any anticipated level of effort overruns or schedule noncompliances as soon as such problems arise along with full justification for any deviations from the budget estimates (provided they were generated by the MIS Manager). It shall be the responsibility of the MIS Manager to document any changes to the scope of work dictated by the Project Manager, along with an estimate of the impact of the change on the level of effort and the schedule.

Program/Department Managers - It shall be the responsibility of the Department and/or Program Managers (or designees) to inform their respective department's Project Managers of the existence and requirements of this SOP.

Project Manager - It shall be the responsibility of each Project Manager to determine the applicability of this SOP based on: (1) program-specific requirements, and (2) project size and objectives. It shall be the responsibility of the Project Manager (or designee) to ensure that the FOL is familiar with the requirements regarding Chain-of-Custody Form provision to the Database Records Custodian. It shall be the responsibility of the Project Manager (or designee) to determine which, if any, historical data are relevant and to ensure that such data (including all relevant information such as originating entity, sample locations, sampling dates, etc.) are provided to the Database Records Custodian for inclusion in the Database Records File. It shall be the responsibility of the Project Manager to obtain project planning input regarding the level of effort and schedule from the MIS Manager. It shall be the responsibility of the Project Manager to complete the database checklist (Attachment A) to support the level of effort and schedule estimate and to facilitate database preparation and subroutine execution.

Risk Assessment Department Manager - It shall be the responsibility of the Risk Assessment Department Manager to monitor compliance with this Standard Operating Procedure, to modify this SOP as necessary, and to take corrective action if necessary. Monitoring of the process shall be completed on a quarterly basis.

Quality Assurance Reviewers - It shall be the responsibility of the Quality Assurance Reviewers to verify the completeness of the sample results via review of the Chain-of-Custody Forms and Sample Tracking Summaries. It shall be the responsibility of the Quality Assurance Reviewers to ensure the correctness of the database via direct comparison of the hardcopy printout of the database and the hardcopy summaries of the original analytical data (e.g., Form Is provided in data validation deliverables). Correctness includes the presence of all relevant sample information (all sample information fields), agreement of the laboratory and database analytical results, and the presence of data validation qualifiers.

Quality Manager - It shall be the responsibility of the Quality Manager to monitor compliance with this Standard Operating Procedure via routine audits.

5.0 PROCEDURES

5.1 Introduction

Verification of the accuracy and completeness of an electronic database can only be accomplished via comparison of a hardcopy of the database with hardcopy of all relevant sample information. The primary purposes of this SOP are to ensure that 1) all necessary hardcopy information is readily available to Quality Assurance Reviewers; 2) ensure that the Quality Assurance review is completed in a consistent and comprehensive manner, and; 3) ensure that documentation of the Quality Assurance review process is maintained in the project file.

5.2 File Establishment

A Database Record file shall be established for a specific project at the discretion of the Project Manager. Initiation of the filing procedure will commence upon receipt of the first set of Chain-of-Custody documents from a FOL or sampling technician. The Database Record Custodian shall establish a project-specific file for placement in the Database Record File. Each file in the Database Record File shall consist of standard components placed in the file as the project progresses. Each file shall be clearly labeled with the project number, which shall be placed on the front of the file drawer and on each and every hanging file folder relevant to the project. The following constitute the minimum components of a completed file:

- Electronic Deliverables
- Sample Tracking Forms
- Chain-of-Custody Forms
- Data Validation Letters
- Quality Assurance Records

5.3 Electronic Deliverables

The format of electronic deliverables shall be specified in the laboratory procurement specification and shall be provided by the laboratory. The integrity of all original electronic data deliverables shall be maintained. This shall be accomplished via the generation of copies of each electronic deliverable provided by the laboratory. The original electronic deliverable shall be provided to the project manager for inclusion in the project file. A copy of the original electronic deliverable shall be placed in the Database Record File. The second copy shall be maintained by the MIS Manager (or designee) to be used as a working copy.

5.4 Sample Tracking Forms

Updated versions of the sample tracking form for each relevant project shall be maintained by the Database Record Custodian. The Sample Tracking Forms shall be updated any time additional Chain-of-Custody Forms are received from a FOL or sampling technician, or at any time that data are received from a laboratory, or at any time that validation of a given data package (sample delivery group) is completed. The Data Validation Coordinator shall inform the Database Record Custodian of the receipt of any data packages from the laboratory and of completion of validation of a given data package to facilitate updating of the Sample Tracking Form. The Database Record Custodian shall place a revised copy of the Sample Tracking Form in the Database Record File anytime it has been updated. Copies of the updated Sample Tracking Form shall also be provided to the project manager to apprise the project manager of sample package receipt, completion of validation, etc.

5.5 Chain-of-Custody Forms

The Chain-of-Custody Forms for all sampling efforts will be used as the basis for (1) updating the Sample Tracking Form, and (2) confirming that all required samples and associated analyses have been completed. It shall be the responsibility of the FOL (or sample technician) to provide a photocopy of all Chain-of-Custody Forms to the Database Record Custodian immediately upon completion of a sampling effort. The Database Record Custodian shall then place the copies of the Chain-of-Custody Form(s) in the Database Record File. Upon receipt of a sample data package from an analytical laboratory, the Data Validation Coordinator shall provide a copy of the laboratory Chain-of-Custody Form to the Database Record Custodian. The Database Record Custodian shall use this copy to update the Sample Tracking Summary and shall place the copy of the laboratory-provided Chain-of-Custody Form in the Database Record File. The photocopy of the laboratory-provided Chain-of Custody Form shall be stapled to the previously filed field copy. Upon receipt of all analytical data, two copies of the Chain-of-Custody will therefore be in the file. Review of the Chain-of-Custody Forms will therefore be a simple mechanism to determine if all data have been received. Chain-of-Custody is addressed in SOP SA-6.1.

5.6 Data Validation Letters

All data validation deliverables (or raw data summaries if validation is not conducted) shall be provided for inclusion in both the Database Record File and the project file. If USEPA regional- or client-specific requirements are such that Form Is (or similar analytical results) need not be provided with the validation deliverable, copies of such results must be appended to the deliverable. It is preferable, although not essential that the validation qualifiers be hand-written directly on the data summary forms. The data validation deliverables (and attendant analytical summaries) will provide the basis for direct comparison of the database printout and the raw data and qualifiers.

5.7 Historical Data

At the direction of the Project Manager, historical data may also be included in a project-specific analytical database. In the event that historical data are germane to the project, hardcopy of the historical data must be included in the Database Record File. Historical data may be maintained in the form of final reports or as raw data. The information contained in the historical data file must be sufficient to identify its origin, its collection date, the sample location, the matrix, and any and all other pertinent information. All available analytical data, Chain-of-Custody Forms, boring logs, well construction logs, sample location maps, shall be photocopied by the Project Manager (or designee) and placed in one or more 3-ring binders. All information shall be organized chronologically by matrix. It shall be the responsibility of the Project Manager (or designee) to ensure that all inconsistencies between analytical data, Chain-of-Custody Forms, boring logs, sample log sheets, and field logbooks are identified and corrected. The Project Manager (or designee) shall decide which nomenclature is appropriate and edit, initial and date all relevant forms. Data entry may only be performed on information that has undergone the aforementioned

editing process, thereby having a direct correlation between hardcopy information and what will become the electronic database.

6.0 RECORDS

Records regarding database preparation and quality assurance review include all those identified in the previous section. Upon completion of the database task, records from the file will be forwarded to the Project Manager for inclusion in the project file, or will be placed in bankers boxes (or equivalent) for storage. The final records for storage shall include the following minimum information on placards placed on both the top and end of the storage box:

Database Record File
PROJECT NUMBER: ____
SITE NAME: _____
DATE FILED: __/__/__
SUMMARY OF CONTENTS ENCLOSED
BOX _ OF _

Project- or program-specific record keeping requirements shall take precedence over the record keeping requirements of this SOP.

vi. Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
vii. Modifying this HASP, as it becomes necessary.

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The SSO supports site activities by advising the FOL on the aspects of health and safety on-site. In this capacity the SSO:

  i. Coordinates health and safety activities with the FOL.
  ii. Selects, applies, inspects, and maintains personal protective equipment.
  iii. Establishes safe work zones and control points in areas of operation.
  iv. Implements air monitoring program during onsite activities.
  v. Verifies training and medical clearance of onsite personnel status in relation to site activities.
  vi. Implements Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
  vii. Coordinates emergency services.
  viii. Provides site-specific training for onsite personnel.
  ix. Investigates accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
  x. Provides input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.

Note: In some cases one person may be designated responsibilities for more than one position. For example, the FOL may also be responsible for SSO duties. This action will be performed and permitted only as credentials, experience, and availability permits.

ATTACHMENT A

MIS REQUEST FORM

Tetra Tech NUS, Inc.

Project Name: _____ Request Date: _____
CTO: _____ Date Data Available for Production: _____
Project Manager: _____ Request in Support of: _____
Requestor: _____ Database Lead: _____
Program/Client: _____ GIS Lead: _____
State/EPA Region: _____ Statistics Lead: _____
Risk Lead: _____

Site Name(s) (Area, OU, etc.): _____
Sampling Date(s): _____
Matrix: ☐ GW ☐ SO ☐ SD ☐ SW ☐ Other: _____

Labels: ☐ Labels needed for an upcoming sampling event _____ Total # of Samples
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.
_____ FOL

Data Entry:
☐ Chemical data needs to be entered from hardcopy _____ Estimated # of Samples
☐ Chemical data needs to be formated electronically
☐ Field analytical data needs to be entered from hardcopy
☐ Geologic data needs to be entered from hardcopy
☐ Hydrology data needs to be entered from hardcopy
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.

Tables:
☐ Full Data Printout
☐ Summary of Positive Hits
☐ Occurance and Distribution ☐ with criteria
☐ Sampling Analytical Summary
☐ Other: _____
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.

GIS:
☐ General Facility Location
☐ Site Location
☐ Potentiometric Contours/Groundwater Flow
☐ Sample Location Proposed
☐ Sample Location Existing
☐ Tag Map Single Round
☐ Tag Map Multiple Round
☐ Isoconcentrations
☐ Chart Map
☐ 3D Visualization
☐ EGIS CD
☐ Other: _____
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.

Statistics: ☐ Yes
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.

Geostatistics: ☐ Yes
_____ Estimated Hours — Additional Instructions: _____
_____ Due Date
_____ Complete ETS Charge No.

APPENDIX D

HEALTH AND SAFETY PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Rev. 0
09/07

Health and Safety Plan for Supplemental RCRA Facility Investigation of Zone J at

Charleston Naval Complex
Charleston, South Carolina

Contract Task Order 0017

September 2007

USEPA ID No. SC0170022560

BRAC Program Management Office Southeast
4130 Faber Place Drive, Suite 202
North Charleston, South Carolina 29405

TETRA TECH NUS, Inc.

Rev. 0
09/07

HEALTH AND SAFETY PLAN
FOR
SUPPLEMENTAL RCRA FACILITY INVESTIGATION OF
ZONE J

CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
BRAC Program Management Office SE
4130 Faber Place Drive
Suite 202
North Charleston, South Carolina 29405

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0017

SEPTEMBER 2007

PREPARED UNDER THE SUPERVISION OF:

Linda Klink

LINDA KLINK, P.E.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMITTAL BY:

Matthew M. Soltis

MATTHEW M. SOLTIS, CIH, CSP
CLEAN HEALTH AND SAFETY MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) was developed as part of the Tetra Tech NUS, Inc, environmental health and safety program. It is designed to provide site-specific information regarding site conditions and planned activities in support of a Supplemental RCRA Facility Investigation (RFI) in Zone J of Charleston Naval Complex in North Charleston, South Carolina. It is the objective of this HASP to protect TtNUS employees, subcontractors, and the general public from hazards that may be associated with these activities. This HASP will be used in conjunction with the TtNUS Health and Safety Guidance Manual, which contains Standard Operating Procedures (SOPs) and safe work practices that may be related to site activities. This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 CFR 1910.120, OSHA's Hazardous Waste Operations and Emergency Response Standard.

In the event that the scope of site activities are modified, this HASP will be reviewed and if necessary be updated to include necessary information including applicable hazard assessments. Changes to this HASP will be requested through the Task Order Manager (TOM) also known as the Project Manager (PM), and/or the Health and Safety Manager (HSM). It is the responsibility of the TOM to notify affected personnel of any scope of work changes and associated modifications to this HASP.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site health and safety for TtNUS and subcontractor employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility for onsite health and safety. These persons will be the primary points of contact for any questions regarding the health and safety procedures and the selected control measures that are to be implemented for the protection from hazards associated with onsite activities.

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.

- The Project Health and Safety Officer (PHSO) is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:

    i. Providing information regarding site contaminants and physical hazards associated with the site.
    ii. Establishing air monitoring and decontamination procedures.
    iii. Assigning personal protective equipment based on task and potential hazards.
    iv. Determining emergency response procedures and emergency contacts.
    v. Stipulating training and medical surveillance requirements as it may pertain to onsite activities.

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Charleston Naval Complex

Address: North Charleston, South Carolina

Client Contact: _____

Phone Number: _____

Pager: _____

Fax Number: _____

E- Mail _____

Purpose of Site Visit: See Section 4.0 of this HASP.

Proposed Dates of Work: January 2008

Project Team:

Tetra Tech NUS Personnel:	Discipline/Tasks Assigned:	Phone No.
Linda Klink, P.E.	Task Order Manager	(412) 921-8650
Mike Whitten	FOL/SSO	(803) 649-7963
Matthew M. Soltis, CIH, CSP	CLEAN Health and Safety Manager	(412) 921-8912
Don Westerhoff, CSP	Project Health and Safety Officer	(412) 600-8292
TBD	Field Technician	

Non-Tetra Tech NUS Personnel	Affiliation/Discipline/Tasks Assigned	
Katahdin Analytical	Analytical Laboratory	(207) 874-2400
FedEx	Sample/Parcel Delivery	(800) 463-3339

Hazard Assessments (for purposes of 29 CFR 1910.132) and HASP preparation conducted by:

Don Westerhoff, CSP

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section was developed as part of a planning effort to direct and guide field personnel in the event of an emergency. In the event of on-site emergencies, which cannot be handled by on-site personnel, site personnel will be evacuated to a safe place of refuge and the appropriate emergency response agencies will be notified. It has been determined that a majority of potential emergency situations would be better supported by outside emergency responders. Based on this determination, Tetra Tech NUS and subcontractor personnel will only provide emergency response support at the capabilities of on-site response. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

Tetra Tech NUS, Inc. and subcontractor personnel will provide:

- Initial stage fire fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provide initial medical support for injuries or illnesses requiring only first-aid level support
- Provide site control and security measures as necessary

2.2 EMERGENCY PLANNING

To minimize and eliminate these potential emergency situations, emergency planning activities associated with this project include the following. The SSO and/or the FOL are responsible for:

- Coordinating with Local Emergency Responders to ensure that Tetra Tech NUS emergency action activities are compatible with existing facility emergency response procedures.

- Establishing and maintaining information at the project staging area (support zone) or the Tetra Tech NUS Field Office for easy access in the event of an emergency. This information will include the following:
  - Chemical Inventory (used on-site), with Material Safety Data Sheets.

- On-site personnel medical records (medical data sheets).
- A logbook identifying personnel on site each day.

- Identifying a chain of command for emergency action.

- Educating site workers to the hazards and control measures associated with planned activities at the site, and to provide early recognition and prevention where possible.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Site workers shall anticipate potential emergency situations (personal injury, boating incidents, etc.) and implement appropriate planning exercises, preventative measures, and precautions to ensure they are capable of necessary response activities. Potential site hazards, the activities for which they are associated with, and the recommended control methods are discussed in detail in Section 6.0 and the Safe Work Permits contained in this HASP. Additionally, early recognition of emergency situations will be supported by periodic site surveys to eliminate any situation predisposed to an emergency. The FOL, and the SSO will make up the site evaluation committee responsible for these periodic surveys.

2.3.2 Prevention

Tetra Tech NUS and subcontractor personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual and applicable OSHA regulations.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

In the event that the site must be evacuated, all personnel will immediately stop activities and report to the support zone or site vehicles. An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety or welfare of site workers. Specific examples of conditions that may initiate an evacuation include, but are not limited to the following: severe weather conditions; fire or explosion; boat malfunction; snake/alligator attack, and ill site workers or any evidence of personnel exposure to potential site contaminants.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. As a

result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed.

2.5 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since Tetra Tech NUS personnel will be working in close proximity to each other, hand signals and voice commands, will be sufficient to alert site personnel of an emergency. Though unexpected, if site personnel work in remote locations or if site activities are conducted in separate sites simultaneously, cell phones or two-way radios will be used to communicate between teams of workers.

If an emergency occurs, the following procedures are to be initiated:

- Initiate an evacuation. Report to the designated refuge assembly point in the support zone.

- Describe to the FOL (who will serve as the Incident Coordinator) what has occurred and as many details as possible. Once all personnel are evacuated, incipient response procedures will be enacted to control the situation.

In the event that site personnel cannot control the incident through offensive and defensive measures, the FOL and SSO will enact the emergency notification procedures to secure additional outside assistance in the following manner:

- Call **9-1-1** or other emergency contacts (Table 2-1) and report the emergency. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of what occurred. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

While on the boat emergency communication and/or alarm (airhorn, whistle) will be maintained on board. Remember whatever is selected must work if wet.

2.7 EMERGENCY EQUIPMENT

A first aid kit and a 2A. ABC Fire extinguisher will be available during all on site activities and will be maintained and shall be immediately available for use in the event of an emergency.

2.8 EMERGENCY CONTACTS

Prior to performing work at any of the sites, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted on site where it is readily available to all site personnel.

In addition, Tetra Tech NUS personnel who are injured or become ill on the job must notify appropriate company representatives. Figure 2-1 presents the procedure for reporting an injury/illness, and the form to use for this purpose. **If the emergency involves personnel exposures to chemicals, follow the steps in Figure 2-1.**

FIGURE 2-1
POTENTIAL EXPOSURE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations.

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, being prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) and Human Resources (Marilyn Duffy) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

FIGURE 2-1 (continued)
WORKCARE

POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. **Exposing Agent**
Name of Product or Chemicals (if known): _____
_____
Characteristics (if the name is not known)
Solid Liquid Gas Fume Mist Vapor

II. **Dose Determinants**
What was individual doing? _____
How long did individual work in area before signs/symptoms developed? _____
Was protective gear being used? If yes, what was the PPE? _____
Was their skin contact? _____
Was the exposing agent inhaled? _____
Were other persons exposed? If yes, did they experience symptoms? _____

III. **Signs and Symptoms** (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache Dizziness
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. **Present Status of Symptoms** (check off appropriate symptoms)
Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)
Improved: _____ Worsened: _____ Remained Unchanged: _____

V. **Treatment of Symptoms** (check off appropriate response)
None: _____ Self-Medicated: _____ Physician Treated: _____

TABLE 2-1
EMERGENCY REFERENCE
CNC, NORTH CHARLESTON, SOUTH CAROLINA

CONTACT	PHONE NUMBER
EMERGENCY (Charleston Police, Fire, and Ambulance Services)	911
Charleston County EMS	(843) 745-4000
Charleston Naval Hospital	(843) 743-7011
Onsite Representative at CNC Dudley Patrick	(843) 743-2136
US Coast Guard	(843) 742-7616
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Palmetto Poison Control Center Columbia, S.C.	(800) 222-1222
WorkCare	(800) 455-6155 ext. 109
TtNUS, Pittsburgh Office	(412) 921-7090
Task Order Manager Linda Klink, P.E.	(412) 921-8650
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Don Westerhoff, CSP	(412) 600-8292
National Call Before You Dig	811

2.9 DIRECTIONS TO THE HOSPITAL

The nearest hospital is the Charleston Naval Hospital.

Charleston Naval Hospital
McMillan Road
Charleston, SC 29406
(843)743-7011

Directions:

- Exit Naval Complex via the Main Gate (McMillan Road)
- Proceed West, toward Rivers Road
- At the intersection of McMillan and Rivers, the hospital is on the left. The hospital entrance is just before the intersection. The hospital is approximately ½ mile from the Main Gate.

3.0 SITE BACKGROUND

3.1 FACILITY INFORMATION

The Charleston Naval Complex (CNC) facility is being turned over to the city, once the Navy has fully evacuated and remediated the site. The complex is a heavily industrialized 1,500 acres with over four and a half miles of shoreline on the Cooper River, north of the city of Charleston. This location was also known as the Charleston Naval Shipyard.

3.2 ZONE J

Zone J consists of the Cooper River, Shipyard Creek, and Noisette Creek, which adjoin CNC properties. The CNC is on the western shore of the Cooper River, approximately 6.75 miles upriver from Fort Sumter. Its 3.75-mile waterfront is dominated by 25 piers and five drydocks, and is protected along most of its length by a wooden and/or concrete seawall. Industrial areas along the CNC's shoreline were associated primarily with the repair and maintenance of large ships. Both Noisette Creek and Shipyard Creek are bordered by less industrial areas, but point source discharges are also present in these tributaries. Numerous stormwater and/or industrial outfalls are also along the CNC shoreline.

Each Zone J water body, although part of the same dynamic watershed is distinctly different in size, flow, and level of near shore industrialization; therefore, it was considered necessary to segregate the data collected from each water body and assess the Cooper River, Shipyard Creek, and Noisette Creek as separate entities.

Prior sediment sampling at Zone J utilized method detection limits (MDLs) that exceed ecological screening values. Additional sediment samples are required to address this situation and satisfy regulatory agency concerns and comments as related to the site RFI.

4.0 SCOPE OF WORK

This section of the HASP describes the project tasks that will be performed at CNC. Additionally, each task has been evaluated and the associated hazards and recommended control measures are provided in each Safe Work Permit provided in Attachment II of this HASP. Specific tasks to be conducted include but are not necessarily limited to, the following:

- Mobilization/Demobilization
- Sediment Sampling
- Decontamination
- IDW Management

For a more detailed description of the sampling activities refer to the Site Work Plan. Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit requests for modifications to this document to the HSM.

5.0 SAFE WORK PRACTICES

In addition to the task-specific work practices identified, the following general safe work practices are to be observed when conducting work on-site. These practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations.

- Eating, drinking, chewing gum or tobacco, taking medication, and/or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists or within designated operational areas is prohibited.

- A copy of the Map to the hospital and the emergency telephone numbers must be maintained where it is immediately accessible to all site personnel.

- Attend briefings on anticipated hazards, equipment requirements, emergency procedures, and communication methods before going on site.

- Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Safety and Health Officer (SSO).

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision. These symptoms could be indicative of potential chemical exposure or possibly heat or cold stress related conditions.

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards associated with the sites to be investigated and the activities that are to be conducted as part of the scope of work.

6.1 CHEMICAL HAZARDS

This project is in support of a RFI. Previous analytical data from Zone J indicate the presence of low concentrations of metals, semi-volatile organic compounds (SVOCs), Pesticides, and Polychlorinated Biphenyls (PCBs).

None of the previously identified contaminants are expected to be encountered at concentrations that are likely to pose an exposure threat to site workers performing sampling activities. Safe work practices will be used to prevent potential exposures to any contaminants that may be present in sediments. Site personnel will employ good work hygiene practices and PPE to minimize potential contact and therefore exposure.

6.1.1 Metals

Specific toxicities and hence symptoms vary to somewhat extent between individual metal compounds and associated isomers. However, general toxicities exist that can be applied to all metals. For instance all metals are considered kidney toxins. Other generalized effects have shown demonstrated impacts on the peripheral and central nervous systems, blood forming mechanisms, gastrointestinal disturbances, cardio and vascular toxicities and some are cancer causing agents. Generally, in a particulate form, metals will cause respiratory, dermal, and eye irritation. Acute symptoms associated with ingestion include stomach pain, cramps, headaches, possibly diarrhea and vomiting. These conditions are typically symptomatic of chronic exposure or acute exposure to high concentrations which are not anticipated on the site.

Over exposure to these substances as indicated above typically occurs through ingestion or inhalation of particulates and/or fumes found within some industrial settings. The majority of the available toxicological information has been derived from such settings. In our situation, potential exposure to these compounds are greatly reduced if not eliminated based on the media in which they (the contaminants) may exist. This includes commingled and bound with soil particulates, sediments, the majority of which will be underwater. This aspect greatly reduces the mobility of the metals and thereby has a direct impact on the exposure potential and impact. Ingestion possibilities still exist however, usually facilitated through contaminated hand or glove to mouth contact or to some media which eventually contacts the mouth. This exposure

route can also be controlled and thereby minimize exposure potential. Actions include the use of gloves, good work hygiene practices, and through the employment of a suitable decontamination procedure.

6.1.2 Polycyclic Aromatic Hydrocarbons (PAHs)

These substances include anthracene, benzo[a]anthracene, benzo[a]pyrene, chrysene, fluroanthene Acute exposures may result in difficulty breathing, respiratory failure and skin and eye burns. Chronic exposure may damage the liver, kidneys, lungs and skin. Many of these substances are recognized for their cancer causing properties. Overexposure to these substances has shown to be a skin, eye, and mucous membrane irritant. Some of these substances are considered a photosensitizer and mild allergen and considered mildly to moderately toxic by ingestion. The majority of these substances are petroleum based pitch which is considered insoluble. These substances will commingle with soils and sediments which minimizes mobility and exposure potential. Ingestion exposure routes still exist. But this route can be controlled through use of PPE, good work hygiene practices, and diligent application of decontamination procedures.

6.1.3 PCBs/Pesticides (Insecticides/Herbicides)

These substances exercise general toxicities on the Central Nervous Systems, Liver, Kidneys, and skin. The function of pesticides and herbicides are typically to disrupt operations on a molecular level through enzyme inhibition or binding. PCBs were employed as dielectric fluids to control heat within transformers and capacitors. Due to the bioaccumulative properties and persistence within the environment these substances were eventually discontinued from use. Acute signs and symptoms are:

- Skin eruptions – chloroacne (yellow pustules similar to acne) associated with PCBs and some herbicides
- CNS/Neuromuscular symptoms include headaches, fatigue, dizziness, muscle twitching, tremors, convulsions, weakness or numbness of the arms or legs, as well as, disturbed equilibrium.

These signs and symptoms are associated with acute poisoning and are not anticipated within this environmental setting. PCBs have been implicated as a potential carcinogen.

Other sources of potential chemical exposure during planned activities include decontamination fluids (e.g., isopropanol) and sample preservatives. For any substances brought onto the site, the SSO is responsible for instituting a site-specific Hazard Communication Program (see Section 5 of the Health and Safety Guidance Manual) and for collecting the appropriate Material Safety Data Sheets (MSDS) from the chemical manufacturers/suppliers. The SSO is also responsible for completing the Safe Work Permit for the decontamination task using the appropriate MSDS (specifying any necessary PPE, etc.) and for reviewing the contents of the MSDSs and Safe Work Permit with anyone who will use these substances.

6.2 PHYSICAL HAZARDS

In addition to the chemical hazards discussed above, the following physical hazards may be present during the performance of the site activities.

- Water/Boating Hazards
- Slips, trips, and falls
- Cuts (or other injuries associated with hand tool use)
- Lifting (strain/muscle pulls)
- Vehicular and foot traffic

Each of these physical hazards is discussed in greater detail in the Health and Safety Guidance Manual. Additionally, information on the associated control measures for these hazards are discussed in Table 5-1 of this HASP.

6.2.1 Water/Boating Hazards

Every year hundreds of people die, thousands are injured, and millions of dollars of property damage occur because of preventable boating accidents on U.S. waterways. Prior to performing sediment sampling from a boat, site personnel shall:

- Ensure the vessel is sea worthy and appropriately licensed/registered with a USCG Safe Vessel Certificate.

- An emergency means of communication (cell phone, air horn, two way radio – Remember the selected communication must work if wet) will be available to alert appropriate emergency responders in the event of an incident.

- Boating operations will be performed in accordance with United States Coast Guard rules and regulations (http://www.uscgboating.org/).

- At least one member of the sampling team will be an experienced operator of a boat and have completed a boating safety course with knowledge of USCG rules and regulations. USCG personal flotation devices will be available and worn at all times while on the boat.

6.2.1.1 U.S.C.G. Flotation Device Types

Use the following information to determine the proper type of U.S.C.G. PFD.

Off Shore Life Jacket (type I, 22lbs buoyancy)

Type I life jacket is the best choice for rough or open waters. This type will float you the best and is favorable if rescue may be long in coming. This type will turn an unconscious person upright in the water. Though is bulky it does have a highly visible color for easier detection.

Near Shore Buoyant Vest (Type II, 15.5lbs buoyancy)

Type II is a good choice for calmer waters. It will turn most unconscious persons face-up in the water. Though it is less bulky than Type I, it is not intended for long hours in calm or rough water.

Flotation Aid (Type III, 15.5lbs buoyancy)

Type III is probably the most comfortable device offering more freedom of movement, such as water skiing or fishing, but is not intended for rough water. As a result an unconscious person may end up face-down in the water. However, based on the planned task this will be sufficient for planned activities.

Throwable Devices (Type IV)

Throwable devices are intended for calm waters with heavy boat traffic where help is always close. It is not intended for unconscious persons or non-swimmers or long hours in the water. They are good backups for the other devices.

- Under no circumstances shall boating operations be performed under adverse weather/water conditions (thunderstorms, high winds, excessive surf, etc.).

The following link can be used to view additional information including the Reference Guide to State Boating Laws:http://www.uscgboating.org/regulations/Nasbla_Ref_Guide_6.pdf

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted

6.3.1 Insect/Animal Bites and Stings

Insect/animal bites and stings are difficult to control given the climate Charleston. However, in an effort to minimize this hazard the following control measures will be implemented.

- Commercially available bug sprays and repellents will be used whenever possible. Products such as DEET should not be applied directly to the skin due to potential irritation. This product, should be applied over clothing articles.

- Where possible, loose-fitting and light-colored clothing with long sleeves should be worn. This will also aid in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be secured to the work-boots using duct tape to prevent access by ticks

- Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting vegetated areas. Workers should perform a more detailed check of themselves when showering in the evening. Ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations.

- The FOL/SSO will preview access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to site personnel.

- The FOL/SSO must determine if site personnel (through completion of Medical Data Sheets), suffer allergic reactions to bee and other insect stings and bites. When personnel are on-site who are predisposed to these conditions, the FOL/SSO will take the appropriate measures to secure physician directed antidotes.

Note: Record any allergies on the Medical Data Sheets and report them to the SSO.

Mosquito Transmitted Illnesses and Disease

Malaria may occur when a mosquito or other infected insect sucks blood from an infected person, and the insect becomes the carrier to infect other hosts. The parasite reproduces within the mosquito, and is then passed on to another person through the biting action. Acute symptoms include chills accompanied by fever and general flu like symptoms. This generally terminates in a sweating stage. These symptoms may recur every 48 to 72 hours.

6.3.2 Snakes, Alligators and Other Wild Animals

Areas to be investigated could be prime nesting and/or hiding locations for alligators, snakes and other reptiles. Sharks have also been reported in the Cooper. To avoid potential injury the following safe work practices will be employed:

- Avoid dangling hands or any other part of the body into the water from the boat. This will look like bait.
- Do not throw food overboard as it may attract alligators and/or sharks.
- Use an alligator watch when sampling along waters edge.
- Examine areas to be sampled prior to moving the boat in place where overhanging vegetation may hide snake, alligators or similar reptiles. It has been reported that water moccasins have dropped from trees into boats. Again examine areas prior to entering.
- When extracting the sediment sampler examine it for snakes before opening it in the boat. Have a large tub with a lid so if a snake is in the sampler during sediment extraction it will drop in the tub vs. the boat.
- Personnel should avoid reaching into areas that are not visibly clear of snakes or insects.
- Snake chaps will be worn in areas of known or anticipated snake infestation.
- Site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SSO notified.

Alligators are often found in the major river drainage basins and large lakes. They also can be found in marshes, swamps, ponds, drainage canals, settling ponds, and ditches. Alligators are tolerant of poor water-quality and occasionally inhabit brackish marshes along the coast. A few even venture into salt water.

Mature alligators seek open water areas during the April-to-May courtship and breeding season. After mating, the females move into marsh areas to nest in June and early July where they remain until the following spring. Males generally prefer open and deeper water year-round. Alligators less than four feet

long typically inhabit the marshy areas of lakes and rivers. Dense vegetation in these habitats provides protective cover and many of the preferred foods of young alligators.

- Most human attacks associated with alligators occur when they have been fed by humans or when defending their nests.

- Under no circumstances should you approach an alligator closely. They are quite agile, even on land. As with any wild animal, alligators merit a measure of respect.

- Alligators are classified as a threatened species and thus enjoy the protection of state and federal law. Only representatives of the South Carolina Department of Natural Resources (SCDNR) are empowered to handle nuisance alligators.

- It is illegal to feed, tease, harass, molest, capture or kill alligators.

If a serious problem does exist, notify the site contact and if necessary the SCDNR.

6.3.3 Poisonous Plants

Various plants which can cause allergic reactions may be encountered during field work. These include, but may not be limited to, poison ivy, poison oak, and poison sumac. Contact of field personnel with these plants may occur when clearing vegetation for access to work areas, or as a result of movement through these plants. An irritating, allergic reaction can occur when direct contact is achieved between the plant and the bare skin of a field person, or the plant and some piece of equipment or clothing article that then later comes in contact with the bare skin of a field person. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next.

Protective measures to control and minimize the effects of this hazard may include, but not limited to, the following:

- Identify plants for field personnel.

  - Poison Ivy - Characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.

  - Poison Sumac - Characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with auxiliary clusters of white fruit.

NOTE: These white fruits and berries may exist only during pubescent stages.

- Poison oak - Characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.

Protective measures may include wearing disposable garments such as Tyvek when clearing brush. These may be carefully removed and disposed of along with any oils accumulated from the plants.

- Personal Hygiene - The oils obtained from the plants will only elicit an allergic response when the person's bare skin layer is contacted. This can be aggravated when skin pores are open (perspiring), or through breaks in the skin such as cuts, nicks, scratches, etc. This can also be accomplished when using excessively hot water for cleaning the skin, which also causes pores to open. Prior to break time, lunchtime, etc. personnel should wash with cool water and soap to remove as much of the oils as possible. In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to prevent the oils from accessing and penetrating the skin.

These plants present an airborne sensitization hazard when burned. This is not to occur as part of this scope of work and therefore will not be addressed.

6.3.4 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors and on/near water. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, hurricanes, etc.), the FOL and/or the SSO will be responsible for suspending or terminating activities until hazardous weather conditions no longer exist. When on the boat have a weather warning/alert radio. When sampling from shore use the radio or employ the 30/30 Rule:
If there is less than 30 seconds between thunder and lightning go inside for at least 30 minutes from the last thunder.

6.3.5 Temperature Extremes (Heat Stress and Cold Stress

Given the anticipated project schedule, encountering low ambient temperatures during the planned work could be encountered. Likewise, exposures to cold temperatures could be encountered due to the geographic location of the project site. If such conditions are encountered, information on heat and cold stress recognition, prevention, and control may be found in Section 4.6 of the Health & Safety Guidance Manual.

7.0 HAZARD MONITORING

This section provides direction to field personnel that will perform hazard monitoring during site activities.

7.1 IDENTIFIED SITE HAZARDS TO BE MONITORED

Historical information regarding groundwater contamination does not suggest the presence of VOCs. As a result, the use of direct read air monitoring devices such as a Photoionization Detector (PID) is not required during sediment sampling activities.

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

8.1.1 Requirements for Tetra Tech NUS and Subcontractor Personnel

All Tetra Tech NUS and subcontractor personnel must complete 40 hours of introductory hazardous waste site training in accordance with 29 CFR 1910.120(e) prior to performing work at Zone J of CNC. Additionally, Tetra Tech NUS and subcontractor personnel who have had introductory training more than 12 months prior to site work, must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. 8-hour Supervisory Training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel.

Documentation of Health and Safety Training will be maintained at the project site. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.2 SITE-SPECIFIC TRAINING

Tetra Tech NUS will provide site-specific training to Tetra Tech NUS employees and subcontractor personnel who will perform work on this project. Site-specific training will also be provided to site visitors (DOD, EPA, etc.) who may enter the site to perform functions that may or may not be directly related to site operations. Site-specific training will include:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure to site contaminants
- The contents of the site-specific health and safety plan including the contents of Tables 5-1 and 6-1.
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review the contents of relevant Material Safety Data Sheets

Site-specific documentation will be established as identified in Figure 8-2. Site personnel and visitors must sign this document upon receiving site-specific training prior to commencement of site activities.

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements For Tetra Tech NUS and Subcontractor Personnel

Tetra Tech NUS personnel participating in project field activities will have had a physical examination meeting the requirements of Tetra Tech NUS' medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection. Documentation for medical clearances will be maintained on the project site and made available as necessary.

8.3.2 Medical Data Sheet Exception Health Insurance Portability and Accountability (HIPAA) Requirements – The Privacy Rule

The Privacy Rule took effect April 14, 2003. Loosely interpreted it establishes regulations for the use and disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on your Medical Data Sheet Information), provision of health care, or payment for health care. This rule also requires Tetra Tech NUS, Inc. in this case to insure the confidentiality of communication (Medical Data Sheets). This provision severely limits the ability of the Medical Data Sheet to convey information you would want the Doctor to know regarding PHI if you were incapacitated. This rule also limits the SSO ability to insure provisions are in place to provide timely response for instance to an allergic reaction. So before you complete the Medical Data Sheet understand that:

The Medical Data Sheets will not be maintained in a secure location. They will be maintained in a file box or binder accessible to all members of the field crew. This is intended to make these documents quickly accessible so they can accompany the injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

If you are concerned about any of these provisions do not complete the medical data sheet, but convey verbally to the SSO any information about allergic reactions or drug allergies that would be critical in your treatment

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing investigation activities at CNC, and that I have received site-specific training that included the elements presented below:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the health and safety plan including Tables 5-1
- Emergency response procedures (evacuation and assembly points)
- Review contents of the Safe Work Permits and the Material Safety Data Sheets

I have been given the opportunity to ask questions and that my questions have been answered to my satisfaction. The dates of my training (introductory, refresher, and supervisory, as applicable), and my medical surveillance requirements are accurate and correct to the best of my knowledge.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

Instructor:

8.4 SUBCONTRACTOR EXCEPTION

Subcontractors who will not enter the exclusion zone during operation, and whose activities involve no potential for exposure to site contaminants, will not be required to meet the requirements for training/medical surveillance, other than site-specific training as stipulated in Section 8-2. The use of this type of exception is permissible only with the prior consent of the CLEAN HSM.

9.0 SITE CONTROL

9.1 WORK ZONES

Given the location and procedure used to collect sediment samples, a delineated work zone approach (using an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone) is not feasible and will not be required as the spread of potential contaminants into previously unaffected areas of the site is unlikely. All sediment sampling and decontamination operations performed at sediment sampling locations or from an anchored boat will be considered the Exclusion zone. Limited equipment decontamination will occur at the sampling locations to prevent the possible spread of site contaminants or cross contamination of samples. The Support Zone can consist of some other uncontaminated, controlled point. The Support Zone for this project will include a staging area where site vehicles can be parked, equipment will be unloaded, and where food and drink containers will be maintained. The support zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

9.2 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is included in Figure 9-1. The daily meetings conducted by the FOL/SSO will further support these work permits. This will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Permits will require the signatures of the FOL and/or the SSO. Personnel engaged in onsite activities must be made aware of the elements indicating levels of protection and precautionary measures to be used.

The use of these permits will establish and provide for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

9.3 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of the personnel involved in this operation.

9.4 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

Tetra Tech NUS personnel will provide MSDSs for chemicals brought on-site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application or the substances on-site. The MSDSs will be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SSO will be responsible for implementing a site-specific Hazard Communication Program using Section 5 of the Health and Safety Guidance Manual. This includes collection of MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, addressing container labeling and personnel training issues, and other aspects as defined in that section.

9.5 COMMUNICATION

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized.

External communications will be accomplished utilizing telephones at predetermined and approved locations or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications.

9.6 SITE VISITORS

Potential site visitors that may be encountered during the performance of the field work could include the following:

- Personnel invited to observe or participate in operations by Tetra Tech NUS.
- Regulatory personnel (i.e., DOD, USCG, SCDHEC, EPA, OSHA, etc.)
- Navy personnel
- Other authorized visitors

Site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individuals name (proper identification required), who they represent, and the purpose for the visit. **The FOL is responsible for ensuring that site visitors are escorted.**

Site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for Southern Division Navy Personnel), and medical surveillance as stipulated in Section 8.3, of this

document. In addition, to enter the sites operational zones during planned activities, visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items they will be permitted to enter the site and applicable operational areas. Visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. Visitors must meet the requirements as stipulated in this plan for site clearance in order to be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause on-site activities to be terminated until that visitor can be removed.

FIGURE 9-1
SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** _____

II. **Primary Hazards** _____

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. **Protective equipment required**
Level D ☐ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures

Primary Route(s) of Exposure/Hazard: _____

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes	☐ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☐ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – _____)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes or boots	☐ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☐ Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: _____

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, SHSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** _____

Permit Issued by: _____ Permit Accepted by: _____

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

The spill containment program is intended to provide direction to Tetra Tech NUS, Inc. and subcontractor field personnel regarding areas that may be vulnerable to spill and what control measures are necessary.

10.2 POTENTIAL SPILL AREAS

Given the planned scope of work, there are few potential spill areas associated with the site. Potential spill areas (IDW containers) will be monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, there are various areas vulnerable to this hazard including the following:

- Areas used for central staging of resources
- Areas used for central staging of IDW materials
- Decontamination area

Monitoring of these areas will be done at least weekly.

10.2.1 Site Drums/Containers

If applicable, drums/containers used for containing liquids will be sealed, labeled, and staged within a centralized area awaiting shipment or disposal. Drums used for the storage and transportation of IDW will meet the packaging requirements for steel drums category U.N. 1A2, removable head as specified in paragraph 9.6.1, United Nations Transport of Dangerous Goods.

10.3 LEAK AND SPILL DETECTION

If a leak is detected, the first approach will be to transfer the container contents using a hand pump into a new container. Other provisions for the transfer of container contents will be made and appropriate emergency contacts will be notified, if necessary. All inspections will be documented in the project logbook.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed on the procedures for spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and/or the SSO will serve as the Spill Response Coordinator for this operation should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment which may be maintained at the staging area for the purpose of supporting this Spill Prevention/Containment Program.

Spill Response Equipment:

- Sand, clean fill, cat litter, or other noncombustible absorbent (oil-dry);
- Drums (55-gallon U.N 1A2)
- Portable storage tanks or additional drums
- Shovels, rakes, and brooms
- Labels

It is not anticipated that a spill will occur in which the field crews cannot handle. Should this occur notification of appropriate emergency response agencies will be carried out by the FOL or SSO.

11.0 CONFINED SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces**.

A **confined space** is defined as a space:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A **Permit-Required Confined Space** is defined as confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, then this HASP will require modification.

12.0 MATERIALS AND DOCUMENTS

The Tetra Tech FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP (signed)
- Blank Incident Report forms
- Emergency Reference Information (Section 2.0, extra copy for posting)
- Incident Reports
- Material Safety Data Sheets for chemicals brought on site, including decon solutions, fuels, lime, sample preservatives, calibration gases, etc.
- Medical Data Sheets
- OSHA 29 CFR 1910.120 (HAZWOPER) training certificates
- OSHA Job Safety and Health Poster (posted at the site)
- Training/Medical Surveillance Documentation Form (Blank)

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (posted) - This list represents the chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc.. This list should be posted in a central area.

Material Safety Data Sheets (MSDS) (maintained) - The MSDSs should also be in a central area accessible to site personnel. These documents should match the listings on the chemical inventory list for substances employed on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - this poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaces, altered, or covered by other material.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies site personnel, dates of training (including site-specific training), and medical

surveillance. The lists indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet (Figure 11-1) will accompany any injury or illness requiring medical attention to the medical facility. a copy of this sheet or a wallet card will be given to personnel to be carried on their person.

The purpose of maintaining or posting this information, as stated above, is to allow site personnel quick access. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-Term Environmental Action Navy
CPR	Cardio-Pulmonary Resuscitation
CSP	Certified Safety Professional
CTO	Contract Task Order
dB	decibels
dBA	decibels on an A-rated scale
eV	electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HSM	Health and Safety Manager
IDLH	Immediately Dangerous to Life and Health
MSDS	Material safety Data Sheet
N/A	Not Available
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAH	Polynuclear Aromatic Hydrocarbons
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Manager
PID	Photo Ionization Detector
POM FLANT	Polaris Missle Facility U.S. Atlantic Fleet
PPE	Personal Protective Equipment
PPM	Parts Per Million
PVC	Poly Vinyl Chloride
RFI	RCRA Facility Investigation
RCRA	Resource Conservation and Recovery Act
SCDHEC	South Carolina Department of Health and Environmental Control
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
TOM	Task Order Manager

TWA	Time Weighted Average
UV	Ultra Violet
WP	Work Plan

ATTACHMENT I

INCIDENT REPORT FORM

TETRA TECH, INC.
Safety Excellence

TETRA TECH, INC.
INCIDENT REPORT

Report Date	Report Prepared By	Incident Report Number

INSTRUCTIONS:

All incidents (including those involving subcontractors under direct supervision of Tetra Tech personnel) must be documented on the IR Form.

Complete any additional parts to this form as indicated below for the type of incident selected.

TYPE OF INCIDENT (Check all that apply)	Additional Form(s) Required for this type of incident
Near Miss (No losses, but could have resulted in injury, illness, or damage)	☐ Complete IR Form Only
Injury or Illness	☐ Complete Form IR-A; Injury or Illness
Property or Equipment Damage, Fire, Spill or Release	☐ Complete Form IR-B; Damage, Fire, Spill or Release
Motor Vehicle	☐ Complete Form IR-C; Motor Vehicle

INFORMATION ABOUT THE INCIDENT

Description of Incident

_____

_____

_____

_____

Date of Incident	Time of Incident
	_____ AM ☐ PM ☐ *OR* Cannot be determined ☐
Weather conditions at the time of the incident	**Was there adequate lighting?**
	_____ Yes ☐ No ☐

Location of Incident

_____ Was location of incident within the employer's work environment? Yes ☐ No ☐

Street Address	City, State, Zip Code and Country
Project Name	**Client:**
Tt Supervisor or Project Manager	**Was supervisor on the scene?**
	Yes ☐ No ☐

WITNESS INFORMATION (attach additional sheets if necessary)

Name	Company
Street Address	**City, State and Zip Code**

Telephone Number(s)

CORRECTIVE ACTIONS

Corrective action(s) immediately taken by unit reporting the incident:

_____

_____

_____

_____

Corrective action(s) still to be taken (by whom and when):

_____

_____

_____

_____

ROOT CAUSE ANALYSIS LEVEL REQUIRED

Root Cause Analysis Level Required: Level - 1 ☐ Level - 2 ☐ None ☐

Root Cause Analysis Level Definitions

Level - 1	**Definition:** A Level 1 RCA is conducted by an individual(s) with experience or training in root cause analysis techniques and will conduct or direct documentation reviews, site investigation, witness and affected employee interviews, and identify corrective actions. Activating a Level 1 RCA and identifying RCA team members will be at the discretion of the Corporate Administration office. The following events may trigger a Level 1 RCA: ▪ Work related fatality ▪ Hospitalization of one or more employee where injuries result in total or partial permanent disability ▪ Property damage in excess of $75,000 ▪ When requested by senior management
Level - 2	**Definition:** A Level 2 RCA is self performed within the operating unit by supervisory personnel with assistance of the operating unit HSR. Level 2 RCA will utilize the 5 Why RCA methodology and document the findings on the tools provided. The following events will require a Level 2 RCA: ▪ OSHA recordable lost time incident ▪ Near miss incident that could have triggered a Level 1 RCA ▪ When requested by senior management

Complete the Root Cause Analysis Worksheet and Corrective Action form. Identify a corrective action(s) for each root cause identified within each area of inquiry.

NOTIFICATIONS

Title	Printed Name	Signature	Telephone Number	Date
Project Manager or Supervisor				
Site Safety Coordinator or Office H&S Representative				
Operating Unit H&S Representative				
Other: _____				

The signatures provided above indicate that appropriate personnel have been notified of the incident.

INSTRUCTIONS:

Complete all sections below for incidents involving injury or illness.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)	

EMPLOYEE INFORMATION

Company Affiliation

Tetra Tech Employee? ☐ TetraTech subcontractor employee (directly supervised by Tt personnel)? ☐

Full Name	**Company (if not Tt employee)**
Street Address, City, State and Zip Code	**Address Type**
_____	Home address (for Tt employees) ☐
_____	Business address (for subcontractors) ☐

Telephone Numbers

Work: _____ Home: _____ Cell: _____

Occupation (regular job title)	**Department**
Was the individual performing regular job duties?	**Time individual began work**
Yes ☐ No ☐	_____ AM ☐ PM ☐ *OR* Cannot be determined ☐

Safety equipment

Provided? Yes ☐ No ☐

Used? Yes ☐ No ☐ If no, explain why

_____

_____

_____

Type(s) provided:
- ☐ Hard hat
- ☐ Gloves
- ☐ Eye protection
- ☐ Safety shoes
- ☐ Respirator
- ☐ Protective clothing
- ☐ High visibility vest
- ☐ Fall protection
- ☐ Machine guarding
- ☐ Other (list)

_____

NOTIFICATIONS

Name of Tt employee to whom the injury or illness was first reported	**Was H&S notified within one hour of injury or illness?**
	Yes ☐ No ☐
Date of report	**H&S Personnel Notified**
Time of report	**Time of Report**

If subcontractor injury, did subcontractor's firm perform their own incident investigation?

Yes ☐ No ☐ If yes, request a copy of their completed investigation form/report and attach it to this report.

INJURY / ILLNESS DETAILS

What was the individual doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the individual was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from a hand sprayer"; "Daily computer key-entry"

_____

_____

_____

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor and worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; Worker developed soreness in wrist over time"

_____

_____

_____

_____

Describe the object or substance that directly harmed the individual: Examples: "Concrete floor"; "Chlorine"; "Radial Arm Saw". If this question does not apply to the incident, write "Not Applicable".

_____

_____

MEDICAL CARE PROVIDED

Was first aid provided at the site: Yes ☐ No ☐ If yes, describe the type of first aid administered and by whom?

_____

Was treatment provided away from the site: Yes ☐ No ☐ If yes, provide the information below.

Name of physician or health care professional	**Facility Name**
Street Address, City State and Zip Code	**Type of Care?**
_____ _____	Was individual treated in emergency room? Yes ☐ No ☐ Was individual hospitalized overnight as an in-patient? Yes ☐ No ☐ Did the individual die? Yes ☐ No ☐ If yes, date: _____ Will a worker's compensation claim be filed? Yes ☐ No ☐
Telephone Number	

NOTE: Attach any police reports or related diagrams to this report.

SIGNATURES

I have reviewed this report and agree that all the supplied information is accurate

Affected individual (print)	**Affected individual (signature)**	**Telephone Number**	**Date**

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

INSTRUCTIONS:

Complete all sections below for incidents involving property/equipment damage, fire, spill or release.
Do NOT leave any blanks.
Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)	

TYPE OF INCIDENT (Check all that apply)

Property Damage ☐ Equipment Damage ☐ Fire or Explosion ☐ Spill or Release ☐

INCIDENT DETAILS

Results of Incident: Fully describe damages, losses, etc.

_____

_____

_____

Response Actions Taken:

_____

_____

_____

Responding Agency(s) (i.e. police, fire department, etc.)	**Agency(s) Contact Name(s)**

DAMAGED ITEMS (List all damaged items, extent of damage and estimated repair cost)

Item:	**Extent of damage:**	**Estimated repair cost**

SPILLS / RELEASES (Provide information for spilled/released materials)

Substance	**Estimated quantity and duration**	**Specify Reportable Quantity (RQ)**
		_____ Exceeded? Yes ☐ No ☐ NA ☐

FIRES / EXPLOSIONS (Provide information related to fires/explosions)

Fire fighting equipment used? Yes ☐ No ☐ If yes, type of equipment: _____

NOTIFICATIONS

Required notifications	**Name of person notified**	**By whom**	**Date / Time**
Client: _____ Yes ☐ No ☐			
Agency: _____ Yes ☐ No ☐			
Other: _____ Yes ☐ No ☐			

Who is responsible for reporting incident to outside agency(s)? Tt ☐ Client ☐ Other ☐ Name: _____

Was an additional written report on this incident generated? Yes ☐ No ☐ If yes, place in project file.

INSTRUCTIONS:

Complete all sections below for incidents involving motor vehicle accidents. Do NOT leave any blanks. Attach this form to the IR FORM completed for this incident.

Incident Report Number: (From the IR Form)	

INCIDENT DETAILS

Name of road, street, highway or location where accident occurred	Name of intersecting road, street or highway if applicable

County	City	State

Did police respond to the accident?	Did ambulance respond to the accident?
Yes ☐ No ☐	Yes ☐ No ☐
Name and location of responding police department	Ambulance company name and location
Officer's name/badge #	

Did police complete an incident report? Yes ☐ No ☐ If yes, police report number: _____
Request a copy of completed investigation report and attach to this form.

VEHICLE INFORMATION

How many vehicles were involved in the accident? _____ (Attach additional sheets as applicable for accidents involving more than 2 vehicles.)

Vehicle Number 1 – Tetra Tech Vehicle		Vehicle Number 2 – Other Vehicle	
Vehicle Owner / Contact Information		Vehicle Owner / Contact Information	
Color		Color	
Make		Make	
Model		Model	
Year		Year	
License Plate #		License Plate #	
Identification #		Identification #	
Describe damage to vehicle number 1		Describe damage to vehicle number 2	
Insurance Company Name and Address		Insurance Company Name and Address	
Agent Name		Agent Name	
Agent Phone No.		Agent Phone No.	
Policy Number		Policy Number	

DRIVER INFORMATION

Vehicle Number 1 – Tetra Tech Vehicle		Vehicle Number 2 – Other Vehicle	
Driver's Name		Driver's Name	
Driver's Address		Driver's Address	
Phone Number		Phone Number	
Date of Birth		Date of Birth	
Driver's License #		Driver's License #	
Licensing State		Licensing State	
Gender	Male ☐ Female ☐	Gender	Male ☐ Female ☐
Was traffic citation issued to Tetra Tech driver? Yes ☐ No ☐		Was traffic citation issued to driver of other vehicle? Yes ☐ No ☐	
Citation #		Citation #	
Citation Description		Citation Description	

PASSENGERS IN VEHICLES (NON-INJURED)

List all non-injured passengers (excluding driver) in each vehicle.
Driver information is captured in the preceding section.
Information related to persons injured in the accident (non-Tt employees) is captured in the section below on this form.
Injured Tt employee information is captured on FORM IR-A

Vehicle Number 1 – Tetra Tech Vehicle		Vehicle Number 2 – Other Vehicle	
How many passengers (excluding driver) in the vehicle? ____		How many passengers (excluding driver) in the vehicle? ____	
Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address	
Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address	
Non-Injured Passenger Name and Address		Non-Injured Passenger Name and Address	

INJURIES TO NON-TETRATECH EMPLOYEES

Name of injured person 1				Address of injured person 1		
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?
	Male ☐ Female ☐			Yes ☐ No ☐	Yes ☐ No ☐	Injured ☐ Died ☐
Name of injured person 2				Address of injured person 2		
Age	Gender	Car No.	Location in Car	Seat Belt Used?	Ejected from car?	Injury or Fatality?
	Male ☐ Female ☐			Yes ☐ No ☐	Yes ☐ No ☐	Injured ☐ Died ☐

OTHER PROPERTY DAMAGE

Describe damage to property other than motor vehicles	
Property Owner's Name	Property Owner's Address

COMPLETE AND SUBMIT DIAGRAM DEPICTING WHAT HAPPENED

ATTACHMENT II

SAFE WORK PERMITS

SAFE WORK PERMIT
MOBILIZATION AND DEMOBILIZATION
CHARLESTON NAVAL COMPLEX – ZONE J,
NORTH CHARLESTON, SOUTH CAROLINA

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Mobilization / Demobilization activities.

II. **Primary Hazards:** Lifting; pinches and compressions; slip, trip and falls; pinches/compressions; cuts and lacerations; vehicular and foot traffic; ambient temperature extremes; insect and animal bites, and inclement weather

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this task			

Primary Route(s) of Exposure/Hazard: NA

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☒ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – Work)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes/boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☒ No
High visibility vest	☐Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒Yes	☐ No	Fire extinguisher	☒ Yes	☐ No
Safety Shower/Eyewash	☐Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Various tasks performed as part of mobilization/demobilization require additional PPE. Tasks and site conditions will determine the need for additional PPE (safety glasses, protective gloves, hearing protection, life vests, etc.). A minimum 2A Portable Fire Extinguisher will be maintained onsite for all operations.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Use safe lifting/carrying techniques. Use additional PPE based on the hazards that are associated with each task. Use work gloves when cutting boxes or handling sharp tools/cutting devices. Safety glasses will be required whenever eye hazards are present. Life vests will be used when working near or on water or from a boat. Identify/remove potential physical hazards and mark areas or hazards that cannot be removed. Keep work area free of ground clutter.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
MULTI-MEDIA SAMPLING
CHARLESTON NAVAL COMPLEX – ZONE J,
NORTH CHARLESTON, SOUTH CAROLINA

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Sediment sampling on Cooper River, Shipyard Creek, and Noisette Creek. Samples will be collected from an anchored boat. Limited decontamination is also included in this task since these activities will be performed in conjunction with sampling activities.

II. **Primary Hazards:** Water hazards/drowning; Contact with site contaminants; noise; pinches and compressions; rope burns; lifting (muscle strains) heavy lifting; slip, trip and fall; ambient temperature extremes; insect/animal bites and stings, inclement weather.

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes_____ ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes_____ ☐ No Initials of Inspector _____TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)/	Response Measures
SVOCs (PAHs), Pesticides	Visual observation	Any perceived contact	Wash contact point
Metals, PCBs.	Visual observation	Any perceived contact	Wash contact point

Primary Route(s) of Exposure/Hazard: Contact and incidental ingestion as a result of hand to mouth activities.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☒ Yes	☐ No	Safety Belt/Harness	☐ Yes	☒ No
Chemical/Splash Goggles	☐ Yes	☒ No	Radio/Cellular Phone	☒ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash Suits/Coveralls	☐ Yes	☐ No	Gloves (Type – Nitrile)	☒ Yes	☐ No
Impermeable Apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel Toe Work Shoes/Boots	☐ Yes	☒ No	Chemical Resistant Boot Covers	☐ Yes	☒ No
High Visibility Vest	☐ Yes	☒ No	Tape/Insect Repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☒ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☒ Yes	☐ No

Modifications/Exceptions: USCG approved personal floatation devices (life vests) for activities on a boat or along water. Always have a means to extract someone who has fallen in the water. Use insect repellant as needed. Use sunscreen, hat, glasses to protect from the sun. A minimum 2A Portable Fire Extinguisher will be maintained on site during all activities.

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☒ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Follow USCG boating guidelines and do not enter waterways when the threat of severe weather exists. Inspect and verify sea worthiness of vessel prior to use (Safe Vessel Certificate required or inspection conducted. See attached Vessel Checklist). Operator shall be experienced and knowledgeable in boating and waterway safety practices and have passed a safet boating course. Potential site contaminants are unlikely to be encountered at concentrations that pose a threat to site workers. Avoid contact with sediments and implement decontamination and good personal hygiene practices (washing hands and face) prior to eating or performing other hand to mouth activities. Use safe lifting/carrying techniques. Assume media is contaminated and avoid contact through the use of safe work practices, PPE and decontamination. Common hazards associated with the use of the Ponar Dredge because of the multiple hinges and trigger mechanism. In addition, due to the weight of the device and the thin rope, rope burns also result when lowering the device. To prevent these hazards the following measures will be employed

- Set the device on the deck and engage. Pick it up by the rope to keep hands away from pinch points.
- Coil the rope to permit unencumbered descending into the sediments. Even the patete Ponar Dredge is heavy. Leather gloves should be worn for the placement and extraction. Assistance may be required for the retrieval of this device with the weight of sediments and water.

SAFE WORK PERMIT
MULTI-MEDIA SAMPLING
CHARLESTON NAVAL COMPLEX – ZONE J,
NORTH CHARLESTON, SOUTH CAROLINA

- When unloading the Ponar Dredge grab it near very pinch points to release the contents. Care and assistance should be employed to avoiding getting fingers caught within the hinges or jaws.

The sediment core samplers are much easier and safer as there are no moving parts to pinch/compress.

Slips, Trips, and Falls – Boat are typically covered with indoor/outdoor carpeting or some other slip resistant materials. However, when these materials get wet, are covered in sediment, or bare metal is exposed, they become slippery. To combat hazards of this nature:

- Maintain a clutter free work area
- Clean up any residual spills
- Do not over extend yourself when reaching or pulling up the dredge sampler.

Tennis shoes, boat shoes or other footwear with adequate traction is recommended.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
MULTI-MEDIA SAMPLING
CHARLESTON NAVAL COMPLEX – ZONE J,
NORTH CHARLESTON, SOUTH CAROLINA

Vessel Safety Checklist	**Yes**	**No**
Display of numbers*		
Registration / documentation*		
Life jackets (PFDs)*		
Visual distress signals (VDS)*		
Fire extinguishers*		
Sound-producing devices*		
Navigation lights*		
Marine sanitation devices*		
Presence of Navigation Rules*		
Unique state and/or local requirements*		
Overall vessel condition*		
Deck free of hazards and clean bilge*		
Safe electrical and fuel systems*		
Safe galley and heating systems*		
Anchor & line for area		
First Aid and PIW kits		
Inland visual distress signals		
Capacity certificate of compliance		
**required items*		

If the boat being used has gone through an official USCG Vessel Safety Check it will have a decal indicating successful completion.

SAFE WORK PERMIT
IDW MANAGEMENT
CHARLESTON NAVAL COMPLEX – ZONE J,
NORTH CHARLESTON, SOUTH CAROLINA

Permit No. _____ Date: _____ Time: From _____ to _____

I. **Work limited to the following (description, area, equipment used):** Limited IDW management and storage

II. **Primary Hazards::** lifting; pinch and compressions; slip, trip and fall, vehicular and foot traffic; insect/animal/snake/alligator bites and stings temperature extremes, and inclement weather

III. **Field Crew:** _____

IV. **On-site Inspection conducted** ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. **Protective equipment required**
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	Hazard Monitoring	Action Level(s)/	Response Measures
SVOCs (PAHs), Pesticides	Visual observation	Any perceived contact	Wash contact point
Metals, PCBs.	Visual observation	Any perceived contact	Wash contact point

Primary Route(s) of Exposure/Hazard: Exposure to site contaminants is not likely to occur during this activity since IDW will be containerized.

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. **Additional Safety Equipment/Procedures**

Hard-hat	☐ Yes	☒ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☒ No
Safety Glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/Cellular Phone	☒ Yes	☐ No
Splash Shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – Work/nitrile)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel toe work shoes/boots	☒ Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☒ No
High Visibility vest	☐ Yes	☒ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☒ Yes	☐ No	Fire Extinguisher	☒ Yes	☐ No
Safety Shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Reflective vests for traffic areas

VIII. **Site Preparation**

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. **Additional Permits required** (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. **Special instructions, precautions:** Inspect drums used to store IDW prior to use. Use caution when opening drums that may have been exposed to sunlight or excessive heat as they may become pressurized. Stand in a clear area and allow drums to vent by slowly opening. Use proper lifting practices and obtain assistance when handling heavy drums. Use equipment whenever possible to move heavy items.

Permit Issued by: _____ Permit Accepted by: _____

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Person to notify in the event of an emergency: Name: _____

Phone: _____

Drug or other Allergies: _____

Particular Sensitivities : _____

Do You Wear Contacts?_____

What medications are you presently using? _____

_____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

Note: Health Insurance Portability and Accountability Act (HIPAA) Requirements

HIPAA took effect April 14, 2003. Loosely interpreted, HIPAA regulates the disclosure of Protected Health Information (PHI) by the entity collecting that information. PHI is any information about health status (such as that you may report on this Medical Data Sheet), provision of health care, or other information. HIPAA also requires TtNUS to ensure the confidentiality of PHI. This Act can affect the ability of the Medical Data Sheet to contain and convey information you would want a Doctor to know if you were incapacitated. So before you complete the Medical Data Sheet understand that this form will not be maintained in a secure location. It will be maintained in a file box or binder accessible to other members of the field crew so that the can accompany an injured party to the hospital.

DO NOT include information that you do not wish others to know, only information that may be pertinent in an emergency situation or treatment.

ATTACHMENT IV

OSHA POSTER

ATTACHMENT III

MEDICAL DATA SHEET

Job Safety and Health

It's the law!

OSHA

Occupational Safety and Health Administration
U.S. Department of Labor

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 3165-12-06R

APPENDIX E

ANALYTICAL LABORATORY STANDARD OPERATING PROCEDURES

ZONE J ANALYTICAL LABORATORY SOPs

(provided on compact disc)

APPENDIX F

ECOLOGICAL RISK ASSESSMENT SUPPORTING INFORMATION

APPENDIX F

FOOD CHAIN MODELING METHODOLOGY

The objective of food-chain modeling is to evaluate potential risks to representative receptors from screening-level chemicals of preliminary concern (COPCs) at Zone J that are known to bioaccumulate or biomagnify. U.S. Environmental Protection Agency (USEPA) Region 4 considers chemicals in this category to consist of those so designated in Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs (USEPA, 2000), with the exception of PAHs. USEPA Region 4 does not consider polynuclear aromatic hydrocarbons (PAHs) to bioaccumulate unless they are present at percent levels in soil or sediment.

Risk via the food chain will be evaluated using two scenarios. The first scenario will use maximum detected COPC concentrations in sediment and conservative assumptions for body weight, food consumption, and sediment ingestion. The second scenario will use average COPC concentrations and less conservative values for body weight, food consumption, and sediment ingestion, except where noted. For brevity, the first scenario will hereafter be referred to as the conservative scenario, and the second scenario will be referred to as the average scenario. For each scenario, ingested doses for birds and mammals will be calculated using the following equation.

$$PD = [[(C_{food} \times I_f) + (C_{sed} \times I_{sed})] \times AUF]/BW \qquad \text{(Equation 1)}$$

where:

PD	=	predicted dose from the ingestion of food and the incidental ingestion of sediment (mg/kg/day)
C_{food}	=	contaminant concentration in food (mg/kg)
I_f	=	food ingestion rate (kg/day)
C_{sed}	=	contaminant concentration in sediment (mg/kg)
I_{sed}	=	sediment ingestion rate (kg/day)
AUF	=	area use factor (portion of home range that overlaps the site)
BW	=	weight of receptor (kg)

REPRESENTATIVE RECEPTORS AND EXPOSURE FACTORS

The mink (*Mustela vison*) will be used to represent mammals that prey on fish and invertebrates. Birds that prey on fish and invertebrates will be represented by the green heron (*Butorides virescens*). These species typically have a high probability of exposure to sediment contaminants based on their diet and habitat preferences. The selected species are assumed to be representative of other species within the same trophic group or guild and to represent the groups of organisms specified in the assessment

endpoints. Information regarding these representative receptors is presented below and in Table F-1. Values for body weight and food consumption were taken preferentially from the Wildlife Exposure Factors Handbook (USEPA, 1993). Table F-2 presents the values for body weight, food consumption, and incidental sediment ingestion that will be used in the food-chain model (Equation 1), and was derived from Table F-1.

The Cooper River at Charleston Naval Complex (CNC) is heavily industrialized, so piscivorous birds and mammals would probably not forage in this portion of the river to any significant extent. Nevertheless, as a conservative measure, risks to these representative receptors will be evaluated for the Cooper River portion of Zone J.

Various fish, mollusk, and crustacean species are present in the Zone J water bodies. Attempts could be made to evaluate potential risks to these organisms by estimating the ingested doses in representative species and then the doses could be compared to toxicity thresholds derived from no observed adverse effect levels (NOAELs) and lowest observed adverse effect levels (LOAELs). However, there is considerable uncertainty inherent with this approach regarding factors such as food ingestion and toxicity thresholds. Instead, the evaluation of potential sediment-associated risks to these organisms will be evaluated by the comparison of Zone J sediment concentrations to USEPA Region 4 ecological screening values (ESVs); the ESVs are conservative in character and are based on toxicity tests using a variety of sediment organisms. Therefore, food-chain modeling for fish, mollusk, and crustacean species is not necessary.

Mink

The mink is the most abundant and widespread carnivorous mammal in North America. Mink are found in freshwater and brackish coastal marshes, wetlands, swamps, and along the edges of rivers, streams, lakes, lakes, and ditches (USEPA, 1993). They are never found far from water (Lowery, 1974). Mink tend to use brushy or wooded cover adjacent to the water where prey is abundant and downfall and debris provide den sites. Mink den in cavities in tree roots, brush piles, rock piles, logjams, or bank burrows of other animals, particularly muskrats. Mink are largely nocturnal but may move or feed during crepuscular (twilight) periods or during cloudy daylight conditions (USEPA, 1993).

Mink are carnivorous opportunistic predators, taking whatever prey is abundant. They feed on fish, crustaceans, and amphibians in aquatic habitats. Mammals are the most important prey in nearby terrestrial habitats where mink prey especially on mice, rats, and rabbits, and also birds, reptiles, and insects (Lowery, 1974 and USEPA, 1993).

Mean body weight values for adult wild mink (non-farm raised) were 1.040 kg (male, summer), 1.233 kg (male, fall), 0.550 kg (female, summer), and 0.586 kg (female, fall) in studies summarized in USEPA's Wildlife Exposure Factors Handbook (1993). Because female mink are especially sensitive to COPCs such as Aroclor, mink body weight and food ingestion values in the ecological risk assessment will be based on female data. Therefore, the body weight term in Equation 1 will be 0.550 kg in the conservative scenario and 0.568 kg (average female summer and fall) in the average scenario (Tables F-1 and F-2).

Food ingestion rates for mink ranged from 0.12 to 0.22 g/g body weight/day (USEPA, 1993). The food ingestion in the conservative scenario (0.0678 kg/day) was derived by multiplying the maximum food ingestion rate (0.22 g/g body weight/day) by the maximum body weight (1.233 kg) then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value, based on a 75-percent moisture content in fish (Sample et al., 1997). Food ingestion in the average scenario (0.0227 kg/day) was derived by multiplying the female food ingestion rate (0.16 g/g body weight/day) by the average female body weight (0.568 kg) then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value.

The two incidental sediment ingestion rates in Table F-2 (0.0064 kg/day and 0.0021 kg/day) were calculated by multiplying the two food ingestion rates (0.0678 kg/day and 0.0227 kg/day) by incidentally ingested sediment (9.4 percent of diet). The 9.4 percent value is based on the incidental soil/sediment ingestion rate of the raccoon (Beyer et al., 1994), which also forages on aquatic organisms, because sediment ingestion data were not available for the mink.

Green Heron

The green heron is a common bird in wetland thickets throughout the eastern United States. It is typically a bird of swampy thickets where it forages in both fresh and salt water, especially along forested margins of ponds, lakes, rivers, streams, marshes, and swamps. It prefers thick vegetation but will feed in the open when food is available. Small fish are its primary prey, but the green heron also consumes insects and a variety of aquatic invertebrates. Breeding populations in coastal South Carolina are non-migratory (Davis and Kushlan, 1994). The green heron probably forages in Shipyard Creek and Noisette Creek, and its small size relative to other wading birds makes it a good representative of other bird species that prey on aquatic and benthic organisms (a low body weight is usually associated with high food intake per unit body weight).

Data for the green heron were not included in USEPA's Wildlife Exposure Factors Handbook (USEPA, 1993), so data were obtained elsewhere. The mean adult body weight of 34 green herons in Florida was 212 grams (Dunning, 1993). Minimum and maximum body weights were not provided, but the standard deviation was 5.92 grams (Dunning, 1993). A value of 0.200 kg was used as the body weight term in

Equation 1 for the conservative scenario (Table F-2). This value is the mean minus two standard deviations from Dunning's data. The body weight term in Equation 1 for the average scenario was the mean (0.212 kg) from Dunning's data.

Food ingestion rates for the green heron were not available. Nagy (2001) provided allometric equations for several orders of birds but not for Ciconiiformes (herons). Dry weight food ingestion in the conservative scenario (0.031 kg/day) was derived using the Nagy (2001) equation for "marine birds" based on a 0.224 kg bird. The 0.224 kg body weight value is the mean plus two standard deviations from Dunning's (1993) green heron data; this value would approximate the 98th percentile and thus represents a conservative approach. Dry weight food ingestion in the average scenario (0.030 kg/day) was derived using the Nagy (2001) equation for marine birds based on a 0.212 kg bird, which is the mean body weight value from Dunning's (1993) green heron data.

Sediment ingestion data for piscivorous birds were not available in the literature. A sediment ingestion rate of 5 percent for piscivorous birds will be used in Equation 1. Unlike shorebirds, herons do not probe the sediment. Green herons and other wading birds typically capture prey with a darting stroke, grasping or spearing with the bill (Davis and Kushlan, 1994). Similarly, piscivorous birds such as the belted kingfisher and osprey capture prey primarily from the water column rather than by probing on or near the sediment substrate. Therefore, an assumed value of 5 percent for incidental sediment ingestion is probably a very conservative estimate for the green heron as well as for other piscivorous birds. The two sediment ingestion rates in Table F-2 (0.0016 kg/day and 0.0015 kg/day) were calculated by multiplying the two food ingestion rates (0.031 kg/day and 0.030 kg/day) by 0.05, assuming that incidentally ingested sediment is 5 percent of the diet.

CHEMICAL CONCENTRATIONS IN FOOD ITEMS

Chemical concentrations in food items (the "C_{food}" term in Equation 1) will be calculated using biota sediment accumulation factors (BSAFs) from published sources. The following sources of BSAFs will be preferentially used:

- BSAFs (Inorganics): Biota Sediment Accumulation Factors for Invertebrates: Review and Recommendations for the Oak Ridge Reservation (ORNL, 1998).

- BSAFs (Organics) The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, Volume 1: National Sediment Quality Survey (USEPA, 2004).

If BSAFs are not available in the above references, other sources of BSAFs will be used when available. A default value of 1.0 will be used for the BSAF if chemical-specific data are not available.

Concentrations of organic COPCs in food items of piscivorous birds and mammals will be estimated using the following equation (USEPA, 2004):

$$C_f = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

where:

C_f = chemical concentration in food (mg/kg)

C_s = chemical concentration in sediment (mg/kg)

BSAF = biota-sediment accumulation factor (ratio of the concentration of a chemical in tissue, normalized to lipid, to the concentration of the chemical in surface sediment, normalized to organic carbon)

f_{oc} = total organic carbon (TOC) content of sediment expressed as a decimal fraction

f_l = organism lipid content expressed as a decimal fraction

The TOC value to be used in Equation 2 for each water body will be a site-specific value from samples to be collected during the upcoming field effort.

A lipid content of 3 percent (0.03) is often used for assessing human health effects from the consumption of contaminated fish (USEPA, 2004); this value will be divided by 0.25 to convert the lipid content from a wet-weight value to a dry-weight value (0.12), based on a 75 percent moisture content in fish (Sample et al., 1997). Thus, 0.12 will be used to represent f_l in Equation 2 for organic compounds.

Sediment-to-fish BSAFs are not available for metals, so sediment-to-aquatic invertebrate BSAFs from ORNL (1998) will be used to estimate tissue concentrations of metals in food items of piscivorous birds and mammals. The BSAFs for metals are not normalized to lipids or TOC, so concentrations of metals in aquatic and benthic invertebrates will be estimated by multiplying each COPC's sediment concentration by its associated BSAF.

AREA USE FACTORS

In ecological risk assessments, the home range size of a representative receptor can be used to determine the proportion of time that an individual animal is expected to contact contaminated environmental media. Home range is defined as the geographic area encompassed by an animal's activities (except migration) over a specified time. The home range of each representative receptor will be assumed to be equal in size to each water body in both the conservative and average initial estimates

of ingested doses (i.e., AUF in Equation 1 = 1.0). This assumption is overly conservative for piscivorous receptors such as the green heron and mink at relatively small sites, so AUFs will be incorporated in subsequent iterations of dose calculations. Because the precise AUFs for piscivorous receptors at Zone J are unknown, a range of AUF values will be used.

ECOLOGICAL EFFECTS EVALUATION

Potential effects to representative piscivorous birds and mammals will be evaluated by comparing the modeled ingested doses to threshold oral toxicity reference values (TRVs), which are doses associated with adverse effects on growth, survival, or reproduction. Because TRVs for the specific representative receptors used herein (mink and green heron) are not available, toxicity data from laboratory species will be extrapolated to the representative receptor species. NOAELs and LOAELs will be used to provide a range of risks.

TRVs will be preferentially obtained from USEPA (2005), in which numerous toxicity studies were evaluated. TRVs for COPCs not included in USEPA (2005) will be preferentially obtained from an Oak Ridge National Laboratory (ORNL) report (Sample et al., 1996) that compiled toxicity data from several sources.

The ratio of the modeled dose to the TRV is called the hazard quotient (HQ). An HQ less than 1.0 in the food-chain modeling (in the conservative scenario and using the NOAEL as the TRV) indicates that risk to the representative piscivorous receptor is unlikely. A food chain HQ of greater than 1.0 indicates that potential risks to ecological receptors is possible, and the chemical will be further evaluated.

Calculation spreadsheets for the representative receptors will be presented in the ecological risk assessment.

REFERENCE LIST

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Lowery, G.H. 1974. The Mammals of Louisiana and its Adjacent Waters. Louisiana State University Press, Baton Rouge, Louisiana.

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TABLE F-1

DERIVATION OF BODY WEIGHT AND FOOD INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Species/Factor	Age/Sex/Season[a]	Value	Derivation of Factors Used in Food Chain Modeling		
Mink[b]					
Body Weight (g)	A M summer	1040	Minimum Value	0.550 kg	
	A M fall	1233	Maximum Value	1.233 kg	
	A F summer	550	Overall average	0.852 kg	
	A F fall	586	Average female	0.568 kg	
Food Ingestion Rate (g/g-day)	A M summer	0.13	Conservative scenario:	0.0678 kg/day	Maximum ingestion rate (0.22 g/g/day) × maximum body weight (1.233 kg) × 0.25[c]
	A M winter	0.12			
	A F winter	0.16	Less conservative scenario:	0.0227 kg/day	Female ingestion rate (0.16 g/g/day) × average female body weight (0.568 kg) × 0.25[c]
	A M year-round	0.22			
Green Heron[d]					
Body Weight (g)	AB	212	Mean of 34 adults from Florida = 212 g, standard deviation = 5.92 g (Dunning, 1993)		
			Conservative scenario:	0.200 kg	Mean minus 2 standard deviations (Dunning, 1993)
			Less conservative scenario:	0.212 kg	Mean (Dunning, 1993)
Food Ingestion Rate (g/g-day)	-	-	Conservative scenario:	0.031 kg/day	Using allometric equation from Nagy (2001) for 0.224 kg marine bird (0.224 kg = mean plus 2 standard deviations from Dunning (1993) green heron data)
			Less conservative scenario:	0.030 kg/day	Using allometric equation from Nagy (2001) for 0.212 kg marine bird

Notes:
a A=adult, M=male, F=female, B=both sexes
b Data from Wildlife Exposure Factors Handbook (USEPA, 1993).
c Food ingestion was multiplied by 0.25 (based on 75 percent moisture content in fish) to convert to dry weight ingestion rate.
d Green heron data not available in Wildlife Exposure Factors Handbook (USEPA, 1993). Values obtained from other sources as shown.

TABLE F-2

FOOD CHAIN EXPOSURE FACTORS FOR PISCIVOROUS WILDLIFE
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Species/Exposure Inputs	Conservative Scenario[1]		Average Scenario[1]	
	Value	Unit	Value	Unit
Mink				
Body Weight	0.550	kg	0.568	kg
Food Ingestion Rate[2]	0.0678	kg/day	0.0227	kg/day
Sediment Ingestion Rate[3]	0.0064	kg/day	0.0021	kg/day
Green Heron				
Body Weight	0.200	kg	0.212	kg
Food Ingestion Rate[2]	0.031	kg/day	0.030	kg/day
Sediment Ingestion Rate[3]	0.0016	kg/day	0.0015	kg/day

(1)The derivations of values in this table are presented in Table F-1.
(2) Food ingestion rates are dry-weight values.
(3) Sediment ingestion rates were calculated by multiplying the food ingestion (kg/day) by the proportion of the diet comprised of incidentally ingested sediment (9.4% for mink, 5% for green heron).

APPENDIX G

MEETING/CONFERENCE CALL MINUTES

01/04/07 Conference Call Minutes (SCDHEC, Navy, and Navy contractors)
AOC 721 and Zone J
Charleston Naval Complex, Charleston, South Carolina

Attendees and Contact Information:

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Gary Benfield, WPC	843-884-1234	gbenfield@wpceng.com
Mike Whitten, TtNUS	803-641-6313	mike.whitten@ttnus.com
Linda Klink, TtNUS	412-921-8650	linda.klink@ttnus.com

Time:
1:00 p.m. – 1:45 p.m.

Introduction

Dudley Patrick (Navy BRAC PMO) led the meeting with the objective of reviewing the progress to date and establishing the path forward. The agenda is attached.

Review of Minutes from the 11/16/06 Meeting

The 11/16/06 meeting minutes were accepted "as is" by the team.

Review of Action Item List

Linda Klink (TtNUS) led a review of the action item list from the 11/16/06 meeting. The status of these items and new items added during the 01/04/07 conference call are attached.

Navy Plans for Additional Field Work

During the 11/16/06 kickoff meeting, SCDHEC brought up several concerns requiring further consideration by the Navy. Since that time, the Navy has made the following decisions:

- To conduct sediment re-sampling using lower detection limits to support a No Further Action (NFA) decision for the Zone J RFI.
- To conduct groundwater re-sampling at Area of Concern (AOC) 721 to obtain "post-remediation" concentrations to aid in determining the path forward for groundwater.

Dudley Patrick discussed the implications to the project. The additional field work is not currently under contract and a change order to the TtNUS existing scope will be required. Also, the additional field work will necessitate preparation of a Work Plan, which will be provided to SCDHEC for review, as well as the Natural Resources Trustees. The Navy's vision for the Work Plan is a comprehensive document that will address sampling and analyses, including establishment of detection limits. Moreover, ecological risk assessment methodology (e.g., data sets, food-chain modeling receptors, and use of reference background samples) and project history (e.g., meeting minutes, e-mails, technical memos, and State approvals) for Zone J and AOC 721 will be addressed in the Work Plan. Considering the funding step and work plan step, Dudley estimated a field work start date in the spring of 2007.

Linda Klink was concerned about the future report presentation, considering that the Ensafe risk assessment was not conducted like TtNUS conducts ecological risk assessments for SCDHEC. Susan Byrd (SCDHEC) expressed a preference for the TtNUS risk assessment presentations and the team agreed on this methodology for the new samples to be collected. However, it is uncertain how to address the historical risk assessment work by Ensafe in order to provide their results without extensive rework. Furthermore, during the 11/16/06 kickoff meeting, Susan Byrd cautioned the Navy that historical work is extensive, particularly for Zone J, and for the Navy to pursue a recommendation of no further action, the deliverable will need to encompass and document previous tech memos, etc., hydrology dynamics, and dredging operations in order to be strongly defensible. Report presentation issues were not resolved and will require further thought during Work Plan preparation.

Benthic receptors will be addressed straightforward in the risk assessment. Mike Whitten (TtNUS) was interested in Susan Byrd's input on food-chain modeling receptors. Mike's preliminary list includes the mink (piscivorous mammal) and little blue heron (piscivorous bird) for Shipyard Creek and Noisette Creek. For the Cooper River, Mike believes that food chain modeling would not be necessary. Susan Byrd suggested that the Natural Resources Trustees may prefer the green heron instead of the little blue heron based on previous document decisions. Susan also indicated that the Natural Resources Trustees may want to see food chain modeling conducted for the Cooper River. Susan's input will be considered during Work Plan development and discussions with the Natural Resources Trustees.

Natural Resources Trustees

Dudley Patrick asked for input on how and when to involve the Natural Resources Trustees. Dudley believes that preparing a comprehensive Work Plan (see preceding discussion on Navy Plans for Additional Field Work) will serve as a vehicle for their involvement and the team agreed. The team also agreed on the importance of meetings with the Trustees as the project proceeds.

Dudley suggested that SCDHEC serve as the focal point of contact for the Trustees to ensure that comments received are consistent among the reviewers and in accordance with the team objectives. Stacey French (SCDHEC) indicated that coordination with the Trustees is instead the responsibility of the Navy. Dudley agreed that the Navy will do what needs to be done. Regulatory guidance on Trustee involvement will be reviewed by the team before deciding on how best to initiate contact (e.g., individual phone calls, conference call, written correspondence, or meeting).

Susan Byrd noted that the Trustees were involved with the Spectra Tech sediment sampling conducted in December 2005 and so updating of status should not be too extensive. Susan Byrd suggested that the team will need to give some thought to the title of the planned comprehensive Work Plan by TtNUS, considering that the previous Work Plan by Spectra Tech was called a Sediment Sampling Work Plan and only addressed sampling and analysis.

Conclusion

Dudley Patrick concluded the meeting, expressing his appreciation and thanking the team members for their input.

CHARLESTON NAVAL COMPLEX ACTION ITEM LIST FOR ZONE J AND AOC 721 January 4, 2007 Conference Call Charleston, South Carolina			
ITEM NUMBER	PERSON(S) RESPONSIBLE	DESCRIPTION OF ACTION REQUIRED	DUE DATE
1	Mike Whitten	**Spectra Tech Data:** Evaluate Spectra Tech detection limits and provide Navy with evaluation	DONE
2	L Klink/M Whitten	**Spectra Tech Data:** Propose path forward (i.e., use Spectra Tech data and/or resample)	DONE Resampling was recommended
3	Linda Klink	**Spectra Tech Data:** e-mail Trustees Spectra Tech revised table from response to comment letter	Defer to pending Work Plan and/or contact with Trustees
4	Dudley Patrick	**Spectra Tech Data:** Set up conference call with stakeholders for Thursday, 12/14/06 at 10:00 a.m. *(Note: Conference call moved to Thursday, 01/04/07 at 1:00 p.m. and will not include Natural Resources Trustees.)*	DONE
5	Mike Whitten	**Tech Memo:** Prepare tech memo identifying ecological receptors, path forward, etc. for stakeholder review	Defer to pending Work Plan
6	Linda Klink	**Tech Memo:** Obtain list of Trustees (from NWS Charleston) and confirm with SCDHEC (Stacey French)	DONE
7	Jerry Stamps	**Tech Memo:** e-mail team SCDHEC approval letter for Spectra Tech Work Plan	DONE
8	Linda Klink	**Tech Memo:** Submit tech memo to stakeholders	Defer to pending Work Plan
9	L Klink/M Whitten	**Dredging:** Research frequency and locations of Zone J dredging operations conducted by the Army Corps and maintenance dredging by others	DONE Incorporate into pending Work Plan
10	Dudley Patrick	**Dredging**: Provide TtNUS with storm water effluent report electronic file of dredging maps [Figures 1-3 and 1-4; drawing name 0154C007 dated 09/24/02]	DONE Incorporate into pending Work Plan
11	Dean Williamson	**RFI Report Preparation**: Provide TtNUS with listing of site remedies, changes in conditions to aid in evaluating linkages.	Defer to RFI Report
12	J Stamps/S Byrd	**RFI Report Preparation:** Provide Navy with presentation preferences for RFI Reports	In progress Incorporate into pending Work Plan
13	Dudley Patrick	**RFI Report Preparation:** Provide Linda with Zone J electronic file of oversized map for future presentations at meetings.	In progress
14	Dudley Patrick	**Funding:** Modify/fund TtNUS contract to conduct the resampling efforts	03/01/07
15	Dudley Patrick/L Klink	**Trustees:** Determine how and when to involve Trustees	01/31/07

CHARLESTON NAVAL COMPLEX CONFERENCE CALL FOR ZONE J AND AOC 721 AGENDA January 4, 2007 Charleston, South Carolina		
TIME	SUBJECT	PRESENTER
1:00-1:05	Review of minutes from 11/16/06 meeting	Linda Klink
1:05-1:10	Review action item list	Linda Klink
1:10- 1:15	Navy Plans for Additional Field Work - Zone J Sediment Sampling - AOC 721 GW Sampling	Dudley Patrick/ Linda Klink
1:15-1:25	Natural Resources Trustees Involvement	All Team
1:25-1:30	Review updated action item list	Linda Klink

11/16/06 Kickoff Meeting Minutes (SCDHEC, Navy, and Navy contractors)
AOC 721 and Zone J
Charleston Naval Complex, Charleston, South Carolina

Attendees and Contact Information:

Dudley Patrick, Navy BRAC SE PMO	843-743-2136	dudley.patrick@navy.mil
Jerry Stamps, SCDHEC	803-896-4285	stampsjm@dhec.sc.gov
Susan Byrd, SCDHEC	803-896-4188	byrdsk@dhec.sc.gov
Dean Williamson, CH2MHill	352-335-5877	dean.williamson@ch2m.com
Gary Benfield, WPC	843-884-1234	gbenfield@wpceng.com
Mike Whitten, TtNUS	803-641-6313	mike.whitten@ttnus.com
Linda Klink, TtNUS	412-921-8650	linda.klink@ttnus.com

Location:
CNC RDA Conference Room, Charleston, South Carolina

Time:
10:00 a.m. to noon

Introduction/Roles

Dudley Patrick (Navy BRAC PMO) led the introductions of team members.

The purpose of the meeting was to discuss issues, questions, and the path forward for Charleston Naval Complex (CNC) Area of Concern (AOC) 721 and Zone J.

Zone J Chronology

Gary Benfield was historically involved in Zone J activities and provided a chronology of events to the team. In summary, a draft RFI Report was originally submitted in 1996 but was not well received by SCDHEC because the report did not evaluate linkages with land-side sites. A number of technical memos have since been submitted to address impacts to Zone J from storm water effluent (Ensafe), surface runoff (CH2MHill), and contaminated groundwater migration (CH2MHill). A new draft RFI Report was underway by Ensafe to integrate and document all results to date but the document is not complete and has not been submitted to SCDHEC. The original RFI data was collected in the early 1990s and the data is too old for use in evaluating current conditions. Moreover, dredging has regularly occurred since the time of sampling. Therefore, Spectra Tech was contracted by the Navy in 2005 to collect representative current-day samples from five locations that were previously identified as most highly contaminated. Spectra Tech also collected ten sediment samples from reference background locations for comparison purposes. The Spectra Tech work was conducted in accordance with a SCDHEC-approved Work Plan. Recently, TtNUS has been tasked by the Navy to finalize the draft RFI Report by Ensafe, incorporating the Sediment Sampling Report by Spectra Tech, and conducting ecological risk assessment.

Regulatory Perspective

SCDHEC was provided an opportunity to voice their concerns, identified as follows:

- *Comprehensive Deliverable:* Susan Byrd cautioned the Navy that historical work is extensive, particularly for Zone J, and for the Navy to pursue no remediation, the deliverable will need to encompass and document previous tech memos, etc., hydrology dynamics, and dredging operations in order to be strongly defensible.

- *Natural Resources Trustees:* The Natural Resources Trustees are decision makers and need to be involved with the project. Susan Byrd said that the Trustees are unofficially "on board" with

decisions to date. Susan Byrd mentioned that SCDHEC is the lead and the US Environmental Protection Agency (USEPA) has not significantly participated, although invited.

- *Elevated Detection Limits:* This was by far the most significant concern. Upon review of the Spectra Tech Sediment Sampling Report for Zone J, both Jerry Stamps and Susan Byrd (SCDHEC) were very concerned with the elevated detection limits compared to criteria. Spectra Tech responded to the SCDHEC concern by providing a revised table showing instrument method detection limits (MDLs), which were significantly less than the reported detection limits. However, approximately one-third of the MDLs still exceed criteria. Dudley Patrick (Navy BRAC PMO) and TtNUS will further evaluate this concern before proposing a path forward, which will be discussed with the stakeholders in a conference call agreed upon Thursday, December 14, 2006 at 10:00 a.m. The Natural Resources Trustees will be invited to participate.

Zone J Eco Risk Methodology

Mike Whitten (TtNUS) led a discussion on the Navy/Tetra Tech proposed path forward concerning the ecological risk assessment. First, Mike asked for confirmation that human health risks were not of concern and that the sediment reference background data set is acceptable; Susan Byrd (SCDHEC) confirmed. Next, Mike asked if surface water was a concern; Susan responded that surface water concentrations are not of concern; however, surface water risks will need to be documented in the RFI Report.

Mike then discussed how the reference background samples would be used in the eco risk assessment. He and Susan agreed that screening could be conducted up front for background with the screening value at two times the average background concentration. Discretion can be used in evaluating samples slightly greater than the screening value yet within the background range. Susan Byrd mentioned a 2004 USEPA background document supporting this methodology.

Next, Mike discussed identification of the eco receptors. He proposed that pisciverous birds and mammals be considered for the Shipyard Creek and Noisette Creek but not the Cooper River. The team suggested that Mike prepare a short tech memo for team review and approval prior to conducting the food-chain modeling. The Natural Resources Trustees should be included in the review. Linda Klink (TtNUS) will distribute the tech memo to all. The team agreed that it is important to reference previous decisions (e.g., establishment of five locations for Spectra Tech sampling) within the tech memo for the benefit of the Trustees. Jerry Stamps (SCDHEC) agreed to send the team the State's letter of approval for the Spectra Tech Work Plan.

Zone J Eco Data Sets

Mike Whitten (TtNUS) led a discussion on how the historical data would be grouped. He proposed focusing on the Spectra Tech data since it is most recent and is representative of current-day contamination of concern. The team agreed. The five samples will be grouped into three separate areas – Noisette Creek, Shipyard Creek, and the Cooper River.

Linda Klink (TtNUS) noted that a status update of activities at land-side sites impacting Zone J would aid the linkage evaluation. Activity may be related to remediation or other changes in conditions that would lessen stormwater effluent or runoff impacts (site grading, parking lot construction, etc.). Dean Williamson agreed to provide the team with this information.

Zone J Dredging

Dudley Patrick (Navy BRAC PMO) has been researching dredging operations and developed points of contact, which he passed along to TtNUS for inclusion in the RFI Report. Dudley spoke of upcoming dredging operation in the near future. Susan Byrd (SCDHEC) added that good maps on dredging are available in the storm water effluent report and could be updated to document more recent dredging

operations. Dudley Patrick will need to contact Ensafe to obtain electronic versions of the dredge maps for TtNUS.

AOC 721

TtNUS has been scoped to finalize the draft RFI Report by Ensafe, incorporating the Interim Measures (IM) Report prepared by Spectra Tech. Linda Klink (TtNUS) believed that the IM for soil appears to have been successful. Susan Byrd and Jerry Stamps (SCDHEC) agreed. However, no further action might not be appropriate depending on the status of groundwater, which needs reviewed.

Linda asked the SCDHEC how the report should be presented, considering that Ensafe and Spectra Tech prepared most of the report, yet TtNUS needs to finalize. SCDHEC will provide the Navy/TtNUS with direction.

Action Items

Detection Limits

Mike Whitten	Evaluate Spectra Tech data and provide Navy with evaluation.
L Klink/M Whitten	Propose path forward (i.e., use Spectra Tech data and/or resample).
L Klink	e-mail Trustees Spectra Tech revised table from response to comment letter.
Dudley Patrick	Set up conference call with stakeholders for Thursday, 12/14/06 at 10:00 a.m. *(Note: Conference call moved to Thursday, 01/04/07 at 1:00 p.m. and will not include Natural Resources Trustees.)*

Tech Memo

Mike Whitten	Prepare tech memo identifying ecological receptors, path forward, etc. for stakeholder review.
Linda Klink	Obtain list of Trustees (from NWS Charleston) and confirm with SCDHEC (Stacey French).
Jerry Stamps	e-mail team SCDHEC approval letter for Spectra Tech Work Plan.
Linda Klink	Submit tech memo to stakeholders.

Dredging

L Klink/M Whitten	Research frequency and locations of Zone J dredging operations conducted by the Army Corps and maintenance dredging by others.
Dudley Patrick	Provide TtNUS with storm water effluent report electronic file of dredging maps [Figures 1-3 and 1-4; drawing name 0154C007 dated 09/24/02].

RFI Report Preparation

Dean Williamson	Provide TtNUS with listing of site remedies, changes in conditions to aid in evaluating linkages.
J Stamps/S Byrd	Provide Navy with presentation preferences for RFI Reports
Dudley Patrick	Provide Linda with Zone J electronic file of oversized map for future presentations at meetings.

APPENDIX M

PHOTOGRAPHS

Photograph M-1: North shore of Noisette Creek seen from sample location JNOIM0004. Remains of former bridge visible.

Photograph M-2: South shore of Noisette Creek seen from sample location JNOIM0004. Remains of former bridge visible.

Photograph M-3: Noisette Creek; looking upstream (west) toward sample locations JNOIM0004 and JNOIM0011. Photo taken from sample location JNOIM0012.

Photograph M-4: Noisette Creek; looking downstream (east) from sample location JNOIM0012. Confluence of Noisette Creek and Cooper River is visible in background (to the left of the towers).

Photograph M-5: Shipyard Creek, sample location H009M0016.

Photograph M-6: Shipyard Creek, sample location H009M0004.

Photograph M-7: Upper Shipyard Creek. All three Shipyard Creek sediment samples were collected from this segment of the creek.

Photograph M-8: Cooper River, looking south from sample location E054M0001.

Photograph M-9: Cooper River, looking southwest from sample location E054M0001.

Photograph M-10: Cooper River, looking northwest from sample location E054M0001.

Photograph M-11: Cooper River; sample 556M000503 was collected at the concrete piling visible in the center of the photograph.

APPENDIX N

SEDIMENT SAMPLE LOGS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: NOIM0001103
Sample Location: Zone J, Noise the Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			dark brown, silty, with some shell
Time: 0935			
Method: Ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, Pest/PCBs, metals, TOC			

OBSERVATIONS / NOTES:

water depth: 5 ft

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M L Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: NOIM000403
Sample Location: Noisette Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			dark brown, silty, some sand + shells
Time: 0955			small wood fragments
Method: Ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, Pest/PCBs, metals, TOC			

OBSERVATIONS/NOTES:

Water = 5 ft deep
site of former bridge
photos 001 + 002 show remains of bridge from sampling location

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M J Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: NOIM001203
Sample Location: Noisette Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			fluffy, silty, dark gray
Time: 1015			
Method: Ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, Pest/PCBs, metals, TOC			

OBSERVATIONS/NOTES:

photo # 003 looking upstream, photo # 004 looking downstream

dup collected here

FD0430801 = dup.

water depth: 5 ft

MAP:

see field logbook for GPS position recorded here.

Circle if Applicable:

MS/MSD	Duplicate ID No.:
	FD0430801

Signature(s): M L Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 054M0Ø0103
Sample Location: Cooper River
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			dark brown/gray silty sand
Time: 1105			
Method: ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, pest/PCB, metals, TOC			

OBSERVATIONS/NOTES:

4 photos taken here (#005 - 008) of shoreline panning from south to NW.
Northern of 3 Cooper River samples
water depth ~ 18 inches
~ 40 ft offshore

MAP:

see field logbook for GPS posit. recorded here

Circle If Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M J Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 556M000703
Sample Location: Cooper River
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			black silty "jelly-like" petroleum odor
Time: 1150			
Method: Ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, pest/PCB, metals, TOC			

OBSERVATIONS / NOTES:

water depth = 20 ft
~ 5 ft from dock
No photos taken here

MAP:

see field logbook for GPS coordinates (but GPS indicated poor posit.)

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M L Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 556M000503
Sample Location: Cooper River
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4/30/08			black, very silty "jelly-like" slight petroleum odor
Time: 1215			
Method: Ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, pest/PCB, metals, TOC			

OBSERVATIONS/NOTES:

water depth ≈ 12 ft

photos #009 - 011 taken showing concrete divider/piling where sample was collected.

MAP:

see field logbook for GPS coordinates.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M L Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009M000403
Sample Location: Shipyard Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-30-08			dark, silty with slight sand
Time: 1455			
Method: ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, pest/PCB, metals, TOC			

OBSERVATIONS/NOTES:

water depth approx. 4 feet
photo # 012 = sample location 009M000403
photo # 013 = this sample location (009M000403); & location of sample 009M001703 in background.
photos # 014 & 015 show all three shipyard Creek sample locations. see field logbook for GPS coordinates of 009M000403.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M J Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: 112 G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009M001703
Sample Location: Shipyard Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-30-08			silty, dark
Time: 1510			
Method: ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC, pest/PCB, metals, TOC			

OBSERVATIONS / NOTES:

water depth ~ 4 feet
photo # ~~024~~ 013 shows sample location in background, in foreground is location of 009M000403.
MS/MSD sample collected here.
Sample location is ~ 50 feet upstream of 009M000403.

MAP:

Circle If Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): M J Whitten

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: CNC Zone J
Project No.: N2G00349

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 009M001603
Sample Location: Shipyard Creek
Sampled By: M. Whitten
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 4-30-08			dark, silty
Time: 1525			
Method: ponar			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

Sample collected ~50 ft downstream of 009M000403. photos # 014 + 015 show all 3 shipyard Creek sample locations (left to right = 1603, 0403, 1703).

Shipyard Creek samples accessed by vehicle via Bainbridge Ave; turn right at Visitor's Center.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): M J Whitten

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC Zone J
Project Number: 112G00349
Sample Location: Noisette Creek
QA Sample Type:

Sample ID Number: FD0430080I
Sampled By: M. Whitten
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[] Rinsate Blank
[] ~~Other Blank~~ Field Duplicate

SAMPLING DATA:

Date: 4-30-08
Time: 1015
Method: Ponar

WATER SOURCE:

[] Laboratory Prepared
[] Purchased
[] Other N/A
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: N/A
Supplier:
Manufacturer:
Order Number:
Lot Number:
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO
TOC			yes

OBSERVATIONS / NOTES:

Collected as duplicate of sample NOIM00 1203.

Signature(s): MJ Whitten

Tetra Tech NUS, Inc.

QA SAMPLE LOG SHEET

Page___ of ___

Project Site Name: CNC Zone J
Project Number: 112G00349
Sample Location: NA
QA Sample Type:

Sample ID Number: RB04300801
Sampled By: M. Whitten
C.O.C. Number:

[] Trip Blank
[] Source Water Blank
[X] Rinsate Blank
[] Other Blank

SAMPLING DATA:

Date: 4-30-08
Time: 1705
Method:

WATER SOURCE:

[] Laboratory Prepared
[X] Purchased
[] Other
[] Tap
[] Fire Hydrant

PURCHASED WATER INFORMATION (If Applicable as Source or Rinsate Water):

Product Name: BDH Water
Supplier: Pine Environmental
~~Manufacturer:~~ Distributor = VWR International
Order Number:
Lot Number: 051806E
Expiration Date:

RINSATE INFORMATION (If Applicable):

Media Type:
Equipment Used:
Equipment Type:
[] Dedicated
[] Reusable

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Volatiles	Cool 4°C & HCl		YES / NO
Semivolatiles	Cool 4°C		YES / NO
Pesticide / PCB	Cool 4°C		YES / NO
Metals	Cool 4°C & HNO_3		YES / NO
Cyanide	Cool 4°C & NaOH		YES / NO

OBSERVATIONS / NOTES:

Rinsate blank = DI water poured from container over sediment-scoop into sample container.

Signature(s): M. Whitten

APPENDIX O

DATA VALIDATION REPORTS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**C. PIKE**	**DATE:**	**SEPTEMBER 24, 2008**
FROM:	**LEANNE M. GANSER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- SVOC/PAH/PEST/PCB**
CTO 017 CNC CHARLESTON
SDG: SB2238

SAMPLES: 10/Solid/

009M000403	009M001603	009M001703	054M000103	556M000503
556M000703	FD04300801	NOIM000403	NOIM001103	NOIM001203

1/Aqueous/
RB04300801

OVERVIEW

The sample set for CNC Charleston, SDG SB2238 consists of ten (10) soil samples and one (1) rinse blank. The samples were analyzed for semi-volatile organic compounds (SVOC), polycyclic aromatic hydrocarbons (PAHs), pesticides (PEST) and PCBs. One field duplicate pair was associated with this SDG: NOIM001203/ FD04300801.

The samples were collected by TetraTech NUS on April 30, 2008 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with SW-846 methods 8081, 8082, and 8270C. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
* • GC/MS Tuning
• Initial/continuing calibrations
• Field/Laboratory method blank results
• Surrogate Recoveries
* • Internal Standards
• Blank Spike/Blank Spike Duplicate Results
• Matrix Spike/Matrix Spike Duplicate Results
• Field Duplicate Results
* • Compound Quantitation
* • Compound Identification
* • Detection Limits

The symbol (*) indicates that quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A. Results as reported by the laboratory are presented in Appendix B.

Semivolatiles

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries for sample 009M001703 were <10% for hexachlorocyclopentadiene. The nondetect result for hexachlorocyclopentadiene was rejected, "UR", in this sample.

MS/MSD percent recoveries were greater than quality control limits for di-n-octylphthalate. No data was qualified as all results for di-n-octylphthalate were nondetects.

The relative percent difference between the laboratory control sample and laboratory control sample duplicate percent recoveries for benzaldehyde was greater than quality control limits. No data was qualified as all results for benzaldehyde were nondetects.

PAHs

Calibration verification %D on instrument R, on 05/24/08 at 10:54, exceeded the 25% quality control limit for benzo(a)anthracene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. The detected and nondetected results for the aforementioned compounds were qualified as estimated "J" and "UJ", respectively, in all samples, except 009M001603, 054M000103, and RB04300801.

Calibration verification %D on instrument R, on 06/03/08 at 16:36, exceeded the 25% quality control limit for indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. The nondetected results for the aforementioned compounds were qualified as estimated "UJ" in sample RB04300801.

The following contaminant was detected in the laboratory method blank at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Bis(2-ethylhexyl)phthalate	14 ug/kg	140 ug/kg

An action level of 10X the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. The positive result below the action level for bis(2-ethylhexyl)phthalate in sample 054M000103 was qualified as a false positive, "U".

The matrix spike duplicate (MSD) percent recovery for benzo(k)fluoranthene was < 30% quality control limit. The positive results reported for benzo(k)fluoranthene were qualified as "J".

The MSD percent recovery for pyrene and benzo(a)anthracene was greater than the quality control limit. The positive and nondetected results reported for pyrene and benzo(a)anthracene were qualified as estimated, "J" and "UJ", respectively.

Field duplicate imprecision (relative percent difference > 50%) was noted for sample pair NOIM001203/ FD04300801 for phenanthrene. Positive results reported for phenanthrene were qualified as estimated "J".

Pesticides

Calibration verification %D exceeded the 25% quality control limit for gamma BHC, heptachlor, beta-BHC,

endrin, methoxychlor, and endrin ketone for GC instrument 8 column 1 and column 2 on 05/23/08 at 16:56 affecting all solid samples, except 009M001603 and 009M001703. No action was taken on this basis because all associated results for the aforementioned compounds were non-detected.

Calibration verification %D exceeded the 25% quality control limit for 4,4'-DDD and 4,4'-DDT for GC instrument 8 column 2 on 05/23/08 at 16:56 affecting all solid samples, except 009M001603 and 009M001703. Positive results for 4,4'-DDD were qualified in the affected samples as estimated, "J". Non-detected results for the aforementioned compounds were not qualified.

Calibration verification %D exceeded the 25% quality control limit for gamma BHC, heptachlor, beta-BHC, endrin, 4,4'-DDT, methoxychlor, and endrin ketone for GC instrument 8 column 1 and column 2 on 05/27/08 at 14:28 affecting samples 009M001603 and 009M001703. No action was taken on this basis because all associated results for the aforementioned compounds were non-detected.

Calibration verification %D exceeded the 25% quality control limit for endosulfan sulfate for GC instrument 8 column 1 on 05/27/08 at 14:28 affecting samples 009M001603 and 009M001703. No action was taken on this basis because all associated results for the aforementioned compound were non-detected.

One system monitoring compound (decachlorobiphenyl) in the matrix spike, matrix spike duplicate and samples 556M000503, FD04300801, NOIM000403, and NOIM001103, in the associated batch analyzed on 05/23/08 at 10:22-16:56 had a recovery greater than acceptance limits. Positive results in samples 556M000503, FD04300801, NOIM000403, and NOIM001103 were qualified as estimated, "J".

One system monitoring compound (tetrachloro-m-xylene) in samples 009M000403, 556M000703, and NOIM001203, in the associated batch analyzed on 05/23/08 at 10:22-16:56 had a recovery greater than acceptance limits. Positive results in samples 009M000403, 556M000703, and NOIM001203 were qualified as estimated, "J".

The matrix spike/ matrix spike duplicate (MS/MSD) percent recoveries in 009M001703 for beta-BHC, aldrin, and heptachlor epoxide were < 30% quality control limit. Nondetected results reported for the aforementioned compounds were rejected, "UR".

The MS/MSD percent recoveries for alpha-BHC, gamma BHC, delta-BHC, heptachlor, gamma-chlordane, alpha-chlordane, endosulfan I, dieldrin, endrin, 4,4'-DDD, endosulfan II, 4,4'-DDT, endrin aldehyde, methoxychlor, endosulfan sulfate, and endrin ketone were greater than quality control limits. The positive results reported for the aforementioned compounds in all samples were qualified as estimated, "J".

The relative percent difference (RPD) between the MS and MSD percent recoveries was greater than quality control limit for delta-BHC, aldrin, endosulfan I, endrin aldehyde, and endrin ketone. No action was taken as these compounds were not detected in any sample.

The laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) percent recoveries for delta-BHC and endosulfan sulfate were greater than quality control limits affecting the rinse blank. No action was taken as results for the aforementioned compounds were nondetects.

<u>PCBs</u>

Calibration verification %D exceeded the 25% quality control limit for Aroclor-1260 and surrogate for GC instrument 6 column 1 on 05/15/08 at 04:14 affecting the rinse blank. No action was taken on this basis as Aroclor-1260 was not detected in RB04300801.

Calibration verification %D exceeded the 25% quality control limit for Aroclor-1016 and Aroclor-1260 and surrogate for GC instrument 8 column 1 and 2 on 05/29/08 at 06:24 affecting the matrix spike and samples

NOIM000403, NOIM001103, and NOIM001203. No action was taken on this basis as the aforementioned compounds were not detected in the affected samples.

System monitoring compounds (tetrachloro-m-xylene and decachlorobiphenyl) in samples 009M001603, 009M001703, 054M000103, 556M000503, 556M000703, FD04300801, NOIM001103, and NOIM001203 in the associated batch analyzed on 05/28/08 at 16:51-23:56 had recoveries greater than acceptance limits. Positive results in samples 009M001603, 009M001703, and 054M000103 were qualified as estimated, "J".

System monitoring compounds (tetrachloro-m-xylene and decachlorobiphenyl) in rinse blank, RB04300801, in the associated batch analyzed on 05/14/08 to 05/15/08 at 11:33-04:14 had recoveries greater than acceptance limits. No action was taken on this basis as all results for the aforementioned samples were nondetects.

One system monitoring compound (decachlorobiphenyl) in the matrix spike, matrix spike duplicate, and samples, 009M000403 and NOIM000403, in the associated batch analyzed on 05/28/08 at 16:51-23:56 had recoveries greater than acceptance limits. Positive results in sample 009M000403 were qualified as estimated, "J".

The MS/MSD percent recoveries for Aroclor-1016 and Aroclor-1260 in sample 009M001703 were greater than quality control limits. The positive results reported for the aforementioned compounds in all samples were qualified as estimated, "J".

The LCS/LCSD percent recoveries for Aroclor-1016 and Aroclor-1260 were greater than quality control limits affecting the rinse blank. No action was taken as results for the aforementioned compounds were nondetects.

Additional Comments

Positive results less than the reporting limit (RL) were qualified as estimated "J", due to uncertainty near the detection limit.

Samples 009M000403, 009M001703, 556M000503, 556M000703, FD04300801, NOIM000403, NOIM001103, and NOIM001203, were reanalyzed for PAH compounds at a dilution. Only the results from these diluted samples were qualified.

For PAH analysis, sample 009M000403 was analyzed at a 4X dilution, 009M001703 at 2X, 556M000503 at 50X, 556M000703 at 4X, FD04300801 at 3X, NOIM000403 at 5X, NOIM001103 at 3X, and NOIM001203 at 5X, resulting in elevated detection limits for all compounds in these samples.

For pesticide analysis, all solid samples were analyzed at a 5X dilution, resulting in elevated detection limits for all compounds in these samples.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Continuing calibrations for the PAH, pesticide, and PCB fractions had %D noncompliances that resulted in qualification of the data. Bis(2-ethylhexyl)phthalate was present in a laboratory blank. Surrogate recoveries were outside of quality control limits for several compounds in the pesticide and PCB fractions, resulting in qualification of data. LCS/LCSD percent recoveries were greater than acceptance limits for pesticide and PCB fractions.

Other Factors Affecting Data Quality: Several compounds were qualified due to uncertainty near the

detection limit. MS/MSD percent recovery was outside of control limits for several compounds. Field duplicate imprecision was noted for phenanthrene in the field duplicate pair.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October 1999) and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (January 2006). The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the DoD QSM."

Tetra Tech NUS

Leanne M. Ganser
Environmental Scientist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS-GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DOT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	009M000403	nsample	009M000403	nsample	009M001603
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-15	lab_id	SB2238-15	lab_id	SB2238-19
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	44.8	Pct_Solids	44.8	Pct_Solids	28.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	740	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	740	U	
2,4,5-TRICHLOROPHENOL	1800	U	
2,4,6-TRICHLOROPHENOL	740	U	
2,4-DICHLOROPHENOL	740	U	
2,4-DIMETHYLPHENOL	740	U	
2,4-DINITROPHENOL	1800	U	
2,4-DINITROTOLUENE	740	U	
2,6-DINITROTOLUENE	740	U	
2-CHLORONAPHTHALENE	740	U	
2-CHLOROPHENOL	740	U	
2-METHYLPHENOL	740	U	
2-NITROANILINE	1800	U	
2-NITROPHENOL	740	U	
3&4-METHYLPHENOL	740	U	
3,3'-DICHLOROBENZIDINE	740	U	
3-NITROANILINE	1800	U	
4,6-DINITRO-2-METHYLPHENOL	1800	U	
4-BROMOPHENYL PHENYL ETHER	740	U	
4-CHLORO-3-METHYLPHENOL	740	U	
4-CHLOROANILINE	740	U	
4-CHLOROPHENYL PHENYL ETHER	740	U	
4-NITROANILINE	1800	U	
4-NITROPHENOL	1800	U	
ACETOPHENONE	740	U	
ATRAZINE	740	U	
BENZALDEHYDE	740	U	
BIS(2-CHLOROETHOXY)METHANE	740	U	
BIS(2-CHLOROETHYL)ETHER	740	U	
BUTYL BENZYL PHTHALATE	740	U	
CAPROLACTAM	740	U	
CARBAZOLE	740	U	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	740	U	
DIETHYL PHTHALATE	740	U	
DIMETHYL PHTHALATE	740	U	
DI-N-BUTYL PHTHALATE	740	U	
DI-N-OCTYL PHTHALATE	740	U	
HEXACHLOROBENZENE	740	U	
HEXACHLOROBUTADIENE	740	U	
HEXACHLOROCYCLOPENTADIENE	740	U	
HEXACHLOROETHANE	740	U	
ISOPHORONE	740	U	
NITROBENZENE	740	U	
N-NITROSO-DI-N-PROPYLAMINE	740	U	
N-NITROSODIPHENYLAMINE	740	U	
PENTACHLOROPHENOL	1800	U	
PHENOL	740	U	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	1100	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	1100	U	
2,4,5-TRICHLOROPHENOL	2800	U	
2,4,6-TRICHLOROPHENOL	1100	U	
2,4-DICHLOROPHENOL	1100	U	
2,4-DIMETHYLPHENOL	1100	U	
2,4-DINITROPHENOL	2800	U	
2,4-DINITROTOLUENE	1100	U	
2,6-DINITROTOLUENE	1100	U	
2-CHLORONAPHTHALENE	1100	U	
2-CHLOROPHENOL	1100	U	
2-METHYLPHENOL	1100	U	
2-NITROANILINE	2800	U	
2-NITROPHENOL	1100	U	
3&4-METHYLPHENOL	1100	U	
3,3'-DICHLOROBENZIDINE	1100	U	
3-NITROANILINE	2800	U	
4,6-DINITRO-2-METHYLPHENOL	2800	U	
4-BROMOPHENYL PHENYL ETHER	1100	U	
4-CHLORO-3-METHYLPHENOL	1100	U	
4-CHLOROANILINE	1100	U	
4-CHLOROPHENYL PHENYL ETHER	1100	U	
4-NITROANILINE	2800	U	
4-NITROPHENOL	2800	U	
ACETOPHENONE	1100	U	
ATRAZINE	1100	U	
BENZALDEHYDE	1100	U	
BIS(2-CHLOROETHOXY)METHANE	1100	U	
BIS(2-CHLOROETHYL)ETHER	1100	U	
BUTYL BENZYL PHTHALATE	1100	U	
CAPROLACTAM	1100	U	
CARBAZOLE	1100	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	009M001603
samp_date	4/30/2008
lab_id	SB2238-19
qc_type	NM
units	UG/KG
Pct_Solids	28.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	1100	U	
DIETHYL PHTHALATE	1100	U	
DIMETHYL PHTHALATE	1100	U	
DI-N-BUTYL PHTHALATE	1100	U	
DI-N-OCTYL PHTHALATE	1100	U	
HEXACHLOROBENZENE	1100	U	
HEXACHLOROBUTADIENE	1100	U	
HEXACHLOROCYCLOPENTADIENE	1100	U	
HEXACHLOROETHANE	1100	U	
ISOPHORONE	1100	U	
NITROBENZENE	1100	U	
N-NITROSO-DI-N-PROPYLAMINE	1100	U	
N-NITROSODIPHENYLAMINE	1100	U	
PENTACHLOROPHENOL	2800	U	
PHENOL	1100	U	

nsample	009M001703
samp_date	4/30/2008
lab_id	SB2238-17
qc_type	NM
units	UG/KG
Pct_Solids	26.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	1200	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	1200	U	
2,4,5-TRICHLOROPHENOL	3000	U	
2,4,6-TRICHLOROPHENOL	1200	U	
2,4-DICHLOROPHENOL	1200	U	
2,4-DIMETHYLPHENOL	1200	U	
2,4-DINITROPHENOL	3000	U	
2,4-DINITROTOLUENE	1200	U	
2,6-DINITROTOLUENE	1200	U	
2-CHLORONAPHTHALENE	1200	U	
2-CHLOROPHENOL	1200	U	
2-METHYLPHENOL	1200	U	
2-NITROANILINE	3000	U	
2-NITROPHENOL	1200	U	
3&4-METHYLPHENOL	1200	U	
3,3'-DICHLOROBENZIDINE	1200	U	
3-NITROANILINE	3000	U	
4,6-DINITRO-2-METHYLPHENOL	3000	U	
4-BROMOPHENYL PHENYL ETHER	1200	U	
4-CHLORO-3-METHYLPHENOL	1200	U	
4-CHLOROANILINE	1200	U	
4-CHLOROPHENYL PHENYL ETHER	1200	U	
4-NITROANILINE	3000	U	
4-NITROPHENOL	3000	U	
ACETOPHENONE	1200	U	
ATRAZINE	1200	U	
BENZALDEHYDE	1200	U	
BIS(2-CHLOROETHOXY)METHANE	1200	U	
BIS(2-CHLOROETHYL)ETHER	1200	U	
BUTYL BENZYL PHTHALATE	1200	U	
CAPROLACTAM	1200	U	
CARBAZOLE	1200	U	

nsample	009M001703
samp_date	4/30/2008
lab_id	SB2238-17
qc_type	NM
units	UG/KG
Pct_Solids	26.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	1200	U	
DIETHYL PHTHALATE	1200	U	
DIMETHYL PHTHALATE	1200	U	
DI-N-BUTYL PHTHALATE	1200	U	
DI-N-OCTYL PHTHALATE	1200	U	
HEXACHLOROBENZENE	1200	U	
HEXACHLOROBUTADIENE	1200	U	
HEXACHLOROCYCLOPENTADIENE	1200	UR	D
HEXACHLOROETHANE	1200	U	
ISOPHORONE	1200	U	
NITROBENZENE	1200	U	
N-NITROSO-DI-N-PROPYLAMINE	1200	U	
N-NITROSODIPHENYLAMINE	1200	U	
PENTACHLOROPHENOL	3000	U	
PHENOL	1200	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	054M000103	nsample	054M000103	nsample	556M000503
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-7	lab_id	SB2238-7	lab_id	SB2238-11
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	77.9	Pct_Solids	77.9	Pct_Solids	23.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	420	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	420	U	
2,4,5-TRICHLOROPHENOL	1000	U	
2,4,6-TRICHLOROPHENOL	420	U	
2,4-DICHLOROPHENOL	420	U	
2,4-DIMETHYLPHENOL	420	U	
2,4-DINITROPHENOL	1000	U	
2,4-DINITROTOLUENE	420	U	
2,6-DINITROTOLUENE	420	U	
2-CHLORONAPHTHALENE	420	U	
2-CHLOROPHENOL	420	U	
2-METHYLPHENOL	420	U	
2-NITROANILINE	1000	U	
2-NITROPHENOL	420	U	
3&4-METHYLPHENOL	420	U	
3,3'-DICHLOROBENZIDINE	420	U	
3-NITROANILINE	1000	U	
4,6-DINITRO-2-METHYLPHENOL	1000	U	
4-BROMOPHENYL PHENYL ETHER	420	U	
4-CHLORO-3-METHYLPHENOL	420	U	
4-CHLOROANILINE	420	U	
4-CHLOROPHENYL PHENYL ETHER	420	U	
4-NITROANILINE	1000	U	
4-NITROPHENOL	1000	U	
ACETOPHENONE	420	U	
ATRAZINE	420	U	
BENZALDEHYDE	420	U	
BIS(2-CHLOROETHOXY)METHANE	420	U	
BIS(2-CHLOROETHYL)ETHER	420	U	
BUTYL BENZYL PHTHALATE	420	U	
CAPROLACTAM	420	U	
CARBAZOLE	420	U	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	420	U	
DIETHYL PHTHALATE	420	U	
DIMETHYL PHTHALATE	420	U	
DI-N-BUTYL PHTHALATE	420	U	
DI-N-OCTYL PHTHALATE	420	U	
HEXACHLOROBENZENE	420	U	
HEXACHLOROBUTADIENE	420	U	
HEXACHLOROCYCLOPENTADIENE	420	U	
HEXACHLOROETHANE	420	U	
ISOPHORONE	420	U	
NITROBENZENE	420	U	
N-NITROSO-DI-N-PROPYLAMINE	420	U	
N-NITROSODIPHENYLAMINE	420	U	
PENTACHLOROPHENOL	1000	U	
PHENOL	420	U	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	1400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	1400	U	
2,4,5-TRICHLOROPHENOL	3400	U	
2,4,6-TRICHLOROPHENOL	1400	U	
2,4-DICHLOROPHENOL	1400	U	
2,4-DIMETHYLPHENOL	1400	U	
2,4-DINITROPHENOL	3400	U	
2,4-DINITROTOLUENE	1400	U	
2,6-DINITROTOLUENE	1400	U	
2-CHLORONAPHTHALENE	1400	U	
2-CHLOROPHENOL	1400	U	
2-METHYLPHENOL	1400	U	
2-NITROANILINE	3400	U	
2-NITROPHENOL	1400	U	
3&4-METHYLPHENOL	1400	U	
3,3'-DICHLOROBENZIDINE	1400	U	
3-NITROANILINE	3400	U	
4,6-DINITRO-2-METHYLPHENOL	3400	U	
4-BROMOPHENYL PHENYL ETHER	1400	U	
4-CHLORO-3-METHYLPHENOL	1400	U	
4-CHLOROANILINE	1400	U	
4-CHLOROPHENYL PHENYL ETHER	1400	U	
4-NITROANILINE	3400	U	
4-NITROPHENOL	3400	U	
ACETOPHENONE	1400	U	
ATRAZINE	1400	U	
BENZALDEHYDE	1400	U	
BIS(2-CHLOROETHOXY)METHANE	1400	U	
BIS(2-CHLOROETHYL)ETHER	1400	U	
BUTYL BENZYL PHTHALATE	1400	U	
CAPROLACTAM	1400	U	
CARBAZOLE	1400	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	556M000503
samp_date	4/30/2008
lab_id	SB2238-11
qc_type	NM
units	UG/KG
Pct_Solids	23.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	1400	U	
DIETHYL PHTHALATE	1400	U	
DIMETHYL PHTHALATE	1400	U	
DI-N-BUTYL PHTHALATE	1400	U	
DI-N-OCTYL PHTHALATE	1400	U	
HEXACHLOROBENZENE	1400	U	
HEXACHLOROBUTADIENE	1400	U	
HEXACHLOROCYCLOPENTADIENE	1400	U	
HEXACHLOROETHANE	1400	U	
ISOPHORONE	1400	U	
NITROBENZENE	1400	U	
N-NITROSO-DI-N-PROPYLAMINE	1400	U	
N-NITROSODIPHENYLAMINE	1400	U	
PENTACHLOROPHENOL	3400	U	
PHENOL	1400	U	

nsample	556M000703
samp_date	4/30/2008
lab_id	SB2238-9
qc_type	NM
units	UG/KG
Pct_Solids	24.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	1400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	1400	U	
2,4,5-TRICHLOROPHENOL	3400	U	
2,4,6-TRICHLOROPHENOL	1400	U	
2,4-DICHLOROPHENOL	1400	U	
2,4-DIMETHYLPHENOL	1400	U	
2,4-DINITROPHENOL	3400	U	
2,4-DINITROTOLUENE	1400	U	
2,6-DINITROTOLUENE	1400	U	
2-CHLORONAPHTHALENE	1400	U	
2-CHLOROPHENOL	1400	U	
2-METHYLPHENOL	1400	U	
2-NITROANILINE	3400	U	
2-NITROPHENOL	1400	U	
3&4-METHYLPHENOL	1400	U	
3,3'-DICHLOROBENZIDINE	1400	U	
3-NITROANILINE	3400	U	
4,6-DINITRO-2-METHYLPHENOL	3400	U	
4-BROMOPHENYL PHENYL ETHER	1400	U	
4-CHLORO-3-METHYLPHENOL	1400	U	
4-CHLOROANILINE	1400	U	
4-CHLOROPHENYL PHENYL ETHER	1400	U	
4-NITROANILINE	3400	U	
4-NITROPHENOL	3400	U	
ACETOPHENONE	1400	U	
ATRAZINE	1400	U	
BENZALDEHYDE	1400	U	
BIS(2-CHLOROETHOXY)METHANE	1400	U	
BIS(2-CHLOROETHYL)ETHER	1400	U	
BUTYL BENZYL PHTHALATE	1400	U	
CAPROLACTAM	1400	U	
CARBAZOLE	1400	U	

nsample	556M000703
samp_date	4/30/2008
lab_id	SB2238-9
qc_type	NM
units	UG/KG
Pct_Solids	24.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	1400	U	
DIETHYL PHTHALATE	1400	U	
DIMETHYL PHTHALATE	1400	U	
DI-N-BUTYL PHTHALATE	1400	U	
DI-N-OCTYL PHTHALATE	1400	U	
HEXACHLOROBENZENE	1400	U	
HEXACHLOROBUTADIENE	1400	U	
HEXACHLOROCYCLOPENTADIENE	1400	U	
HEXACHLOROETHANE	1400	U	
ISOPHORONE	1400	U	
NITROBENZENE	1400	U	
N-NITROSO-DI-N-PROPYLAMINE	1400	U	
N-NITROSODIPHENYLAMINE	1400	U	
PENTACHLOROPHENOL	3400	U	
PHENOL	1400	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	FD04300801	nsample	FD04300801	nsample	NOIM000403
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-13	lab_id	SB2238-13	lab_id	SB2238-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	42.9	Pct_Solids	42.9	Pct_Solids	57.7
DUP_OF:	NOIM001203	DUP_OF:	NOIM001203	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	770	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	770	U	
2,4,5-TRICHLOROPHENOL	1900	U	
2,4,6-TRICHLOROPHENOL	770	U	
2,4-DICHLOROPHENOL	770	U	
2,4-DIMETHYLPHENOL	770	U	
2,4-DINITROPHENOL	1900	U	
2,4-DINITROTOLUENE	770	U	
2,6-DINITROTOLUENE	770	U	
2-CHLORONAPHTHALENE	770	U	
2-CHLOROPHENOL	770	U	
2-METHYLPHENOL	770	U	
2-NITROANILINE	1900	U	
2-NITROPHENOL	770	U	
3&4-METHYLPHENOL	770	U	
3,3'-DICHLOROBENZIDINE	770	U	
3-NITROANILINE	1900	U	
4,6-DINITRO-2-METHYLPHENOL	1900	U	
4-BROMOPHENYL PHENYL ETHER	770	U	
4-CHLORO-3-METHYLPHENOL	770	U	
4-CHLOROANILINE	770	U	
4-CHLOROPHENYL PHENYL ETHER	770	U	
4-NITROANILINE	1900	U	
4-NITROPHENOL	1900	U	
ACETOPHENONE	770	U	
ATRAZINE	770	U	
BENZALDEHYDE	770	U	
BIS(2-CHLOROETHOXY)METHANE	770	U	
BIS(2-CHLOROETHYL)ETHER	770	U	
BUTYL BENZYL PHTHALATE	770	U	
CAPROLACTAM	770	U	
CARBAZOLE	770	U	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	770	U	
DIETHYL PHTHALATE	770	U	
DIMETHYL PHTHALATE	770	U	
DI-N-BUTYL PHTHALATE	770	U	
DI-N-OCTYL PHTHALATE	770	U	
HEXACHLOROBENZENE	770	U	
HEXACHLOROBUTADIENE	770	U	
HEXACHLOROCYCLOPENTADIENE	770	U	
HEXACHLOROETHANE	770	U	
ISOPHORONE	770	U	
NITROBENZENE	770	U	
N-NITROSO-DI-N-PROPYLAMINE	770	U	
N-NITROSODIPHENYLAMINE	770	U	
PENTACHLOROPHENOL	1900	U	
PHENOL	770	U	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	570	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	570	U	
2,4,5-TRICHLOROPHENOL	1400	U	
2,4,6-TRICHLOROPHENOL	570	U	
2,4-DICHLOROPHENOL	570	U	
2,4-DIMETHYLPHENOL	570	U	
2,4-DINITROPHENOL	1400	U	
2,4-DINITROTOLUENE	570	U	
2,6-DINITROTOLUENE	570	U	
2-CHLORONAPHTHALENE	570	U	
2-CHLOROPHENOL	570	U	
2-METHYLPHENOL	570	U	
2-NITROANILINE	1400	U	
2-NITROPHENOL	570	U	
3&4-METHYLPHENOL	570	U	
3,3'-DICHLOROBENZIDINE	570	U	
3-NITROANILINE	1400	U	
4,6-DINITRO-2-METHYLPHENOL	1400	U	
4-BROMOPHENYL PHENYL ETHER	570	U	
4-CHLORO-3-METHYLPHENOL	570	U	
4-CHLOROANILINE	570	U	
4-CHLOROPHENYL PHENYL ETHER	570	U	
4-NITROANILINE	1400	U	
4-NITROPHENOL	1400	U	
ACETOPHENONE	570	U	
ATRAZINE	570	U	
BENZALDEHYDE	570	U	
BIS(2-CHLOROETHOXY)METHANE	570	U	
BIS(2-CHLOROETHYL)ETHER	570	U	
BUTYL BENZYL PHTHALATE	570	U	
CAPROLACTAM	570	U	
CARBAZOLE	570	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	NOIM000403
samp_date	4/30/2008
lab_id	SB2238-3
qc_type	NM
units	UG/KG
Pct_Solids	57.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	570	U	
DIETHYL PHTHALATE	570	U	
DIMETHYL PHTHALATE	570	U	
DI-N-BUTYL PHTHALATE	570	U	
DI-N-OCTYL PHTHALATE	570	U	
HEXACHLOROBENZENE	570	U	
HEXACHLOROBUTADIENE	570	U	
HEXACHLOROCYCLOPENTADIENE	570	U	
HEXACHLOROETHANE	570	U	
ISOPHORONE	570	U	
NITROBENZENE	570	U	
N-NITROSO-DI-N-PROPYLAMINE	570	U	
N-NITROSODIPHENYLAMINE	570	U	
PENTACHLOROPHENOL	1400	U	
PHENOL	570	U	

nsample	NOIM001103
samp_date	4/30/2008
lab_id	SB2238-1
qc_type	NM
units	UG/KG
Pct_Solids	61.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	530	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	530	U	
2,4,5-TRICHLOROPHENOL	1300	U	
2,4,6-TRICHLOROPHENOL	530	U	
2,4-DICHLOROPHENOL	530	U	
2,4-DIMETHYLPHENOL	530	U	
2,4-DINITROPHENOL	1300	U	
2,4-DINITROTOLUENE	530	U	
2,6-DINITROTOLUENE	530	U	
2-CHLORONAPHTHALENE	530	U	
2-CHLOROPHENOL	530	U	
2-METHYLPHENOL	530	U	
2-NITROANILINE	1300	U	
2-NITROPHENOL	530	U	
3&4-METHYLPHENOL	530	U	
3,3'-DICHLOROBENZIDINE	530	U	
3-NITROANILINE	1300	U	
4,6-DINITRO-2-METHYLPHENOL	1300	U	
4-BROMOPHENYL PHENYL ETHER	530	U	
4-CHLORO-3-METHYLPHENOL	530	U	
4-CHLOROANILINE	530	U	
4-CHLOROPHENYL PHENYL ETHER	530	U	
4-NITROANILINE	1300	U	
4-NITROPHENOL	1300	U	
ACETOPHENONE	530	U	
ATRAZINE	530	U	
BENZALDEHYDE	530	U	
BIS(2-CHLOROETHOXY)METHANE	530	U	
BIS(2-CHLOROETHYL)ETHER	530	U	
BUTYL BENZYL PHTHALATE	530	U	
CAPROLACTAM	530	U	
CARBAZOLE	530	U	

nsample	NOIM001103
samp_date	4/30/2008
lab_id	SB2238-1
qc_type	NM
units	UG/KG
Pct_Solids	61.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	530	U	
DIETHYL PHTHALATE	530	U	
DIMETHYL PHTHALATE	530	U	
DI-N-BUTYL PHTHALATE	530	U	
DI-N-OCTYL PHTHALATE	530	U	
HEXACHLOROBENZENE	530	U	
HEXACHLOROBUTADIENE	530	UR	D
HEXACHLOROCYCLOPENTADIENE	530	U	
HEXACHLOROETHANE	530	U	
ISOPHORONE	530	U	
NITROBENZENE	530	U	
N-NITROSO-DI-N-PROPYLAMINE	530	U	
N-NITROSODIPHENYLAMINE	530	U	
PENTACHLOROPHENOL	1300	U	
PHENOL	530	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	NOIM001203
samp_date	4/30/2008
lab_id	SB2238-5
qc_type	NM
units	UG/KG
Pct_Solids	50.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	650	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	650	U	
2,4,5-TRICHLOROPHENOL	1600	U	
2,4,6-TRICHLOROPHENOL	650	U	
2,4-DICHLOROPHENOL	650	U	
2,4-DIMETHYLPHENOL	650	U	
2,4-DINITROPHENOL	1600	U	
2,4-DINITROTOLUENE	650	U	
2,6-DINITROTOLUENE	650	U	
2-CHLORONAPHTHALENE	650	U	
2-CHLOROPHENOL	650	U	
2-METHYLPHENOL	650	U	
2-NITROANILINE	1600	U	
2-NITROPHENOL	650	U	
3&4-METHYLPHENOL	650	U	
3,3'-DICHLOROBENZIDINE	650	U	
3-NITROANILINE	1600	U	
4,6-DINITRO-2-METHYLPHENOL	1600	U	
4-BROMOPHENYL PHENYL ETHER	650	U	
4-CHLORO-3-METHYLPHENOL	650	U	
4-CHLOROANILINE	650	U	
4-CHLOROPHENYL PHENYL ETHER	650	U	
4-NITROANILINE	1600	U	
4-NITROPHENOL	1600	U	
ACETOPHENONE	650	U	
ATRAZINE	650	U	
BENZALDEHYDE	650	U	
BIS(2-CHLOROETHOXY)METHANE	650	U	
BIS(2-CHLOROETHYL)ETHER	650	U	
BUTYL BENZYL PHTHALATE	650	U	
CAPROLACTAM	650	U	
CARBAZOLE	650	U	

nsample	NOIM001203
samp_date	4/30/2008
lab_id	SB2238-5
qc_type	NM
units	UG/KG
Pct_Solids	50.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	650	U	
DIETHYL PHTHALATE	650	U	
DIMETHYL PHTHALATE	650	U	
DI-N-BUTYL PHTHALATE	650	U	
DI-N-OCTYL PHTHALATE	650	U	
HEXACHLOROBENZENE	650	U	
HEXACHLOROBUTADIENE	650	U	
HEXACHLOROCYCLOPENTADIENE	650	U	
HEXACHLOROETHANE	650	U	
ISOPHORONE	650	U	
NITROBENZENE	650	U	
N-NITROSO-DI-N-PROPYLAMINE	650	U	
N-NITROSODIPHENYLAMINE	650	U	
PENTACHLOROPHENOL	1600	U	
PHENOL	650	U	

nsample	RB04300801
samp_date	4/30/2008
lab_id	SB2238-21
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	25	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	25	U	
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	10	U	
3&4-METHYLPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	25	U	
4,6-DINITRO-2-METHYLPHENOL	25	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACETOPHENONE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: OS

nsample	RB04300801
samp_date	4/30/2008
lab_id	SB2238-21
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
ISOPHORONE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENOL	10	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PAH

nsample	009M000403REDL	nsample	009M001603RE	nsample	009M001703REDL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-16REDL	lab_id	SB2238-20RE	lab_id	SB2238-18REDL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	44.8	Pct_Solids	28.9	Pct_Solids	26.8
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	28	J	P
ACENAPHTHENE	44	J	P
ACENAPHTHYLENE	20	J	P
ANTHRACENE	110	J	P
BENZO(A)ANTHRACENE	490	J	CD
BENZO(A)PYRENE	420		
BENZO(B)FLUORANTHENE	950		
BENZO(G,H,I)PERYLENE	200	J	C
BENZO(K)FLUORANTHENE	200	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	540	J	P
CHRYSENE	360		
DIBENZO(A,H)ANTHRACENE	180	UJ	C
FLUORANTHENE	820		
FLUORENE	33	J	P
INDENO(1,2,3-CD)PYRENE	180		
NAPHTHALENE	180	U	
PHENANTHRENE	280		
PYRENE	1200	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	18	J	P
ACENAPHTHENE	9.6	J	P
ACENAPHTHYLENE	24	J	P
ANTHRACENE	48	J	P
BENZO(A)ANTHRACENE	260	J	D
BENZO(A)PYRENE	170		
BENZO(B)FLUORANTHENE	460		
BENZO(G,H,I)PERYLENE	99		
BENZO(K)FLUORANTHENE	100	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	750		
CHRYSENE	190		
DIBENZO(A,H)ANTHRACENE	69	U	
FLUORANTHENE	370		
FLUORENE	13	J	P
INDENO(1,2,3-CD)PYRENE	100		
NAPHTHALENE	7.5	J	P
PHENANTHRENE	90		
PYRENE	620	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	30	J	P
ACENAPHTHENE	13	J	P
ACENAPHTHYLENE	56	J	P
ANTHRACENE	80	J	P
BENZO(A)ANTHRACENE	580	J	CD
BENZO(A)PYRENE	560		
BENZO(B)FLUORANTHENE	1500		
BENZO(G,H,I)PERYLENE	330	J	C
BENZO(K)FLUORANTHENE	400	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	630	J	P
CHRYSENE	560		
DIBENZO(A,H)ANTHRACENE	150	UJ	C
FLUORANTHENE	860		
FLUORENE	17	J	P
INDENO(1,2,3-CD)PYRENE	320		
NAPHTHALENE	150	U	
PHENANTHRENE	120	J	P
PYRENE	1000	J	D

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PAH

nsample	054M000103RE	nsample	556M000503REDL	nsample	556M000703REDL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-8RE	lab_id	SB2238-12REDL	lab_id	SB2238-10REDL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	77.9	Pct_Solids	23.9	Pct_Solids	24.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	5.2	J	P
ACENAPHTHENE	7	J	P
ACENAPHTHYLENE	3.9	J	P
ANTHRACENE	64		
BENZO(A)ANTHRACENE	190	J	D
BENZO(A)PYRENE	120		
BENZO(B)FLUORANTHENE	250		
BENZO(G,H,I)PERYLENE	51		
BENZO(K)FLUORANTHENE	82	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	110	U	A
CHRYSENE	170		
DIBENZO(A,H)ANTHRACENE	11	J	P
FLUORANTHENE	330		
FLUORENE	14	J	P
INDENO(1,2,3-CD)PYRENE	50		
NAPHTHALENE	2.7	J	P
PHENANTHRENE	110		
PYRENE	300	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	4200	U	
ACENAPHTHENE	1400	J	P
ACENAPHTHYLENE	4200	U	
ANTHRACENE	2400	J	P
BENZO(A)ANTHRACENE	5800	J	CD
BENZO(A)PYRENE	2500	J	P
BENZO(B)FLUORANTHENE	5400		
BENZO(G,H,I)PERYLENE	780	J	CP
BENZO(K)FLUORANTHENE	1200	J	DP
BIS(2-ETHYLHEXYL)PHTHALATE	21000	U	
CHRYSENE	5100		
DIBENZO(A,H)ANTHRACENE	4200	UJ	C
FLUORANTHENE	41000		
FLUORENE	2200	J	P
INDENO(1,2,3-CD)PYRENE	4200	U	
NAPHTHALENE	4200	U	
PHENANTHRENE	18000		
PYRENE	26000	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	330	U	
ACENAPHTHENE	330	U	
ACENAPHTHYLENE	72	J	P
ANTHRACENE	200	J	P
BENZO(A)ANTHRACENE	640	J	CD
BENZO(A)PYRENE	840		
BENZO(B)FLUORANTHENE	1700		
BENZO(G,H,I)PERYLENE	270	J	CP
BENZO(K)FLUORANTHENE	560	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	1700	U	
CHRYSENE	880		
DIBENZO(A,H)ANTHRACENE	68	J	CP
FLUORANTHENE	550		
FLUORENE	330	U	
INDENO(1,2,3-CD)PYRENE	280	J	P
NAPHTHALENE	330	U	
PHENANTHRENE	97	J	P
PYRENE	2600	J	D

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PAH

nsample	FD04300801REDL	nsample	NOIM000403REDL	nsample	NOIM001103REDL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-14REDL	lab_id	SB2238-4REDL	lab_id	SB2238-2REDL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	42.9	Pct_Solids	57.7	Pct_Solids	61.9
DUP_OF:	NOIM001203	DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	140	U	
ACENAPHTHENE	140	U	
ACENAPHTHYLENE	31	J	P
ANTHRACENE	170		
BENZO(A)ANTHRACENE	730	J	CD
BENZO(A)PYRENE	510		
BENZO(B)FLUORANTHENE	1100		
BENZO(G,H,I)PERYLENE	240	J	C
BENZO(K)FLUORANTHENE	380	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	700	U	
CHRYSENE	690		
DIBENZO(A,H)ANTHRACENE	76	J	CP
FLUORANTHENE	1200		
FLUORENE	21	J	P
INDENO(1,2,3-CD)PYRENE	250		
NAPHTHALENE	140	U	
PHENANTHRENE	190	J	G
PYRENE	1000	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	170	U	
ACENAPHTHENE	18	J	P
ACENAPHTHYLENE	34	J	P
ANTHRACENE	58	J	P
BENZO(A)ANTHRACENE	720	J	CD
BENZO(A)PYRENE	510		
BENZO(B)FLUORANTHENE	1200		
BENZO(G,H,I)PERYLENE	200	J	C
BENZO(K)FLUORANTHENE	270	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	860	U	
CHRYSENE	510		
DIBENZO(A,H)ANTHRACENE	170	UJ	C
FLUORANTHENE	1000		
FLUORENE	16	J	P
INDENO(1,2,3-CD)PYRENE	220		
NAPHTHALENE	170	U	
PHENANTHRENE	170	J	P
PYRENE	1200	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	16	J	P
ACENAPHTHENE	97	U	
ACENAPHTHYLENE	15	J	P
ANTHRACENE	58	J	P
BENZO(A)ANTHRACENE	460	J	CD
BENZO(A)PYRENE	330		
BENZO(B)FLUORANTHENE	790		
BENZO(G,H,I)PERYLENE	150	J	C
BENZO(K)FLUORANTHENE	170	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	240	J	P
CHRYSENE	390		
DIBENZO(A,H)ANTHRACENE	97	UJ	C
FLUORANTHENE	720		
FLUORENE	11	J	P
INDENO(1,2,3-CD)PYRENE	170		
NAPHTHALENE	97	U	
PHENANTHRENE	160		
PYRENE	770	J	D

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PAH

nsample	NOIM001203REDL	nsample	RB04300801
samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-6REDL	lab_id	SB2238-22
qc_type	NM	qc_type	NM
units	UG/KG	units	UG/L
Pct_Solids	50.7	Pct_Solids	0.0
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	200	U	
ACENAPHTHENE	200	U	
ACENAPHTHYLENE	34	J	P
ANTHRACENE	170	J	P
BENZO(A)ANTHRACENE	810	J	CD
BENZO(A)PYRENE	540		
BENZO(B)FLUORANTHENE	1200		
BENZO(G,H,I)PERYLENE	250	J	C
BENZO(K)FLUORANTHENE	380	J	D
BIS(2-ETHYLHEXYL)PHTHALATE	980	U	
CHRYSENE	670		
DIBENZO(A,H)ANTHRACENE	200	UJ	C
FLUORANTHENE	1500		
FLUORENE	30	J	P
INDENO(1,2,3-CD)PYRENE	260		
NAPHTHALENE	200	U	
PHENANTHRENE	370	J	G
PYRENE	1200	J	D

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.093	J	P
ACENAPHTHENE	0.033	J	P
ACENAPHTHYLENE	0.2	U	
ANTHRACENE	0.2	U	
BENZO(A)ANTHRACENE	0.2	UJ	D
BENZO(A)PYRENE	0.2	U	
BENZO(B)FLUORANTHENE	0.2	U	
BENZO(G,H,I)PERYLENE	0.2	UJ	C
BENZO(K)FLUORANTHENE	0.2	U	
BIS(2-ETHYLHEXYL)PHTHALATE	1	UJ	D
CHRYSENE	0.2	U	
DIBENZO(A,H)ANTHRACENE	0.2	UJ	C
FLUORANTHENE	0.2	U	
FLUORENE	0.2	U	
INDENO(1,2,3-CD)PYRENE	0.2	U	
NAPHTHALENE	0.066	J	P
PHENANTHRENE	0.2	U	
PYRENE	0.2	UJ	D

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	009M000403
samp_date	4/30/2008
lab_id	SB2238-15
qc_type	NM
units	UG/KG
Pct_Solids	44.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	19	U	
AROCLOR-1221	19	U	
AROCLOR-1232	19	U	
AROCLOR-1242	19	U	
AROCLOR-1248	19	U	
AROCLOR-1254	19	U	
AROCLOR-1260	150	J	R

nsample	009M000403DL
samp_date	4/30/2008
lab_id	SB2238-15DL
qc_type	NM
units	UG/KG
Pct_Solids	44.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	1.8	U	
4,4'-DDE	6.6	J	R
4,4'-DDT	1.8	U	
ALDRIN	0.95	U	
ALPHA-BHC	0.95	U	
ALPHA-CHLORDANE	0.95	U	
BETA-BHC	0.95	U	
DELTA-BHC	0.95	U	
DIELDRIN	9.1	J	R
ENDOSULFAN I	0.95	U	
ENDOSULFAN II	1.8	U	
ENDOSULFAN SULFATE	1.8	U	
ENDRIN	1.8	U	
ENDRIN ALDEHYDE	1.8	U	
ENDRIN KETONE	1.8	U	
GAMMA-BHC (LINDANE)	0.95	U	
GAMMA-CHLORDANE	0.95	U	
HEPTACHLOR	0.95	U	
HEPTACHLOR EPOXIDE	0.95	U	
METHOXYCHLOR	9.5	U	
TOXAPHENE	18	U	

nsample	009M001603
samp_date	4/30/2008
lab_id	SB2238-19
qc_type	NM
units	UG/KG
Pct_Solids	28.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	29	U	
AROCLOR-1221	29	U	
AROCLOR-1232	29	U	
AROCLOR-1242	29	U	
AROCLOR-1248	29	U	
AROCLOR-1254	29	U	
AROCLOR-1260	210	J	R

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	009M001603DL	nsample	009M001703	nsample	009M001703DL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-19DL	lab_id	SB2238-17	lab_id	SB2238-17DL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	28.9	Pct_Solids	26.8	Pct_Solids	26.8
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	2.9	U	
4,4'-DDE	25		
4,4'-DDT	2.9	U	
ALDRIN	1.5	U	
ALPHA-BHC	1.5	U	
ALPHA-CHLORDANE	1.5	U	
BETA-BHC	1.5	U	
DELTA-BHC	1.5	U	
DIELDRIN	2.9	U	
ENDOSULFAN I	1.5	U	
ENDOSULFAN II	2.9	U	
ENDOSULFAN SULFATE	2.9	U	
ENDRIN	2.9	U	
ENDRIN ALDEHYDE	2.9	U	
ENDRIN KETONE	2.9	U	
GAMMA-BHC (LINDANE)	1.5	U	
GAMMA-CHLORDANE	1.5	U	
HEPTACHLOR	1.5	U	
HEPTACHLOR EPOXIDE	1.5	U	
METHOXYCHLOR	15	U	
TOXAPHENE	28	U	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	32	U	
AROCLOR-1221	32	U	
AROCLOR-1232	32	U	
AROCLOR-1242	32	U	
AROCLOR-1248	32	U	
AROCLOR-1254	32	U	
AROCLOR-1260	200	J	DR

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.1	U	
4,4'-DDE	12		
4,4'-DDT	3.1	U	
ALDRIN	1.6	UR	D
ALPHA-BHC	1.6	U	
ALPHA-CHLORDANE	1.6	U	
BETA-BHC	1.6	UR	D
DELTA-BHC	1.6	U	
DIELDRIN	3.1	U	
ENDOSULFAN I	1.6	U	
ENDOSULFAN II	3.1	U	
ENDOSULFAN SULFATE	3.1	U	
ENDRIN	3.1	U	
ENDRIN ALDEHYDE	3.1	U	
ENDRIN KETONE	3.1	U	
GAMMA-BHC (LINDANE)	1.6	U	
GAMMA-CHLORDANE	1.6	U	
HEPTACHLOR	1.6	U	
HEPTACHLOR EPOXIDE	1.6	UR	D
METHOXYCHLOR	16	U	
TOXAPHENE	31	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	054M000103	nsample	054M000103DL	nsample	556M000503
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-7	lab_id	SB2238-7DL	lab_id	SB2238-11
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	77.9	Pct_Solids	77.9	Pct_Solids	23.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	11	U	
AROCLOR-1221	11	U	
AROCLOR-1232	11	U	
AROCLOR-1242	11	U	
AROCLOR-1248	11	U	
AROCLOR-1254	11	U	
AROCLOR-1260	94	J	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	1.1	U	
4,4'-DDE	1.1	U	
4,4'-DDT	1.1	U	
ALDRIN	0.54	U	
ALPHA-BHC	0.54	U	
ALPHA-CHLORDANE	0.54	U	
BETA-BHC	0.54	U	
DELTA-BHC	0.54	U	
DIELDRIN	1.1	U	
ENDOSULFAN I	0.54	U	
ENDOSULFAN II	1.1	U	
ENDOSULFAN SULFATE	1.1	U	
ENDRIN	1.1	U	
ENDRIN ALDEHYDE	1.1	U	
ENDRIN KETONE	1.1	U	
GAMMA-BHC (LINDANE)	0.54	U	
GAMMA-CHLORDANE	0.54	U	
HEPTACHLOR	0.54	U	
HEPTACHLOR EPOXIDE	0.54	U	
METHOXYCHLOR	5.4	U	
TOXAPHENE	10	U	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	35	U	
AROCLOR-1221	35	U	
AROCLOR-1232	35	U	
AROCLOR-1242	35	U	
AROCLOR-1248	35	U	
AROCLOR-1254	35	U	
AROCLOR-1260	35	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	556M000503DL	nsample	556M000703	nsample	556M000703DL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-11DL	lab_id	SB2238-9	lab_id	SB2238-9DL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	23.9	Pct_Solids	24.0	Pct_Solids	24.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.8	J	CR
4,4'-DDE	3.5	U	
4,4'-DDT	3.5	U	
ALDRIN	1.8	U	
ALPHA-BHC	1.8	U	
ALPHA-CHLORDANE	1.8	U	
BETA-BHC	1.8	U	
DELTA-BHC	1.8	U	
DIELDRIN	3.5	U	
ENDOSULFAN I	1.8	U	
ENDOSULFAN II	3.5	U	
ENDOSULFAN SULFATE	3.5	U	
ENDRIN	3.5	U	
ENDRIN ALDEHYDE	3.5	U	
ENDRIN KETONE	3.5	U	
GAMMA-BHC (LINDANE)	1.8	U	
GAMMA-CHLORDANE	1.8	U	
HEPTACHLOR	1.8	U	
HEPTACHLOR EPOXIDE	1.8	U	
METHOXYCHLOR	18	U	
TOXAPHENE	34	U	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	35	U	
AROCLOR-1221	35	U	
AROCLOR-1232	35	U	
AROCLOR-1242	35	U	
AROCLOR-1248	35	U	
AROCLOR-1254	35	U	
AROCLOR-1260	35	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.5	U	
4,4'-DDE	3.5	U	
4,4'-DDT	3.5	U	
ALDRIN	1.8	U	
ALPHA-BHC	1.8	U	
ALPHA-CHLORDANE	1.8	U	
BETA-BHC	1.8	U	
DELTA-BHC	1.8	U	
DIELDRIN	3.5	U	
ENDOSULFAN I	1.8	U	
ENDOSULFAN II	3.5	U	
ENDOSULFAN SULFATE	3.5	U	
ENDRIN	3.5	U	
ENDRIN ALDEHYDE	3.5	U	
ENDRIN KETONE	3.5	U	
GAMMA-BHC (LINDANE)	1.8	U	
GAMMA-CHLORDANE	1.8	U	
HEPTACHLOR	1.8	U	
HEPTACHLOR EPOXIDE	1.8	U	
METHOXYCHLOR	18	U	
TOXAPHENE	34	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	FD04300801	nsample	FD04300801DL	nsample	NOIM000403
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-13	lab_id	SB2238-13DL	lab_id	SB2238-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	42.9	Pct_Solids	42.9	Pct_Solids	57.7
DUP_OF:	NOIM001203	DUP_OF:	NOIM001203	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	20	U	
AROCLOR-1221	20	U	
AROCLOR-1232	20	U	
AROCLOR-1242	20	U	
AROCLOR-1248	20	U	
AROCLOR-1254	20	U	
AROCLOR-1260	20	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	6	J	CR
4,4'-DDE	1.9	U	
4,4'-DDT	1.9	U	
ALDRIN	0.99	U	
ALPHA-BHC	0.99	U	
ALPHA-CHLORDANE	0.99	U	
BETA-BHC	0.99	U	
DELTA-BHC	0.99	U	
DIELDRIN	1.9	U	
ENDOSULFAN I	0.99	U	
ENDOSULFAN II	1.9	U	
ENDOSULFAN SULFATE	1.9	U	
ENDRIN	1.9	U	
ENDRIN ALDEHYDE	1.9	U	
ENDRIN KETONE	1.9	U	
GAMMA-BHC (LINDANE)	0.99	U	
GAMMA-CHLORDANE	0.99	U	
HEPTACHLOR	0.99	U	
HEPTACHLOR EPOXIDE	0.99	U	
METHOXYCHLOR	9.9	U	
TOXAPHENE	19	U	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	15	U	
AROCLOR-1221	15	U	
AROCLOR-1232	15	U	
AROCLOR-1242	15	U	
AROCLOR-1248	15	U	
AROCLOR-1254	15	U	
AROCLOR-1260	15	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	NOIM000403DL	nsample	NOIM001103	nsample	NOIM001103DL
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-3DL	lab_id	SB2238-1	lab_id	SB2238-1DL
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	57.7	Pct_Solids	61.9	Pct_Solids	61.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.8	J	CR
4,4'-DDE	1.4	U	
4,4'-DDT	1.4	U	
ALDRIN	0.74	U	
ALPHA-BHC	0.74	U	
ALPHA-CHLORDANE	0.74	U	
BETA-BHC	0.74	U	
DELTA-BHC	0.74	U	
DIELDRIN	1.4	U	
ENDOSULFAN I	0.74	U	
ENDOSULFAN II	1.4	U	
ENDOSULFAN SULFATE	1.4	U	
ENDRIN	1.4	U	
ENDRIN ALDEHYDE	1.4	U	
ENDRIN KETONE	1.4	U	
GAMMA-BHC (LINDANE)	0.74	U	
GAMMA-CHLORDANE	0.74	U	
HEPTACHLOR	0.74	U	
HEPTACHLOR EPOXIDE	0.74	U	
METHOXYCHLOR	7.4	U	
TOXAPHENE	14	U	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	14	U	
AROCLOR-1221	14	U	
AROCLOR-1232	14	U	
AROCLOR-1242	14	U	
AROCLOR-1248	14	U	
AROCLOR-1254	14	U	
AROCLOR-1260	14	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	2.8	J	CR
4,4'-DDE	3.6	J	R
4,4'-DDT	1.3	U	
ALDRIN	0.69	U	
ALPHA-BHC	0.69	U	
ALPHA-CHLORDANE	0.69	U	
BETA-BHC	0.69	U	
DELTA-BHC	0.69	U	
DIELDRIN	1.3	U	
ENDOSULFAN I	0.69	U	
ENDOSULFAN II	1.3	U	
ENDOSULFAN SULFATE	1.3	U	
ENDRIN	1.3	U	
ENDRIN ALDEHYDE	1.3	U	
ENDRIN KETONE	1.3	U	
GAMMA-BHC (LINDANE)	0.69	U	
GAMMA-CHLORDANE	0.69	U	
HEPTACHLOR	0.69	U	
HEPTACHLOR EPOXIDE	0.69	U	
METHOXYCHLOR	6.9	U	
TOXAPHENE	13	U	

PROJ_NO: 00349

SDG: SB2238 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	NOIM001203	nsample	NOIM001203DL	nsample	RB04300801
samp_date	4/30/2008	samp_date	4/30/2008	samp_date	4/30/2008
lab_id	SB2238-5	lab_id	SB2238-5DL	lab_id	SB2238-21
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/L
Pct_Solids	50.7	Pct_Solids	50.7	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	17	U	
AROCLOR-1221	17	U	
AROCLOR-1232	17	U	
AROCLOR-1242	17	U	
AROCLOR-1248	17	U	
AROCLOR-1254	17	U	
AROCLOR-1260	17	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.8	J	CR
4,4'-DDE	1.6	U	
4,4'-DDT	1.6	U	
ALDRIN	0.84	U	
ALPHA-BHC	0.84	U	
ALPHA-CHLORDANE	0.84	U	
BETA-BHC	0.84	U	
DELTA-BHC	0.84	U	
DIELDRIN	1.6	U	
ENDOSULFAN I	0.84	U	
ENDOSULFAN II	1.6	U	
ENDOSULFAN SULFATE	1.6	U	
ENDRIN	1.6	U	
ENDRIN ALDEHYDE	1.6	U	
ENDRIN KETONE	1.6	U	
GAMMA-BHC (LINDANE)	0.84	U	
GAMMA-CHLORDANE	0.84	U	
HEPTACHLOR	0.84	U	
HEPTACHLOR EPOXIDE	0.84	U	
METHOXYCHLOR	8.4	U	
TOXAPHENE	16	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.01	U	
4,4'-DDE	0.01	U	
4,4'-DDT	0.01	U	
ALDRIN	0.005	U	
ALPHA-BHC	0.005	U	
ALPHA-CHLORDANE	0.005	U	
AROCLOR-1016	0.05	U	
AROCLOR-1221	0.05	U	
AROCLOR-1232	0.05	U	
AROCLOR-1242	0.05	U	
AROCLOR-1248	0.05	U	
AROCLOR-1254	0.05	U	
AROCLOR-1260	0.05	U	
BETA-BHC	0.005	U	
DELTA-BHC	0.005	U	
DIELDRIN	0.01	U	
ENDOSULFAN I	0.005	U	
ENDOSULFAN II	0.01	U	
ENDOSULFAN SULFATE	0.01	U	
ENDRIN	0.01	U	
ENDRIN ALDEHYDE	0.01	U	
ENDRIN KETONE	0.01	U	
GAMMA-BHC (LINDANE)	0.005	U	
GAMMA-CHLORDANE	0.005	U	
HEPTACHLOR	0.005	U	
HEPTACHLOR EPOXIDE	0.005	U	
METHOXYCHLOR	0.05	U	
TOXAPHENE	0.1	U	

APPENDIX P

HHRA – SUPPORTING DATA

RAGS PART F TABLES

Noisette Creek

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Finfish/Shellfish	Site 16	Ingestion	Benzo(a)anthracene	0.056	MG/KG	8.2E-08	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	6.0E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.037	MG/KG	5.4E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	4.0E-07	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.083	MG/KG	1.2E-07	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	8.9E-08	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	0.017	MG/KG	2.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.8E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002
				Benzo(k)fluoranthene	0.026	MG/KG	3.8E-08	(mg/kg/day)	7.3E-02	$(mg/kg/day)^{-1}$	2.8E-09	8.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	0.057	MG/KG	8.4E-08	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.2E-09	2.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00001
				Chrysene	0.048	MG/KG	7.0E-08	(mg/kg/day)	7.3E-03	$(mg/kg/day)^{-1}$	5.1E-10	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Fluoranthene	0.100	MG/KG	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.4E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00001
				Indeno(1,2,3-cd)pyrene	0.018	MG/KG	2.6E-08	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	1.9E-08	6.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Phenanthrene	0.026	MG/KG	3.8E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000003
				Pyrene	0.083	MG/KG	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00001
				4,4'-DDD	0.000	MG/KG	5.9E-10	(mg/kg/day)	2.4E-01	$(mg/kg/day)^{-1}$	1.4E-10	1.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				4,4'-DDE	0.007	MG/KG	9.7E-09	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	3.3E-09	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Copper	56	MG/KG	8.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.005
				Methyl Mercury	0.79	MG/KG	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	0.03
				Selenium	0.080	MG/KG	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.7E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0001
				Thallium	0.048	MG/KG	7.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.6E-07	(mg/kg/day)	6.5E-05	(mg/kg/day)	0.003
				Zinc	297	MG/KG	4.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.003
			Exp. Route Total								5.7E-07					0.04
		Exposure Point Total									5.7E-07					0.04
	Exposure Medium Total										5.7E-07					0.04
Medium Total											5.7E-07					0.04
										Total of Receptor Risks Across All Media	5.7E-07			Total of Receptor Hazards Across All Media		0.04

Shipyard Creek

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Finfish/Shellfish	Site 16	Ingestion	Benzo(a)anthracene	0.078	MG/KG	1.1E-07	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	8.4E-08	6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.075	MG/KG	1.1E-07	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	8.0E-07	6.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.200	MG/KG	2.9E-07	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	2.1E-07	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	0.044	MG/KG	6.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00001
				Benzo(k)fluoranthene	0.013	MG/KG	1.9E-08	(mg/kg/day)	7.3E-02	$(mg/kg/day)^{-1}$	1.4E-09	1.0E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	0.086	MG/KG	1.3E-07	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.8E-09	6.9E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0000
				Chrysene	0.019	MG/KG	2.8E-08	(mg/kg/day)	7.3E-03	$(mg/kg/day)^{-1}$	2.0E-10	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Fluoranthene	0.029	MG/KG	4.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00001
				Indeno(1,2,3-cd)pyrene	0.011	MG/KG	1.6E-08	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	1.2E-08	8.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Pyrene	0.040	MG/KG	5.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00001
				4,4'-DDE	0.022	MG/KG	3.2E-08	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.1E-08	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aroclor-1260	0.045	MG/KG	6.6E-08	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.3E-07	3.6E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	0.002	MG/KG	2.8E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.5E-08	1.5E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0003
				Aluminum	8230	MG/KG	1.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
				Arsenic	3.400	MG/KG	5.0E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.5E-06	2.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.09
				Barium	21.7	MG/KG	3.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.001
				Chromium	39	MG/KG	5.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1
				Cobalt	1.90	MG/KG	2.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Copper	175	MG/KG	2.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.03
				Iron	8480	MG/KG	1.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.1
				Lead	21.5	MG/KG	3.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methyl Mercury	0.32	MG/KG	4.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-06	(mg/kg/day)	1.0E-04	(mg/kg/day)	0.03
				Nickel	19.0	MG/KG	2.8E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.01
				Selenium	0.220	MG/KG	3.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0004
				Thallium	0.110	MG/KG	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.8E-07	(mg/kg/day)	6.5E-05	(mg/kg/day)	0.01
				Vanadium	15.6	MG/KG	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.02
				Zinc	930	MG/KG	1.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.4E-03	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.02
			Exp. Route Total								8.8E-06					0.5
		Exposure Point Total									8.8E-06					0.5
	Exposure Medium Total										8.8E-06					0.5
Medium Total											8.8E-06					0.5
										Total of Receptor Risks Across All Media	8.8E-06				Total of Receptor Hazards Across All Media	0.5

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Finfish/Shellfish	Site 16	Benzo(a)anthracene	8E-08	--	- -	--	8E-08	NA	--	- -	- -	--
			Benzo(a)pyrene	8E-07	--	- -	--	8E-07	NA	--	- -	- -	--
			Benzo(b)fluoranthene	2E-07	--	- -	--	2E-07	NA	--	- -	- -	--
			Benzo(g,h,i)perylene	- -	--	- -	--	- -	CNS	0.00001	- -	- -	0.00001
			Benzo(k)fluoranthene	1E-09	--	- -	--	1E-09	NA	--	- -	- -	--
			Bis(2-ethylhexyl)phthalate	2E-09	--	- -	--	2E-09	Liver	0.0000	- -	- -	0.00003
			Chrysene	2E-10	--	- -	--	2E-10	NA	--	- -	- -	--
			Fluoranthene	- -	--	- -	--	- -	Blood, Kidney, Liver	0.00001	- -	- -	0.00001
			Indeno(1,2,3-cd)pyrene	1E-08	--	- -	--	1E-08	NA	--	- -	- -	--
			Pyrene	- -	--	- -	--	- -	Kidney	0.00001	- -	- -	0.00001
			4,4'-DDE	1E-08	--	- -	--	1E-08	NA	--	- -	- -	--
			Aroclor-1260	1E-07	--	- -	--	1E-07	NA	--	- -	- -	--
			Dieldrin	4E-08	--	- -	--	4E-08	Liver	0.000	- -	- -	0.0003
			Aluminum	- -	--	- -	--	- -	Body Weight	0.1	- -	- -	0.1
			Arsenic	7E-06	--	- -	--	7E-06	Skin, CVS	0.09	- -	- -	0.09
			Barium	- -	--	- -	--	- -	CVS	0.001	- -	- -	0.001
			Chromium	- -	--	- -	--	- -	Respiratory	0.1	- -	- -	0.1
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.1	- -	- -	0.1
			Copper	- -	--	- -	--	- -	GS	0.0	- -	- -	0.03
			Iron	- -	--	- -	--	- -	GS	0.1	- -	- -	0.1
			Lead	- -	--	- -	--	- -	NA	--	- -	- -	--
			Methyl Mercury	- -	--	- -	--	- -	CNS	0.0	- -	- -	0.03
			Nickel	- -	--	- -	--	- -	Body Weight	0.01	- -	- -	0.01
			Selenium	- -	--	- -	--	- -	Hair Loss, CNS, Skin	0.000	- -	- -	0.0004
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0.01	- -	- -	0.01
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.02	- -	- -	0.02
			Zinc	- -	--	- -	--	- -	Blood	0.02	- -	- -	0.02
			Chemical Total	9E-06	--	- -	--	9E-06		1	- -	- -	1
		Exposure Point Total						9E-06					1
	Exposure Medium Total							9E-06					1
Medium Total								9E-06					1
Receptor Total							Receptor Risk Total	9E-06				Receptor HI Total	1

Total Blood HI	0.02
Total Body Weight HI	0.1
Total CNS HI	0.1
Total CVS HI	0.1
Total GS HI	0.1
Total Immune HI	0.1

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Kidney HI	0.00002
Total Liver HI	0.01
Total Skin HI	0.09
Total Hair Loss HI	0.0

TABLE 7.1.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Finfish/Shellfish	Site 16	Ingestion	Benzo(a)anthracene	0.078	MG/KG	1.1E-08	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	8.0E-09	8.5E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.075	MG/KG	1.1E-08	(mg/kg/day)	7.3E+00	$(mg/kg/day)^{-1}$	7.7E-08	8.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.200	MG/KG	2.8E-08	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	2.1E-08	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	0.044	MG/KG	6.2E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000002
				Benzo(k)fluoranthene	0.013	MG/KG	1.8E-09	(mg/kg/day)	7.3E-02	$(mg/kg/day)^{-1}$	1.3E-10	1.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Bis(2-ethylhexyl)phthalate	0.086	MG/KG	1.2E-08	(mg/kg/day)	1.4E-02	$(mg/kg/day)^{-1}$	1.7E-10	9.4E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000005
				Chrysene	0.019	MG/KG	2.7E-09	(mg/kg/day)	7.3E-03	$(mg/kg/day)^{-1}$	2.0E-11	2.1E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Fluoranthene	0.029	MG/KG	4.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.2E-08	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.000001
				Indeno(1,2,3-cd)pyrene	0.011	MG/KG	1.5E-09	(mg/kg/day)	7.3E-01	$(mg/kg/day)^{-1}$	1.1E-09	1.2E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Pyrene	0.040	MG/KG	5.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-08	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000001
				4,4'-DDE	0.022	MG/KG	3.1E-09	(mg/kg/day)	3.4E-01	$(mg/kg/day)^{-1}$	1.1E-09	2.4E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Aroclor-1260	0.045	MG/KG	6.3E-09	(mg/kg/day)	2.0E+00	$(mg/kg/day)^{-1}$	1.3E-08	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Dieldrin	0.002	MG/KG	2.7E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.3E-09	2.1E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00004
				Aluminum	8230	MG/KG	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.01
				Arsenic	3.400	MG/KG	4.8E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.2E-07	3.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.012
				Barium	21.7	MG/KG	3.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0001
				Chromium	39	MG/KG	5.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.01
				Cobalt	1.90	MG/KG	2.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Copper	175	MG/KG	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.9E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.005
				Iron	8480	MG/KG	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
				Lead	21.5	MG/KG	3.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methyl Mercury	0.32	MG/KG	4.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-07	(mg/kg/day)	1.0E-04	(mg/kg/day)	0.004
				Nickel	19.0	MG/KG	2.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.001
				Selenium	0.220	MG/KG	3.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00005
				Thallium	0.110	MG/KG	1.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.2E-07	(mg/kg/day)	6.5E-05	(mg/kg/day)	0.002
				Vanadium	15.6	MG/KG	2.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.7E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.003
				Zinc	930	MG/KG	1.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.0E-03	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.003
			Exp. Route Total								8.4E-07					0.1
		Exposure Point Total									8.4E-07					0.1
	Exposure Medium Total										8.4E-07					0.1
Medium Total											8.4E-07					0.1
										Total of Receptor Risks Across All Media	8.4E-07				Total of Receptor Hazards Across All Media	0.1

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Finfish/Shellfish	Site 16	Benzo(a)anthracene	8E-09	--	- -	--	8E-09	NA	--	- -	- -	--
			Benzo(a)pyrene	8E-08	--	- -	--	8E-08	NA	--	- -	- -	--
			Benzo(b)fluoranthene	2E-08	--	- -	--	2E-08	NA	--	- -	- -	--
			Benzo(g,h,i)perylene	- -	--	- -	--	- -	CNS	0.000002	- -	- -	0.000002
			Benzo(k)fluoranthene	1E-10	--	- -	--	1E-10	NA	--	- -	- -	--
			Bis(2-ethylhexyl)phthalate	2E-10	--	- -	--	2E-10	Liver	0.00000	- -	- -	0.000005
			Chrysene	2E-11	--	- -	--	2E-11	NA	--	- -	- -	--
			Fluoranthene	- -	--	- -	--	- -	Blood, Kidney, Liver	0.000001	- -	- -	0.000001
			Indeno(1,2,3-cd)pyrene	1E-09	--	- -	--	1E-09	NA	--	- -	- -	--
			Pyrene	- -	--	- -	--	- -	Kidney	0.000001	- -	- -	0.000001
			4,4'-DDE	1E-09	--	- -	--	1E-09	NA	--	- -	- -	--
			Aroclor-1260	1E-08	--	- -	--	1E-08	NA	--	- -	- -	--
			Dieldrin	4E-09	--	- -	--	4E-09	Liver	0.0000	- -	- -	0.00004
			Aluminum	- -	--	- -	--	- -	Body Weight	0.01	- -	- -	0.01
			Arsenic	7E-07	--	- -	--	7E-07	Skin, CVS	0.012	- -	- -	0.012
			Barium	- -	--	- -	--	- -	CVS	0.0001	- -	- -	0.0001
			Chromium	- -	--	- -	--	- -	Respiratory	0.01	- -	- -	0.01
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.01	- -	- -	0.01
			Copper	- -	--	- -	--	- -	GS	0.00	- -	- -	0.005
			Iron	- -	--	- -	--	- -	GS	0.01	- -	- -	0.01
			Lead	- -	--	- -	--	- -	NA	--	- -	- -	--
			Methyl Mercury	- -	--	- -	--	- -	CNS	0.00	- -	- -	0.004
			Nickel	- -	--	- -	--	- -	Body Weight	0.001	- -	- -	0.001
			Selenium	- -	--	- -	--	- -	Hair Loss, CNS, Skin	0.0000	- -	- -	0.00005
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0.002	- -	- -	0.002
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.00	- -	- -	0.003
			Zinc	- -	--	- -	--	- -	Blood	0.00	- -	- -	0.003
			Chemical Total	8E-07	--	- -	--	8E-07		0.1	- -	- -	0.1
		Exposure Point Total						8E-07					0.1
	Exposure Medium Total							8E-07					0.1
Medium Total								8E-07					0.1
Receptor Total							Receptor Risk Total	8E-07				Receptor HI Total	0.1

Total Blood HI	0.003
Total Body Weight HI	0.01
Total CNS HI	0.01
Total CVS HI	0.02
Total GS HI	0.02
Total Immune HI	0.01

TABLE 9.1.CTE

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Kidney HI	0.000002
												Total Liver HI	0.002
												Total Skin HI	0.012
												Total Hair Loss HI	0.01

Cooper River

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Finfish/Shellfish	Cooper River	Ingestion	Acenaphthene	0.081	MG/KG	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.8E-06	(mg/kg/day)	6.0E-02	(mg/kg/day)	0.0000
				Anthracene	0.140	MG/KG	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	4.8E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.0000
				Benzo(a)anthracene	0.35	MG/KG	5.1E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	3.8E-06	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.150	MG/KG	2.2E-06	(mg/kg/day)	7.3E+00	(mg/kg/day)$^{-1}$	1.6E-05	5.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.32	MG/KG	4.7E-06	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	3.4E-06	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	0.047	MG/KG	6.9E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0001
				Benzo(k)fluoranthene	0.072	MG/KG	1.1E-06	(mg/kg/day)	7.3E-02	(mg/kg/day)$^{-1}$	7.7E-08	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.30	MG/KG	4.4E-06	(mg/kg/day)	7.3E-03	(mg/kg/day)$^{-1}$	3.2E-08	1.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Fluoranthene	2.40	MG/KG	3.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	8.2E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00
				Fluorene	0.130	MG/KG	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	4.5E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.000
				Indeno(1,2,3-cd)pyrene	0.017	MG/KG	2.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	1.8E-07	5.8E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Phenanthrene	1.10	MG/KG	1.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	3.8E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00
				Pyrene	1.60	MG/KG	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	5.5E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00
				4,4'-DDD	0.000	MG/KG	4.1E-09	(mg/kg/day)	2.4E-01	(mg/kg/day)$^{-1}$	9.9E-10	9.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aroclor-1260	0.036	MG/KG	5.3E-07	(mg/kg/day)	2.0E+00	(mg/kg/day)$^{-1}$	1.1E-06	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	11900	MG/KG	1.7E-01	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	4.1E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.4
				Arsenic	3.500	MG/KG	5.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.7E-05	1.2E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4
				Barium	21.4	MG/KG	3.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	7.3E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00
				Chromium	8.0	MG/KG	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1
				Cobalt	2.3	MG/KG	3.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	7.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.3
				Copper	507	MG/KG	7.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.7E-02	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.4
				Iron	9180	MG/KG	1.3E-01	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	3.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.4
				Lead	10.5	MG/KG	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	3.6E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese (Soil)	124	MG/KG	1.8E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	4.2E-03	(mg/kg/day)	7.0E-02	(mg/kg/day)	0.1
				Nickel	18.9	MG/KG	2.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	6.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0
				Selenium	0.190	MG/KG	2.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	6.5E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00
				Vanadium	20.0	MG/KG	2.9E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	6.8E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.1
				Zinc	1550	MG/KG	2.3E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	5.3E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.2
			Exp. Route Total								1.0E-04					2
		Exposure Point Total									1.0E-04					2
	Exposure Medium Total										1.0E-04					2
Medium Total											1.0E-04					2
										Total of Receptor Risks Across All Media	1.0E-04				Total of Receptor Hazards Across All Media	2

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Finfish/Shellfish	Site 16	Acenaphthene	- -	--	- -	--	- -	Liver	0.0000	- -	- -	0.0000
			Anthracene	- -	--	- -	--	- -	None Reported	0.0000	- -	- -	0.0000
			Benzo(a)anthracene	4E-06	--	- -	--	4E-06	NA	--	- -	- -	--
			Benzo(a)pyrene	2E-05	--	- -	--	2E-05	NA	--	- -	- -	--
			Benzo(b)fluoranthene	3E-06	--	- -	--	3E-06	NA	--	- -	- -	--
			Benzo(g,h,i)perylene	- -	--	- -	--	- -	CNS	0.0001	- -	- -	0.0001
			Benzo(k)fluoranthene	8E-08	--	- -	--	8E-08	NA	--	- -	- -	--
			Chrysene	3E-08	--	- -	--	3E-08	NA	--	- -	- -	--
			Fluoranthene	- -	--	- -	--	- -	Blood, Kidney, Liver	0.00	- -	- -	0.00
			Fluorene	- -	--	- -	--	- -	Blood	0.000	- -	- -	0.000
			Indeno(1,2,3-cd)pyrene	2E-07	--	- -	--	2E-07	NA	--	- -	- -	--
			Phenanthrene	- -	--	- -	--	- -	Kidney	0.00	- -	- -	0.00
			Pyrene	- -	--	- -	--	- -	Kidney	0.00	- -	- -	0.00
			4,4'-DDD	1E-09	--	- -	--	1E-09	NA	--	- -	- -	--
			Aroclor-1260	1E-06	--	- -	--	1E-06	NA	--	- -	- -	--
			Aluminum	- -	--	- -	--	- -	Body Weight	0	- -	- -	0
			Arsenic	8E-05	--	- -	--	8E-05	Skin, CVS	0.4	- -	- -	0.4
			Barium	- -	--	- -	--	- -	CVS	0.00	- -	- -	0.00
			Chromium	- -	--	- -	--	- -	Respiratory	0.1	- -	- -	0.1
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0	- -	- -	0
			Copper	- -	--	- -	--	- -	GS	0	- -	- -	0
			Iron	- -	--	- -	--	- -	GS	0	- -	- -	0
			Lead	- -	--	- -	--	- -	NA	--	- -	- -	--
			Manganese (Soil)	- -	--	- -	--	- -	CNS	0.1	- -	- -	0.1
			Nickel	- -	--	- -	--	- -	Body Weight	0.0	- -	- -	0.0
			Selenium	- -	--	- -	--	- -	Hair Loss, CNS, Skin	0.00	- -	- -	0.00
			Vanadium	- -	--	- -	--	- -	Hair Loss	0	- -	- -	0
			Zinc	- -	--	- -	--	- -	Blood	0	- -	- -	0
			Chemical Total	1E-04	--	- -	--	1E-04		2	- -	- -	2
		Exposure Point Total						1E-04					2
	Exposure Medium Total							1E-04					2
Medium Total								1E-04					2
Receptor Total							Receptor Risk Total	1E-04				Receptor HI Total	2

Total Blood HI	0.2
Total Body Weight HI	0.4
Total CNS HI	0.3
Total CVS HI	0.7
Total GS HI	0.9

TABLE 9.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Immune HI	0.3
												Total Kidney HI	0.01
												Total Liver HI	0.002
												Total Skin HI	0.4
												Total None Reported HI	0.00002
												Total Hair Loss HI	0.1

TABLE 7.1.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURES

CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Finfish/Shellfish	Site 16	Ingestion	Acenaphthene	0.081	MG/KG	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	8.9E-07	(mg/kg/day)	6.0E-02	(mg/kg/day)	0.00001
				Anthracene	0.140	MG/KG	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.5E-06	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.00001
				Benzo(a)anthracene	0.35	MG/KG	4.9E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	3.6E-07	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(a)pyrene	0.150	MG/KG	2.1E-07	(mg/kg/day)	7.3E+00	(mg/kg/day)$^{-1}$	1.5E-06	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(b)fluoranthene	0.32	MG/KG	4.5E-07	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	3.3E-07	3.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Benzo(g,h,i)perylene	0.047	MG/KG	6.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	5.2E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00002
				Benzo(k)fluoranthene	0.072	MG/KG	1.0E-07	(mg/kg/day)	7.3E-02	(mg/kg/day)$^{-1}$	7.4E-09	7.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Chrysene	0.30	MG/KG	4.2E-07	(mg/kg/day)	7.3E-03	(mg/kg/day)$^{-1}$	3.1E-09	3.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Fluoranthene	2.40	MG/KG	3.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.6E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.001
				Fluorene	0.130	MG/KG	1.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.4E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0000
				Indeno(1,2,3-cd)pyrene	0.017	MG/KG	2.4E-08	(mg/kg/day)	7.3E-01	(mg/kg/day)$^{-1}$	1.7E-08	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Phenanthrene	1.10	MG/KG	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.2E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000
				Pyrene	1.60	MG/KG	2.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.8E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.001
				4,4'-DDD	0.000	MG/KG	3.9E-10	(mg/kg/day)	2.4E-01	(mg/kg/day)$^{-1}$	9.5E-11	3.1E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aroclor-1260	0.036	MG/KG	5.1E-08	(mg/kg/day)	2.0E+00	(mg/kg/day)$^{-1}$	1.0E-07	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aluminum	11900	MG/KG	1.7E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.3E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
				Arsenic	3.500	MG/KG	4.9E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.4E-06	3.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.13
				Barium	21.4	MG/KG	3.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.3E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.001
				Chromium	8.0	MG/KG	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	8.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0
				Cobalt	2.3	MG/KG	3.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Copper	507	MG/KG	7.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	5.6E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.1
				Iron	9180	MG/KG	1.3E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.0E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.1
				Lead	10.5	MG/KG	1.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese (Soil)	124	MG/KG	1.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.4E-03	(mg/kg/day)	7.0E-02	(mg/kg/day)	0.02
				Nickel	18.9	MG/KG	2.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.01
				Selenium	0.190	MG/KG	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.1E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.000
				Vanadium	20.0	MG/KG	2.8E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0
				Zinc	1550	MG/KG	2.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.7E-02	(mg/kg/day)	3.0E-01	(mg/kg/day)	0.1
			Exp. Route Total								9.8E-06					0.8
		Exposure Point Total									9.8E-06					0.8
	Exposure Medium Total										9.8E-06					0.8
Medium Total											9.8E-06					0.8
										Total of Receptor Risks Across All Media	9.8E-06				Total of Receptor Hazards Across All Media	0.8

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Finfish/Shellfish	Site 16	Acenaphthene	- -	--	- -	--	- -	Liver	0.00001	- -	- -	0.00001
			Anthracene	- -	--	- -	--	- -	None Reported	0.00001	- -	- -	0.00001
			Benzo(a)anthracene	4E-07	--	- -	--	4E-07	NA	--	- -	- -	--
			Benzo(a)pyrene	2E-06	--	- -	--	2E-06	NA	--	- -	- -	--
			Benzo(b)fluoranthene	3E-07	--	- -	--	3E-07	NA	--	- -	- -	--
			Benzo(g,h,i)perylene	- -	--	- -	--	- -	CNS	0.00002	- -	- -	0.00002
			Benzo(k)fluoranthene	7E-09	--	- -	--	7E-09	NA	--	- -	- -	--
			Chrysene	3E-09	--	- -	--	3E-09	NA	--	- -	- -	--
			Fluoranthene	- -	--	- -	--	- -	Blood, Kidney, Liver	0.001	- -	- -	0.001
			Fluorene	- -	--	- -	--	- -	Blood	0.0000	- -	- -	0.00004
			Indeno(1,2,3-cd)pyrene	2E-08	--	- -	--	2E-08	NA	--	- -	- -	--
			Phenanthrene	- -	--	- -	--	- -	Kidney	0.0004	- -	- -	0.0004
			Pyrene	- -	--	- -	--	- -	Kidney	0.001	- -	- -	0.001
			4,4'-DDD	9E-11	--	- -	--	9E-11	NA	--	- -	- -	--
			Aroclor-1260	1E-07	--	- -	--	1E-07	NA	--	- -	- -	--
			Aluminum	- -	--	- -	--	- -	Body Weight	0.1	- -	- -	0.1
			Arsenic	7E-06	--	- -	--	7E-06	Skin, CVS	0.13	- -	- -	0.13
			Barium	- -	--	- -	--	- -	CVS	0.001	- -	- -	0.001
			Chromium	- -	--	- -	--	- -	Respiratory	0.03	- -	- -	0.03
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.1	- -	- -	0.1
			Copper	- -	--	- -	--	- -	GS	0.1	- -	- -	0.1
			Iron	- -	--	- -	--	- -	GS	0.1	- -	- -	0.1
			Lead	- -	--	- -	--	- -	NA	--	- -	- -	--
			Manganese (Soil)	- -	--	- -	--	- -	CNS	0.02	- -	- -	0.02
			Nickel	- -	--	- -	--	- -	Body Weight	0.01	- -	- -	0.01
			Selenium	- -	--	- -	--	- -	Hair Loss, CNS, Skin	0.0004	- -	- -	0.0004
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.04	- -	- -	0.04
			Zinc	- -	--	- -	--	- -	Blood	0.1	- -	- -	0.1
			Chemical Total	1E-05	--	- -	--	1E-05		1	- -	- -	1
		Exposure Point Total						1E-05					1
	Exposure Medium Total							1E-05					1
Medium Total								1E-05					1
Receptor Total							Receptor Risk Total	1E-05				Receptor HI Total	1

Total Blood HI	0.1
Total Body Weight HI	0.1
Total CNS HI	0.1
Total CVS HI	0.2

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total GS HI	0.3
												Total Immune HI	0.1
												Total Kidney HI	0.002
												Total Liver HI	0.001
												Total Skin HI	0.13
												Total None Reported HI	0.00001
												Total Hair Loss HI	0.04

FOOD CHAIN MODELS

Shipyard Creek

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
SHIPYARD CREEK
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
2-Methylnaphthalane	0.030	0.000	1.000	1.38E-02					
Acenaphthene	0.044	0.000	0.290	5.86E-03	0.001	65.6	356	1.88E-05	3.47E-06
Acenaphthylene	5.60E-02	0.00E+00	0.290	7.46E-03	1.57E-03	65.6	356	2.40E-05	4.41E-06
Anthracene	1.10E-01	0.00E+00	0.290	1.47E-02	3.09E-03	65.6	356	4.71E-05	8.67E-06
Benzo(a)anthracene	5.80E-01	0.00E+00	0.290	7.73E-02	1.63E-02	0.615	38.4	2.65E-02	4.24E-04
Benzo(a)pyrene	5.60E-01	0.00E+00	0.290	7.46E-02	1.57E-02	0.615	38.4	2.56E-02	4.09E-04
Benzo(b)fluoranthene	1.50E+00	0.00E+00	0.290	2.00E-01	4.21E-02	0.615	38.4	6.84E-02	1.10E-03
Benzo(g,h,i)perylene	3.30E-01	0.00E+00	0.290	4.40E-02	9.26E-03	0.615	38.4	1.51E-02	2.41E-04
Benzo(k)fluoranthene	4.00E-01	0.00E+00	0.290	1.33E-02	6.30E-03	0.615	38.4	1.02E-02	1.64E-04
Bis(2-ethylhexyl)phthalate	7.50E-01	0.00E+00	1.000	8.61E-02	1.93E-02	18.3	183	1.06E-03	1.06E-04
Chrysene	5.60E-01	0.00E+00	0.290	1.87E-02	8.82E-03	0.615	38.4	1.43E-02	2.30E-04
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.290	0.00E+00	0.00E+00	0.615	38.4	0.00E+00	0.00E+00
Fluoranthene	8.60E-01	0.00E+00	0.290	2.86E-02	1.35E-02	65.6	356	2.06E-04	3.80E-05
Fluorene	3.30E-02	0.00E+00	0.290	1.10E-03	5.19E-04	65.6	356	7.92E-06	1.46E-06
Indeno(1,2,3-cd)pyrene	3.20E-01	0.00E+00	0.290	1.07E-02	5.04E-03	0.615	38.4	8.19E-03	1.31E-04
Naphthalene	7.50E-03	0.00E+00	0.290	2.50E-04	1.18E-04	7.1	14.2	1.66E-05	8.31E-06
Phenanthrene	2.80E-01	0.00E+00	0.290	9.33E-03	4.41E-03	65.6	356	6.72E-05	1.24E-05
Pyrene	1.20E+00	0.00E+00	0.290	4.00E-02	1.89E-02	0.615	38.4	3.07E-02	4.92E-04
Pesticides and PCBs									
4,4'-DDE	2.50E-02	0.00E+00	7.7	2.21E-02	3.02E-03	0.147	5.56	2.05E-02	5.43E-04
Dieldrin	9.10E-03	0.00E+00	1.8	1.88E-03	3.38E-04	0.015	1.27	2.25E-02	2.66E-04
Aroclor-1260	2.10E-01	0.00E+00	1.850	4.46E-02	7.94E-03	0.14	0.69	5.67E-02	1.15E-02
Inorganics									
Aluminum	3.29E+04	0.00E+00	1.000	8.23E+03	1.40E+03	#N/A	#N/A	#N/A	#N/A
Arsenic	1.98E+01	0.00E+00	0.690	3.42E+00	6.51E-01	1.04	4.55	6.26E-01	1.43E-01
Barium	8.66E+01	0.00E+00	1.000	2.17E+01	3.68E+00	#N/A	#N/A		
Chromium	3.36E+02	0.00E+00	0.468	3.93E+01	8.76E+00	2.4	58.17	3.65E+00	1.51E-01
Cobalt	7.40E+00	0.00E+00	1.000	1.85E+00	3.14E-01	#N/A	#N/A		
Copper	1.33E+02	0.00E+00	5.250	1.75E+02	2.31E+01	5.6	82.7	4.12E+00	2.79E-01
Iron	3.39E+04	0.00E+00	1.000	8.48E+03	1.44E+03				
Lead	1.42E+02	0.00E+00	0.607	2.15E+01	4.31E+00	4.7	186.4	9.17E-01	2.31E-02
Manganese	2.01E+02	0.00E+00	1.000	5.03E+01	8.53E+00				
Mercury	4.50E-01	0.00E+00	2.868	3.23E-01	4.50E-02	0.032	0.16	1.41E+00	2.81E-01
Nickel	3.28E+01	0.00E+00	2.320	1.90E+01	2.73E+00	1.7	14.77	1.60E+00	1.85E-01
Selenium	8.90E-01	0.00E+00	1.000	2.23E-01	3.78E-02	0.143	0.661	2.64E-01	5.72E-02
Thallium	4.20E-01	0.00E+00	1.000	1.05E-01	1.78E-02				
Vanadium	6.22E+01	0.00E+00	1.000	1.56E+01	2.64E+00				
Zinc	4.94E+02	0.00E+00	7.527	9.30E+02	1.20E+02	75.4	297.6	1.60E+00	4.04E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
SHIPYARD CREEK
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
			1.000						
Acenaphthene	2.20E-02	0.00E+00	0.290	7.33E-04	1.11E-04	65.6	356	1.69E-06	3.11E-07
Acenaphthylene	3.30E-02	0.00E+00	0.290	1.10E-03	1.66E-04	65.6	356	2.53E-06	4.66E-07
Anthracene	7.90E-02	0.00E+00	0.290	2.63E-03	3.97E-04	65.6	356	6.06E-06	1.12E-06
Benzo(a)anthracene	4.43E-01	0.00E+00	0.290	1.48E-02	2.23E-03	0.615	38.4	3.62E-03	5.80E-05
Benzo(a)pyrene	3.82E-01	0.00E+00	0.290	1.27E-02	1.92E-03	0.615	38.4	3.12E-03	5.00E-05
Benzo(b)fluoranthene	9.70E-01	0.00E+00	0.290	3.23E-02	4.88E-03	0.615	38.4	7.93E-03	1.27E-04
Benzo(g,h,i)perylene	2.10E-01	0.00E+00	0.290	6.99E-03	1.06E-03	0.615	38.4	1.72E-03	2.75E-05
Benzo(k)fluoranthene	2.33E-01	0.00E+00	0.290	7.76E-03	1.17E-03	0.615	38.4	1.91E-03	3.05E-05
Bis(2-ethylhexyl)phthalate	6.40E-01		1.000	7.35E-02					
Chrysene	3.70E-01	0.00E+00	0.290	1.23E-02	1.86E-03	0.615	38.4	3.03E-03	4.84E-05
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	0.290	0.00E+00	0.00E+00	0.615	38.4	0.00E+00	0.00E+00
Fluoranthene	6.83E-01	0.00E+00	0.290	2.27E-02	3.43E-03	65.6	356	5.24E-05	9.65E-06
Fluorene	2.10E-02	0.00E+00	0.290	6.99E-04	1.06E-04	65.6	356	1.61E-06	2.97E-07
Indeno(1,2,3-cd)pyrene	2.00E-01	0.00E+00	0.290	6.66E-03	1.01E-03	0.615	38.4	1.64E-03	2.62E-05
Napthalene	7.30E-03		0.290	2.43E-04					
Phenanthrene	1.63E-01	0.00E+00	0.290	5.43E-03	8.20E-04	65.6	356	1.25E-05	2.30E-06
Pyrene	9.40E-01		0.290	3.13E-02					
Pesticides and PCBs									
4,4'-DDE	1.45E-02	0.00E+00	7.7	1.28E-02	5.66E-04	0.147	5.56	3.85E-03	1.02E-04
Dieldrin	3.00E-03	0.00E+00	1.8	6.20E-04	3.59E-05	0.015	1.27	2.39E-03	2.83E-05
Aroclor-1260	1.87E-01	0.00E+00	1.850	3.97E-02	2.28E-03	0.14	0.69	1.63E-02	3.30E-03
Inorganics									
Aluminum	2.37E+04		1.000	5.92E+03					
Arsenic	1.29E+01	0.00E+00	0.690	2.22E+00	1.36E-01	1.04	4.55	1.31E-01	2.99E-02
Barium	6.05E+01		1.000	1.51E+01					
Chromium	2.15E+02	0.00E+00	0.468	2.51E+01	1.80E+00	2.4	58.17	7.50E-01	3.09E-02
Cobalt	4.80E+00		1.000	1.20E+00					
Copper	8.94E+01	0.00E+00	5.250	1.17E+02	5.02E+00	5.6	82.7	8.97E-01	6.07E-02
Iron	2.31E+04		1.000	5.78E+03					
Lead	8.65E+01	0.00E+00	0.071	1.54E+00	3.81E-01	4.7	186.4	8.11E-02	2.04E-03
Manganese	1.57E+02		1.000	3.93E+01					
Mercury	3.53E-01	0.00E+00	2.868	2.53E-01	1.14E-02	0.032	0.16	3.57E-01	7.14E-02
Nickel	2.25E+01	0.00E+00	2.320	1.30E+01	6.04E-01	1.7	14.77	3.55E-01	4.09E-02
Selenium	7.60E-01	0.00E+00	1.000	1.90E-01	1.04E-02	0.143	0.661	7.27E-02	1.57E-02
Thallium	3.00E-01		1.000	7.50E-02					
Vanadium	4.38E+01		1.000	1.10E+01					
Zinc	2.83E+02	0.00E+00	7.527	5.32E+02	2.23E+01	75.4	297.6	2.96E-01	7.49E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

Noisette Creek

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
NOISETTE CREEK
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
2-Methylnaphthalene	0.016	0.000	1.000	3.81E-03					
Acenaphthene	0.018	0.000	0.290	1.24E-03	0.000	65.6	356	5.53E-06	1.02E-06
Acenaphthylene	3.40E-02	0.00E+00	0.290	2.35E-03	6.85E-04	65.6	356	1.04E-05	1.92E-06
Anthracene	1.70E-01	0.00E+00	0.290	1.17E-02	3.43E-03	65.6	356	5.22E-05	9.62E-06
Benzo(a)anthracene	8.10E-01	0.00E+00	0.290	5.59E-02	1.63E-02	0.615	38.4	2.65E-02	4.25E-04
Benzo(a)pyrene	5.40E-01	0.00E+00	0.290	3.73E-02	1.09E-02	0.615	38.4	1.77E-02	2.83E-04
Benzo(b)fluoranthene	1.20E+00	0.00E+00	0.290	8.29E-02	2.42E-02	0.615	38.4	3.93E-02	6.30E-04
Benzo(g,h,i)perylene	2.50E-01	0.00E+00	0.290	1.73E-02	5.04E-03	0.615	38.4	8.19E-03	1.31E-04
Benzo(k)fluoranthene	3.80E-01	0.00E+00	0.290	2.62E-02	7.66E-03	0.615	38.4	1.24E-02	1.99E-04
Bis(2-Ethylhexyl)pthalate	2.40E-01	0.00E+00	1.000	5.71E-02					
Chrysene	6.90E-01	0.00E+00	0.290	4.76E-02	1.39E-02	0.615	38.4	2.26E-02	3.62E-04
Dibenzo(a,h)anthracene	7.60E-02	0.00E+00	0.290	5.25E-03	1.53E-03	0.615	38.4	2.49E-03	3.99E-05
Fluoranthene	1.50E+00	0.00E+00	0.290	1.04E-01	3.02E-02	65.6	356	4.61E-04	8.49E-05
Fluorene	3.00E-02	0.00E+00	0.290	2.07E-03	6.04E-04	65.6	356	9.21E-06	1.70E-06
Indeno(1,2,3-cd)pyrene	2.60E-01	0.00E+00	0.290	1.80E-02	5.24E-03	0.615	38.4	8.52E-03	1.36E-04
Phenanthrene	3.70E-01	0.00E+00	0.290	2.55E-02	7.45E-03	65.6	356	1.14E-04	2.09E-05
Pyrene	1.20E+00	0.00E+00	0.290	8.29E-02					
Pesticides									
4,4'-DDD	6.00E-03	0.00E+00	0.28	4.00E-04	1.19E-04	0.147	5.56	8.10E-04	2.14E-05
4,4'-DDE	3.60E-03	0.00E+00	7.7	6.60E-03	8.55E-04	0.147	5.56	5.82E-03	1.54E-04
Total DDT	6.40E-03	0.00E+00	7.7	1.17E-02	1.52E-03	0.147	5.56	1.03E-02	2.74E-04
Inorganics									
Aluminum	1.40E+04	0.00E+00	1.000	3.50E+03					
Arsenic	9.20E+00	0.00E+00	0.690	1.59E+00	3.03E-01	1.04	4.55	2.91E-01	6.65E-02
Barium	2.21E+01	0.00E+00	1.000	5.53E+00	9.38E-01				
Cadmium	0.00E+00	0.00E+00	7.990	0.00E+00	0.00E+00	0.77	6.9	0.00E+00	0.00E+00
Chromium	2.70E+01	0.00E+00	0.468	3.16E+00	7.04E-01	2.4	58.17	2.93E-01	1.21E-02
Cobalt	4.10E+00	0.00E+00	1.000	1.03E+00					
Copper	4.28E+01	0.00E+00	5.250	5.62E+01	7.42E+00	5.6	82.7	1.33E+00	8.98E-02
Iron	1.19E+04	0.00E+00	1.000	2.98E+03					
Lead	2.89E+01	0.00E+00	0.607	4.39E+00	8.77E-01	4.7	186.4	1.87E-01	4.70E-03
Manganese	7.85E+01	0.00E+00	1.000	1.96E+01	3.33E+00				
Mercury	1.10E+00	0.00E+00	2.868	7.89E-01	1.10E-01	0.032	0.16	3.44E+00	6.88E-01
Nickel	8.30E+00	0.00E+00	2.320	4.81E+00	6.90E-01	1.7	14.77	4.06E-01	4.67E-02
Selenium	3.20E-01	0.00E+00	1.000	8.00E-02	1.36E-02	0.143	0.661	9.50E-02	2.06E-02
Thallium	1.90E-01	0.00E+00	1.000	4.75E-02					
Vanadium	2.18E+01	0.00E+00	1.000	5.45E+00					
Zinc	1.58E+02	0.00E+00	7.527	2.97E+02	3.85E+01	75.4	297.6	5.10E-01	1.29E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs

were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
NOISETTE CREEK
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
Acenaphthene	9.50E-03	0.00E+00	0.290	6.56E-04	6.13E-05	65.6	356	9.35E-07	1.72E-07
Acenaphthylene	2.72E-01	0.00E+00	0.290	1.88E-02	1.76E-03	65.6	356	2.68E-05	4.93E-06
Anthracene	9.53E-02	0.00E+00	0.290	6.58E-03	6.15E-04	65.6	356	9.38E-06	1.73E-06
Benzo(a)anthracene	6.50E-01	0.00E+00	0.290	4.49E-02	4.20E-03	0.615	38.4	6.82E-03	1.09E-04
Benzo(a)pyrene	4.55E-01	0.00E+00	0.290	3.14E-02	2.94E-03	0.615	38.4	4.78E-03	7.65E-05
Benzo(b)fluoranthene	1.05E+00	0.00E+00	0.290	7.25E-02	6.78E-03	0.615	38.4	1.10E-02	1.77E-04
Benzo(g,h,i)perylene	1.98E-01	0.00E+00	0.290	1.37E-02	1.28E-03	0.615	38.4	2.08E-03	3.33E-05
Benzo(k)fluoranthene	2.73E-01	0.00E+00	0.290	1.89E-02	1.76E-03	0.615	38.4	2.87E-03	4.59E-05
Bis(2-Ethylhexyl)pthalate	8.72E-02		1.000	2.08E-02					
Chrysene	5.27E-01	0.00E+00	0.290	3.64E-02	3.40E-03	0.615	38.4	5.53E-03	8.86E-05
Dibenzo(a,h)anthracene	3.36E-02	0.00E+00	0.290	2.32E-03	2.17E-04	0.615	38.4	3.53E-04	5.65E-06
Fluoranthene	1.02E+00	0.00E+00	0.290	7.04E-02	6.59E-03	65.6	356	1.00E-04	1.85E-05
Fluorene	1.42E-02	0.00E+00	0.290	9.80E-04	9.17E-05	65.6	356	1.40E-06	2.58E-07
Indeno(1,2,3-cd)pyrene	2.15E-01	0.00E+00	0.290	1.48E-02	1.39E-03	0.615	38.4	2.26E-03	3.62E-05
Phenanthrene	2.03E-01	0.00E+00	0.290	1.40E-02	1.31E-03	65.6	356	2.00E-05	3.68E-06
Pyrene	1.02E+00		0.290	7.04E-02					
4,4'-DDD	4.17E-03	0.00E+00	0.280	2.78E-04	2.65E-05	0.147	5.56	1.80E-04	4.77E-06
4,4'-DDE	1.40E-03	0.00E+00	7.7	2.57E-03	1.08E-04	0.147	5.56	7.33E-04	1.94E-05
Total DDT	0.00E+00	0.00E+00	7.7	0.00E+00	0.00E+00	0.147	5.56	0.00E+00	0.00E+00
Inorganics									
Aluminum	9.37E+03		1.000	2.34E+03					
Arsenic	6.40E+00	0.00E+00	0.690	1.10E+00	6.78E-02	1.04	4.55	6.52E-02	1.49E-02
Barium	1.59E+01		1.000	3.98E+00					
Cadmium	0.00E+00	0.00E+00	7.990	0.00E+00	0.00E+00	0.77	6.9	0.00E+00	0.00E+00
Chromium	9.01E+00	0.00E+00	0.468	1.05E+00	7.54E-02	2.4	58.17	3.14E-02	1.30E-03
Cobalt	2.15E+00		1.000	5.38E-01					
Copper	2.33E+01	0.00E+00	5.250	3.06E+01	1.31E+00	5.6	82.7	2.34E-01	1.58E-02
Iron	8.66E+03		1.000	2.17E+03					
Lead	1.78E+01	0.00E+00	0.071	3.16E-01	7.84E-02	4.7	186.4	1.67E-02	4.21E-04
Manganese	6.19E+01		1.000	1.55E+01					
Mercury	2.40E-01	0.00E+00	2.868	1.72E-01	7.76E-03	0.032	0.16	2.43E-01	4.85E-02
Nickel	5.40E+00	0.00E+00	2.320	3.13E+00	1.45E-01	1.7	14.77	8.54E-02	9.83E-03
Selenium	2.05E-01	0.00E+00	1.000	5.13E-02	2.81E-03	0.143	0.661	1.96E-02	4.25E-03
Thallium	1.25E-01		1.000	3.13E-02					
Vanadium	1.53E+01		1.000	3.83E+00					
Zinc	7.56E+01	0.00E+00	7.527	1.42E+02	5.96E+00	75.4	297.6	7.91E-02	2.00E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs

were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

Cooper River

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
COOPER RIVER
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
2-Methylnaphthalene	0.0052	0.000	1.000	1.07E-03					
Acenaphthene	1.4	0.000	0.290	8.37E-02	0.027	65.6	356	4.06E-04	7.47E-05
Acenaphthylene	0.072	0.00E+00	0.290	4.30E-03	1.37E-03	65.6	356	2.09E-05	3.84E-06
Anthracene	2.4	0.00E+00	0.290	1.43E-01	4.56E-02	65.6	356	6.95E-04	1.28E-04
Benzo(a)anthracene	5.8	0.00E+00	0.290	3.47E-01	1.10E-01	0.615	38.4	1.79E-01	2.87E-03
Benzo(a)pyrene	2.5	0.00E+00	0.290	1.49E-01	4.75E-02	0.615	38.4	7.72E-02	1.24E-03
Benzo(b)fluoranthene	5.4	0.00E+00	0.290	3.23E-01	1.03E-01	0.615	38.4	1.67E-01	2.67E-03
Benzo(g,h,i)perylene	0.78	0.00E+00	0.290	4.66E-02	1.48E-02	0.615	38.4	2.41E-02	3.86E-04
Benzo(k)fluoranthene	1.2	0.00E+00	0.290	7.17E-02	2.28E-02	0.615	38.4	3.71E-02	5.94E-04
Chrysene	5.1	0.00E+00	0.290	3.05E-01	9.69E-02	0.615	38.4	1.58E-01	2.52E-03
Dibenzo(a,h)anthracene	0.068	0.00E+00	0.290	4.06E-03	1.29E-03	0.615	38.4	2.10E-03	3.36E-05
Fluoranthene	41	0.00E+00	0.290	2.45E+00	7.79E-01	65.6	356	1.19E-02	2.19E-03
Fluorene	2.2	0.00E+00	0.290	1.31E-01	4.18E-02	65.6	356	6.37E-04	1.17E-04
Naphthalene	0.0027		0.290	1.61E-04					
Indeno(1,2,3-cd)pyrene	0.28	0.00E+00	0.290	1.67E-02	5.32E-03	0.615	38.4	8.65E-03	1.39E-04
Phenanthrene	18	0.00E+00	0.290	1.08E+00	3.42E-01	65.6	356	5.21E-03	9.61E-04
Pyrene	26		0.290	1.55E+00					
Pesticides and PCBs									
4,4'-DDD	0.0048	0.00E+00	0.28	2.77E-04	9.00E-05	0.147	5.56	6.12E-04	1.62E-05
Aroclor-1260	9.40E-02	0.00E+00	1.850	3.58E-02	5.51E-03	0.14	0.69	3.94E-02	7.99E-03
Inorganics									
Aluminum	4.77E+04	0.00E+00	1.000	1.19E+04					
Arsenic	2.05E+01	0.00E+00	0.690	3.54E+00	6.74E-01	1.04	4.55	6.49E-01	1.48E-01
Barium	8.57E+01	0.00E+00	1.000	2.14E+01					
Chromium	6.84E+01	0.00E+00	0.468	8.00E+00	1.78E+00	2.4	58.17	7.43E-01	3.06E-02
Cobalt	9.20E+00	0.00E+00	1.000	2.30E+00					
Copper	3.86E+02	0.00E+00	5.250	5.07E+02	6.69E+01	5.6	82.7	1.20E+01	8.09E-01
Iron	3.67E+04	0.00E+00	1.000	9.18E+03					
Lead	1.47E+02	0.00E+00	0.607	2.23E+01	4.46E+00	4.7	186.4	9.49E-01	2.39E-02
Manganese	4.94E+02	0.00E+00	1.000	1.24E+02					
Mercury	1.10E-01	0.00E+00	2.868	7.89E-02	1.10E-02	0.032	0.16	3.44E-01	6.88E-02
Nickel	3.26E+01	0.00E+00	2.320	1.89E+01	2.71E+00	1.7	14.77	1.59E+00	1.83E-01
Selenium	7.70E-01	0.00E+00	1.000	1.93E-01	3.27E-02	0.143	0.661	2.29E-01	4.95E-02
Vanadium	8.01E+01	0.00E+00	1.000	2.00E+01					
Zinc	8.26E+02	0.00E+00	7.527	1.55E+03	2.01E+02	75.4	297.6	2.67E+00	6.76E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg		
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
COOPER RIVER
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Semivolatile Organics									
Acenaphthene	4.73E-01	0.00E+00	0.290	2.83E-02	2.88E-03	65.6	356	4.39E-05	8.09E-06
Acenaphthylene	7.20E-02	0.00E+00	0.290	4.30E-03	4.38E-04	65.6	356	6.68E-06	1.23E-06
Anthracene	8.88E-01	0.00E+00	0.290	5.31E-02	5.40E-03	65.6	356	8.24E-05	1.52E-05
Benzo(a)anthracene	2.21E+00	0.00E+00	0.290	1.32E-01	1.34E-02	0.615	38.4	2.19E-02	3.50E-04
Benzo(a)pyrene	8.79E-01	0.00E+00	0.290	5.25E-02	5.35E-03	0.615	38.4	8.70E-03	1.39E-04
Benzo(b)fluoranthene	2.45E+00	0.00E+00	0.290	1.46E-01	1.49E-02	0.615	38.4	2.42E-02	3.88E-04
Benzo(g,h,i)perylene	3.67E-01	0.00E+00	0.290	2.19E-02	2.23E-03	0.615	38.4	3.63E-03	5.82E-05
Benzo(k)fluoranthene	1.50E+00	0.00E+00	0.290	8.96E-02	9.13E-03	0.615	38.4	1.48E-02	2.38E-04
Chrysene	2.05E+00	0.00E+00	0.290	1.22E-01	1.25E-02	0.615	38.4	2.03E-02	3.25E-04
Dibenzo(a,h)anthracene	1.56E-01	0.00E+00	0.290	3.73E-02	2.07E-03	0.615	38.4	3.36E-03	5.38E-05
Fluoranthene	1.40E+01	0.00E+00	0.290	8.34E-01	8.49E-02	65.6	356	1.29E-03	2.39E-04
Fluorene	7.43E-01	0.00E+00	0.290	4.44E-02	4.52E-03	65.6	356	6.89E-05	1.27E-05
Indeno(1,2,3-cd)pyrene	2.62E-01	0.00E+00	0.290	1.57E-02	1.59E-03	0.615	38.4	2.59E-03	4.15E-05
Phenanthrene	6.07E+00	0.00E+00	0.290	3.63E-01	3.69E-02	65.6	356	5.63E-04	1.04E-04
Pyrene	9.63E+00		0.290	5.75E-01					
Pesticides and PCBs									
4,4'-DDD	2.10E-03	0.00E+00	0.28	1.21E-04	1.26E-05	0.147	5.56	8.58E-05	2.27E-06
Aroclor-1260	4.10E-02	0.00E+00	1.850	1.56E-02	7.76E-04	0.14	0.69	5.54E-03	1.12E-03
Inorganics									
Aluminum	3.05E+04		1.000	7.62E+03					
Arsenic	1.34E+01	0.00E+00	0.690	2.31E+00	1.42E-01	1.04	4.55	1.36E-01	3.12E-02
Barium	5.83E+01		1.000	1.46E+01					
Chromium	5.44E+01	0.00E+00	0.468	6.37E+00	4.56E-01	2.4	58.17	1.90E-01	7.84E-03
Cobalt	9.20E+00		1.000	2.30E+00					
Copper	1.93E+02	0.00E+00	5.250	2.53E+02	1.08E+01	5.6	82.7	1.93E+00	1.31E-01
Iron	2.58E+04		1.000	6.45E+03					
Lead	6.95E+01	0.00E+00	0.071	1.23E+00	3.06E-01	4.7	186.4	6.52E-02	1.64E-03
Manganese	3.58E+02		1.000	8.94E+01					
Mercury	2.70E+00	0.00E+00	2.868	1.94E+00	8.74E-02	0.032	0.16	2.73E+00	5.46E-01
Nickel	2.52E+01	0.00E+00	2.320	1.46E+01	6.77E-01	1.7	14.77	3.98E-01	4.59E-02
Selenium	4.97E-01	0.00E+00	1.000	1.24E-01	6.80E-03	0.143	0.661	4.75E-02	1.03E-02
Vanadium	5.04E+01		1.000	1.26E+01					
Zinc	3.55E+02	0.00E+00	7.527	6.69E+02	2.80E+01	75.4	297.6	3.72E-01	9.42E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	3.0 %

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

LEAD MODELS

Shipyard Creek

ZONE J CALCULATIONS OF BLOOD LEAD CONCENTRATIONS - INGESTION OF FISH BY A RECREATIONAL FISHERMAN
SHIPYARD CREEK
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 05/19/05 **EDIT RED CELLS**

Exposure Variable	Description of Exposure Variable	Units	Region OR Ethnic GSDi and PbBo Data from NHANES III Analysis							
			All/All	All/White	All/Black	All/Mexican	Northeast/All	Midwest/All	South/All	West/All
PbF	Lead concentration in Fish Tissue (wet weight)	ug/g or ppm	0.62	0.62	0.62	0.62	0.62	0.62	1.54	0.62
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	2.11	2.09	2.16	2.29	2.0	2.18	2.07	2.11
PbB_0	Baseline PbB	ug/dL	1.53	1.45	1.78	1.7	1.98	1.53	1.39	1.4
IR_f	Fish ingestion rate	g/day	25	25	25	25	25	25	25	25
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
AF_f	Absorption fraction (from ingested fish)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
EF_f	Exposure frequency	days/yr	350	350	350	350	350	350	350	350
AT_f	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**2.2**	**2.2**	**2.5**	**2.4**	**2.7**	**2.2**	**3.2**	**2.1**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	6.9	6.5	8.0	8.5	7.6	7.3	9.4	6.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**1.6%**	**1.3%**	**2.6%**	**3.3%**	**2.0%**	**2.0%**	**4.2%**	**1.3%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Cooper River

ZONE J CALCULATIONS OF BLOOD LEAD CONCENTRATIONS - INGESTION OF FISH BY A RECREATIONAL FISHERMAN
COOPER RIVER
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/05 **EDIT RED CELLS**

Exposure Variable	Description of Exposure Variable	Units	Region OR Ethnic GSDi and PbBo Data from NHANES III Analysis							
			All/All	All/White	All/Black	All/Mexican	Northeast/All	Midwest/All	South/All	West/All
PbF	Lead concentration in Fish Tissue (wet weight)	ug/g or ppm	0.62	0.62	0.62	0.62	0.62	0.62	1.23	0.62
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	2.11	2.09	2.16	2.29	2.0	2.18	2.07	2.11
PbB_0	Baseline PbB	ug/dL	1.53	1.45	1.78	1.7	1.98	1.53	1.39	1.4
IR_f	Fish ingestion rate	g/day	25	25	25	25	25	25	25	25
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
			--	--	--	--	--	--	--	--
AF_f	Absorption fraction (from ingested fish)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
EF_f	Exposure frequency	days/yr	350	350	350	350	350	350	350	350
AT_f	Averaging time (same for soil and dust)	days/yr	365	365	365	365	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**2.2**	**2.2**	**2.5**	**2.4**	**2.7**	**2.2**	**2.8**	**2.1**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	6.9	6.5	8.0	8.5	7.6	7.3	8.4	6.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**1.6%**	**1.3%**	**2.6%**	**3.3%**	**2.0%**	**2.0%**	**2.9%**	**1.3%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

SAMPLE CALCULATIONS

Calculation Worksheet

CLIENT: Charleston Naval Complex		Job Number: 349
SUBJECT: Calculation of intake risk from fish ingestion for Adult Recreational Users		
BASED ON: USEPA, DECEMBER 1989		
BY: A.M. CHRISTIAN	CHECKED BY: [illegible]	DATE: 11-1-11

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from fish ingestion from Cooper River.

Equation: Ingestion Intake = $\frac{\text{Cfish X IR X FI X EF X ED}}{\text{BW X AT}}$

Where:

Cfish = Chemcial concentration in fish (mg/kg)
IR = Ingestion Rate of fish/shellfish (kg/meal)
FI = Fraction Ingested from source
EF = Exposure Frequency (meals/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT-C = Averaging Time (Cancer) (days)
AT-N = Averaging Time (Non-Cancer) (days)
CSFo= oral carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDO= oral noncarcinogenic reference dose (mg/kg/day)

Risks:

ILCR (Carcinogens) = Intake (mg/kg/day) X CSFo (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

Assumptions

Cfish =	3.5 mg/kg	Chemical: Arsenic, Central Tendancy Exposure Scenario
IR =	0.008 kg/mean	
FI =	0.1	
EF =	350 means/year	
ED =	9 years	
BW =	70 kg	
AT-C =	25550 days	
AT-N =	3285 days	
CSFo=	1.5 (mg/kg/day)-1	
RfDO=	3.00E-04 (mg/kg/day)	

Example of Carcinogenic Calculation

Ingestion Intake = $\frac{\text{3.5 mg/kg X 0.008 kg/meal X 0.1 X 350 meals/year X 9 years}}{\text{70kg X 25550 days}}$

4.9E-06 mg/kg/day

ILCR = 4.9E-06 mg/kg/day X 1.5 (mg/kg/day)$^{-1}$
ILCR = **7.4E-06**

Example of Noncarcinogenic Calculation

Ingestion Intake $\frac{\text{3.5 mg/kg X 0.008 kg/meal X 0.1 X 350 meals/year X 9 years}}{\text{70kg X 3285 days}}$

3.8E-05 mg/kg/day

HQ = $\frac{\text{3.8E-05 (mg/kg/day)}}{\text{3.0E-04 (mg/kg/day)}}$
HQ = **0.1**

APPENDIX Q

ECOLOGICAL RISK ASSESSMENT – SUPPORTING DATA

Q.1 FOOD CHAIN MODELING

Q.2 NOISETTE CREEK: FIGURE SHOWING AREA OF CREEK AND MARSH DOWNSTREAM OF SAMPLE NOIM0001203

Q.3 SHIPYARD CREEK SUPPORTING DATA

Q.4 COOPER RIVER: CHEMICAL CONCENTRATIONS IN SEDIMENT SAMPLES COLLECTED IN SUPPORT OF DREDGING ACTIVITIES

APPENDIX Q.1

FOOD CHAIN MODELING

FOOD CHAIN MODELING METHODOLOGY

The objective of the food chain modeling was to evaluate potential risks to representative receptors from screening-level sediment COPCs that are known to bioaccumulate or biomagnify. USEPA Region 4 considers chemicals in this category to consist of those so designated in *Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs* (USEPA, 2000), with the exception of PAHs. USEPA Region 4 does not consider PAHs to significantly bioaccumulate unless they are present at percent levels in soil or sediment.

Screening-level COPCs in Noisette Creek sediment are shown in Tables 7-2 and 7-6 of the ecological risk assessment; those that are known to bioaccumulate or biomagnify consist of 4,4'-DDD, 4,4'-DDE, total DDT, copper, mercury, selenium, and zinc. Screening-level COPCs in Shipyard Creek sediment are shown in Tables 7-3 and 7-9 of the ecological risk assessment; those that are known to bioaccumulate or biomagnify consist of 4,4'-DDE, Aroclor-1260, dieldrin, arsenic, chromium, copper, lead, mercury, nickel, selenium, and zinc. Screening-level COPCs in Cooper River sediment are shown in Tables 7-4 and 7-12 of the ecological risk assessment; those that are known to bioaccumulate or biomagnify consist of 4,4'-DDD, Aroclor-1260, arsenic, chromium, copper, lead, nickel, selenium, and zinc. Other COPCs in Noisette Creek, Shipyard Creek, and the Cooper River are not known to bioaccumulate or biomagnify and were not included in the food chain models.

Risk via the food chain was evaluated using two scenarios. The first scenario used maximum detected COPC concentrations in sediment and conservative assumptions for body weight, food consumption, and sediment ingestion. The second scenario used average COPC concentrations in sediment, and less conservative values for body weight, food consumption, and sediment ingestion, except where noted. For brevity, the first scenario will hereafter be referred to as the conservative scenario, and the second scenario will be referred to as the average scenario. For each scenario, ingested doses for birds and mammals were calculated using the following equation.

$$PD = [[(C_{food} \times I_f) + (C_{sed} \times I_{sed})] \times AUF]/BW \qquad \text{(Equation 1)}$$

where:

PD	=	predicted dose from the ingestion of food and the incidental ingestion of sediment (mg/kg/day)
C_{food}	=	contaminant concentration in food (mg/kg)
I_f	=	food ingestion rate (kg/day)
C_{sed}	=	contaminant concentration in sediment (mg/kg)
I_{sed}	=	sediment ingestion rate (kg/day)
AUF	=	area use factor (portion of home range that overlaps the site)
BW	=	weight of receptor (kg)

REPRESENTATIVE RECEPTORS AND EXPOSURE FACTORS

The mink (*Mustela vison*) was used to represent mammals that prey upon fish and invertebrates. Birds that prey on fish and invertebrates were represented by the green heron (*Butorides virescens*). These species typically have a high probability of exposure to sediment contaminants based on their diet and habitat preferences. The mink and green heron are assumed to be representative of other species within the same trophic group and represent the groups of organisms specified in the assessment endpoints. Information regarding these representative receptors is presented below and in Table Q-1. Values for body weight and food consumption were taken preferentially from the *Wildlife Exposure Factors Handbook* (USEPA, 1993). Table Q-2 presents the values for body weight, food consumption, and incidental sediment ingestion that were used in the food chain model (Equation 1), and was derived from Table Q-1.

Mink

The mink is the most abundant and widespread carnivorous mammal in North America. Mink are found in freshwater and brackish coastal marshes, wetlands, swamps, and along the edges of rivers, streams, lakes, lakes, and ditches (USEPA, 1993). They are never found far from water (Lowery, 1974). Mink tend to use brushy or wooded cover adjacent to water where prey is abundant. Mink den in cavities in tree roots, brush piles, rock piles, logjams, or bank burrows of other animals, particularly muskrats. Mink are largely nocturnal but may move or feed during crepuscular (twilight) periods or during cloudy daylight conditions (USEPA, 1993).

Mink are carnivorous opportunistic predators, taking whatever prey is abundant. They feed on fish, crustaceans, and amphibians in aquatic habitats. Mammals are the most important prey in nearby terrestrial habitats where mink prey especially on mice, rats, and rabbits, and also birds, reptiles, and insects (Lowery, 1974; USEPA, 1993).

Mean body weight values for adult wild mink (non-farm raised) were 1.040 kg (male, summer), 1.233 kg (male, fall), 0.550 kg (female, summer), and 0.586 kg (female, fall) in studies summarized in USEPA's Wildlife Exposure Factors Handbook (1993). Because female mink are especially sensitive to COPCs such as Aroclor, mink body weight and food ingestion values in the ecological risk assessment were based on female data. Therefore, the BW term in Equation 1 was 0.550 kg in the conservative scenario and 0.568 kg (average female summer and fall) in the average scenario (Tables Q-1 and Q-2).

Food ingestion rates for mink ranged from 0.12 to 0.22 g/g body weight/day (USEPA, 1993). The food ingestion in the conservative scenario (0.0678 kg/day; Table Q-2) was derived by multiplying the maximum food ingestion rate (0.22 g/g body weight/day) by the maximum body weight (1.233 kg), then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value, based on a 75-percent moisture content in fish (Sample, et al., 1997). Food ingestion in the average scenario (0.0227 kg/day; Table Q-2) was derived by multiplying the female food ingestion rate (0.16 g/g body weight/day) by the average female body weight (0.568 kg), then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value.

The two incidental sediment ingestion rates in Table Q-2 (0.0064 kg/day and 0.0021 kg/day) were calculated by multiplying the two food ingestion rates (0.0678 kg/day and 0.0227 kg/day) by incidentally ingested sediment (9.4 percent of diet). The 9.4 percent value is based on the incidental soil/sediment ingestion rate of the raccoon (Beyer, et al., 1994), which also forages on aquatic organisms, because sediment ingestion data were not available for the mink.

Green Heron

The green heron is a common bird in wetland thickets throughout the eastern United States. It is typically a bird of swampy thickets where it forages in both fresh and salt water, especially along forested margins of ponds, lakes, rivers, streams, marshes, and swamps. It prefers thick vegetation but will feed in the open when food is available. Small fish are the primary prey, but green herons also consume insects and a variety of aquatic invertebrates. Breeding populations in coastal South Carolina are non-migratory (Davis and Kushlan, 1994). The green heron undoubtedly forages in Shipyard Creek and Noisette Creek (and perhaps in the Cooper River, at least occasionally), and its small size relative to other wading birds makes it a good representative of other bird species that prey on aquatic and benthic organisms (a low body weight is usually associated with high food intake per unit body weight).

Data for the green heron were not included in USEPA's *Wildlife Exposure Factors Handbook* (USEPA, 1993). The mean adult body weight of 34 green herons in Florida was 212 g (Dunning, 1993). Minimum and maximum body weights were not provided, but the standard deviation was 5.92 g (Dunning, 1993). A value of 0.200 kg was used as the BW term in Equation 1 for the conservative scenario (Table Q-2). This value is the mean minus two standard deviations from Dunning's data. The BW term in Equation 1 for the average scenario was the mean (0.212 kg) from Dunning's data.

Food ingestion rates for the green heron were not available. Nagy (2001) provided allometric equations for several orders of birds but not for Ciconiiformes (herons). Dry weight food ingestion in the conservative scenario (0.031 kg/day; Table Q-2) was derived using the Nagy (2001) equation for "marine birds" based on a 0.224 kg bird. The 0.224 kg body weight value is the mean plus two standard deviations from Dunning's (1993) green heron data (see previous paragraph); this value would approximate the 98th percentile, and thus, represents a conservative approach. Dry weight food ingestion in the average scenario (0.030 kg/day; Table Q-2) was derived using the Nagy (2001) equation for marine birds based on a 0.212 kg bird, which is the mean body weight value from Dunning's (1993) green heron data.

Sediment ingestion data for piscivorous birds were not available in the literature. A sediment ingestion rate of 5 percent for piscivorous birds was used in Equation 1. Unlike shorebirds, herons do not probe the sediment. Green herons and other wading birds typically capture prey with a darting stroke, grasping or spearing with the bill (Davis and Kushlan, 1994). Similarly, piscivorous birds such as the belted kingfisher and osprey capture prey primarily from the water column rather than by probing on or near the sediment substrate. Therefore, an assumed value of 5 percent for incidental sediment ingestion is probably a very conservative estimate for the green heron as well as for other piscivorous birds. The two sediment ingestion rates in Table Q-2 (0.0016 kg/day and 0.0015 kg/day) were calculated by multiplying the two food ingestion rates (0.031 kg/day and 0.030 kg/day) by 0.05, assuming that incidentally ingested sediment is 5 percent of the diet.

CHEMICAL CONCENTRATIONS IN FOOD ITEMS

Chemical concentrations in food items (the "C_{food}" term in Equation 1) were calculated using biota sediment accumulation factors (BSAFs), which are shown in Table Q-3:

Concentrations of organic COPCs in food items of piscivorous birds and mammals were estimated using the following equation (USEPA, 2004):

$$C_f = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

where:

C_f	=	chemical concentration in food (mg/kg)
C_s	=	chemical concentration in sediment (mg/kg)
BSAF	=	biota-sediment accumulation factor (ratio of the concentration of a chemical in tissue, normalized to lipid, to the concentration of the chemical in surface sediment, normalized to organic carbon)
f_{oc}	=	total organic carbon (TOC) content of sediment expressed as a decimal fraction
f_l	=	organism lipid content expressed as a decimal fraction

BSAFs for organic compounds were obtained from *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, Volume 1: National Sediment Quality Survey* (USEPA, 2004).

Total organic carbon (TOC) was measured in all sediment samples collected in April 2008. The average TOC value for each of the three water bodies was used to calculate the dose for piscivorous birds and mammals. The average TOC in Noisette Creek samples was 31,500 mg/kg, which equates to 3.15 percent, or 0.0315. Similarly, the average TOC in Shipyard Creek samples was 65,300 mg/kg and the average TOC in Cooper River samples was 36,400 mg/kg. Thus, the f_{oc} term in Equation 2 was 0.0315 for Noisette Creek, 0.0653 for Shipyard Creek, and 0.0364 for the Cooper River.

A lipid content of 3 percent (0.03) is often used for assessing human health effects from the consumption of contaminated fish (USEPA, 2004); this value was divided by 0.25 to convert the lipid content from a wet-weight value to a dry-weight value (0.12), based on a 75 percent moisture content in fish (Sample et al., 1997). Thus, 0.12 was used to represent f_l in Equation 2 for organic compounds.

Sediment-to-fish BSAFs are not available for metals, so sediment-to-aquatic invertebrate BSAFs from ORNL (1998) were used to estimate tissue concentrations of metals in food items of piscivorous birds and mammals. The BSAFs for metals are not normalized to lipids or TOC, so concentrations of metals in food items were estimated by multiplying each COPC's sediment concentration by its associated BSAF.

AREA USE FACTORS

In ecological risk assessments, the home range size of a representative receptor can be used to determine the proportion of time that an individual animal is expected to contact contaminated environmental media. Home range is defined as the geographic area encompassed by an animal's activities (except migration) over a specified time. Home range values often are expressed in units of area, but for species dependent on riparian or coastal habitats (such as mink), home range is often expressed as foraging radius or as shoreline distance (USEPA, 1993). The home range of each representative receptor (mink and green heron) was assumed to be equal in size to each water body in both the conservative and average initial estimates of ingested doses (i.e., AUF in Equation 1 = 1.0). This assumption is overly conservative for piscivorous receptors such as the green heron and mink at relatively small sites, so AUFs were incorporated in subsequent iterations of dose calculations. Home ranges for the mink and green heron are discussed below.

Mink

Home ranges for mink are highly variable, depending on sex, age, time of year, and habitat. Mink in areas with an abundant food source have smaller home ranges than mink in areas where food is scarce (USEPA). Mature males travel extensively, moving from one temporary den to the next in an area as large as 5 square miles. They may take as long as 2 weeks to complete the "circuit," returning to the area where they started (MDC, 2004). Males forage within as much as 2.5 miles of stream habitat (NGPC, undated). Mink home range values were highly variable in a literature review of several studies, ranging from 259 to 1,626 hectares (640 to 4,018 acres), and home ranges measured in distances along stream or river shoreline habitats were usually in the range of 1 to 3 km (0.6 to 1.9 miles) of shoreline (USEPA, 1993). The smallest reported home ranges were 19 acres for a female mink in a heavily vegetated riverine area, and 50 acres for a female mink in a sparsely vegetated riverine area; both of these values however, was based on a study of only one mink (USEPA, 1993). Based on USEPA's (1993) literature review, the mink typically forages within approximately 0.6 to 1.9 miles of streamside habitats. The midpoint of this range is 1.25 miles, or 6,600 feet.

Green Heron

The green heron was not included in the *Wildlife Exposure Factors Handbook* (USEPA, 1993), and home range data for the green heron was not located. Peters (1983) used data from several studies to develop the following formula for the relationship of body size to home range for predatory birds:

$$\text{home range (km}^2\text{)} = 8.3\ W^{1.37} \quad \text{where } W = \text{body mass (kg)}$$

Using this formula and a body weight of 212 g, the estimated home range for a green heron would be 0.99 km^2 (245 acres).

ECOLOGICAL EFFECTS EVALUATION

Potential effects to representative piscivorous birds and mammals were evaluated by comparing the modeled ingested doses to threshold oral toxicity reference values (TRVs), which are doses associated with adverse effects on growth, survival, or reproduction. Because TRVs for the specific representative receptors (mink and green heron) used for ecological risk assessments of the Zone J water bodies were not available for most COPCs, toxicity data from laboratory species were extrapolated to the representative receptor species. No observed adverse effect levels (NOAELs) and lowest observed adverse effect levels (LOAELs) were used to provide a range of risks. TRVs used for Zone J and their sources are presented in Table Q-4.

The TRVs for DDT and its metabolites 4,4'-DDD and 4,4'-DDE, and for dieldrin, arsenic, chromium, copper, lead, nickel, selenium, and zinc shown in Table Q-4 represent the geometric means of NOAEL and LOAEL data for growth and reproduction from USEPA's Eco-SSL documents (USEPA, 2005a-c; 2007a-f). TRVs for Aroclors and mercury are not included in Eco-SSL documents, so TRVs for these COPCs were obtained from Sample et al. (1996), who compiled toxicity data from several sources.

The ratio of the modeled dose to the TRV is called the hazard quotient (HQ). An HQ less than 1.0 in the food-chain modeling (in the conservative scenario and using the NOAEL as the TRV) indicates that risk to the representative piscivorous receptor is unlikely. A food chain HQ of greater than 1.0 indicates that potential risks to ecological receptors is possible, and the chemical is further evaluated.

Calculation spreadsheets for the representative receptors are provided in this appendix. A step-by-step example of how food chain HQs were calculated is also provided.

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TABLE Q-1

DERIVATION OF BODY WEIGHT AND FOOD INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Species/Factor	Age/Sex/Season[a]	Value	Derivation of Factors Used in Food Chain Modeling			
Mink[b]						
Body Weight (g)	A M summer	1040	Minimum Value	0.550	kg	
	A M fall	1233	Maximum Value	1.233	kg	
	A F summer	550	Overall average	0.852	kg	
	A F fall	586	Average female	0.568	kg	
Food Ingestion Rate (g/g-day)	A M summer	0.13	Conservative scenario:	0.0678	kg/day	Maximum ingestion rate (0.22 g/g/day) × maximum body weight (1.233 kg) × 0.25[c]
	A M winter	0.12				
	A F winter	0.16	Less conservative scenario:	0.0227	kg/day	Female ingestion rate (0.16 g/g/day) × average female body weight (0.568 kg) × 0.25[c]
	A M year-round	0.22				
Green Heron[d]						
Body Weight (g)	AB	212	Mean of 34 adults from Florida = 212 g, standard deviation = 5.92 g (Dunning, 1993)			
			Conservative scenario:	0.200	kg	Mean minus 2 standard deviations (Dunning, 1993)
			Less conservative scenario:	0.212	kg	Mean (Dunning, 1993)
Food Ingestion Rate (g/g-day)	-	-	Conservative scenario:	0.031	kg/day	Using allometric equation from Nagy (2001) for 0.224 kg marine bird (0.224 kg = mean plus 2 standard deviations from Dunning (1993) green heron data)
			Less conservative scenario:	0.030	kg/day	Using allometric equation from Nagy (2001) for 0.212 kg marine bird

Notes:
a A=adult, M=male, F=female, B=both sexes
b Data from Wildlife Exposure Factors Handbook (USEPA, 1993).
c Food ingestion was multiplied by 0.25 (based on 75 percent moisture content in fish) to convert to dry weight ingestion rate.
d Green heron data not available in Wildlife Exposure Factors Handbook (USEPA, 1993). Values obtained from other sources as shown.

TABLE Q-2

FOOD CHAIN EXPOSURE FACTORS FOR PISCIVOROUS WILDLIFE
ZONE J
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Species/Exposure Inputs	Conservative Scenario(1)		Average Scenario(1)	
	Value	Unit	Value	Unit
Mink				
Body Weight	0.550	kg	0.568	kg
Food Ingestion Rate(2)	0.0678	kg/day	0.0227	kg/day
Sediment Ingestion Rate(3)	0.0064	kg/day	0.0021	kg/day
Green Heron				
Body Weight	0.200	kg	0.212	kg
Food Ingestion Rate(2)	0.031	kg/day	0.030	kg/day
Sediment Ingestion Rate(3)	0.0016	kg/day	0.0015	kg/day

(1)The derivation of values in this table is presented in Table Q-1 and discussed in Appendix Q text.
(2) Food ingestion rates are dry-weight values.
(3) Sediment ingestion rates were calculated by multiplying the food ingestion (kg/day) by the proportion of the diet comprised of incidentally ingested sediment (9.4% for mink, 5% for green heron).

TABLE Q-3

BIOTA SEDIMENT ACCUMULATION FACTORS (BSAFs)
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	BSAFs		Source
	Conservative[1]	Average[1]	
Pesticides and PCBs			
4,4'-DDD	0.28	0.28	USEPA (2004)
4,4'-DDE	7.7	7.7	USEPA (2004)
Total DDT	7.7	7.7	USEPA (2004)
Dieldrin	1.8	1.8	USEPA, 2004
Aroclor-1260	1.85	1.85	USEPA, 2004
Inorganics			
Arsenic	0.69	0.143	ORNL (1998)
Chromium	0.468	0.1	ORNL, 1998
Copper	5.25	1.556	ORNL, 1998
Lead	0.607	0.071	ORNL, 1998
Mercury	2.868	1.136	ORNL, 1998
Nickel	2.32	0.486	ORNL, 1998
Selenium	1.0	1.0	NA[2]
Zinc	7.527	1.936	ORNL (1998)

Notes:
1 Conservative and average refer to the exposure scenarios for which the BSAFs are used. For inorganics, conservative value is 90th percentile from ORNL (1998) and average value is median value from ORNL (1998). For organics, only one BSAF was available in USEPA (2004) for each analyte; thus, the same BSAF value was used for the conservative and average scenarios.
2 BSAF not available; default value of 1.0 was used as BSAF.

TABLE Q-4
TOXICITY REFERENCE VALUES (TRVs)
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Concentration (mg/kg/day)	Endpoint	Effect	Study Duration	Species	Reference
Pesticides and PCBs						
DDT(1)	0.227	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007a
DDT(1)	2.70	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007a
DDT(1)	0.147	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007a
DDT(1)	5.56	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007a
Dieldrin	0.0709	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007b
Dieldrin	0.8	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007b
Dieldrin	0.015	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007b
Dieldrin	1.27	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007b
Aroclor-1254(2)	1.8	LOAEL	reproduction	17 weeks	pheasant	Dahlgren et al., 1972
Aroclor-1254(2)	0.14	NOAEL	reproduction	4.5 months	mink	Aulerich & Ringer, 1977
Aroclor-1254(2)	0.69	LOAEL	reproduction	4.5 months	mink	Aulerich & Ringer, 1977
Inorganics						
Arsenic	2.24	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005a
Arsenic	4.51	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005a
Arsenic	1.04	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005a
Arsenic	4.55	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005a
Chromium (III)	2.66	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005b
Chromium (III)	15.63	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005b
Chromium (III)	2.4	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005b
Chromium (III)	58.17	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005b
Copper	5.6	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007c
Copper	82.7	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007c
Copper	4.05	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007c
Copper	34.87	LOAEL	reproduction & growth	chronic(3)	various birds(6)	USEPA, 2007c
Lead	4.7	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005c
Lead	186.4	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2005c
Lead	1.63	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005c
Lead	44.6	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2005c
Mercury(4)	0.064	LOAEL	reproduction	chronic	mallard	Heinz, 1979
Mercury	0.032	NOAEL	reproduction	chronic	rat	Verschuuren et al., 1976
Mercury	0.16	LOAEL	reproduction	chronic	rat	Verschuuren et al., 1976
Nickel	6.71	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007d
Nickel	18.57	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007d
Nickel	1.7	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007d
Nickel	14.77	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007d
Selenium	0.29	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007e
Selenium	0.819	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007e
Selenium	0.143	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007e
Selenium	0.661	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007e
Zinc	66.1	NOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007f
Zinc	171.4	LOAEL	reproduction & growth	chronic(3)	various birds(3)	USEPA, 2007f
Zinc	75.4	NOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007f
Zinc	297.6	LOAEL	reproduction & growth	chronic(3)	various mammals(3)	USEPA, 2007f

Footnotes:

NOAEL = No Observed Adverse Effects Level

LOAEL = Lowest Observed Adverse Effects Level

(1) DDT used as a surrogate for 4,4'-DDD and 4,4'DDE.

(2) Aroclor-1254 used as a surrogate for Aroclor-1260. A NOAEL was not derived in the Dahlgren et al (1972) pheasant study for Aroclor-1254, so the NOAEL used in the Zone J food chain evaluation for piscivorous birds (0.18 mg/kg/day) was estimated by dividing the LOAEL by 10.

(3) Bird and mammal TRVs from USEPA' s Eco-SSL documents represent the geometric means of numerous studies of various durations and species.

(4) A NOAEL was not derived in the Heinz (1979) mallard study for mercury, so the NOAEL used in the Zone J food chain evaluation (0.0064 mg/kg/day) was estimated by dividing the LOAEL by 10.

EXAMPLE CALCULATION OF HAZARD QUOTIENT FOR THE MINK
USING THE MAXIMUM SEDIMENT CONCENTRATION OF AROCLOR-1260
CONSERVATIVE SCENARIO
SHIPYARD CREEK

The predicted dose for representative receptors =

$$PD = [[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF]/BW \qquad \text{(Equation 1)}$$

where:

PD	=	predicted dose from the ingestion of food and water and the incidental ingestion of sediment (mg/kg/day)
C_{food}	=	contaminant concentration in food (mg/kg)
I_f	=	food ingestion rate (kg/day)
C_{water}	=	contaminant concentration in water (mg/L)
I_w	=	water ingestion rate (L/day)
C_{sed}	=	contaminant concentration in sediment (mg/kg)
I_{sed}	=	sediment ingestion rate (kg/day)
AUF	=	area use factor (portion of home range that overlaps Site 3)
BW	=	weight of receptor (kg)

Chemical concentrations of *organic compounds* (see note below) in food items (C_{food}) of the mink and green heron were estimated using the following equation (chemical concentrations :

$$C_{food} = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

where:

C_{food}	=	chemical concentration in food (mg/kg)
C_s	=	chemical concentration in sediment (mg/kg)
BSAF	=	biota-sediment accumulation factor
f_{oc}	=	total organic carbon (TOC) content of sediment expressed as a decimal fraction
f_l	=	organism lipid content expressed as a decimal fraction

Note: Equation 2 was used to derive estimated concentrations of *organic compounds* in food items. BSAFs for metals are not normalized to lipids or TOC, so concentrations of *metals* were estimated by multiplying each metal's sediment concentration by its associated BSAF.

BSAF for Aroclor-1260 = 1.85 (Table Q-3)
C_s = 210 µg/kg (Table 7-3), which equals 0.210 mg/kg)
f_{oc} = 6.53 percent (average TOC, see Appendix Q text) = 0.0653
f_l = 3 percent wet weight, or 12 percent dry weight (discussed in Appendix Q text) = 0.12
Using these values, C_{food} = (1.85 × 0.210 mg/kg × 0.12) ÷ 0.0653 = 0.71394 mg/kg; this is the estimated concentration in food (fish or benthic invertebrates).

I_f = 0.0678 kg/day (Conservative scenario, Table Q-2)
C_{sed} = 210 µg/kg = 0.210 mg/kg (Table 7-3)
I_{sed} = 0.0064 kg/day (Table Q-2)
C_{water} and I_w are not applicable here, since surface water samples were not collected in the recent sampling effort.
AUF assumed = 1.0.
BW = 0.550 kg (Conservative scenario, Table Q-2)
Using the above values in Equation 1,
Predicted dose = [(0.71394 mg/kg × 0.0678 kg/day) + (0.210 mg/kg × 0.0064 kg/day)] ÷ 0.550 kg = 0.0905 mg/kg/day.

The mammal NOAEL for Aroclor-1260 is 0.14 mg/kg/day (Table Q-4). Thus, the NOAEL-based HQ = 0.0905 mg/kg/day ÷ 0.14 mg/kg/day = 0.646 ≈ 0.6 (Table 7-10).

The mammal LOAEL for Aroclor-1260 is 0.69 mg/kg/day (Table Q-4). Thus, the LOAEL-based HQ = 0.0905 mg/kg/day ÷ 0.69 mg/kg/day = 0.1312 ≈ 0.1 (Table 7-10).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO
NOISETTE CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides									
4,4'-DDD	6.00E-03	0.00E+00	0.28	6.40E-03	1.04E-03	0.227	2.7	4.58E-03	3.85E-04
4,4'-DDE	3.60E-03	0.00E+00	7.7	1.06E-01	1.64E-02	0.227	2.7	7.22E-02	6.07E-03
Total DDT	6.40E-03	0.00E+00	7.7	1.88E-01	2.91E-02	0.227	2.7	1.28E-01	1.08E-02
Inorganics									
Copper	4.28E+01	0.00E+00	5.250	2.25E+02	3.52E+01	4.05	34.87	8.68E+00	1.01E+00
Mercury	1.10E+00	0.00E+00	2.868	3.15E+00	4.98E-01	0.0064	0.064	7.78E+01	7.78E+00
Selenium	3.20E-01	0.00E+00	1.000	3.20E-01	5.22E-02	0.29	0.819	1.80E-01	6.37E-02
Zinc	1.58E+02	0.00E+00	7.527	1.19E+03	1.86E+02	66.1	171.4	2.81E+00	1.08E+00

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.2 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.031 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0016 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
AVERAGE SCENARIO
NOISETTE CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides									
4,4'-DDD	4.17E-03	0.00E+00	0.28	4.44E-03	6.58E-04	0.227	2.7	2.90E-03	2.44E-04
4,4'-DDE	1.40E-03	0.00E+00	7.7	4.11E-02	5.82E-03	0.227	2.7	2.56E-02	2.16E-03
Total DDT	5.40E-03	0.00E+00	7.7	1.58E-01	2.25E-02	0.227	2.7	9.89E-02	8.32E-03
Inorganics									
Copper	2.33E+01	0.00E+00	1.556	3.63E+01	5.30E+00	4.05	34.87	1.31E+00	1.52E-01
Mercury	2.40E-01	0.00E+00	1.136	2.73E-01	4.03E-02	0.0064	0.064	6.29E+00	6.29E-01
Selenium	2.05E-01	0.00E+00	1.000	2.05E-01	3.05E-02	0.29	0.819	1.05E-01	3.72E-02
Zinc	7.56E+01	0.00E+00	1.936	1.46E+02	2.12E+01	66.1	171.4	3.21E-01	1.24E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.212 kg	Cf = Contaminant concentration in soil	
Food Ingestion Rate = (If)	0.030 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0015 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
NOISETTE CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides									
4,4'-DDD	6.00E-03	0.00E+00	0.28	6.40E-03	8.59E-04	0.147	5.56	5.84E-03	1.54E-04
4,4'-DDE	3.60E-03	0.00E+00	7.7	1.06E-01	1.31E-02	0.147	5.56	8.88E-02	2.35E-03
Total DDT	6.40E-03	0.00E+00	7.7	1.88E-01	2.32E-02	0.147	5.56	1.58E-01	4.18E-03
Inorganics									
Copper	4.28E+01	0.00E+00	5.250	2.25E+02	2.82E+01	5.6	82.7	5.04E+00	3.41E-01
Mercury	1.10E+00	0.00E+00	2.868	3.15E+00	4.02E-01	0.032	0.16	1.26E+01	2.51E+00
Selenium	3.20E-01	0.00E+00	1.000	3.20E-01	4.32E-02	0.143	0.661	3.02E-01	6.53E-02
Zinc	1.58E+02	0.00E+00	7.527	1.19E+03	1.48E+02	75.4	297.6	1.97E+00	4.99E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
NOISETTE CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
4,4'-DDD	4.17E-03	0.00E+00	0.28	4.44E-03	1.93E-04	0.147	5.56	1.31E-03	3.47E-05
4,4'-DDE	1.40E-03	0.00E+00	7.7	4.11E-02	1.65E-03	0.147	5.56	1.12E-02	2.96E-04
Total DDT	5.40E-03	0.00E+00	7.7	1.58E-01	6.35E-03	0.147	5.56	4.32E-02	1.14E-03
Inorganics									
Copper	2.33E+01	0.00E+00	1.556	3.63E+01	1.54E+00	5.6	82.7	2.74E-01	1.86E-02
Mercury	2.40E-01	0.00E+00	1.136	2.73E-01	1.18E-02	0.032	0.16	3.68E-01	7.36E-02
Selenium	2.05E-01	0.00E+00	1.000	2.05E-01	8.95E-03	0.143	0.661	6.26E-02	1.35E-02
Zinc	7.56E+01	0.00E+00	1.936	1.46E+02	6.13E+00	75.4	297.6	8.13E-02	2.06E-02

Notes:

Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	3.15 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO
SHIPYARD CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDE	2.50E-02	0.00E+00	7.7	3.54E-01	5.50E-02	0.227	2.7	2.42E-01	2.04E-02
Dieldrin	9.10E-03	0.00E+00	1.8	3.01E-02	4.74E-03	0.0709	0.8	6.68E-02	5.92E-03
Aroclor-1260	2.10E-01	0.00E+00	1.850	7.14E-01	1.12E-01	0.18	1.8	6.24E-01	6.24E-02
Inorganics									
Arsenic	1.98E+01	0.00E+00	0.690	1.37E+01	2.28E+00	2.24	4.51	1.02E+00	5.05E-01
Chromium	3.36E+02	0.00E+00	0.468	1.57E+02	2.71E+01	2.66	15.63	1.02E+01	1.73E+00
Copper	1.33E+02	0.00E+00	5.250	6.98E+02	1.09E+02	4.05	34.87	2.70E+01	3.13E+00
Lead	1.42E+02	0.00E+00	0.607	8.62E+01	1.45E+01	1.63	44.6	8.89E+00	3.25E-01
Mercury	4.50E-01	0.00E+00	2.868	1.29E+00	2.04E-01	0.0064	0.064	3.18E+01	3.18E+00
Nickel	3.28E+01	0.00E+00	2.320	7.61E+01	1.21E+01	6.71	18.57	1.80E+00	6.49E-01
Selenium	8.90E-01	0.00E+00	1.000	8.90E-01	1.45E-01	0.29	0.819	5.00E-01	1.77E-01
Zinc	4.94E+02	0.00E+00	7.527	3.72E+03	5.80E+02	66.1	171.4	8.78E+00	3.39E+00

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.2 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.031 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0016 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
AVERAGE SCENARIO
SHIPYARD CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDE	1.45E-02	0.00E+00	7.7	2.05E-01	2.91E-02	0.227	2.7	1.28E-01	1.08E-02
Dieldrin	3.50E-03	0.00E+00	1.8	1.16E-02	1.66E-03	0.0709	0.8	2.35E-02	2.08E-03
Aroclor-1260	1.87E-01	0.00E+00	1.850	6.36E-01	9.13E-02	0.18	1.8	5.07E-01	5.07E-02
Inorganics									
Arsenic	1.29E+01	0.00E+00	0.143	1.84E+00	3.51E-01	2.24	4.51	1.57E-01	7.79E-02
Chromium	2.15E+02	0.00E+00	0.100	2.15E+01	4.56E+00	2.66	15.63	1.71E+00	2.92E-01
Copper	8.94E+01	0.00E+00	1.556	1.39E+02	2.03E+01	4.05	34.87	5.02E+00	5.83E-01
Lead	8.65E+01	0.00E+00	0.071	6.14E+00	1.48E+00	1.63	44.6	9.09E-01	3.32E-02
Mercury	3.53E-01	0.00E+00	1.136	4.01E-01	5.93E-02	0.0064	0.064	9.27E+00	9.27E-01
Nickel	2.25E+01	0.00E+00	0.486	1.09E+01	1.70E+00	6.71	18.57	2.54E-01	9.18E-02
Selenium	7.60E-01	0.00E+00	1.000	7.60E-01	1.13E-01	0.29	0.819	3.89E-01	1.38E-01
Zinc	2.83E+02	0.00E+00	1.936	5.47E+02	7.94E+01	66.1	171.4	1.20E+00	4.63E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.212 kg	Cf = Contaminant concentration in soil	
Food Ingestion Rate = (If)	0.030 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0015 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
SHIPYARD CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDE	2.50E-02	0.00E+00	7.7	3.54E-01	4.39E-02	0.147	5.56	2.99E-01	7.90E-03
Dieldrin	9.10E-03	0.00E+00	1.8	3.01E-02	3.82E-03	0.015	1.27	2.54E-01	3.01E-03
Aroclor-1260	2.10E-01	0.00E+00	1.850	7.14E-01	9.05E-02	0.14	0.69	6.46E-01	1.31E-01
Inorganics									
Arsenic	1.98E+01	0.00E+00	0.690	1.37E+01	1.91E+00	1.04	4.55	1.84E+00	4.21E-01
Chromium	3.36E+02	0.00E+00	0.468	1.57E+02	2.33E+01	2.4	58.17	9.71E+00	4.00E-01
Copper	1.33E+02	0.00E+00	5.250	6.98E+02	8.76E+01	5.6	82.7	1.56E+01	1.06E+00
Lead	1.42E+02	0.00E+00	0.607	8.62E+01	1.23E+01	4.7	186.4	2.61E+00	6.59E-02
Mercury	4.50E-01	0.00E+00	2.868	1.29E+00	1.64E-01	0.032	0.16	5.14E+00	1.03E+00
Nickel	3.28E+01	0.00E+00	2.320	7.61E+01	9.76E+00	1.7	14.77	5.74E+00	6.61E-01
Selenium	8.90E-01	0.00E+00	1.000	8.90E-01	1.20E-01	0.143	0.661	8.40E-01	1.82E-01
Zinc	4.94E+02	0.00E+00	7.527	3.72E+03	4.64E+02	75.4	297.6	6.16E+00	1.56E+00

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
SHIPYARD CREEK
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDE	1.45E-02	0.00E+00	7.7	2.05E-01	8.25E-03	0.147	5.56	5.61E-02	1.48E-03
Dieldrin	3.50E-03	0.00E+00	1.8	1.16E-02	4.76E-04	0.015	1.27	3.17E-02	3.75E-04
Aroclor-1260	1.87E-01	0.00E+00	1.850	6.36E-01	2.61E-02	0.14	0.69	1.86E-01	3.78E-02
Inorganics									
Arsenic	1.29E+01	0.00E+00	0.143	1.84E+00	1.21E-01	1.04	4.55	1.16E-01	2.66E-02
Chromium	2.15E+02	0.00E+00	0.100	2.15E+01	1.65E+00	2.4	58.17	6.89E-01	2.84E-02
Copper	8.94E+01	0.00E+00	1.556	1.39E+02	5.89E+00	5.6	82.7	1.05E+00	7.12E-02
Lead	8.65E+01	0.00E+00	0.071	6.14E+00	5.65E-01	4.7	186.4	1.20E-01	3.03E-03
Mercury	3.53E-01	0.00E+00	1.136	4.01E-01	1.73E-02	0.032	0.16	5.42E-01	1.08E-01
Nickel	2.25E+01	0.00E+00	0.486	1.09E+01	5.19E-01	1.7	14.77	3.06E-01	3.52E-02
Selenium	7.60E-01	0.00E+00	1.000	7.60E-01	3.32E-02	0.143	0.661	2.32E-01	5.02E-02
Zinc	2.83E+02	0.00E+00	1.936	5.47E+02	2.29E+01	75.4	297.6	3.04E-01	7.70E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	6.53 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO
COOPER RIVER
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	4.80E-03	0.00E+00	0.28	4.43E-03	7.25E-04	0.227	2.7	3.19E-03	2.69E-04
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	8.96E-02	0.18	1.8	4.98E-01	4.98E-02
Inorganics									
Arsenic	2.05E+01	0.00E+00	0.690	1.41E+01	2.36E+00	2.24	4.51	1.05E+00	5.23E-01
Chromium	6.84E+01	0.00E+00	0.468	3.20E+01	5.51E+00	2.66	15.63	2.07E+00	3.52E-01
Copper	3.86E+02	0.00E+00	5.250	2.03E+03	3.17E+02	4.05	34.87	7.83E+01	9.10E+00
Lead	1.47E+02	0.00E+00	0.607	8.92E+01	1.50E+01	1.63	44.6	9.21E+00	3.36E-01
Nickel	3.26E+01	0.00E+00	2.320	7.56E+01	1.20E+01	6.71	18.57	1.79E+00	6.45E-01
Selenium	7.70E-01	0.00E+00	1.000	7.70E-01	1.26E-01	0.29	0.819	4.33E-01	1.53E-01
Zinc	8.26E+02	0.00E+00	7.527	6.22E+03	9.70E+02	66.1	171.4	1.47E+01	5.66E+00

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.2 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.031 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0016 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
AVERAGE SCENARIO
COOPER RIVER
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	2.10E-03	0.00E+00	0.28	1.94E-03	2.89E-04	0.227	2.7	1.27E-03	1.07E-04
Aroclor-1260	4.10E-02	0.00E+00	1.850	2.50E-01	3.57E-02	0.18	1.8	1.98E-01	1.98E-02
Inorganics									
Arsenic	1.34E+01	0.00E+00	0.143	1.92E+00	3.66E-01	2.24	4.51	1.63E-01	8.11E-02
Chromium	5.44E+01	0.00E+00	0.100	5.44E+00	1.16E+00	2.66	15.63	4.34E-01	7.39E-02
Copper	1.93E+02	0.00E+00	1.556	3.00E+02	4.37E+01	4.05	34.87	1.08E+01	1.25E+00
Lead	6.95E+01	0.00E+00	0.071	4.93E+00	1.19E+00	1.63	44.6	7.30E-01	2.67E-02
Nickel	2.52E+01	0.00E+00	0.486	1.22E+01	1.91E+00	6.71	18.57	2.85E-01	1.03E-01
Selenium	4.97E-01	0.00E+00	1.000	4.97E-01	7.38E-02	0.29	0.819	2.54E-01	9.01E-02
Zinc	3.55E+02	0.00E+00	1.936	6.88E+02	9.98E+01	66.1	171.4	1.51E+00	5.83E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.212 kg	Cf = Contaminant concentration in soil	
Food Ingestion Rate = (If)	0.030 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0015 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
COOPER RIVER
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	4.80E-03	0.00E+00	0.28	4.43E-03	6.02E-04	0.147	5.56	4.10E-03	1.08E-04
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	7.18E-02	0.14	0.69	5.13E-01	1.04E-01
Inorganics									
Arsenic	2.05E+01	0.00E+00	0.690	1.41E+01	1.98E+00	1.04	4.55	1.91E+00	4.36E-01
Chromium	6.84E+01	0.00E+00	0.468	3.20E+01	4.74E+00	2.4	58.17	1.98E+00	8.15E-02
Copper	3.86E+02	0.00E+00	5.250	2.03E+03	2.54E+02	5.6	82.7	4.54E+01	3.08E+00
Lead	1.47E+02	0.00E+00	0.607	8.92E+01	1.27E+01	4.7	186.4	2.70E+00	6.82E-02
Nickel	3.26E+01	0.00E+00	2.320	7.56E+01	9.70E+00	1.7	14.77	5.71E+00	6.57E-01
Selenium	7.70E-01	0.00E+00	1.000	7.70E-01	1.04E-01	0.143	0.661	7.26E-01	1.57E-01
Zinc	8.26E+02	0.00E+00	7.527	6.22E+03	7.76E+02	75.4	297.6	1.03E+01	2.61E+00

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
COOPER RIVER
ZONE J
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	2.10E-03	0.00E+00	0.28	1.94E-03	8.52E-05	0.147	5.56	5.80E-04	1.53E-05
Aroclor-1260	4.10E-02	0.00E+00	1.850	2.50E-01	1.01E-02	0.14	0.69	7.25E-02	1.47E-02
Inorganics									
Arsenic	1.34E+01	0.00E+00	0.143	1.92E+00	1.26E-01	1.04	4.55	1.21E-01	2.77E-02
Chromium	5.44E+01	0.00E+00	0.100	5.44E+00	4.19E-01	2.4	58.17	1.74E-01	7.20E-03
Copper	1.93E+02	0.00E+00	1.556	3.00E+02	1.27E+01	5.6	82.7	2.26E+00	1.53E-01
Lead	6.95E+01	0.00E+00	0.071	4.93E+00	4.54E-01	4.7	186.4	9.66E-02	2.44E-03
Nickel	2.52E+01	0.00E+00	0.486	1.22E+01	5.83E-01	1.7	14.77	3.43E-01	3.94E-02
Selenium	4.97E-01	0.00E+00	1.000	4.97E-01	2.17E-02	0.143	0.661	1.52E-01	3.28E-02
Zinc	3.55E+02	0.00E+00	1.936	6.88E+02	2.88E+01	75.4	297.6	3.82E-01	9.68E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO FOR BODY WEIGHT, FOOD CONSUMPTION, AND SEDIMENT INGESTION
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	ND	-	-	-	-	-	-	-	-
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	7.18E-02	0.14	0.69	5.13E-01	1.04E-01
Inorganics									
Arsenic	2.10E+00	0.00E+00	0.690	1.45E+00	2.03E-01	1.04	4.55	1.95E-01	4.46E-02
Chromium	3.70E+01	0.00E+00	0.468	1.73E+01	2.57E+00	2.4	58.17	1.07E+00	4.41E-02
Copper	3.86E+02	0.00E+00	5.250	2.03E+03	2.54E+02	5.6	82.7	4.54E+01	3.08E+00
Lead	1.47E+02	0.00E+00	0.607	8.92E+01	1.27E+01	4.7	186.4	2.70E+00	6.82E-02
Nickel	3.26E+01	0.00E+00	2.320	7.56E+01	9.70E+00	1.7	14.77	5.71E+00	6.57E-01
Selenium	ND	-	-	-	-	-	-	-	-
Zinc	8.26E+02	0.00E+00	7.527	6.22E+03	7.76E+02	75.4	297.6	1.03E+01	2.61E+00

Notes:
ND = chemical not detected in this sample
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550 kg	Cf = Contaminant concentration in fish or invertebrates	
Food Ingestion Rate = (If)	0.0678 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0064 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO FOR BODY WEIGHT, FOOD CONSUMPTION, AND SEDIMENT INGESTION
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	ND	-	-	-	-	-	-	-	-
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	2.33E-02	0.14	0.69	1.66E-01	3.37E-02
Inorganics									
Arsenic	2.10E+00	0.00E+00	0.143	3.00E-01	1.98E-02	1.04	4.55	1.90E-02	4.34E-03
Chromium	3.70E+01	0.00E+00	0.100	3.70E+00	2.85E-01	2.4	58.17	1.19E-01	4.89E-03
Copper	3.86E+02	0.00E+00	1.556	6.01E+02	2.54E+01	5.6	82.7	4.54E+00	3.08E-01
Lead	1.47E+02	0.00E+00	0.071	1.04E+01	9.61E-01	4.7	186.4	2.04E-01	5.15E-03
Nickel	3.26E+01	0.00E+00	0.486	1.58E+01	7.54E-01	1.7	14.77	4.43E-01	5.10E-02
Selenium	ND	-	-	-	-	-	-	-	-
Zinc	8.26E+02	0.00E+00	1.936	1.60E+03	6.70E+01	75.4	297.6	8.88E-01	2.25E-01

Notes:
ND = chemical not detected in this sample
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.0227 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0021 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 4.7% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO FOR BODY WEIGHT, FOOD CONSUMPTION, AND SEDIMENT INGESTION
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	ND	-	-	-	-	-	-	-	-
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	8.96E-02	0.18	1.8	4.98E-01	4.98E-02
Inorganics									
Arsenic	2.10E+00	0.00E+00	0.690	1.45E+00	2.41E-01	2.24	4.51	1.08E-01	5.35E-02
Chromium	3.70E+01	0.00E+00	0.468	1.73E+01	2.98E+00	2.66	15.63	1.12E+00	1.91E-01
Copper	3.86E+02	0.00E+00	5.250	2.03E+03	3.17E+02	4.05	34.87	7.83E+01	9.10E+00
Lead	1.47E+02	0.00E+00	0.607	8.92E+01	1.50E+01	1.63	44.6	9.21E+00	3.36E-01
Nickel	3.26E+01	0.00E+00	2.320	7.56E+01	1.20E+01	6.71	18.57	1.79E+00	6.45E-01
Selenium	ND	-	-	-	-	-	-	-	-
Zinc	8.26E+02	0.00E+00	7.527	6.22E+03	9.70E+02	66.1	171.4	1.47E+01	5.66E+00

Notes:
ND = chemical not detected in this sample
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.2 kg	Cf = Contaminant concentration in fish	
Food Ingestion Rate = (If)	0.031 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0016 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).
NA - The HQ could not be calculated because NOAEL and LOAEL were not available.

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
AVERAGE SCENARIO FOR BODY WEIGHT, FOOD CONSUMPTION, AND SEDIMENT INGESTION
COOPER RIVER SAMPLE 054M000103
ZONE J
CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
4,4'-DDD	ND	-	-	-	-	-	-	-	-
Aroclor-1260	9.40E-02	0.00E+00	1.850	5.73E-01	8.18E-02	0.18	1.8	4.54E-01	4.54E-02
Inorganics									
Arsenic	2.10E+00	0.00E+00	0.143	3.00E-01	5.74E-02	2.24	4.51	2.56E-02	1.27E-02
Chromium	3.70E+01	0.00E+00	0.100	3.70E+00	7.85E-01	2.66	15.63	2.95E-01	5.02E-02
Copper	3.86E+02	0.00E+00	1.556	6.01E+02	8.77E+01	4.05	34.87	2.17E+01	2.52E+00
Lead	1.47E+02	0.00E+00	0.071	1.04E+01	2.52E+00	1.63	44.6	1.54E+00	5.64E-02
Nickel	3.26E+01	0.00E+00	0.486	1.58E+01	2.47E+00	6.71	18.57	3.69E-01	1.33E-01
Selenium	ND	-	-	-	-	-	-	-	-
Zinc	8.26E+02	0.00E+00	1.936	1.60E+03	2.32E+02	66.1	171.4	3.51E+00	1.35E+00

Notes:
ND = chemical not detected in this sample
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

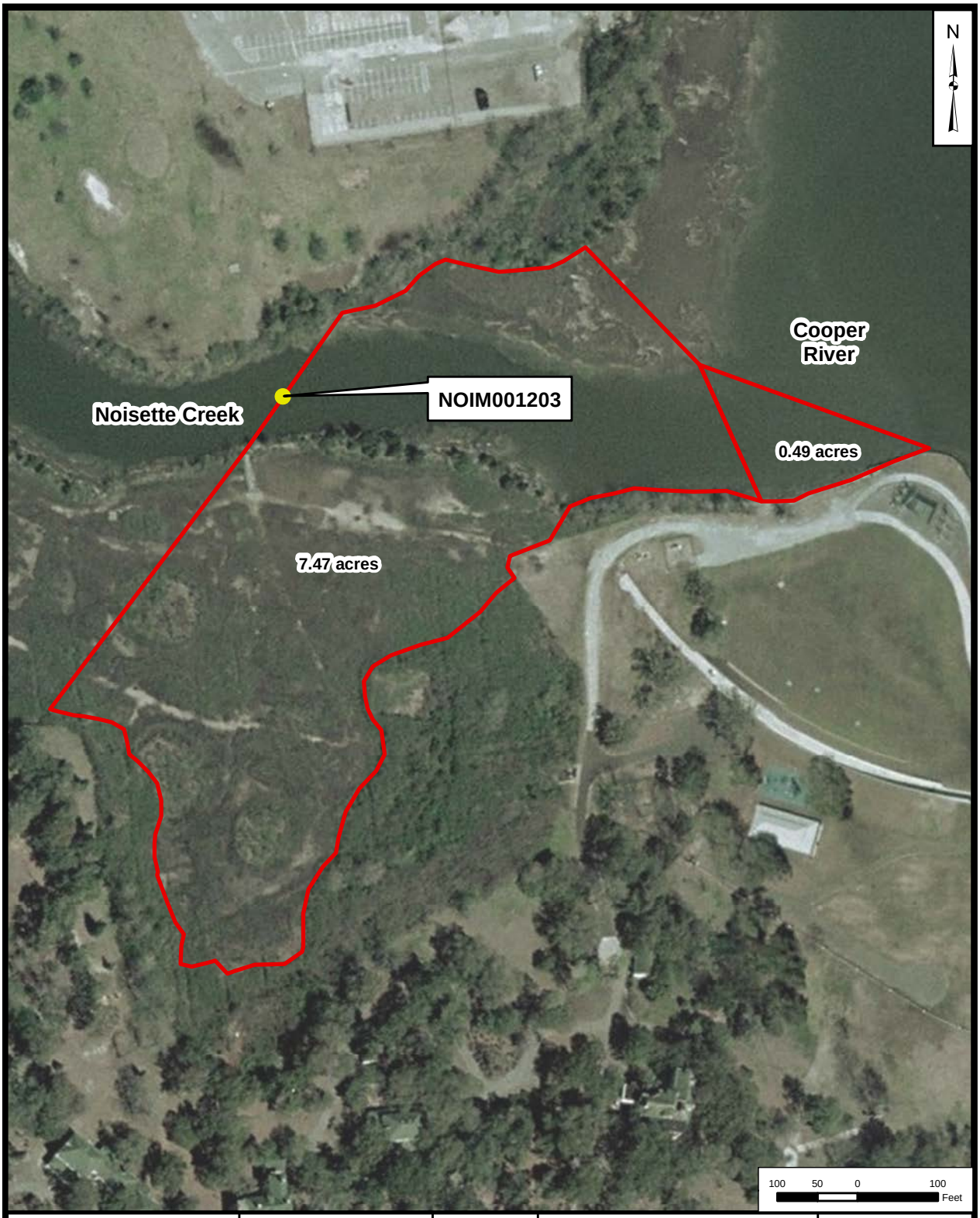
Body Weight = (BW)	0.212 kg	Cf = Contaminant concentration in soil	
Food Ingestion Rate = (If)	0.030 kg/day	Cs = Contaminant concentration in sediment	
Water Ingestion Rate = (Iw)	0.000 L/day	Cw = Contaminant concentration in water	
Sediment Ingestion Rate = (Is)	0.0015 kg/day		
Average TOC =	3.64 %	Lipids (fish) =	12.0 % (dry weight value based on 3.0% wet weight)

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for organic chemicals represent sediment to fish biotransfer factors. Sediment to fish BSAFs were not available for inorganics, and thus, BSAFs for inorganics represent sediment to invertebrate biotransfer factors (see text).
NA - The HQ could not be calculated because NOAEL and LOAEL were not available.

APPENDIX Q.2

NOISETTE CREEK:

FIGURE SHOWING AREA OF CREEK AND MARSH DOWNSTREAM OF SAMPLE NOIM0001203



Legend

Boundary of Potential Foraging by Green Heron

DRAWN BY MJN	DATE 08/27/2012
CHECKED BY MW	DATE 08/27/2012
COST/SCHED-AREA	
SCALE AS NOTED	

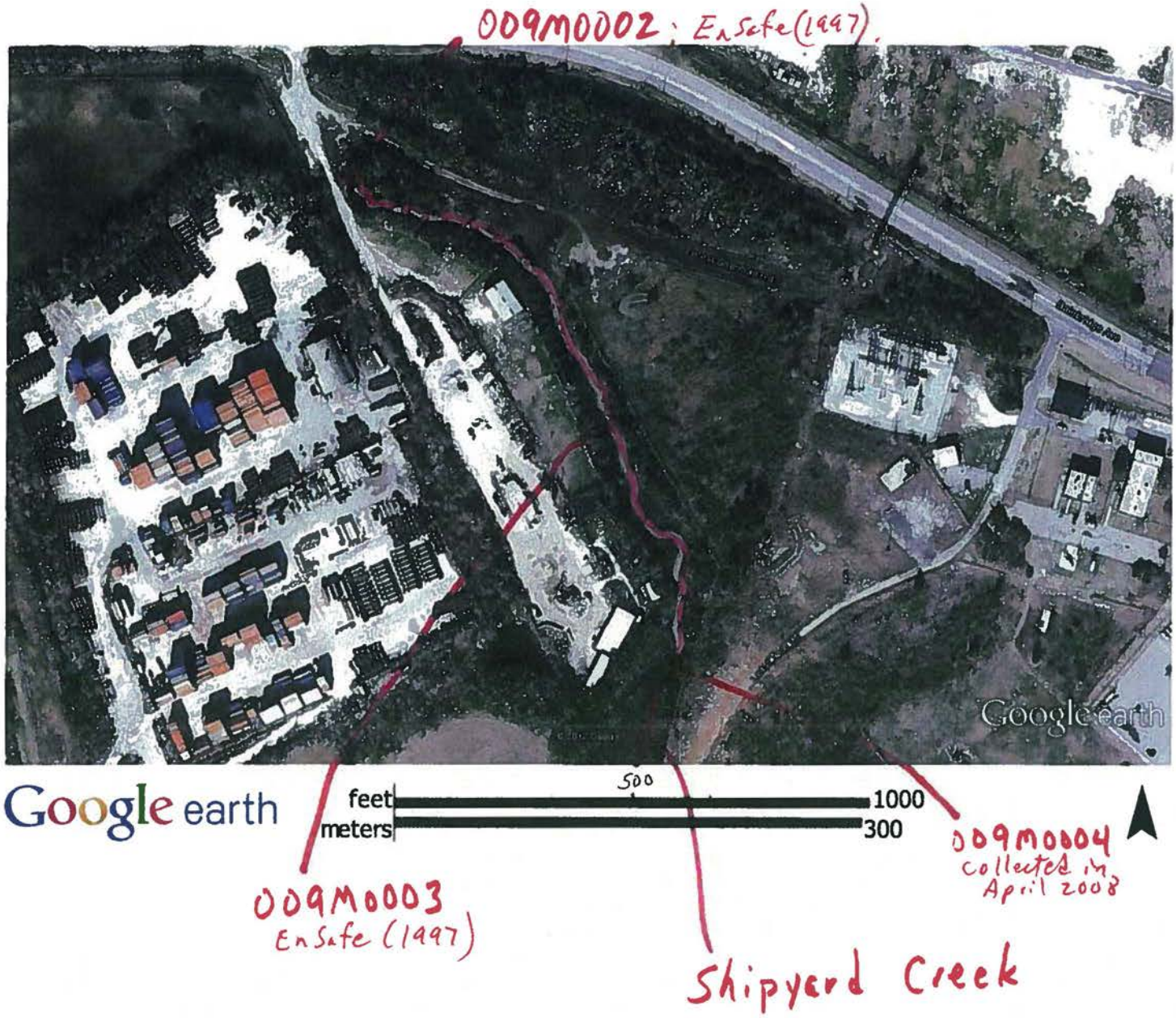
NAVFAC

AREA OF CREEK AND MARSH DOWNSTREAM OF SAMPLE NOIM001203 CHARLESTON NAVAL COMPLEX NORTH CHARLESTON, SC

CONTRACT NO.	
APPROVED BY MW	DATE 08/27/2012
APPROVED BY	DATE
FIGURE NO. Q-1	REV. 0

APPENDIX Q.3

SHIPYARD CREEK SUPPORTING DATA



Distance along creek from 009M0004 to 009M0002 (headwaters) = 1400 feet.

TABLE Q3-1

CONCENTRATIONS OF SELECTED CHEMICALS DETECTED IN SEDIMENT SAMPLES COLLECTED IN 2008
AND IN TWO UPSTREAM SAMPLES COLLECTED IN 1997[1]
SHIPYARD CREEK - ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Sample ID	2X Average Background Concentration	Region 4 Sediment Screening Values	009M000403[2]	009M001603[2]	009M001703[2]	Average of Samples Collected in 2008	009M00201[3]	009M00301[3]	Overall Average[4]
Pesticides/PCBs (ug/kg)									
AROCLOR-1260	NA	NA	150 J	210 J	200 J	187	130	ND	-
Inorganics (mg/kg)									
CHROMIUM	43.5	52.3	89.5	219	336	215	17.8	48.3	142
COPPER	14.9	18.7	56.4	78.9	133	89.4	228	28.7	105
LEAD	18.08	30.2	55.7	61.8	142	86.5	102	74.5	87.2
MERCURY	0.072	0.13	0.45	0.22	0.39	0.353	0.02	0.51	0.318
ZINC	71.54	124	150	204	494	283	133	121	220

Notes:
(1) Chemicals shown in this table are those with concentrations that exceeded PEL values in samples collected in 2008, or with food chain NOAEL HQs greater than 1.0 in Table 7-11 of the current RFI report.
(2) Sample collected in Shipyard Creek in April 2008; data from Table 4-4 of 2012 Zone J RFI.
(3) Data from EnSafe (1997).
(4) Average of all five samples (three samples collected in April 2008 plus samples 009M00201 and 009M00301).
NA = Analyte not deteced in background samples or Region 4 ecological screening value not available.
Shading indicates an exceedance of 2 x Average Background Concentration and Region 4 Ecological Screening Value.
ND = Analyte not detected; detection limits not available in EnSafe (1997) report, so overall average was not calculated.
J = Estimated

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY
NAVAL BASE CHARLESTON
CHARLESTON, SOUTH CAROLINA
CTO-29

TECHNICAL MEMORANDUM PRELIMINARY RESULTS OF ZONE J SAMPLING

Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

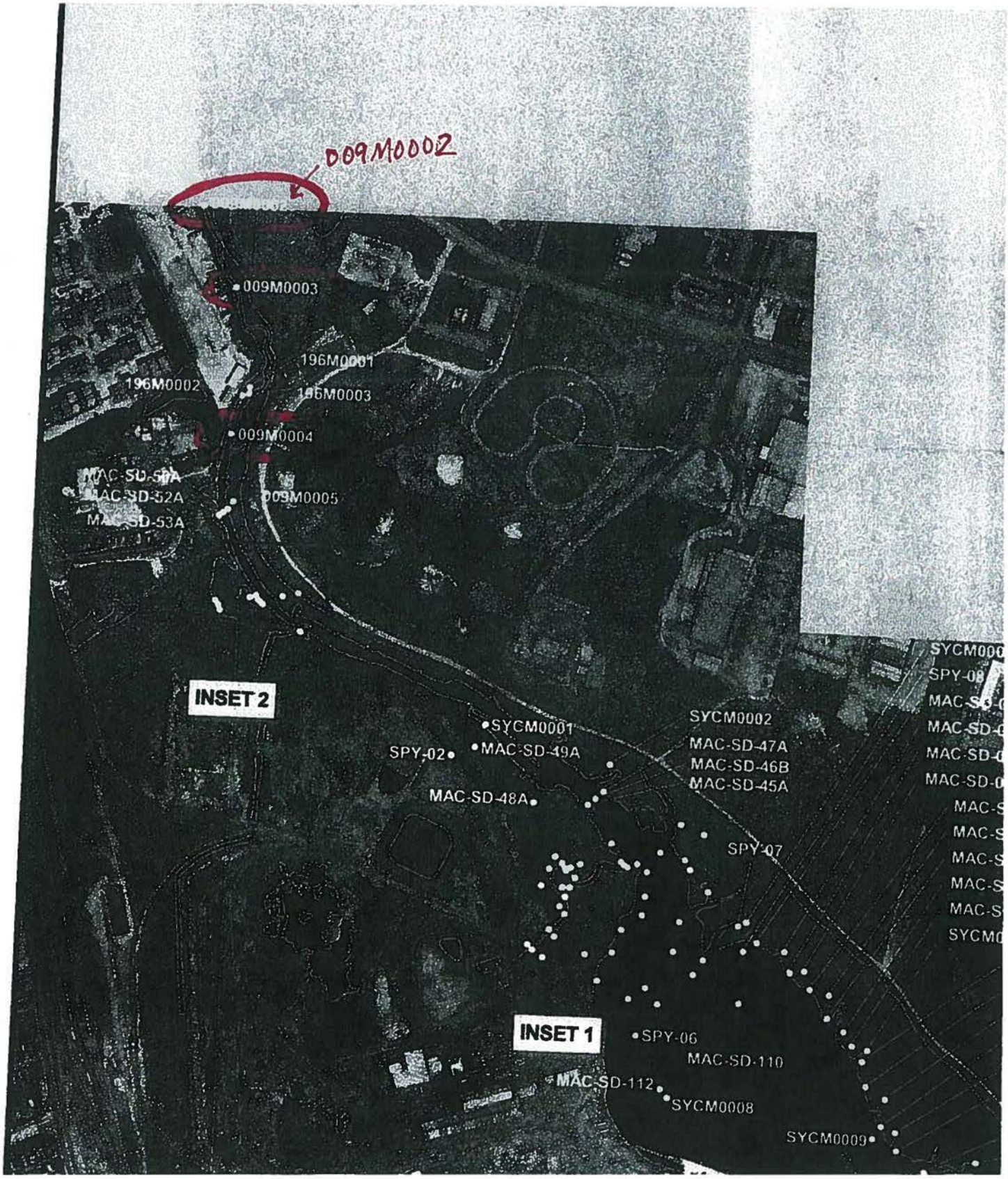
SOUTHDIV CONTRACT NUMBER:
N62467-89-D-0319

Prepared by:

ENSAFE INC.
5724 SUMMER TREES DRIVE
MEMPHIS, TENNESSEE 38134
(901) 372-7962

December 11, 1997

Release of this document requires the prior notification of the Commanding Officer of the Naval Base Charleston, Charleston, South Carolina.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009M0003
196M0001
196M0002
196M0003
009M0004
MAC-SD-50A
MAC-SD-52A
MAC-SD-53A
009M0005
INSET 2
SYCM0001
SPY-02
MAC-SD-49A
MAC-SD-48A
SYCM0002
MAC-SD-47A
MAC-SD-46B
MAC-SD-45A
SPY-07
INSET 1
SPY-06
MAC-SD-110
MAC-SD-112
SYCM0008
SYCM0009

TECHNICAL MEMORANDUM

TO: Tony Hunt, SOUTHDIV

FROM: EnSafe

DATE: December 11, 1997

SUBJECT: Preliminary Results of Zone J Sampling

1.0 INTRODUCTION

As part of the Naval Base Charleston RCRA Facility Investigation (NAVBASE RFI), sediment and surface water from offshore areas adjacent to NAVBASE were sampled during the Zone J investigation of the water bodies. Zone J consists of portions of the Cooper River, Shipyard Creek, and Noisette Creek and associated marsh areas.

The objective of this initial phase is to assess constituents present in the sediment and surface waters in the vicinity of the naval base and to identify areas which might be impacted by NAVBASE activities. Zone J sampling was conducted from May 19 to September 18, 1997. In addition to Zone J samples, results from the analysis of sediment and surface water samples collected during earlier zone investigations are also considered for the assessment of Zone J water bodies. This technical memorandum presents preliminary results for these samples. Correlations between constituents detected in Zone J and potential NAVBASE sources will be studied after the analytical data obtained during the Zone J RFI is compared to suitable background concentrations.

Site Description

Zone J, unlike other NAVBASE RFI zones, is totally aquatic and does not consider specific areas of concern or solid waste management units (AOCs/SWMUs) typical of land-based investigative zones. Although several unexploded ordnance (UXO) sites (AOCs 500, 501, and 502) were identified within the boundaries of Zone J, they are being addressed under a separate investigation and are not included in the Zone J RFI.

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Cation Exchange Capacity	REDOX	2-Butanone (MEK)	Acetone	Carbon disulfide	1234678-HpCDD	1234678-HpCDF	123478-HxCDD
	meq/kg	mV	ug/kg	ug/kg	ug/kg	ug/kg	ng/kg	ng/kg
SYCM000101	55.7	273			13	46.8	5.15	
SYCM000201	53.6	278			23	14.2	1.7	
SYCM000301	66	248		380	8	0.89		
SYCM000401	29.7	268				27	2.05	
SYCM000501	46.1	230			11	11.2	0.99	
SYCM000601	24.1	240				4.49	0.2	
SYCM000701	69.8	209	8	99	17	26	1.86	0.83
SYCM000801	154	245	13		12	91.2	5.34	
SYCM000901	66.8	299	8		14	56.5		
SYCM001001	51	197	17	120	7	34.1	0.46	0.57
SYCM001101	41.8	185	5			4.56		
SYCM001201	41.5	170				2.45	0.42	
SYCM001301	62.6	185				20	1.96	
SYCM001401	149	268	47			267	11.1	
SYCM001501	66.6	191	6		19	58.4	1.38	0.92
SYCM001601	120.87	148	52	1000	18	84.5	5.34	
SYCM001701	71.9	233.5	10	1010	20	13.88		
SYCM001801	22.03	224	7.5		8.5	23.89	2.92	
SYCM001901	120	112	47	420	11	67.3	3.93	
SYCM002001	7.8	256	12	7600	-	80.5		
SYCM002101	8.7	247.5		1300	5	16.85		
SYCM002201	83.7	132	21		8	40.9	2.81	
009M000101								
009M000201								
009M000301					150			
009M000401					64			
009M000501					11			

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	123478-HxCDF	1234789-HpCDF	123678-HxCDD	123678-HxCDF	123789-HxCDD	OCDD	OCDF	Total Hepta-Dioxins
	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SYCM000101	0.75		1.64		2.21	566	6.76	181
SYCM000201						153	2.17	57.2
SYCM000301						17.1	0.49	0.09
SYCM000401			1.11		2.53	415	2.98	126
SYCM000501						183	0.91	45.4
SYCM000601						46.1	0.34	25.1
SYCM000701	0.35		0.93		1.56	389	3.23	106
SYCM000801					3.13	995	15.9	435
SYCM000901			1.47		3.7	893		245
SYCM001001			1.51		2.62	366	0.49	148
SYCM001101						35.3	0.72	20.1
SYCM001201						21.7	0.51	8.46
SYCM001301						212	5.05	66.1
SYCM001401	1.79		3.39		8.75	2540	55.3	1990
SYCM001501	0.31		1.53		3.94	828	4.84	272
SYCM001601			2.495		5.165	882.67	16.57	424.33
SYCM001701					1.53	177.5		53.2
SYCM001801	0.77	0.49	0.57	0.53	1.33	232.67	9.43	100.87
SYCM001901	3.33		1.95		3.99	734	12.1	313
SYCM002001						1060	10	430
SYCM002101						289.5		73.75
SYCM002201					2.24	444	10.3	176
009M000101								
009M000201								
009M000301								
009M000401								
009M000501								

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Total Hepta-Furans	Total Hexa-Dioxins	Total Hexa-Furans	Total Penta-Dioxins	Total Penta-Furans	Total Tetra-Dioxins	Total Tetra-Furans
	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg	ng/kg
SYCM000101	5.5	81.3	4.34	8.71	3.14	9.09	1.03
SYCM000201	1.81	25.4	1.58	4.23		9.27	
SYCM000301						0.88	
SYCM000401	2.05	74.1	5.15	8.82		16.8	
SYCM000501	1.06	21.4	0.7	3.4		7.46	
SYCM000601	0.47	19.7	0.2	2.22		5.2	
SYCM000701	5.04	45.4	2.71	3.56	1.34	2.51	
SYCM000801	5.7	97.3	1.82	8.6		4.72	
SYCM000901	1.09	126		15.6		7.32	
SYCM001001	1.17	119		12.4		5.79	
SYCM001101	0.68	8.81		1.41		1.39	
SYCM001201	0.82	2.38					
SYCM001301	2.09	23	2.09	1.41			
SYCM001401		201	13.4	5.62		5.56	
SYCM001501	1.48	112	1.9	8.14		3.92	0.42
SYCM001601	7.69	88.33	4.69	5.22		3.98	
SYCM001701		46		7.17		3.15	
SYCM001801	3.36	27.28	1.31	2.41	2.72	2.12	
SYCM001901	4.2	74.2		7.42		3.37	
SYCM002001	8.89	151					
SYCM002101		47.15				2.26	
SYCM002201		50.4	2.63	3.78		2.76	
009M000101							
009M000201							
009M000301							
009M000401							
009M000501							

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SYCM000101	16900	0.99	13.1	21.8	0.91	1	132	3.4	20.1
SYCM000201	15100		12.9	18.6	0.93	0.77	97.7	3.4	18.6
SYCM000301	14300		13.2	19.9	0.97	0.97	53.7	3.3	14
SYCM000401	9640	0.96	9.4	14.7	0.68	0.66	79.4	2.2	10.7
SYCM000501	17300	0.77	12.8	20.3	0.82	0.8	63.4	3.3	11.9
SYCM000601	7350	0.78	9.1	15.5	0.63	0.64	50	1.2	13.5
SYCM000701	13700		12.8	21.7	0.77	0.68	76.5	3.4	23.4
SYCM000801	20200		21.6	27.5	0.72	0.84	63.2	6.3	20.8
SYCM000901	10800	0.66	13.9	18.3	0.43	0.76	60.5	3.9	41.9
SYCM001001	16900		13.4	27.1	1.2	0.73	73.1	5.2	21
SYCM001101	5720		6.9	15.1	0.49	0.15	26	2.6	11.4
SYCM001201	13400	0.7	8.1	27.7	0.68	0.56	59.2	2.5	24.1
SYCM001301	14900		7.3	23.4	0.84	0.28	104	4.2	36.5
SYCM001401	33800		18.8	37.4	0.82	0.87	57.7	7.3	24.4
SYCM001501	27300		21.7	32.6	1.3	0.35	58.2	7.1	17.3
SYCM001601	26,366.67		20.43	31.33	0.81	0.98	50.27	6.4	20.53
SYCM001701	20550		24.2	24.65	1.35	0.32	43.8	6.9	12.2
SYCM001801	15,826.67	0.56	11.63	28.47	0.78	0.73	40.4	2.35	30.93
SYCM001901	25100		21.7	31.4	0.93	0.84	52.4	6.7	21.3
SYCM002001	26300		20.6	30.4	1.2		53.4	7.1	18.3
SYCM002101	24200		14.8	30.55	1.1	0.185	43.3	3.8	12.6
SYCM002201	16300		13.8	21.3	0.78	0.72	37	5.1	16.1
009M000101	21400		14.1	17.7	0.93		132	5	31.4
009M000201	5160		3.3	18.6	0.57		17.8	2.3	228
009M000301	17600		15.6	21.4	1	0.23	48.3	5.6	28.7
009M000401	20600	2.7	11.9	29.1	0.94	0.64	291	5.7	141
009M000501	9870	2.9	7.3	19.2	0.55	0.61	168	3.3	90

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Lead (Pb)	Manganese (Mn)	Mercury (Hg)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Tl)	Tin (Sn)	Vanadium (V)	Zinc (Zn)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SYCM000101	22.9	192		27.8					45.4	115
SYCM000201	18	179		25.4	1.7	0.44			40.9	89.3
SYCM000301	11.5	202		21.5	2.5	0.49			42.7	67
SYCM000401	10.9	98.1		22	1.2	0.38			25.7	67.5
SYCM000501	10	142		22.3	1.9				40.5	56.5
SYCM000601	3.8	74.7		20.9	2		1.3		22.4	41.4
SYCM000701	23	197		24.3					40.7	76.4
SYCM000801	27.7	626		13.7					72.4	99.3
SYCM000901	28.1	118		10.2					30.6	94.9
SYCM001001	21.5	145		20		1.1			36.6	87.4
SYCM001101	10.6	128		6.5		0.7			19.4	39.2
SYCM001201	17.3	367		16.5	1.2		3.3		30.4	74.8
SYCM001301	36.9	67.7	0.09	19.9		1.4			42.3	87.5
SYCM001401	27	532		17					83.9	102
SYCM001501	20.9	383		17.7		0.78			61.8	60.5
SYCM001601	25.77	707		14.1					66.53	90.77
SYCM001701	19.6	183		13.9	2.2	0.87			59.9	46.85
SYCM001801	14.13	142.27		11.77	1.7		1.65		28.53	49.17
SYCM001901	28.6	763		14.4					70	103
SYCM002001	22.5	838		14.4	2.9			27.1	63.6	76.5
SYCM002101	17.7	166.5		15.25	0.86				43.9	51.05
SYCM002201	19.7	434		10.8					48	69.2
009M000101	44.8	161	0.16	24.3	1.5				47.7	115
009M000201	102	25.7	0.02	14.2	0.82				17.4	133
009M000301	74.5	274	0.51	18.3	1.5				49.6	121
009M000401	107	274	0.69	37.3	0.56				52.2	387
009M000501	74.8	118	0.33	21.2	0.9				28.7	261

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Benzo(a)anthracene ug/kg	Benzo(a)pyrene ug/kg	Benzo(b)fluoranthene ug/kg	Benzo(g,h,i)perylene ug/kg	Benzo(k)fluoranthene ug/kg	BEHP ug/kg	Chrysene ug/kg
SYCM000101							
SYCM000201							
SYCM000301						1600	
SYCM000401							
SYCM000501							
SYCM000601							
SYCM000701	110						170
SYCM000801							
SYCM000901	100	110	140				120
SYCM001001							
SYCM001101							
SYCM001201							
SYCM001301						150	
SYCM001401							
SYCM001501							
SYCM001601							
SYCM001701							
SYCM001801	114	147.5	139	41	87	51	122
SYCM001901							
SYCM002001							180
SYCM002101	68.5	60				630	70
SYCM002201							
009M000101	87						
009M000201						160	
009M000301							
009M000401							
009M000501	140					830	

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Di-n-butylphthalate	Di-n-octyl phthalate	Diethylphthalate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SYCM000101							
SYCM000201							
SYCM000301			830				
SYCM000401							
SYCM000501							
SYCM000601							
SYCM000701	160			99			100
SYCM000801	200			210			
SYCM000901	81			190		74	180
SYCM001001							
SYCM001101							
SYCM001201							
SYCM001301	130						
SYCM001401			1400				
SYCM001501	89						
SYCM001601				180			
SYCM001701							
SYCM001801	45			203.33	100	96.5	206.67
SYCM001901							
SYCM002001				350		170	250
SYCM002101		110		115.5		69	170
SYCM002201							
009M000101				230			280
009M000201							
009M000301							
009M000401				9500			6400
009M000501				350			340

SHIPYARD CREEK SEDIMENT RESULTS

Sample ID	Total Organic Carbon (TOC)	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	Aroclor-1248	Aroclor-1254	Aroclor-1260	beta-BHC
	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SYCM000101	2.1								
SYCM000201	2.6								
SYCM000301	2.4								
SYCM000401	0.98								
SYCM000501	3.4								
SYCM000601	0.71								
SYCM000701	5.1								
SYCM000801	4.7								
SYCM000901	2.7								
SYCM001001	3.2								
SYCM001101	1.9								
SYCM001201	2.2								
SYCM001301	6.4								
SYCM001401	4.6								
SYCM001501	2.4								
SYCM001601	4.87								
SYCM001701	5.1								
SYCM001801	1.12								
SYCM001901	4.7								
SYCM002001	2.8								
SYCM002101	2.6								
SYCM002201	3.5								
009M000101	34000		4				110		
009M000201	22000	4	4	15				130	7
009M000301	26000		21						
009M000401	46000	41	110		18	3000	690	770	
009M000501	26000	91	150	140	12		510	380	

APPENDIX Q.4

COOPER RIVER:

CHEMICAL CONCENTRATIONS IN SEDIMENT SAMPLES COLLECTED IN SUPPORT OF DREDGING ACTIVITIES

TABLE Q4-1

COOPER RIVER SEDIMENT DATA FOR SAMPLES COLLECTED IN 2008
COMPARED TO CONCENTRATIONS IN SEDIMENT SAMPLES COLLECTED IN SUPPORT OF DREDGING ACTIVITIES
ZONE J
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical[1]	Samples Collected in 2008[2]		GEL[3]	WPC[4]	ANAMAR[5]
	Range of Detected Concentrations	Average Concentration			
Semivolatile Organic Compounds (µg/kg)					
ACENAPHTHENE	7 - 1400	473	4.12 - 60.9	9.6 - 24	17.9U - 18.9U
ANTHRACENE	64 - 2400	888	25.5 - 173	59 - 140	17.9U - 18.9U
BENZO(A)ANTHRACENE	190 - 5800	2210	52.6 - 260	100 - 190	23.1 - 44.1
BENZO(A)PYRENE	120 - 2500	1153	40.7 - 208	74 - 150	19.0 - 39.3
CHRYSENE	170 - 5100	2050	58.7 - 299	110 - 190	25.5 - 51.2
FLUORANTHENE	330 - 41000	13960	154 - 525	160 - 380	18.7 - 27.9
FLUORENE	14 - 2200	742	4.46 - 50.0	15 - 26	12.0U - 12.6U
PHENANTHRENE	97 - 18000	6069	12.3 - 164	23 - 130	5.98U - 9.59
PYRENE	300 - 26000	9633	110 - 376	140 - 340	20.6 - 29.1
Inorganics (mg/kg)					
ARSENIC	2.1 - 20.5	13.4	18.7 - 26.1	16.6 - 18.9	17.2 - 21.5
CHROMIUM	37 - 68.4	54.4	44.1 - 53.2	43.1 - 47.2	39.3 - 44.3
COPPER	43.5 - 386	192.5	19.5 - 67.5	19.2 - 21.8	21.6 - 23.3
LEAD	21 - 147	69.5	19.1 - 29.2	20.7 - 25.5	18 -20.9
NICKEL	20 - 32.6	25.2	12.6 - 14.3	13.2 - 14.8	10.8 - 12.1
ZINC	95.8 - 826	355.3	72.7 - 110	68 - 74.6	71.9 - 77.1

Footnotes:

(1) Chemcals shown are those indicated in RFI Table 4-6 as having detected concentrations that exceeded ecological screening values and background values.

(2) Three samples collected by Tetra Tech NUS, Inc. (054M000103, 556M000703, and 556M000503); see RFI Table 4-6.

(3) Range of concentrations in seven samples (reference sample excluded); from Table 1 of *Sediment Testing Report* (GEL, 2010).

(4) Range of concentrations in six samples; from Table 5 of *Berth Maintenance, Shallow Sediment Sampling Report, Veterans Terminal* (WPC,2011).

(5) Concentrations in two samples collected at Pier P; from Tables 5B and 6B of *Evaluation of Dredged Material, USCG Tradd Street and Pier Papa* (ANAMAR, 2011). "U" values are method detection limits in non-detect samples.

SEDIMENT TESTING REPORT
CMMC, LLC
NORTH CHARLESTON, SOUTH CAROLINA

CMMC, LLC
1670 Drydock Avenue
North Charleston, South Carolina 29405

February 9, 2010

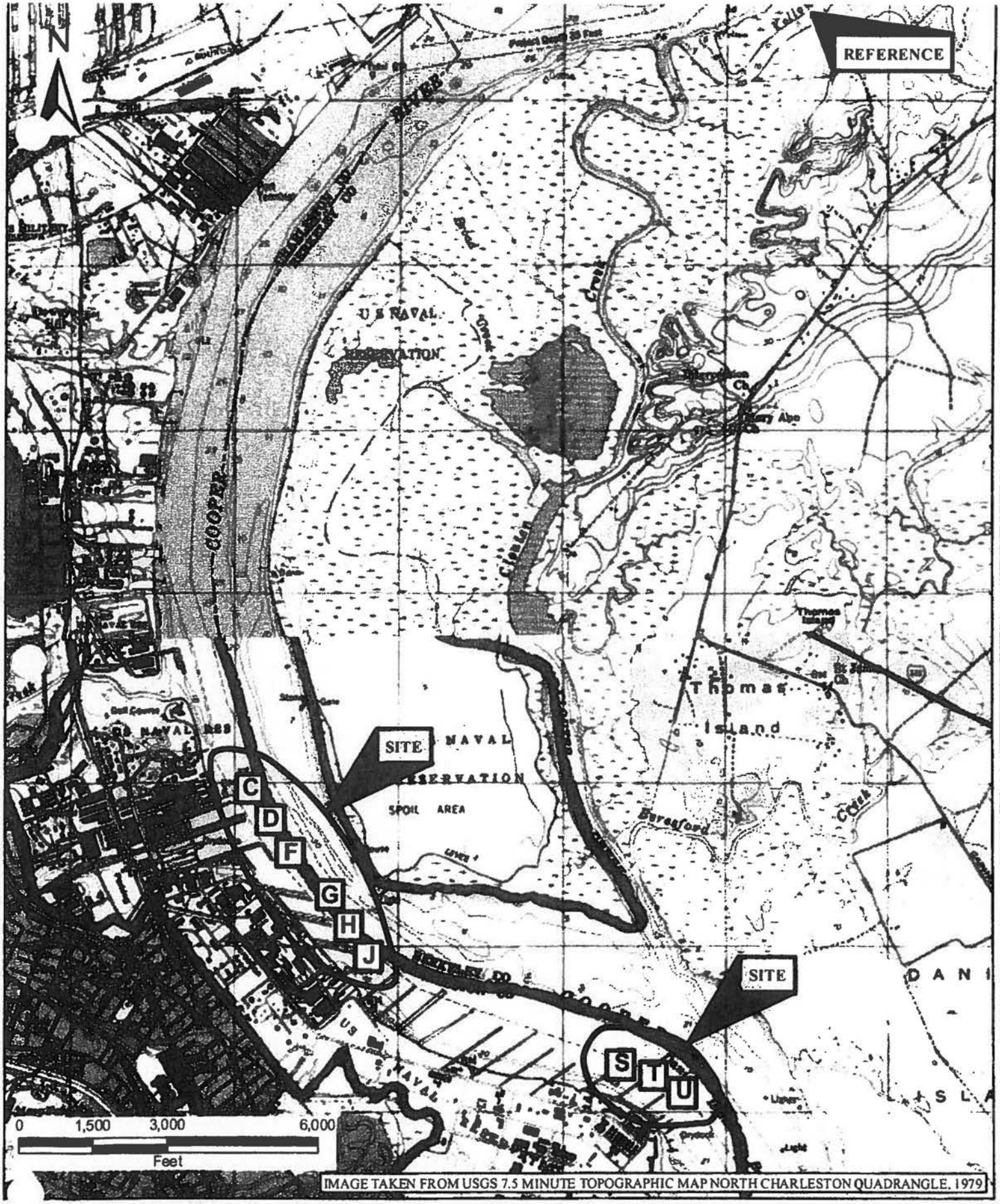


IMAGE TAKEN FROM USGS 7.5 MINUTE TOPOGRAPHIC MAP NORTH CHARLESTON QUADRANGLE, 1979

GEL Engineering, LLC *a Member of THE GEL GROUP, INC.* GEI P.O BOX 30712 CHARLESTON, SC 29417 2040 SAVAGE ROAD 29407 (843) 769-7378 FAX (843) 769-7397 WWW.GEL.COM ENGINEERING ENVIRONMENTAL ANALYTICAL	PROJECT: CHMM00109		
	CMMC, LLC 2670 DRYDOCK AVENUE NORTH CHARLESTON, SOUTH CAROLINA	SITE LOCATION MAP	FIGURE 1
	DATE: MAY 4, 2009	CREATED BY: RCR / APPRV BY: LWS	

SEDIMENT TESTING REPORT

CMMC, LLC
North Charleston, South Carolina

1.0 Introduction

CMMC, LLC (CMMC) has applied to the Charleston District, Corps of Engineers (COE) for authorization to perform berth maintenance dredging with a hydraulic dredge and transport the dredged material via pipeline to the Clouter Island Confined Disposal Facility (CDF). The CMMC facility is comprised of several piers at the former Charleston Naval Complex located on the Cooper River in North Charleston, Charleston County, South Carolina. The specific piers are Pier Charlie (C), Pier Delta (D), Pier Foxtrot (F), Pier Golf (G), Pier Hotel (H), Pier Juliet (J), Pier Sierra (S), Pier Tango (T), and Pier Uniform (U). The permit application number for the proposed maintenance dredging activity is PN 2008-2305-2IR. CMMC has an active South Carolina Department of Health and Environmental Control – Office of Ocean and Coastal Resource Management (OCRM) permit (OCRM-06-129-R) to perform the above maintenance dredging activities.

As part of the authorization process for the dredging and disposal activities, the COE required sampling and analysis of the proposed dredge material. This evaluation of the sediment quality has been performed in accordance with standard COE protocol as presented in GEL Engineering, LLC's (GEL's) Sampling and Analysis Plan (SAP), dated June 24, 2009. A copy of the SAP and the COE's approval dated November 3, 2009, are included in Appendix I.

In accordance with the approved SAP, eight sediment samples were analyzed, including seven from the various piers and a reference sample from Yellow House Creek. The eight sediment samples were analyzed in accordance with the tables shown in the SAP. Eight water samples were analyzed, including seven from the various piers and a background sample collected from Yellow House Creek. A rinsate sample was also collected and analyzed to assess field quality control. The nine water samples were analyzed in accordance with the tables shown in the SAP. Details of the sample collection and analytical procedures are presented below.

2.0 Location of Sampling Areas

The sampling areas consisted of each side of Piers C, D, F, H, S, T, and U with the sediment and water samples collected on each side of the pier composited to form one sediment and one water sample per pier. The reference samples were collected from the standard location within the mouth of Yellow House Creek. Details concerning each sample location are shown in Figure 2 of the SAP included in Appendix I.

The locations of all the sampling points were recorded in the field with a Trimble global positioning system (GPS) equipped with a differential beacon receiver. Vessels moored along side three of the piers created interference with the GPS equipment and the exact locations could not be determined. A copy of the Summary of Measurements and Field Conditions is included in Appendix II. The state plane coordinates for each sediment sample location and the sample identification numbers are presented below in Table 2.0.1.

Table 2.0.1
Coordinates of Sediment Samples Locations and Sample Identification

Sample Locations	Easting	Northing
SED-REF	2330534.37	393777.86
SED-C-N	2318137.73	377386.22
SED-C-S	2317474.97	376839.19
SED-D-N	2317701.14	376794.32
SED-D-S	2318187.49	376696.35
SED-F-N	2318330.77	376328.44
SED-F-S	2318914.93	376199.85
SED-H-N	2319783.48	374991.04
SED-H-S	2320138.51	374733.95
SED-S-N	no satellite service	
SED-S-S	2325743.08	371701.28
SED-T-N	no satellite service	
SED-T-S	2326364.84	371495.88
SED-U-N	no satellite service	
SED-U-S	2326887.68	371256.61

3.0 Materials and Methods

The samples were collected and analyzed in accordance with the SAP. The field sampling and laboratory methods used to collect and analyze the samples are discussed below.

3.1 Field Sampling and Sample Handling Procedures

The sediment samples were collected during the period of November 16-18, 2009. The samples were collected by vibracoring a continuous core to the proposed dredge depth, including the proposed overdepth. In three locations where moored vessels (vessels were double-breasted and had boom deployed) prevented the use of the vibracore system, the samples were collected using a stainless steel clamshell sampling device (Petite Ponar) between the vessel and pier. The reference samples were also collected using the Petite Ponar. All work was performed from GEL's 30-foot pontoon workboat.

New laboratory-quality PVC gloves were worn by field personnel during all sample collection activities and changed between each sampling location. All of the sampling equipment was thoroughly cleaned prior to use in the field. It was necessary to field clean only the stainless-steel compositing bowl, the stainless-steel clamshell device, and the stainless-steel spoons used to homogenize the sediment samples due to the use of new core-barrel liners at each sample location.

The vibracore system was driven by a concrete vibrating machine. A 3-inch diameter aluminum core-barrel was used at each sediment sampling station. In addition, new, low density polypropylene liners were used in the core-barrels to prevent any potential cross contamination between coring locations. The clamshell device was attached to a polypropylene rope and lowered to the bottom. Following retrieval of the vibracore and clamshell, the sediment was placed into a stainless-steel bowl and thoroughly homogenized until the appropriate volume of sediments had been collected.

The clamshell device was cleaned between each sampling location. The liquids used in the cleaning process were collected and placed in an appropriate container for proper disposal by GEL. One rinsate sample was collected from the final rinsate of the sampling equipment after the cleaning procedures had been performed. The rinsate sample was analyzed for the total and dissolved fractions of the parameters listed in the SAP (Appendix I).

The samples were placed in certified-cleaned laboratory sample containers and labeled. The samples were documented on a chain of custody form with the following information:

a. Name of Site
b. Field Location Number
c. Date and Time of Sample
d. Initials and Printed Name of Collector
e. Type of Analysis

The samples were then placed on ice in a cooler. The samples remained in the custody of GEL personnel during transport back to our laboratory, GEL Laboratories, LLC, for analysis. All samples were analyzed by GEL Laboratories, LLC except for grains size, dioxins and furans, butyltins, and PCBs. These fractions were analyzed by the following laboratories:

- Dioxins and Furans – SGS Environmental Services, Inc.
- Tributyltin and PCBs – Columbia Analytical Services, Inc.
- Grain Size - Soil Consultants, Inc.

3.2 References for Laboratory Protocols

As presented in the SAP, GEL collected and analyzed eight sediment samples, eight water samples, and an equipment rinsate (total and dissolved) sample. A summary of the analyses is presented below.

The sediment samples were analyzed for the following parameters:

Metals	Pesticides
Total Organic Carbons (TOC)	Polychlorinated Biphenyls (PCBs)
Grain Size	Polynuclear Aromatic Hydrocarbons (PAHs)
% Solids	Butyltins, including Tributyltin
Specific Gravity	Dioxins / Furans (Dioxins)
Atterberg Limits	

The water and rinsate samples were analyzed for the following parameters:

Metals	Pesticides
Total Organic Carbons (TOC)	Polychlorinated Biphenyls (PCBs)
Polynuclear Aromatic Hydrocarbons (PAHs)	
% Solids	Butyltins, including Tributyltin
Total Suspended Solids (TSS)	Dioxins / Furans (Dioxins)

In addition, a laboratory control sample (LCS), a LCS duplicate sample (LCSD), a matrix spike sample (MS), a MS duplicate sample (MSD), and a method blank were analyzed with the project samples. The samples were analyzed in accordance with the methods and lower reporting limits (LRLs) presented in the SAP, with minor exceptions. The exceptions are discussed below.

3.2.1 Exceptions to the Proposed Methods

All of the methods used for the analyses were in accordance with the methods presented in GEL's SAP.

3.2.2 Exceptions to the Proposed Lower Reporting Limits

As noted in the SAP, the lower reporting limits (LRL) for the sediment analyses will vary based on the moisture content of the respective sample since the results are reported on a dry weight basis, consistent with industry standards. In addition, matrix interferences are commonly associated with the analysis of marine sediments as a result of the natural occurrence of analytes such as chlorides, sulfates, and sodium. Interferences are particularly common in fine grained, clay-rich sediments, such as pluff mud, which commonly occurs in areas requiring dredging. The following discussion provides more detailed information on Detection Limits (DLs), LRLs and types of interferences.

- Detection Limit (DL) – The DL is the lowest concentration of an analyte that can be detected with a 99% certainty that the analyte is present. At concentrations between the DL and the LRL (discussed below), the only certainty is in the presence or absence of the analyte; therefore, there can be some error associated with the reported concentration, particularly as the concentration approaches the DL. DL values appear under the DL column on the Certificates of Analysis. Analytes detected at concentrations between the DL and the LRL (shown as RL on the Certificate of Analysis) are designated with a "J" on the Certificates of Analysis to indicate that the reported concentration is estimated.
- Lower Reporting Limit (LRL) – The LRL is the lowest concentration of a particular compound that can be detected and quantified with a specific accuracy by available modern instrumentation. The LRL is typically derived from the lowest concentration to which the instrumentation has been calibrated and is typically greater than, but at a minimum, equal to the DL. In cases where samples exhibit no interferences or matrix difficulties, the LRL is the lowest achievable quantifiable limit. This value appears under the RL column on the

Certificates of Analysis. Analytes detected at concentrations equal to or greater than the RL have no associated qualifier on the Certificates of Analysis.

Analytes not present at concentrations equal to or greater than the DL are designated with a "U" qualifier and a "ND" result on the Certificates of Analysis.

To determine a DL for a particular analyte, multiple analyses are performed on a standard of that analyte in deionized water, followed by a statistical evaluation of the results. However, "real world" samples are usually not of the same quality as deionized water and, therefore, it is often difficult or impossible to achieve the stated DL (and associated LRL) in a "real world" sample. The problems associated with "real world" samples substantiate the need for LRLs, as well as DLs. Like DLs, the LRLs reported are the lowest achievable by the methodology only if no interferences exist. To avoid interferences in "real world" samples, it is often necessary to dilute the sample. A dilution of a sample will increase the DL and LRL proportionally to the dilution required. The primary reasons for diluting samples are listed below.

1) High concentrations of heavy molecular weight organic compounds – These interferences usually are not detected within the chromatographic range of the analytes of interest. However, since the heavy organic compounds do not completely volatilize while inside analytical instruments, they contribute to active sites, column degradation, instrument malfunction, and the need for significant maintenance. Some sample "clean-up" methods are available for such interferences; however, many times the sample requires some dilution, even after clean-up.

2) Interferences within the chromatographic from non-target analytes – If the retention times of non-target analytes coincide with those of the analytes of interest, they can mask the signal of the specific analyte of interest.

3) High concentration of an analyte of interest (target analyte) – Target analytes must be quantified within the calibration range of the instrumentation to achieve accurate quantitative data. Furthermore, a high concentration of a target analyte can mask the signal of other analytes of interest. If the concentration exceeds the calibration range, the sample must be diluted to bring the analyte(s) within a quantifiable range.

Collectively, these three reasons for sample dilutions are known as matrix interferences. Substantial efforts are made to avoid dilutions of any sample.

Furthermore, it is also necessary to demonstrate how DLs and LRLs are affected by the varying moisture contents of individual sediment samples. Please note that all of the proposed detection limits in the SAP are based on an "as received" or wet weight basis since it is difficult to predict the moisture contents of the individual project samples. To

report DLs and LRLs on a dry weight basis, the moisture content of the sample must be taken into account. This is best summarized in the EPA's Contract Laboratory Program (CLP) standard contract entitled "Statement of Work for Organic Analysis, Multi-media, Multi-concentration, Revision SOMO1.2," which was promulgated in June 2007. This EPA document is widely accepted as the definitive guidance for performing CLP-type analyses.

As stated on page C-1 of the EPA document, "Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable. Furthermore, for soil samples, the moisture content of the samples must be used to adjust the contract required quantitation limit values appropriately." Since the LRLs (also known as quantitation limits) stated in the EPA contract are based on a wet weight basis, the LRLs for analytes calculated on a dry weight basis will always be higher when adjusted for moisture content. This is also summarized on page C-8 of a previous version of the same EPA contract, version OLMO1.0, which states, "Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on a dry weight basis as required by the contract, will be higher."

As noted above, DLs and LRLs will increase proportionately with moisture content. The moisture contents of the sediment samples collected as part of the CMMC project ranged from 68.3% to 80.4.4%. GEL made every effort to achieve the lowest possible DLs and LRLs for the parameters analyzed; however, since the percent moisture of each sample must be accounted for when reporting the results on a dry weight basis, the DLs and LRLs for the individual constituents are elevated compared to DLs and LRLs on a wet weight basis. An example calculation of the effects of moisture content on an analytical result is included in the Assumptions and Calculations section following the text.

The following discussion provides specific details on DLs and LRLs for the CMMC sediment samples.

- Metals – No sample dilutions were required for the metals analyses. Most of the DLs reported on the Certificates of Analysis are equal to or less that the LRLs proposed in the SAP even though they are reported on a dry weight basis.
- TOC concentrations in all samples exceed the proposed LRL.

- Grain Size is reported to 0.1% which is less than the proposed LRL.
- Moisture Content is reported to 0.1% which is less than the proposed LRL.
- Pesticides – As noted in the laboratory report included in Appendix III, high concentrations of sulfur were present in the samples. Two clean up techniques were used to reduce the sulfur content and "clean up" the samples to reduce interferences. Nevertheless, all pesticide analyses required a 10x dilution. Therefore, the DLs and LRLs are slightly elevated compared to the proposed LRLs.
- PCB Congeners - No sample dilutions were required for the PCB Congener analyses. Most of the DLs reported on the Certificates of Analysis are equal to or less that the LRLs proposed in the SAP even though they are reported on a dry weight basis.
- PCB Aroclors – No sample dilutions were required for the PCB Aroclors analyses. The majority of the results are below the RLs even though they are reported on a dry weight basis.
- PAHs – No sample dilutions were required for the PAH analyses. Most of the DLs reported on the Certificates of Analysis are equal to or less that the LRLs proposed in the SAP even though they are reported on a dry weight basis..
- Dioxins and Furans – No sample dilutions were required for the dioxin and furan analyses after sample cleanup. Most of the reported DLs (referred to as an EDL for dioxin and furan analysis) are below or comparable to the LRL proposed in the SAP even though they are reported on a dry weight basis..
- Butyltins - No sample dilutions were required for the butyltins analyses. The reported DLs (referred to as an MRL for butyltins analysis) are below the LRL proposed in the SAP even though they are reported on a dry weight basis..

In summary, adjustments were made for moisture content to report the data on a dry weight basis in accordance with industry standards, which caused the DLs and LRLs to be raised. For some analytes, a sample dilution was required despite use of sample clean up techniques; this also caused the DLs and LRLs to be raised. Despite these adjustments, the reported data are comparable to or less than the LRLs proposed in the SAP.

Table 1
Summary of Analytical Results - Sediment Bulk Chemistry Analyses

Sample Number	Fraction	Parameter	Lab Result	Lab Qualifier	Units	ERL	ERL (units)	ERM	ERM (units)	ESL	ESL (units)
SED-PIER-C	G	Total Organic Carbon Average	42800		MG/KG	-		-		-	
SED-PIER-D	G	Total Organic Carbon Average	49400		MG/KG	-		-		-	
SED-PIER-F	G	Total Organic Carbon Average	44600		MG/KG	-		-		-	
SED-PIER-H	G	Total Organic Carbon Average	44200		MG/KG	-		-		-	
SED-PIER-S	G	Total Organic Carbon Average	31100		MG/KG	-		-		-	
SED-PIER-T	G	Total Organic Carbon Average	35900		MG/KG	-		-		-	
SED-PIER-U	G	Total Organic Carbon Average	34700		MG/KG	-		-		-	
SED-REF	G	Total Organic Carbon Average	104000		MG/KG	-		-		-	
SED-PIER-C	METALS	Antimony	4.69		MG/KG	-		-		12	mg/kg
SED-REF	METALS	Antimony	1.68	J	MG/KG	-		-		12	mg/kg
SED-PIER-C	METALS	Arsenic	**26.1**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-D	METALS	Arsenic	**20.4**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-F	METALS	Arsenic	**20.9**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-H	METALS	Arsenic	**20.7**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-S	METALS	Arsenic	**19.2**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-T	METALS	Arsenic	**18.7**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-U	METALS	Arsenic	**23.8**		MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-REF !	METALS	Arsenic	**12.9** – Ref. sample	J	MG/KG	8.2	mg/kg	70	mg/kg	7.24	mg/kg
SED-PIER-C	METALS	Cadmium	0.668	J	MG/KG	1.2	mg/kg	9.6	mg/kg	0.68	mg/kg
SED-PIER-D	METALS	Cadmium	0.351	J	MG/KG	1.2	mg/kg	9.6	mg/kg	0.68	mg/kg
SED-PIER-F	METALS	Cadmium	0.409	J	MG/KG	1.2	mg/kg	9.6	mg/kg	0.68	mg/kg
SED-PIER-U	METALS	Cadmium	0.351	J	MG/KG	1.2	mg/kg	9.6	mg/kg	0.68	mg/kg
SED-PIER-C	METALS	Chromium	**53.2**		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-D	METALS	Chromium	47.3		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-F	METALS	Chromium	48.8		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-H	METALS	Chromium	47.4		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-S	METALS	Chromium	44.9		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-T	METALS	Chromium	44.1		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-U	METALS	Chromium	46.3		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-REF	METALS	Chromium	33.1 Ref.		MG/KG	81	mg/kg	370	mg/kg	52.3	mg/kg
SED-PIER-C	METALS	Copper	**38.6**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-D	METALS	Copper	**39.5**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-F	METALS	Copper	**67.5**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-H	METALS	Copper	**38.2**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-S	METALS	Copper	**25.8**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-T	METALS	Copper	**24.6**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-U	METALS	Copper	**19.5**		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-REF	METALS	Copper	16.6		MG/KG	34	mg/kg	270	mg/kg	18.7	mg/kg
SED-PIER-C	METALS	Lead	29.2		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-D	METALS	Lead	23.8		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-F	METALS	Lead	25.0		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-H	METALS	Lead	23.4		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-S	METALS	Lead	20.4		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-T	METALS	Lead	19.1		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-U	METALS	Lead	22.2		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-REF	METALS	Lead	16.3 Ref.		MG/KG	46.7	mg/kg	218	mg/kg	30.2	mg/kg
SED-PIER-C	METALS	Mercury	**1120**		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-D	METALS	Mercury	73.1		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-F	METALS	Mercury	81		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-H	METALS	Mercury	89.2		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-S	METALS	Mercury	69.6		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg

Table 1
Summary of Analytical Results - Sediment Bulk Chemistry Analyses

Sample Number	Fraction	Parameter	Lab Result	Lab Qualifier	Units	ERL	ERL (units)	ERM	ERM (units)	ESL	ESL (units)
SED-PIER-T	METALS	Mercury	69.5		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-U	METALS	Mercury	64.1		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-REF	METALS	Mercury	143 Ref.		UG/KG	150	ug/kg	710	ug/kg	130	ug/kg
SED-PIER-C	METALS	Nickel	13.6		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-D	METALS	Nickel	14.1		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-F	METALS	Nickel	14.3		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-H	METALS	Nickel	13.6		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-S	METALS	Nickel	12.9		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-T	METALS	Nickel	12.6		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-U	METALS	Nickel	13.4		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-REF	METALS	Nickel	7.92 Ref.		MG/KG	20.9	mg/kg	51.6	mg/kg	15.9	mg/kg
SED-PIER-C	METALS	Selenium	3.96	J	MG/KG	-		-		-	
SED-PIER-D	METALS	Selenium	2.20	J	MG/KG	-		-		-	
SED-PIER-H	METALS	Selenium	3.13	J	MG/KG	-		-		-	
SED-REF	METALS	Selenium	10.4	J	MG/KG	-		-		-	
SED-PIER-C	METALS	Zinc	110		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-D	METALS	Zinc	87.2		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-F	METALS	Zinc	105		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-H	METALS	Zinc	99.6		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-S	METALS	Zinc	76.4		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-T	METALS	Zinc	72.7		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-U	METALS	Zinc	81.5		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-REF	METALS	Zinc	64.6 Ref.		MG/KG	150	mg/kg	410	mg/kg	124	mg/kg
SED-PIER-C	PCB	Aroclor-1254	14.2		UG/KG						
SED-PIER-D	PCB	Aroclor-1254	10.3	J	UG/KG						
SED-PIER-F	PCB	Aroclor-1254	8.20	JP	UG/KG						
SED-PIER-C	PCB	Aroclor-1260	8.60	J	UG/KG						
SED-PIER-D	SVOA	1-Methylnaphthalene	1.70	J	UG/KG						
SED-PIER-T	SVOA	1-Methylnaphthalene	5.87	J	UG/KG						
SED-PIER-D	SVOA	2-Methylnaphthalene	2.54	J	UG/KG	70	ug/kg	670	ug/kg	330	ug/kg
SED-PIER-S	SVOA	2-Methylnaphthalene	2.56	J	UG/KG	70	ug/kg	670	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Acenaphthene	4.12	J	UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Acenaphthene	60.9		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Acenaphthene	10.4		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Acenaphthene	10.0		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Acenaphthene	23.1		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Acenaphthene	45.7		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Acenaphthene	15.7		UG/KG	16	ug/kg	500	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Acenaphthylene	8.98		UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Acenaphthylene	4.82	J	UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Acenaphthylene	11.3		UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Acenaphthylene	2.67	J	UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Acenaphthylene	16.4		UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Acenaphthylene	13.2		UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Acenaphthylene	4.16	J	UG/KG	44	ug/kg	640	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Anthracene	25.5		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Anthracene	58.4		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Anthracene	74.8		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Anthracene	32.9		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Anthracene	173		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Anthracene	112		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg

Table 1
Summary of Analytical Results - Sediment Bulk Chemistry Analyses

Sample Number	Fraction	Parameter	Lab Result	Lab Qualifier	Units	ERL	ERL (units)	ERM	ERM (units)	ESL	ESL (units)
SED-PIER-U	SVOA	Anthracene	48.8		UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-REF	SVOA	Anthracene	4.44 Ref	J	UG/KG	85.3	ug/kg	1100	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Benzo(a)anthracene	97.3		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Benzo(a)anthracene	72.5		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Benzo(a)anthracene	151		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Benzo(a)anthracene	62.7		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Benzo(a)anthracene	260		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Benzo(a)anthracene	194		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Benzo(a)anthracene	52.6		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-REF	SVOA	Benzo(a)anthracene	10.7 Ref		UG/KG	261	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Benzo(a)pyrene	97.8		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Benzo(a)pyrene	55.1		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Benzo(a)pyrene	141		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Benzo(a)pyrene	40.7		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Benzo(a)pyrene	208		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Benzo(a)pyrene	189		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Benzo(a)pyrene	42.6		UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-REF	SVOA	Benzo(a)pyrene	6.08 Ref	J	UG/KG	430	ug/kg	1600	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Benzo(b)fluoranthene	152		UG/KG	-		-		-	
SED-PIER-D	SVOA	Benzo(b)fluoranthene	118		UG/KG	-		-		-	
SED-PIER-F	SVOA	Benzo(b)fluoranthene	219		UG/KG	-		-		-	
SED-PIER-H	SVOA	Benzo(b)fluoranthene	86.9		UG/KG	-		-		-	
SED-PIER-S	SVOA	Benzo(b)fluoranthene	316		UG/KG	-		-		-	
SED-PIER-T	SVOA	Benzo(b)fluoranthene	272		UG/KG	-		-		-	
SED-PIER-U	SVOA	Benzo(b)fluoranthene	94.2		UG/KG	-		-		-	
SED-REF	SVOA	Benzo(b)fluoranthene	17.7 Ref		UG/KG	-		-		-	
SED-PIER-C	SVOA	Benzo(ghi)perylene	32.8		UG/KG	-		-		-	
SED-PIER-D	SVOA	Benzo(ghi)perylene	18.6		UG/KG	-		-		-	
SED-PIER-F	SVOA	Benzo(ghi)perylene	46.8		UG/KG	-		-		-	
SED-PIER-S	SVOA	Benzo(ghi)perylene	62.9		UG/KG	-		-		-	
SED-PIER-T	SVOA	Benzo(ghi)perylene	62.8		UG/KG	-		-		-	
SED-PIER-U	SVOA	Benzo(ghi)perylene	15.4		UG/KG	-		-		-	
SED-PIER-C	SVOA	Benzo(k)fluoranthene	52.5		UG/KG	-		-		-	
SED-PIER-F	SVOA	Benzo(k)fluoranthene	74.8		UG/KG	-		-		-	
SED-PIER-T	SVOA	Benzo(k)fluoranthene	96.1		UG/KG	-		-		-	
SED-PIER-C	SVOA	Chrysene	99.2		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Chrysene	96.1		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Chrysene	177		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Chrysene	71.1		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Chrysene	299		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Chrysene	225		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Chrysene	58.7		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-REF	SVOA	Chrysene	7.61 Ref		UG/KG	384	ug/kg	2800	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Fluoranthene	211		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Fluoranthene	287		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Fluoranthene	**355**		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Fluoranthene	198		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Fluoranthene	**525**		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Fluoranthene	**353**		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Fluoranthene	154		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg
SED-REF	SVOA	Fluoranthene	46.6 Ref		UG/KG	600	ug/kg	5100	ug/kg	330	ug/kg

Table 1
Summary of Analytical Results - Sediment Bulk Chemistry Analyses

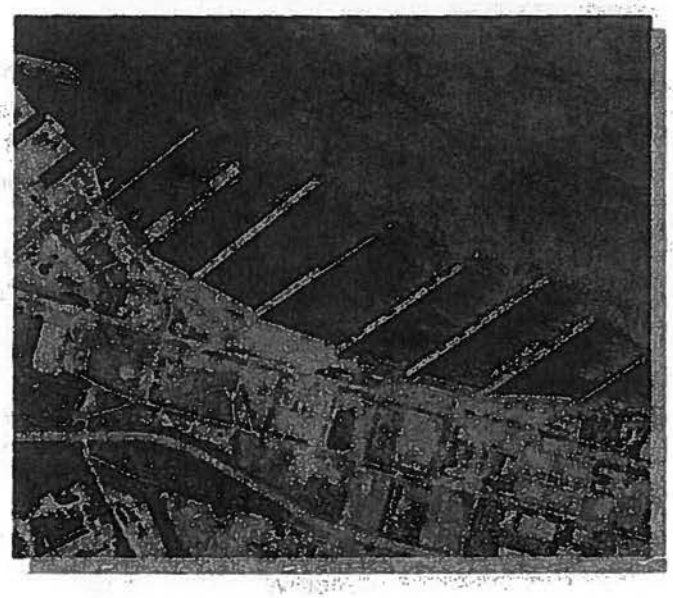
Sample Number	Fraction	Parameter	Lab Result	Lab Qualifier	Units	ERL	ERL (units)	ERM	ERM (units)	ESL	ESL (units)
SED-PIER-C	SVOA	Fluorene	4.46	J	UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Fluorene	44.0		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Fluorene	13.2		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Fluorene	9.80		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Fluorene	36.3		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Fluorene	50.0		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Fluorene	16.5		UG/KG	19	ug/kg	540	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Indeno(1,2,3-cd)pyrene	33.4		UG/KG	-		-		-	
SED-PIER-D	SVOA	Indeno(1,2,3-cd)pyrene	18.9		UG/KG	-		-		-	
SED-PIER-F	SVOA	Indeno(1,2,3-cd)pyrene	49.6		UG/KG	-		-		-	
SED-PIER-S	SVOA	Indeno(1,2,3-cd)pyrene	67.5		UG/KG	-		-		-	
SED-PIER-T	SVOA	Indeno(1,2,3-cd)pyrene	65.5		UG/KG	-		-		-	
SED-PIER-U	SVOA	Indeno(1,2,3-cd)pyrene	14.5		UG/KG	-		-		-	
SED-PIER-C	SVOA	Phenanthrene	12.3		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Phenanthrene	164		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Phenanthrene	27.9		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Phenanthrene	15.9		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Phenanthrene	98.9		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Phenanthrene	104		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Phenanthrene	50.4		UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-REF	SVOA	Phenanthrene	3.01 Ref	J	UG/KG	240	ug/kg	1500	ug/kg	330	ug/kg
SED-PIER-C	SVOA	Pyrene	194		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-D	SVOA	Pyrene	192		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-F	SVOA	Pyrene	301		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-H	SVOA	Pyrene	135		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-S	SVOA	Pyrene	**376**		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-T	SVOA	Pyrene	271		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-PIER-U	SVOA	Pyrene	110		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg
SED-REF	SVOA	Pyrene	31.6 Ref		UG/KG	665	ug/kg	2600	ug/kg	330	ug/kg

Notes:
mg/kg = milligrams per kilogram (ppm)
ug/kg = micrograms per kilogram (ppb)
mg/L = milligrams per liter (ppm)
J = Estimated value less than the Reporting Limit but greater than the Detection Limit.
P = The concentrations between the primary and confirmation columns/detectors is > 40% different.
ERL = Effects Range Low
ERM = Effects Range Median
ESL = United States Environmental Protection Agency (EPA) Region 4 Ecological Screening Level for sediment.
= Exceeds ERL
Bold = Exceeds ESL
- = No established standard
= Quality Control Sample- rinsate blank

Berth Maintenance
Shallow Sediment Sampling Report
Veterans Terminal

June 14, 2011
Project No. EN117019

Prepared for:
South Carolina State Ports Authority
838 Morrison Drive
Charleston, South Carolina 29403



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BERTH MAINTENANCE SHALLOW SEDIMENT SAMPLING
VETERANS TERMINAL
CHARLESTON, SOUTH CAROLINA

Project No. EN117019
June 14, 2011

1.0 INTRODUCTION

1.1 Site Description

ITEM	DESCRIPTION
Location	Veterans Terminal along the Cooper River.
Existing improvements	Existing facilities include three piers at Veterans Terminal.

Veterans Terminal is operated by South Carolina State Ports Authority (SCSPA) and is located on the Cooper River. The berth maintenance sediment sampling investigation was completed in support of the dredge permit renewal that is necessary for planned berth maintenance dredging at the terminals. Prior to gaining a dredge permit renewal, the United States Army Corps of Engineers (USACE) required that a detailed analysis be performed in order to determine any adverse effects of the dredging activities. The dredging project is necessary to maintain safe navigational access for the ships. Sediment cores were collected from representative locations within the project dredge footprint to characterize the physical and chemical quality of the marine sediments.

The site location of Veterans Terminal is depicted on Figure 1 of Appendix I.

1.2 Scope of Work

WPC has completed a marine sediment investigation for the proposed berth maintenance dredging project at Veterans Terminal located on the Cooper River in North Charleston, Charleston County, South Carolina. The research vessel Artemis operated by Athena Technologies, LLC was used as the work platform during the collection of the marine sediment core samples. A total of twelve (12) vibracore borings, were penetrated to a depth of -35 feet below the mean low water on the north and south sides of Piers M, N, and Z. All sample locations were recorded using a GPS device once the vessel was anchored. The purpose of the study was to characterize the physical and chemical quality of the marine sediments within the proposed dredge limits by the following:

- Collection of sediment samples which adequately characterize the project dredged materials;
- Collection of water samples for elutriate and background analyses;
- Analysis of the dredged material samples chemically and physically in order to provide information to determine if the sediments are contaminated; and
- Documentation of the field sampling and results of physical and chemical analyses of sediments and quality control measures.

Table 1 below lists the station IDs, sample IDs, and coordinates for samples collected at Veterans Terminal. Figures 2 and 3 illustrate the station ID and sample ID locations, respectively.

Table 1.
Veterans Terminal
Station IDs/Sample IDs and Coordinates

Station ID	Sample ID	East (x)	North (y)
VT-N-1	VT-NN-03	2322875.52	372339.11
VT-N-2	VT-NN-03	2323476.71	372741.34
VT-N-3	VT-SN-01	2323634.02	372654.68
VT-N-4	VT-SN-01	2323061.53	372232.79
VT-M-1	VT-NM-07	2322276.8	372667.37
VT-M-2	VT-NM-07	2322731.93	372899.46
VT-M-3	VT-SM-05	2323068.42	372969.65
VT-M-4	VT-SM-05	2322477.97	372551.74
VT-Z-1	VT-NZ-11	2321754.69	372945.65
VT-Z-2	VT-NZ-11	2322124.18	373232.14
VT-Z-3	VT-SZ-09	2322088.19	372906.92
VT-Z-4	VT-SZ-09	2321945.35	372846.56

1.3 Standard of Care

WPC's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. WPC makes no warranties, either express or implied, regarding the findings, conclusions or recommendations. Please note that WPC does not warrant the work of laboratories, drilling companies, regulatory agencies or other third parties supplying information

used in the preparation of the report. These dredge sediment analysis services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal.

1.4 Additional Scope Limitations

Findings, conclusions and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Subsurface conditions may vary from those encountered at specific boring or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

1.5 Reliance

This report has been prepared for the exclusive use of SCSPA and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the express written authorization of SCSPA and WPC. Any unauthorized distribution or reuse is at the client's sole risk. Notwithstanding the foregoing, reliance by authorized parties will be subject to the terms, conditions and limitations stated in the proposal and the Service Agreement between WPC and SCSPA.

2.0 PROJECT FIELD EFFORT AND LABORATORY METHODS

On March 29, 2011, WPC mobilized for the Berth Maintenance Sediment Sampling investigation for the SCSPA at Veterans Terminal for collecting sediment samples. Sampling activities were completed on April 4, 2011 with the collection of the reference location samples. Samples were collected from twelve (12) locations at Piers M, N, and Z (2 locations from each side of the pier were composited into one sample) The sample locations were selected by SCSPA in the February 2011 Request for Proposal (RFP). Sample quantities for Veterans Terminal and reference location are listed below:

Veterans Terminal

- Collect 6 sediment samples
- Collect 6 elutriate sediment samples
- Collect 6 elutriate water samples
- Collect 1 background water sample
- Collect 1 MS/MSD for sediment and elutriate VT-NN-03
- Collect 1 equipment blank

Two sediment samples and two elutriate samples were collected in each of the six berths at the required depth. The sediment and water samples for each berth was combined to form one composite sample for each berth resulting in six sediment and six elutriate samples.

Reference location sample from Yellow House Creek

- Collect 1 sediment sample, 1 elutriate sample and 1 water sample

Field collection activities and analytical laboratory methods were followed according to the USACE Draft Sampling and Analysis Plan dated June 17, 1998. The sample location map showing location of sediment cores for Veterans Terminal and reference sample are included as Figures 3 and 4 of Appendix I.

2.1 Field Sampling Method

In accordance with the Sampling and Analysis Plan, WPC collected field logs for each sample location. Field logs are provided in Appendix II. Marine sediment cores from Veterans Terminal were collected using vibracore sampling techniques. The research vessel Artemis operated by Athena Technologies, LLC was used as the work platform during the collection of the marine sediment core samples. The marine sediment cores were collected using a pneumatic vibracore capable of reaching a depth of 55 feet.

Navigational positioning was accomplished using a differential global positioning system (DGPS) aboard the research vessel Artemis deployed for sediment collection. A Trimble 12-channel DGPS with interfaced with HYPACK and a Sitex CVS-106 fathometer for horizontal positioning. The unit provided a real-time display of vessel position over an electronic nautical chart to track vessel position and provide range and bearing information to pre-selected waypoints for accurate positioning and station-keeping during the sample collection process. The stated accuracy of the unit is +/- 3 meters with differential correction and occasional enhancement to +/- 1 meter.

The fathometer on the vessel provided 0.1-ft accuracy on depth measurements. Water depth measurements were verified by weighted tape measurements at each sample station. The water depth measurements were corrected for mean low water from using a Trimble 4800 RTK GPS system and a secured benchmark located on Pier Papa at Veterans Terminal. This benchmark served as a central benchmark for all four terminals.

The sediment core penetration depth requirement for each station ID was based on the February 2011 conditional hydrographic survey of the berthing area dredge footprint conducted by General Engineering Laboratories as shown in Figure 5. Table 2 provides the bathymetric information and project core depths per location.

For the collection of the marine sediment samples, a vibracore system consisting of a generator with a mechanical vibrator attached via cable was utilized. The vibrator was attached to a three (3) inch diameter decontaminated stainless steel sample barrel with a cellulose acetate butyrate liner insert. The sample barrel is lowered to the sediment surface through a moon pool in the deck of the vessel by attaching lengths of drill stem. The vibracore machine is then turned on and the sample barrel is then retrieved using an electric winch.

Upon collection of each sediment sample, the vibracore sampler was suspended above a stainless steel pan lined with plastic and the marine sediment was extruded into the mixing pan. The sediment core extrusion was accomplished by turning on the vibratory source attached to the head of the sample core barrel. Sediment samples were then mixed with stainless steel spoons thoroughly before material for individual analysis was collected.

Table 2 Bathymetric Information and Project Shallow Core Depth

Station ID	Sample ID	Time	Date	East (x)	North (y)	Water Depth (feet)	Water Elevation* (feet relative to MLW)	Top of Core Elevation (feet relative to MLW)	Penetration (feet)	Penetration Depth (feet relative to MLW)	Recovery (feet)	Notes
Veterans Terminal												
VT-N-1	VT-NN-03	9:24:30	3/31/2011	2322875.52	372339.11	20.42	3.77	-16.65	18.3	-35.0	18.3	
VT-N-2	VT-NN-03	10:41:52	3/31/2011	2323476.71	372741.34	22.75	1.97	-20.78	14.2	-35.0	14.2	
VT-N-3	VT-SN-01	15:15:44	3/29/2011	2323634.02	372654.68	26.25	4.29	-21.96	13.0	-35.0	13.0	
VT-N-4	VT-SN-01	13:42:54	3/29/2011	2323061.53	372232.79	17.17	2.71	-14.46	20.5	-35.0	20.5	
VT-M-1	VT-NM-07	7:57:47	4/1/2011	2322276.8	372667.37	34.25	5.01	-29.24	5.8	-35.0	5.8	
VT-M-2	VT-NM-07	8:39:32	4/1/2011	2322731.93	372899.46	34.17	4.57	-29.61	5.4	-35.0	5.4	Moved because sed surface elevation at original location was below project depth.
VT-M-3	VT-SM-05	12:58:59	3/31/2011	2323068.42	372969.65	30.17	0.71	-29.46	5.5	-35.0	5.5	Moved because sed surface elevation at original location was below project depth.
VT-M-4	VT-SM-05	12:19:14	3/31/2011	2322477.97	372551.74	28.08	0.71	-27.37	7.6	-34.9	7.6	
VT-Z-1	VT-NZ-11	11:11:41	4/1/2011	2321754.69	372945.65	28.8	1.74	-27.01	8.0	-35.0	8.0	
VT-Z-2	VT-NZ-11	11:36:43	4/1/2011	2322124.18	373232.14	32.8	1.11	-31.64	3.3	-35.0	3.3	Moved because sed surface elevation at original location was below project depth.
VT-Z-3	VT-SZ-09	10:16:56	4/1/2011	2322088.19	372906.92	34.6	2.93	-31.65	3.3	-35.0	3.3	Moved because sed surface elevation at original location was below project depth.
VT-Z-4	VT-SZ-09	9:40:49	4/1/2011	2321945.35	372846.56	34.4	3.54	-30.88	4.2	-35.0	4.2	
QA/QC Samples												
Reference Sample	RS-01	12:23:10	4/4/2011	2328853.48	392428.34	21.3	2.30	-18.95	–	–	–	Grab sample collected.
Water Sample	RW-01	12:16:22	4/4/2011	2330876.85	394107.75	5.5	2.30	-3.20	–	–	–	
Project Notes		* Sample depth not collected MLW - Mean Low Water Trimble 4800 RTK base station set up over a temporary benchmark created by Athena at Pier November. Pier November Benchmark Elevation = 7.181' NAVD88 (10.181' MLW) Measured elevations at the following reference benchmark: Pier Papa (SC Geodetic Survey BM (est. 2010)) = 7.000' NAVD88 (10.000'MLW) Elevation Datums - http://tidesandcurrents.noaa.gov/data_menu.shtml?stn=8665192%20Wando%20River%20Entrance,%20Hobcaw%20Point,%20SC&type=Datums										

Table 6
Veterans Terminal
Shallow Sediment Core Sample Results

Units	Analyte	VT-SN-01		VT-NN-03		VT-SM-05		VT-NM-07		VT-SZ-9		VT-NZ-11		Reference Sediment RS-01		EPA ESV	ERL	ERM
mg/kg	Antimony	0.15	B J	0.11	B J	0.14	B J	0.1	B J	0.1	B J	0.1	B J	0.12	B J	12	NA	NA
mg/kg	Arsenic	16.8		18.9		18		18		16.6		17		11.8		7.24	8.2	70
mg/kg	Cadmium	0.25		0.27		0.25		0.22		0.26		0.25		0.39		1	1.2	9.6
mg/kg	Chromium	43.1	J	47.2	J	44.8	J	44.5	J	44.1	J	44.4	J	47	J	52.3	81	370
mg/kg	Copper	19.2		19.8		20.8		20.8		21.8		21.8		14.6		18.7	34	270
mg/kg	Lead	22.6		25.5		21.3		21.8		20.7		20.7		16.1		30.2	46.7	218
mg/kg	Mercury	0.086		0.09		0.073		0.085		0.077		0.082		0.11		0.13	0.15	0.7
mg/kg	Nickel	13.8		14.8		13.7		13.6		13.2		13.7		17.4		15.9	20.9	51.6
mg/kg	Selenium	1.4		1.6		1.6		1.7		1.6		1.5		1.9		NA	NA	
mg/kg	Silver	0.098	B	0.12	B J	0.092	B J	0.083	B J	0.086	B J	0.079	B J	0.089	B J	2	1	3.7
mg/kg	Zinc	88		74.6		70.5		73.7		72.5		70.5		60.1		124	150	410
ug/kg	1-Methylnaphthalene	5.6	U	4.6	U	5.3	U	5.3	U	6.8	U	6.7	U	4.2	U	NA	NA	NA
ug/kg	2-Methylnaphthalene	4.7	U	3.9	U	4.4	U	4.5	U	5.7	U	5.6	U	3.6	U	330	70	670
ug/kg	Acenaphthene	24	J	20	J	9.6	J	10	J	13	J	13	J	3.8	U	330	16	500
ug/kg	Acenaphthylene	30	J	20	J	5.7	U	13	J	7.3	U	16	J	4.5	U	330	44	640
ug/kg	Anthracene	140		59		59		60		85		79		5.6	J	330	85.3	1,100
ug/kg	Benzo(a)anthracene	190		120		110		100		140		160		18	J	330	261	1,600
ug/kg	Benzo(a)pyrene	150		100		89		74		100		120		21	J	330	430	1,600
ug/kg	Benzo(b)fluoranthene	160		100		90		69		130		120		25	J	NA	NA	NA
ug/kg	Benzo(ghi)perylene	70		57		46	J	35	J	53	J	58	J	12	J	NA	NA	NA
ug/kg	Benzo(k)fluoranthene	150		88		76		73		53	J	93		9.3	J	NA	NA	NA
ug/kg	Chrysene	190		130		120		110		130		150		19	J	330	384	2,800
ug/kg	Dibenzo(a,h)anthracene	5.8	U	4.8	U	11	J	9	J	7.1	U	7	U	4.4	U	330	63.4	260
ug/kg	Fluoranthene	360		240		160		200		250		380		42		330	600	5,100
ug/kg	Fluorene	26	J	17	J	15	J	15	J	22	J	21	J	5.2	U	330	19	540
ug/kg	Indeno(1,2,3-cd)pyrene	66		54		39	J	41	J	45	J	50	J	9.3	J	NA	NA	NA
ug/kg	Naphthalene	4.5	U	3.7	U	4.3	U	4.3	U	5.5	U	5.4	U	3.4	U	330	160	2,100
ug/kg	Phenanthrene	50	J	33	J	30	J	23	J	45	J	130		12	J	330	240	1,500
ug/kg	Pyrene	340		220		140		160		210		300		50		330	665	2,600
ug/kg	Total PAHs	1,956.3		1,266.5		1,004.5		999.1		1,279.2		1,702.4		228.45		1,684	1,684	44,792
ug/kg	Aroclor 1016	2	U	4	U	4.6	U	4.6	U	4.8	U	4.7	U	3.7	U	NA	NA	NA
ug/kg	Aroclor 1221	2.5	U	5.2	U	5.9	U	6	U	6.1	U	6	U	4.7	U	67	NA	NA
ug/kg	Aroclor 1232	2.2	U	4.6	U	5.3	U	5.3	U	5.5	U	5.4	U	4.2	U	NA	NA	NA
ug/kg	Aroclor 1242	2.1	U	4.4	U	5	U	5.1	U	5.2	U	5.1	U	4	U	NA	NA	NA
ug/kg	Aroclor 1248	1.2	U	2.6	U	2.9	U	3	U	3	U	3	U	2.3	U	NA	NA	NA
ug/kg	Aroclor 1254	1.9	U	3.8	U	4.4	U	4.4	U	4.6	U	4.5	U	3.5	U	NA	NA	NA
ug/kg	Aroclor 1260	1.9	U	3.8	U	4.4	U	4.4	U	4.6	U	4.5	U	3.5	U	NA	NA	NA

Veterans Terminal
Shallow Sediment Core Sample Results

Units	Analyte	VT-SN-01		VT-NN-03		VT-SM-05		VT-NM-07		VT-SZ-9		VT-NZ-11		Reference Sediment RS-01		EPA ESV	ERL	ERM
ug/kg	PCB 8	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 18	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 28	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 44	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 49	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 52	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 66	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 77	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 87	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 101	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 105	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 118	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 126	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 128	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 138	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 153	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 156	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 169	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 170	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 180	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 183	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 184	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 187	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 195	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 206	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A
ug/kg	PCB 209	0.81	U	0.79	U	0.93	U	0.93	U	0.95	U	0.93	U	0.79	U	N/A	N/A	N/A

Table 5
Veterans Terminal
Shallow Sediment Core Sample Results

Units	Analyte	VT-SN-01		VT-NN-03		VT-SM-05		VT-NM-07		VT-SZ-9		VT-NZ-11		Reference Sediment RS-01		EPA ESV	ERL	ERM
ug/kg	2,4'-DDD	0.31	U	0.16	U	0.19	U	0.19	U	3	J	1.3	J PG	0.5	J PG	NA	NA	NA
ug/kg	2,4'-DDE	0.48	U	0.25	U	0.29	U	0.29	U	0.29	U	0.29	U	0.23	U	NA	NA	NA
ug/kg	2,4'-DDT	0.45	U	0.23	U	0.27	U	0.27	U	0.27	U	0.27	U	0.21	U	NA	NA	NA
ug/kg	4,4'-DDD	2.6	J B PG	1.2	J B PG	1.3	J B PG	1.2	J B PG	3.5	B PG	2.5	J B PG	1.4	J B PG	3.3	2	20
ug/kg	4,4'-DDE	0.79	U	0.4	U	0.47	U	0.48	U	0.48	U	0.47	U	0.38	U	3.3	2.2	27
ug/kg	4,4'-DDT	0.78	U	0.4	U	0.46	U	0.47	U	2.8	J	0.85	J PG	0.37	U	3.3	1	7
ug/kg	Aldrin	0.93	U	0.47	U	0.55	U	0.56	U	0.84	J	0.55	U	0.73	J	NA	NA	NA
ug/kg	alpha-BHC	0.85	U	0.43	U	0.5	U	0.51	U	0.51	U	0.5	U	0.4	U	NA	NA	NA
ug/kg	alpha-Chlordane	1	U	0.53	U	0.62	U	0.63	U	0.62	U	0.61	U	0.49	U	NA	NA	NA
ug/kg	beta-BHC	1.4	U	0.69	U	0.8	U	0.82	U	0.82	U	0.8	U	0.65	U	NA	NA	NA
ug/kg	Chlordane (technical)	2.3	U	1.2	U	1.4	U	1.4	U	1.4	U	1.4	U	1.1	U	1.7	0.5	6
ug/kg	cis-Nonachlor	0.38	U	0.19	U	0.23	U	0.23	U	0.23	U	0.23	U	0.18	U	NA	NA	NA
ug/kg	delta-BHC	0.8	U	0.41	U	0.47	U	0.48	U	0.48	U	0.47	U	0.38	U	NA	NA	NA
ug/kg	Dieldrin	0.87	U	0.44	U	0.52	U	0.53	U	0.52	U	0.51	U	0.41	U	3.3	0.02	8
ug/kg	Endosulfan I	0.98	U	0.5	U	0.58	U	0.59	U	0.59	U	0.58	U	0.47	U	NA	NA	NA
ug/kg	Endosulfan II	0.92	U	0.47	U	0.55	U	0.56	U	0.56	U	0.55	U	0.44	U	NA	NA	NA
ug/kg	Endosulfan sulfate	0.54	U	0.28	U	0.32	U	0.33	U	0.33	U	0.32	U	0.26	U	NA	NA	NA
ug/kg	Endrin	2.5	J	1.2	J	0.6	U	0.61	U	1.3	J PG	0.6	U	0.91	J	3.3	NA	NA
ug/kg	Endrin aldehyde	1	U	0.86	J	0.6	U	0.61	U	0.61	U	0.6	U	0.64	J	NA	NA	NA
ug/kg	Endrin ketone	0.81	U	0.41	U	0.48	U	0.49	U	0.49	U	0.48	U	0.39	U	NA	NA	NA
ug/kg	gamma-BHC (Lindane)	0.92	U	0.47	U	0.54	U	0.55	U	0.55	U	0.54	U	0.44	U	3.3	NA	NA
ug/kg	gamma-Chlordane	1	U	0.52	U	0.61	U	0.62	U	0.62	U	0.61	U	0.49	U	NA	NA	NA
ug/kg	Heptachlor	1.2	U	0.59	U	0.69	U	0.7	U	0.7	U	0.69	U	0.55	U	NA	NA	NA
ug/kg	Heptachlor epoxide	1	U	0.52	U	0.6	U	0.61	U	0.61	U	0.6	U	0.48	U	NA	NA	NA
ug/kg	Methoxychlor	1.1	U	0.55	U	0.65	U	0.66	U	0.66	U	0.64	U	0.52	U	NA	NA	NA
ug/kg	Mirex	0.48	U	0.24	U	0.29	U	0.29	U	0.29	U	0.28	U	0.23	U	NA	NA	NA
ug/kg	oxy-Chlordane	11	U	5.6	U	6.5	U	8.6	U	6.6	U	6.5	U	5.2	U	NA	NA	NA
ug/kg	Toxaphene	35	U	18	U	21	U	21	U	21	U	21	U	17	U	NA	NA	NA
ug/kg	trans-Nonachlor	0.29	U	0.15	U	0.17	U	0.17	U	0.17	U	0.17	U	0.14	U	NA	NA	NA
%	Percent Solids	31.6		30.8		26.9		26.4		26		26.5		33.5		NA	NA	NA
mg/kg	TOC	36100		31800		27900		34900		32900		33200		19500		NA	NA	NA

Notes:

J	Estimated value
U	Constituent was not detected - value shown indicates the MDL for the constituent.
B	Analyte was detected in the method blank at a detectable concentration.
PG	The % difference between the results from both columns is >40% (SW846).
Q	Estimated maximum possible concentration.
VT	Veterans Terminal
RS	Reference Sediment
EPA ESV	EPA Region 4 Hazardous Waste Section Ecological Screening Values
ERL	NOAA Effects Range Low
ERM	NOAA Effects Range Median

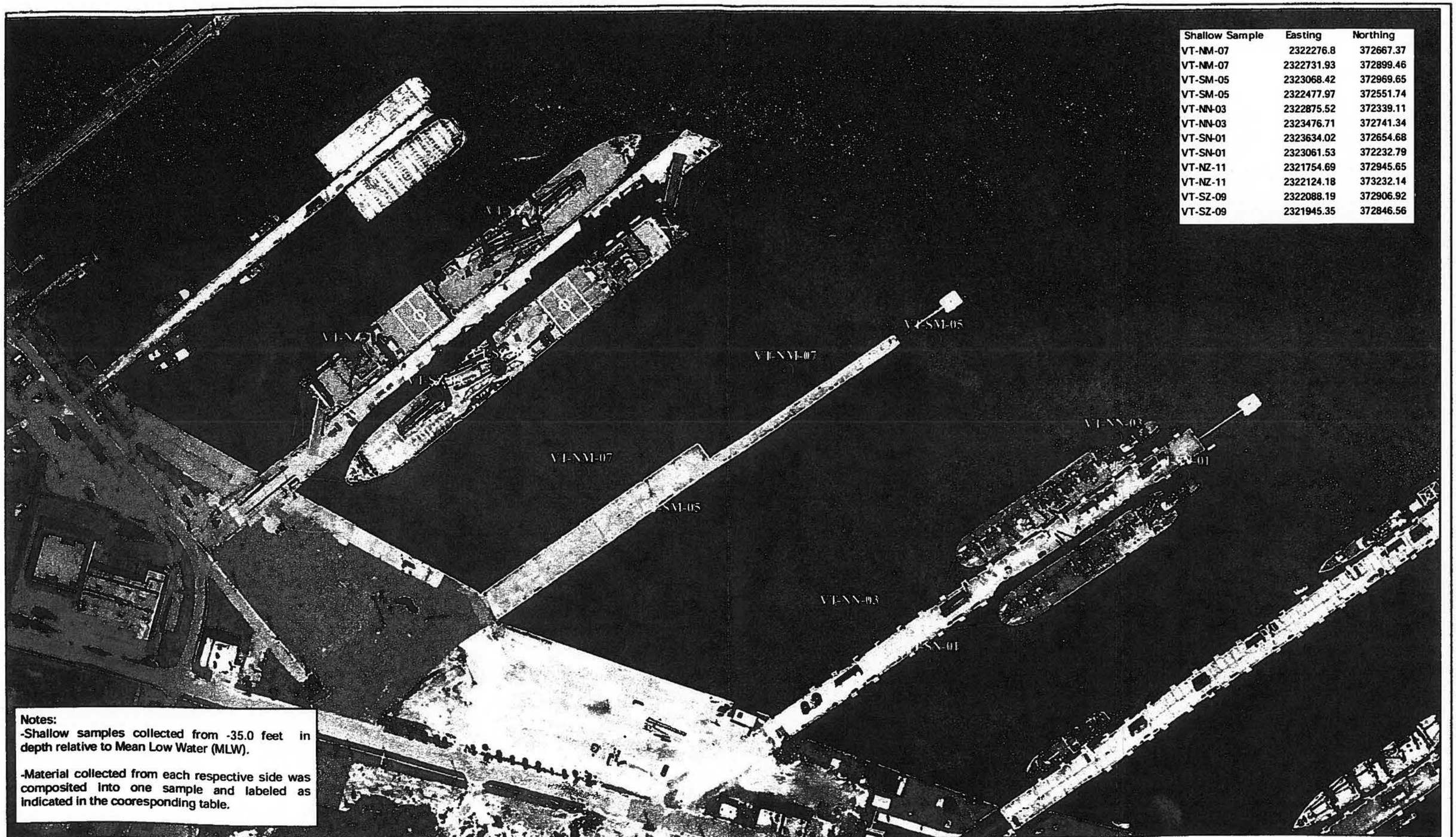
Name	Latitude	Longitude
VT-N-1	32.851983	-79.948731
VT-N-2	32.853074	-79.946761
VT-N-3	32.852828	-79.946252
VT-N-4	32.851684	-79.948128
VT-M-1	32.852902	-79.950667
VT-M-2	32.853907	-79.948524
VT-M-3	32.853706	-79.948086
VT-M-4	32.852577	-79.950019
VT-Z-1	32.853684	-79.95236
VT-Z-2	32.854877	-79.950556
VT-Z-3	32.854578	-79.949933
VT-Z-4	32.853402	-79.951742

0 150 300 600 Feet

Legend

Veterans_Terminal_Proposed_Sample_Locations

PM: JAR	Project No. EN117019	Terracon	Sample Station Identification Map
Drawn By: JAR	Scale: As Shown	1460 Fifth Street West N.Charleston, SC 29405	Veterans Terminal North Charleston, SC
Checked By: WSA	File Path:	Phone: 843.884.1234 Fax: 843.884.9234	Charleston, County South Carolina
Checked By: WSA	Date: 6/25/11		FIGURE NO. 2



Shallow Sample	Easting	Northing
VT-NM-07	2322276.8	372667.37
VT-NM-07	2322731.93	372899.46
VT-SM-05	2323068.42	372969.65
VT-SM-05	2322477.97	372551.74
VT-NN-03	2322875.52	372339.11
VT-NN-03	2323476.71	372741.34
VT-SN-01	2323634.02	372654.68
VT-SN-01	2323061.53	372232.79
VT-NZ-11	2321754.69	372945.65
VT-NZ-11	2322124.18	373232.14
VT-SZ-09	2322088.19	372906.92
VT-SZ-09	2321945.35	372846.56

Notes:
-Shallow samples collected from -35.0 feet in depth relative to Mean Low Water (MLW).

-Material collected from each respective side was composited into one sample and labeled as indicated in the cooresponding table.

0 100 200 400 Feet

1 inch = 200 feet

Legend

● Veterans Terminal Sample Locations

PM: JAR	Project No. EN117019	Terracon	Sample Location Map
Drawn By: JAR	Scale: As Shown		SCSPA Sediment Sampling Investigation VeteransTerminal North Charleston, SC
Checked By: TGB	File Path:	1450 Fifth Street West N.Charleston, SC 29405	FIGURE NO. 3
Checked By: TGB	Date: 5/25/11	Phone: 843.884.1234 Fax: 843.884.9234	Charleston, County South Carolina

Final Report

Evaluation of Dredged Material, USCG Tradd Street and Pier Papa, Charleston, South Carolina

Contract No. W912EP-09-D-0013

Prepared for

U.S. Army Corps of Engineers

Charleston District
69A Hagood Avenue
Charleston, South Carolina 29403-5107

Wilmington District
69 Darlington Avenue
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(ANAMAR Project No. 11-0005)

November 2011

EXECUTIVE SUMMARY

This report details the field sampling, analysis, and results for the U.S. Coast Guard (USCG) Tradd Street Pier and Pier Papa sediment evaluations. The field sampling effort for this project consisted of sediment and water sampling in the vicinity of the piers and took place July 19 and 20, 2011.

To help with review and ease of finding information, this report is organized into main sections and subsections, figures, data tables, and appendices. Section 1.0 provides an introduction to the project, including the purpose and background, an overview of dredge material evaluation, and objectives. Section 2.0 describes the methods and materials for the field sampling effort, sample processing and custody, sediment testing procedures, and data reduction. Section 3.0 summarizes the field data; physical testing data; and sediment, elutriate, and site water chemistry data. Section 4.0 discusses the quality assurance review, including deviations from the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP), data quality objectives, non-conformance issues, and corrective actions.

To facilitate data interpretation, raw field and laboratory data are summarized and compiled into tables. Analytical results are compared to applicable published screening values for reference.

Sampling Approach

Each USCG pier area has been divided into two dredging units (DUs): The Tradd Street Pier DUs are designated T1 and T2, and the Pier Papa DUs are designated P1 and P2. The Tradd Street Pier DUs had two sampling stations each and the Pier Papa DUs had three sampling locations each. These locations were selected by USACE based on review of bathymetry and historical dredging information. These sampling stations are positioned to best represent dredge material that will be taken to the confined disposal area. Two sets of analyses were conducted for each DU. Each subsample was analyzed individually for physical parameters. The subsamples from each DU were then composited into one sample for analysis of physical and chemical parameters.

Sediment sampling was accomplished using a vibratory type core sampler. Pier Papa samples were collected to the project depth, which is -32 feet mean lower low water (MLLW) plus 2 feet overdepth (-34 feet allowable). Samples were collected at two project depths at Tradd Street Pier: the inshore side of the pier to -15 feet MLLW plus 2 feet overdepth (-17 feet allowable), and the offshore or outside side of the pier to -25 feet plus 2 feet overdepth (-27 feet allowable).

Sediment Physical Results (Tables 2-4)

Tradd Street Pier

Overall, sediments were described as dark gray sandy silt. For composited samples, gravel ranged from 0.0% to 1.9%, sand ranged from 10.6% to 26.4%, and silt/clay ranged from 71.7% to 89.4%. Total solids ranged from 32.5% to 43.7% and moisture ranged from 56.3% to 67.5%. The samples are of very high plasticity with plasticity indexes (PIs) ranging from 76 to 91. Final concentrations for settling rates were similar 418.4 to 458.7 g/L.

1 INTRODUCTION

U.S. Coast Guard (USCG) Pier Papa is on the Cooper River on the former Charleston Naval Complex in North Charleston, South Carolina. Tradd Street Pier is associated with the USCG Sector Charleston and is located at the western terminus of Tradd Street, Charleston, South Carolina, on the Ashley River. Both of these facilities have been dredged under Department of the Army authorizations, but those are now expired. Maintenance dredging is proposed to provide adequate navigable depths and berthing areas. Sampling and testing of dredge material were conducted to determine if the proposed dredge materials are acceptable for placement at a confined disposal facility (CDF). This report describes the sampling, analysis, and results of this effort.

Pier Papa and Tradd Street Pier are located near Charleston Harbor, a natural tidal estuary covering an area of approximately 14 square miles and formed by the confluence of the Ashley, Cooper, and Wando rivers (Figure 1). The existing 45-foot federal navigational channel extends from the 47-foot ocean contour through the jetties to the North Charleston Terminal on the Cooper River, a distance of 26.97 miles. An additional 2.08-mile, 45-foot channel extends up the Wando River to the Wando Welch Terminal belonging to South Carolina State Ports Authority. The existing federal channel varies in width from 400 feet in Town Creek and Wando River to 1000 feet in the entrance channel at the Fort Sumter Range. Charleston Harbor also includes Shipyard River. Shipyard River provides an entrance channel 300 feet wide and 45 feet deep from deep water in the Cooper River to Basin A, and then a 200-foot-wide by 30-foot-deep channel to Basin B. Basin A and Basin B are 45 and 30 feet deep, respectively. The mean range of tide at Shipyard Creek, 0.8 miles above the entrance, is 5.3 feet above mean low water, and the spring tide is 6.1 feet above mean low water.

Pier Papa supports the USCG Vessel Support Facility, which provides port engineering and maintenance support to 25 cutters in three states, manages deep-water mooring for two 378-foot cutters, a 225-foot buoy tender, and two major National Oceanic and Atmospheric Administration (NOAA) vessels. The activity involves wharfs used in support of navigation; the principal mission of the subject USCG facilities is to support USCG Maritime Safety and Security Teams. Tradd Street Pier provides mooring for USCG vessels and water access for USCG Sector Charleston.

1.1 Project Purpose, Description, and Permitting

The purpose of the proposed dredging is to maintain adequate depths to ensure safe and efficient use and navigation at port facility berths in support of the USCG mission of national maritime security and safety. The dredging area at Pier Papa encompasses approximately 15 acres of estuarine river bottoms at Pier Papa and approximately 2.5 acres of estuarine river bottoms at Tradd Street Pier. Dredged material will be placed at a CDF.

The project depth at Pier Papa is -32 feet mean lower low water (MLLW) required plus 2 feet overdredge (-34 feet allowable) with 4:1 side slopes. Two dredging depths occur for Tradd Street Pier: the inshore side of the pier is dredged to -15 feet MLLW required plus 2 feet overdredge (-17 feet allowable), and the offshore or outside side of the pier is dredged to -25 feet required plus 2 feet overdredge (-27 feet allowable). Side slopes of 2:1 are also allowable.

The planned maintenance dredging for Pier Papa and Tradd Street Pier will be performed using hydraulic pipeline dredges. Both facilities are somewhat protected from severe open-water conditions. The sediment in both areas is expected to be predominately fine-grained material. With soft sediments, a fair degree of accuracy in dredging depth can be expected.

A recent bathymetric survey at Pier Papa was not available prior to field sampling. The sample vessel depth sonar was used to verify that sample locations represented conditions where maintenance dredging would be required. The sampling team encountered bottom elevations ranging from -6.77 to -23.8 feet MLLW in the -32 foot project area. Annual maintenance is required in this area. Previous sediment studies indicate that the area around Pier Papa shoals at a rate of approximately 10 to 12 inches per month.

An August 2010 USACE survey of the Tradd Street Pier area indicates that MLLW depths range from -11 feet to -31 feet MLLW in the -25-foot portion of the pier basin and from -6 feet to -11 feet in the -15-foot portion of the pier basin. The shoaling rate for Tradd Street Pier area is not known.

Maintenance dredging at both sites is performed under Department of Army, Section 404 of the Clean Water Act of 1972 (as amended) and Section 10 of the Rivers and Harbors Act of 1899. Section 404 establishes a program to regulate the discharge of dredge or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act regulates the creation of potential obstructions including excavation and fill into waters of the United States. These facilities were previously permitted and maintained.

1.2 Evaluation of Dredged Material for Disposal

The estimated annual maintenance dredging volume for Pier Papa is approximately 350,000 cubic yards of predominately fine-grained sediment, and the estimated annual maintenance dredging volume of Tradd Street Pier is 15,000 cubic yards. These estimates are based on surveys or historic dredging volumes and include portions of the allowable overdepth of 2 feet. The estimated dredging volumes are summarized in the table below.

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TABLE 5B

Results of Dry Weight Metals, Total Petroleum Hydrocarbons, TOC, and Organotin Analyses for Sediment Samples

Analyte	SAMPLE ID:			USCGPP11-1				USCGPP11-2			
	Maximum Detected Conc. (mg/kg)	TEL[1] (mg/kg)	ERL[2] (mg/kg)	Result mg/kg	Qualifier	MDL	MRL[3]	Result mg/kg	Qualifier	MDL	MRL[3]
Antimony	1.62	x	x	1.41	J	1.06	3.2	1.62	J	1.06	3.2
Arsenic	**21.5**	7.24	8.2	**21.5**	--	1.8	10.8	**17.2**	--	1.61	9.68
Beryllium	1.07	x	x	1.07	J	0.36	1.8	0.919	J	0.323	1.61
Cadmium	ND	0.676	1.2	ND	U	0.36	1.8	ND	U	0.323	1.61
Chromium	44.3	52.3	81	44.3	--	0.54	1.8	39.3	--	0.484	1.61
Copper	**23.3**	18.7	34	**23.3**	--	1.08	3.6	**21.6**	--	0.968	3.23
Lead	20.9	30.24	46.7	20.9	--	1.19	3.6	18	--	1.06	3.23
Mercury	0.0354	0.13	0.15	0.0354	J	0.0134	0.0393	0.0341	J	0.0133	0.039
Nickel	12.1	15.9	20.9	12.1	--	0.54	1.8	10.8	--	0.484	1.61
Selenium	3.29	x	x	3.29	J	1.8	10.8	1.91	J	1.61	9.68
Silver	ND	0.73	1	ND	U	0.36	1.8	ND	U	0.323	1.61
Thallium	ND	x	x	ND	U	1.8	7.21	ND	U	1.61	6.45
Zinc	77.1	124	150	77.1	--	1.44	3.6	71.9	--	1.29	3.23

Analyte	SAMPLE ID:			USCGPP11-1				USCGPP11-2			
	Maximum Detected Conc.	TEL[1]	ERL[2]	Result	Qualifier	MDL	MRL[3]	Result	Qualifier	MDL	MRL[3]
Total Petroleum Hydrocarbons (mg/kg)	2350	x	x	2350	--	--	370	2230	--	--	380
Total Organic Carbon (mg/kg)	60600	x	x	53900	--	710	2130	60600	--	854	2560
n-butyltin Cation (µg/kg)	1.3	x	x	1.3	J	0.97	3.7	ND	U	0.98	3.8
Di-n-butyltin Cation (µg/kg)	2.1	x	x	2.1	J	0.71	3.7	1.9	JP	0.72	3.8
Tri-n-butyltin Cation (µg/kg)	5.8	x	x	5.8	--	1.6	3.7	3.9	--	1.7	3.8
Total Organotins as Tin (µg/kg)	4.3	x	x	4.3				3.2			

[1] TEL = Threshold Effects Level, see Section 1.2 for definition.

[2] ERL = Effects Range-Low, see Section 1.2 for definition.

[3] MRL is assigned by CAS to a fixed factor above the MDL depending on the analyte, unless otherwise specified. MRL is assigned by GEL as the practical quantitation limit.

-- = No qualifier needed.

J = The result is an estimated value that was detected outside the quantitation range (metals).

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL (butyltins).

U = The parameter was analyzed for but was not detected (ND) at or above the MDL.

P = The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.

x = No TEL or ERL published for parameter.

Bolded values = Result greater than or equal to the TEL and/or ERL.

Source: Columbia Analytical Services, Inc. and GEL Laboratories, Inc.

Compiled by: ANAMAR Environmental Consulting, Inc.

ANAMAR Environmental Consulting, Inc.

TABLE 6B

Results of Dry Weight PAH Analyses for Sediment Samples

Analyte	SAMPLE ID:			USCGPP11-1				USCGPP11-2			
	Maximum Detected Conc. (µg/kg)	TEL[1] (µg/kg)	ERL[2] (µg/kg)	Result µg/kg	Qualifier	MDL	MRL[3]	Result µg/kg	Qualifier	MDL	MRL[3]
1-Methylnaphthalene*	ND	x	x	ND	U	17.9	59.8	ND	U	18.9	63.2
2-Methylnaphthalene*	ND	20.2	70	ND	U	17.9	59.8	ND	U	18.9	63.2
Acenaphthene*	ND	6.71	16	ND	U	17.9	59.8	ND	U	18.9	63.2
Acenaphthylene	ND	5.87	44	ND	U	5.98	59.8	ND	U	6.32	63.2
Anthracene*	ND	46.9	85.3	ND	U	17.9	59.8	ND	U	18.9	63.2
Benzo(a)anthracene**	44.1	74.8	261	23.1	--	1.91	5.98	44.1	--	2.02	6.32
Benzo(a)pyrene**	39.3	88.8	430	19.0	X	1.91	5.98	39.3	--	2.02	6.32
Benzo(b)fluoranthene	73.2	x	x	37.3	PX	1.91	5.98	73.2	P	2.02	6.32
Benzo(g,h,i)perylene	18.5	x	x	9.95	PX	1.91	5.98	18.5	P	2.02	6.32
Benzo(k)fluoranthene	21.7	x	x	ND	U	0.957	2.99	21.7	X	1.01	3.16
Chrysene**	51.2	108	384	25.5	--	1.91	5.98	51.2	--	2.02	6.32
Dibenzo(a,h)anthracene**	ND	6.22	63.4	ND	U	1.91	5.98	ND	U	2.02	6.32
Fluoranthene**	27.9	113	600	18.7	--	1.91	5.98	27.9	--	2.02	6.32
Fluorene*	ND	21.2	19	ND	U	12.0	59.8	ND	U	12.6	63.2
Indeno(1,2,3-cd)pyrene	ND	x	x	ND	U	1.91	5.98	ND	U	2.02	6.32
Naphthalene*	ND	34.6	160	ND	U	17.9	59.8	ND	U	18.9	63.2
Phenanthrene*	9.59	86.7	240	ND	UX	5.98	59.8	9.59	J	6.32	63.2
Pyrene**	29.1	153	665	20.6	--	1.91	5.98	29.1	--	2.02	6.32
Total LMW PAHS	116.7	312	552	97.4				116.7			
Total HMW PAHs	193.6	655	1700	108.8				193.6			
Total PAHs	432.1	1684	4022	272.4				432.1			

[1] TEL = Threshold Effects Level, see Section 1.2 for definition.

[2] ERL = Effects Range-Low, see Section 1.2 for definition.

[3] MRL is assigned by GEL to be equal to their practical quantification limit.

* Low molecular weight (LMW) PAHs (NOAA 1989)

** High molecular weight (HMW) PAHs (NOAA 1989)

P = The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, difference is also <70%.

U = The parameter was analyzed for but was not detected (ND) at or above the MDL.

X = Retention time shift resulting re-analysis of samples, see Section 4 for more details.

-- = No qualifier needed.

x = No TEL/ERL published for parameter

Source: GEL Laboratories, Inc.

Compiled by: ANAMAR Environmental Consulting, Inc.

TABLE 7B

Results of Dry Weight Pesticide Analyses for Sediment Samples

ANAMAR Environmental Consulting, Inc.

Analyte	Maximum Detected Conc. (µg/kg)	TEL[1] (µg/kg)	ERL[2] (µg/kg)	SAMPLE ID: USCGPP11-1 Result µg/kg	Qualifier	MDL	MRL[3]	USCGPP11-2 Result µg/kg	Qualifier	MDL	MRL[3]
2,4-DDD	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
2,4-DDE	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
2,4-DDT	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
4,4'-DDD	ND	1.22	2	ND	U	12.0	47.9	ND	U	12.7	50.7
4,4'-DDE	ND	2.07	2.2	ND	U	12.0	47.9	ND	U	12.7	50.7
4,4'-DDT	ND	1.19	1	ND	U	12.0	47.9	ND	U	12.7	50.7
Aldrin	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
alpha-BHC	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
alpha-Chlordane	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
beta-BHC	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Chlordane (tech.)	ND	2.26	0.5	ND	U	59.9	300	ND	U	63.3	317
cis-Nonachlor	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
delta-BHC	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Dieldrin	ND	0.72	0.02	ND	U	12.0	47.9	ND	U	12.7	50.7
Endosulfan I	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Endosulfan II	ND	x	x	ND	U	12.0	47.9	ND	U	12.7	50.7
Endrin	ND	x	x	ND	U	12.0	47.9	ND	U	12.7	50.7
Endrin aldehyde	ND	x	x	ND	U	12.0	47.9	ND	U	12.7	50.7
Endrin ketone	ND	x	x	ND	U	12.0	47.9	ND	U	12.7	50.7
gamma-BHC (Lindane)	ND	0.32	x	ND	U	5.99	24.0	ND	U	6.33	25.3
gamma-Chlordane	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Heptachlor	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Heptachlor epoxide	ND	x	x	ND	U	7.49	24.0	ND	U	7.92	25.3
Methoxychlor	ND	x	x	ND	U	59.9	240	ND	U	63.3	253
Mirex	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
O-Chlordane	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Toxaphene	ND	0.1	x	ND	U	200	599	ND	U	211	633
trans-Nonachlor	ND	x	x	ND	U	5.99	24.0	ND	U	6.33	25.3
Total Pesticides	548	x	x	519				548			

[1] TEL = Threshold Effects Level, see Section 1.2 for definition.
[2] ERL = Effects Range-Low, see Section 1.2 for definition.
[3] MRL is assigned by GEL to be the practical quantitation limit.
U = The parameter was analyzed for but was not detected (ND) at or above the MDL.
x = No TEL/ERL published for parameter

Source: GEL Laboratories, Inc.
Compiled by: ANAMAR Environmental Consulting, Inc.

ANAMAR Environmental Consulting, Inc.

TABLE 8B

Results for Dry Weight PCB Analyses for Sediment Samples

Analyte	Maximum Detected Conc. (µg/kg)	TEL[1] (µg/kg)	ERL[2] (µg/kg)	SAMPLE ID: USCGPP11-1 Result µg/kg	Qualifier	MDL	MRL[3]	USCGPP11-2 Result µg/kg	Qualifier	MDL	MRL[3]
PCB 8*	ND	x	x	ND	U	0.40	0.94	ND	U	0.41	0.96
PCB 18*	ND	x	x	ND	U	0.18	0.94	ND	U	0.19	0.96
PCB 28*	ND	x	x	ND	U	0.12	0.94	ND	U	0.13	0.96
PCB 44*	ND	x	x	ND	U	0.13	0.94	ND	U	0.13	0.96
PCB 49	ND	x	x	ND	U	0.11	0.94	ND	U	0.12	0.96
PCB 52*	ND	x	x	ND	U	0.12	0.94	ND	U	0.12	0.96
PCB 66*	ND	x	x	ND	U	0.066	0.94	ND	U	0.067	0.96
PCB 77	ND	x	x	ND	U	0.088	0.94	ND	U	0.090	0.96
PCB 87	ND	x	x	ND	U	0.072	0.94	ND	U	0.073	0.96
PCB 101*	ND	x	x	ND	U	0.092	0.94	ND	U	0.094	0.96
PCB 105*	ND	x	x	ND	U	0.062	0.94	ND	U	0.064	0.96
PCB 118*	ND	x	x	ND	U	0.059	0.94	ND	U	0.060	0.96
PCB 126	ND	x	x	ND	U	0.081	0.94	ND	U	0.083	0.96
PCB 128*	ND	x	x	ND	U	0.059	0.94	ND	U	0.060	0.96
PCB 138*	ND	x	x	ND	U	0.12	0.94	ND	U	0.13	0.96
PCB 153*	ND	x	x	ND	U	0.072	0.94	ND	U	0.073	0.96
PCB 156	ND	x	x	ND	U	0.079	0.94	ND	U	0.081	0.96
PCB 169	ND	x	x	ND	U	0.077	0.94	ND	U	0.079	0.96
PCB 170*	ND	x	x	ND	U	0.049	0.94	ND	U	0.050	0.96
PCB 180*	ND	x	x	ND	U	0.18	0.94	ND	U	0.19	0.96
PCB 183	ND	x	x	ND	U	0.16	0.94	ND	U	0.16	0.96
PCB 184	ND	x	x	ND	U	0.098	0.94	ND	U	0.10	0.96
PCB 187*	ND	x	x	ND	U	0.088	0.94	ND	U	0.090	0.96
PCB 195*	ND	x	x	ND	U	0.059	0.94	ND	U	0.060	0.96
PCB 206*	ND	x	x	ND	U	0.059	0.94	ND	U	0.060	0.96
PCB 209*	ND	x	x	ND	U	0.077	0.94	ND	U	0.079	0.96
Total EPA Region 4 PCBs[4]	--	21.6	22.7	2.76	--	--	--	2.84	--	--	--
Total NOAA PCBs[4]	--	21.6	22.7	3.98	--	--	--	4.11	--	--	--

[1] TEL = Threshold Effects Level, see Section 1.2 for definition.

[2] ERL = Effects Range-Low, see Section 1.2 for definition.

[3] MRL is assigned by CAS to a fixed factor above the MDL depending on the analyte, unless otherwise specified.

[4] Non detect results use the MDL for calculating the Total EPA Region 4 and NOAA PCBs.

* NOAA PCBs; see SERIM Table 5-6 for list.

ND = Not detected at or above the MDL

U = The parameter was analyzed for but was not detected (ND) at or above the MDL.

x = No TEL/ERL published for parameter

Source: Columbia Analytical Services, Inc.

Compiled by: ANAMAR Environmental Consulting, Inc.

TABLE 9B

Results for Dry Weight Aroclor Analyses for Sediment Samples

Analyte	SAMPLE ID:			USCGPP11-1				USCGPP11-2			
	Maximum Detected Conc. (µg/kg)	TEL[1] (µg/kg)	ERL[2] (µg/kg)	Result µg/kg	Qualifier	MDL	MRL[3]	Result µg/kg	Qualifier	MDL	MRL[3]
Aroclor-1016	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1221	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1232	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1242	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1248	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1254	ND	63.3	x	ND	U	7.90	23.7	ND	U	8.34	25.1
Aroclor-1260	ND	x	x	ND	U	7.90	23.7	ND	U	8.34	25.1

[1] TEL = Threshold Effects Level, see Section 1.2 for definition.

[2] ERL = Effects Range-Low, see Section 1.2 for definition.

[3] MRL is assigned by GEL to be the practical quantitation limit.

ND = Not detected at or above the MDL

U = The parameter was analyzed for but was not detected (ND) at or above the MDL.

x = No TEL/ERL published for parameter

Source: GEL Laboratories, Inc.

Compiled by: ANAMAR Environmental Consulting, Inc.

APPENDIX R

AOC 695 HUMAN HEALTH RISK ASSESSMENT AND ECOLOGICAL RISK ASSESSMENT

APPENDIX R.1

ECOLOGICAL RISK ASSESSMENT

R1.0 ECOLOGICAL RISK ASSESSMENT AOC 695

R1.1 INTRODUCTION

An ecological risk assessment (ERA) was conducted to evaluate the potential risks to ecological receptors at Area of Concern (AOC) 695. The ERA was conducted following U.S Environmental Protection Agency (USEPA) and Department of Navy (Navy) guidance (USEPA, 1997c; 2001a; Navy, 1999), and consisted of Steps 1 and 2 and the initial portion of Step 3 of the eight-step ecological risk assessment process described by USEPA (1997c). The initial portion of Step 3 (hereinafter referred to as Step 3A) equates to the initial portion of Tier 2 of the Navy's three-tier ecological risk assessment process.

Steps 1-3A consists of the following:

Step 1	Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2	Screening-Level Exposure Estimate and Risk Calculation
Step 3A	Refinement of Preliminary Contaminants of Concern

CNC has been divided into 12 investigative zones for management purposes and to facilitate Resource Conservation and Recovery Act (RCRA) corrective action processes. These are designated as Zones A through L. Zone K consists of five noncontiguous CNC properties, one of which is Clouter Island. Zone K is located in the southwestern portion of Clouter Island (Figure R-1). Clouter Island is undeveloped and has historically been used for disposition of harbor and river dredging spoils. Clouter Island is the site of a former fuse and primer house (Area of Concern [AOC] 693), a former ammunitions depot (AOC 694), and a former electric locomotive shed (AOC 695).

The Navy submitted a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) report entitled *Zone K RCRA Facility Investigation Report* to the South Carolina Department of Health and Environmental Control (SCDHEC) in 1999 (EnSafe, 1999). The 1999 RFI report evaluated data collected at AOCs 693, 694, and 695 (Figure R-2). Additional soil and groundwater samples were subsequently collected at AOCs 693 and 694, and the *Zone K Clouter Island RFI Report Addendum* (EnSafe, 2002) was submitted to SCDHEC in 2002. The 2002 report focused on AOCs 693 and 694, and did not address AOC 695.

The EnSafe (1999) report included a brief evaluation of sediment data collected in July 1997 from two sample locations at AOC 695, but did not include an ERA or a human health risk assessment (HHRA). Instead, the EnSafe (1999) report stated that evaluations of AOC 695 sediment data relative to human health and ecological risk “will be addressed as part of the Zone J RFI”.

As explained in Section 1.3.3 of the Zone J RFI report to which this ERA is appended, sediment data were collected at Zone J from 1997 through 2008 during several investigations. Those investigations indicated that the potential for significant risk existed at five areas within Zone J at which elevated sediment contaminant concentrations and CNC source linkages existed. The five areas consisted of three locations in the Cooper River, one location in Shipyard Creek and one location in Noisette Creek. The Zone J RFI report is focused on sediment data collected from those five areas, and the sediment data from AOC 695 in Zone K were evaluated separately. This appendix contains an ERA and a HHRA of the AOC 695 sediment data.

R.1.2 SCREENING LEVEL PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

AOC 695 consists of the former location of Building 119, an electric locomotive shed that operated from approximately 1922 until 1925. Building 119 was located on a spur of the rail line at the shoreline of the Cooper River, alongside a railroad trestle that extended over the river. Building 119, the trestle, the spur, and rail line no longer exist; it is unknown when these structures were demolished and/or removed. The shoreline has receded, and according to the 1999 RFI, "the only remnant of this AOC is a partially submerged cement foundation approximately 50 feet offshore" (EnSafe, 1999; page 8.9). Elsewhere in the 1999 RFI, AOC 695 is described as being "50 to 100 feet offshore" (EnSafe, 1999; page 10.7.1).

A comparison of the location of AOC 695 in Figure R-2 to Google Earth satellite imagery indicates that AOC 695 is located in open water, with no marsh habitat in the vicinity. As stated in Section 7.1.1 of the Zone J RFI, this portion of the Cooper River experiences a twice-daily tidal ebb and flow, which mix salt water and fresh water and transport sediments and contaminants within the estuary. The salinity in the Cooper River varies depending on rainfall and tidal conditions, but the average daily mean salinity in the Cooper River at CNC is about 11 parts per thousand (ppt) at the surface and 14 ppt at the river bottom (ECT, 2003). See Section 7.1.1 of the Zone J RFI for a list of fish species that are found in the lower Cooper River. The Navy is not aware of the river depth at AOC 695, nor of the quality of the substrate in the area.

The contaminant sources at AOC 695 are wastes associated with the former electric locomotive shed. The EnSafe (1999) RFI states (page 10.7.1) that waste materials associated with AOC 695 are solvents and degreasers; no explanation or further discussion of contaminants potentially associated with the electric locomotive shed is presented in the report.

Disturbance and movement of sediment is probably the only significant contaminant migration pathway at AOC 695. Specifically, storms and currents could uncover buried wastes that might exist at the site. Conversely, storms and currents could deposit sediment and re-bury wastes that were previously uncovered at the site. Any waste material remaining at AOC 695 would be either at the sediment-surface water interface or buried beneath sediment. Contaminants on the sediment surface could disperse into the water column. Benthic organisms (i.e., invertebrate organisms that live on or in sediment) and aquatic organisms in the Cooper River could be exposed to sediment and surface water contaminants through ingestion and direct contact. Higher-trophic-level animals such as piscivorous birds and mammals that forage in the vicinity of AOC 695 could be exposed to sediment and surface water contaminants through direct contact with surface water and sediment, incidental ingestion of surface water and sediment, and consumption of contaminated food items. Some animals could also come into contact with contaminants in surface water through drinking, although this exposure route represents a negligible portion of total exposure for most receptors (Sample et al., 1996). With the above circumstances in mind, complete exposure pathways and routes of entry into biota at AOC 695 consist of direct contact with sediment and surface water, ingestion of sediment and surface water, and ingestion of contaminated food items.

Although surface water represents a potentially complete exposure pathway, evaluations of surface water samples collected at Zone J (across the river from Zone K and AOC 695) have indicated that surface water concentrations in the Cooper River at CNC are similar to surface water concentrations throughout the harbor (see Section 4 of the Zone J RFI). Thus, ecological risks from surface water contaminants associated with AOC 695 are probably negligible.

One of the tasks in preliminary problem formulation is the selection of preliminary assessment and measurement endpoints. An assessment endpoint is “an explicit expression of the environmental value that is to be protected,” while a measurement endpoint is “a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint” (USEPA, 1997c). Measurement endpoints represent the assessment endpoints chosen for a site, and are measures of biological effects (USEPA, 1997c).

USEPA Region 4 has specified that assessment endpoints for the screening-level assessment should be broad and generic. For the AOC 695 screening level assessment, the preliminary assessment endpoint is the protection of benthic biota and piscivorous wildlife from adverse effects of chemicals on their growth, survival, and reproduction. The term “piscivorous” is used here in a broad sense to describe birds and mammals that prey upon not only fish, but on a variety of shellfish (e.g., clams, crabs, and shrimp). The preliminary measurement endpoints are

chemical concentrations in sediment that are associated with no adverse effects on growth, survival, and reproduction of benthic organisms. The measurement endpoints are represented by USEPA Region 4 ecological screening values (ESVs) for sediment. The sediment ESVs are based on conservative endpoints and sensitive ecological effects data, and thus, the screening values represent chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. For this reason, USEPA Region 4 considers its sediment screening values to be protective of benthic invertebrates as well as upper level receptors such as birds and mammals. In the screening level ecological risk assessment, therefore, a distinction is not made between measurement endpoints associated with direct toxicity to benthic invertebrates versus measurement endpoints associated with food chain effects. Sediment ESVs used in the screening level ecological risk assessment were those established by USEPA Region 4 (USEPA, 2001b).

R1.3 SCREENING LEVEL EXPOSURE ESTIMATE AND RISK CALCULATION

Two sediment samples were collected with a ponar sampler in July 1997 from the vicinity of the cement foundation that is the only remnant of the former locomotive shed (Figure R-2). The samples were collected from the upper six inches of sediment, and were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), chlorinated pesticides, organophosphorus pesticides, polychlorinated biphenyl (PCB) compounds, metals, hexavalent chromium, organotins, cyanide, cation exchange capacity, redox, and total organic carbon. Details regarding sample collection procedures, sample preparation and shipping, and laboratory analyses were presented in the EnSafe (1999) RFI report.

The comparison of site concentrations to background values is usually conducted in Step 3A of the ecological risk assessment process, but the selection of ecological chemicals of potential concern (COPCs) for the AOC 695 evaluation followed the process used for the Zone J ecological risk assessment. Specifically, COPCs were determined by comparing a chemical's maximum detected concentration to its USEPA Region 4 sediment ESV and to its Zone J background value (see Section 7.4.1 of the accompanying Zone J RFI for details regarding the background sediment dataset). If the maximum sediment at AOC 695 was equal to or less than the ESV (i.e., the hazard quotient [HQ] was less than or equal to 1), the chemical was eliminated from further consideration. If the maximum concentration exceeded the ESV (i.e., the HQ was greater than 1), or if an ESV was not available, the chemical was then compared to twice the average background concentration; a chemical with a maximum concentration less than or equal to twice the average background concentration was eliminated from further consideration, and a chemical with a maximum concentration that exceeded twice the average background

concentration was considered to be an ecological COPC and was retained for further evaluation.

Calcium, magnesium, potassium, and sodium were not retained as COPCs. These essential nutrients are tolerated by most organisms even at relatively high concentrations and are not typically considered to be COPCs. There are no USEPA Region 4 ESVs for these nutrients, and there have been no activities at sites near Zone J that have resulted in known releases of high concentrations of these nutrients

No organic compounds were detected in the two AOC 695 sediment samples. Eighteen metals were detected in the two samples, and the results of the "screening-level" comparisons to ESVs and background values for the detected metals are presented in Table R1-1. For brevity, the term "background value" in Table R1-1 and in this assessment refers to twice the average concentration in sediment samples collected from 10 reference locations (see Section 7.4.1 and Table 7-1 of the Zone J RFI). Ten metals were retained as ecological COPCs for AOC 695 (Table R1-1). Concentrations of arsenic, chromium, and nickel exceeded their respective ESVs and background values. Seven other detected metals (aluminum, beryllium, cobalt, iron, manganese, thallium, and vanadium) did not have USEPA Region 4 ESVs and were retained as COPCs due to comparisons with background data (Table R1-1). Appendix E of the EnSafe (1999) RFI provides laboratory analytical data reports for samples collected during the Zone K investigation; the laboratory analytical data for the two sediment samples collected at AOC 695 (695M000101 and 695M000201) are provided herein, and are excerpted from Appendix E of the EnSafe (1999) report. Analytical data validation reports can be found in Appendix F of the EnSafe (1999) report.

R1.4 REFINEMENT OF PRELIMINARY CONTAMINANTS OF POTENTIAL CONCERN

Subsequent to the initial screening, factors such as toxicological evaluation of COPCs and comparisons of COPC concentrations to alternate guidelines were considered to further evaluate COPCs. In addition, COPCs that could potentially bioaccumulate and/or biomagnify were investigated by comparing toxic doses to modeled ingested doses for representative receptors. USEPA (1997c) and the Navy (1999) consider the evaluation of these factors to be part of Step 3 in the 8-step process for conducting ecological risk assessments; the Navy refers to this stage as "Step 3A, Refinement of Contaminants of Potential Concern." The Navy has specified that Step 3A be conducted following all screening-level ecological risk assessments at its bases when COPCs remain after the screening. Thus, although USEPA (1997c) guidance suggests that the results of the screening level risk assessment should be provided to the risk manager at the end of Step 2, the current risk assessment includes the results of Step 3A of the 8-step process.

The approach used in the Step 3A COPC refinement, including descriptions of assessment endpoints, measurement endpoints, and representative receptors is the same as used for the Zone J ecological risk assessments, and is described in Sections 7.5.1 and 7.5.2 of the accompanying RFI. Methods used to model the doses that representative receptors could receive ("food chain modeling"), as well as the selection of toxicity reference values (TRVs), are the same as those used for the Zone J ecological risk assessments, and are described in Appendix Q.

During the years when the locomotive shed was in operation, and for an undetermined period afterward, the site conceptual exposure model for AOC 695 was essentially the same as shown in Figure 7-1 of the Zone J RFI. During that time, contaminants were presumably released onto soil and could have been transported into the Cooper River by overland sheet flow, by any storm water drainage system that might have existed, or by infiltration into groundwater and subsequent seepage into surface water and sediment in the river. It is not known whether any contaminants were released directly into the river when the locomotive shed was in operation. The locomotive shed no longer exists and the shoreline has receded, resulting in the AOC being submerged beneath the Cooper River. Thus, under current conditions, any waste material remaining at the underwater site of AOC 695 would be either at the bottom of the river or buried beneath sediment. As mentioned above, previous evaluations of surface water samples collected at Zone J (across the river from Zone K and AOC 695) have indicated that surface water concentrations in the Cooper River at CNC are similar to surface water concentrations throughout the harbor (see Section 4 of the Zone J RFI). With this in mind, risks to aquatic and benthic receptors at AOC 695 are probably similar to risks throughout Charleston Harbor.

Potential risks to benthic receptors at AOC 695 are discussed in Section R.1.4.1, and potential risks to piscivorous wildlife via the food chain are discussed in Section R.1.4.2.

R1.4.1 Potential Risk to Benthic Organisms

Ten metals were COPCs in sediment (Table R1-1) and are discussed below.

Aluminum

USEPA Region 4 does not have a sediment ESV for aluminum. Screening values for evaluating direct toxicity to marine benthic receptors are sparse for aluminum. Buchman (2008) has reviewed numerous sources and generated *Screening Quick Reference Tables*, which provide a spectrum of screening concentrations for inorganic and organic contaminants in various environmental media. The only marine sediment guideline provided by Buchman (2008) for

aluminum is an apparent effects threshold (AET) of 18,000 mg/kg for marine polychaetes of the genus *Neanthes*. The AET is the concentration of a given chemical above which biological effects are always expected to occur. Aluminum concentrations in both sediment samples at AOC 695 (33,300 mg/kg and 29,900 mg/kg) exceeded the AET, indicating potential risk to benthic receptors. Aluminum concentrations in both samples also exceeded the 21,440 mg/kg background value as well as the 27,000 mg/kg maximum concentration in background samples (see Table 7-1 of Zone J RFI for background concentrations at each of the 10 reference locations).

Arsenic

Arsenic concentrations (17.7 mg/kg and 15.5 mg/kg) exceeded the 12.0 mg/kg background value. The maximum screening HQ was 2.4 (Table R1-1). The 7.24 mg/kg ESV is the threshold effect level (TEL); the probable effects level (PEL) for arsenic is 41.6 mg/kg (MacDonald, 1994). The maximum screening HQ of 2.4 is not particularly high, and the maximum concentration of 17.7 mg/kg is well below the PEL, but since the maximum concentration is between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain.

Beryllium

USEPA Region 4 does not have a sediment ESV for beryllium. Sediment screening values were not provided in Buchman's (2008) *Screening Quick Reference Tables*, and were not located elsewhere. Detected beryllium concentrations in sediment at AOC 695 (1.6 mg/kg and 1.5 mg/kg) slightly exceeded the background sediment value of 1.1 mg/kg (Table R1-1). Interestingly, beryllium was detected in sediment samples collected during 1994 through 1997 at each of the five areas evaluated in the current Zone J RFI (where concentrations ranged from 0.26 mg/kg to 1.9 mg/kg), but beryllium was not detected at any of the same locations in samples collected in April 2008; method detection limits in the 2008 samples ranged from 0.01 to 0.03 mg/kg for beryllium (see tables in Section 4 of the Zone J RFI). It could be that beryllium concentrations throughout the vicinity of CNC have decreased since the 1990s, when samples were collected at AOC 695, but this is only speculation. Regardless of the presence or absence of local or regional trends, the absence of sediment toxicity threshold data prevents an assessment of the beryllium data at AOC 695. However, beryllium concentrations at AOC 695 only slightly exceeded the background sediment value.

Chromium

Hexavalent chromium was not detected in sediment at AOC 695. Total chromium concentrations (57.7 mg/kg and 60.3 mg/kg) slightly exceeded the 52.3 mg/kg ESV, with a maximum HQ of 1.2 (Table R1-1). The ESV is the TEL; the PEL for total chromium is 160 mg/kg (MacDonald, 1994).

Total chromium concentrations in both samples exceeded the 43.5 mg/kg background value, and slightly exceeded the 56 mg/kg maximum background concentration (Table 7-1 of the Zone J RFI). The maximum screening HQ of 1.2 is not particularly high, and the concentrations in both samples were well below the PEL, but since the concentrations are between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain. Nevertheless, the relatively low HQs and similarity to background values suggest that site-related risk posed by chromium is probably not significant.

Cobalt

USEPA Region 4 does not have a sediment ESV for cobalt. The only marine sediment guideline provided by Buchman (2008) for cobalt is an AET of 10 mg/kg for marine *Neanthes* polychaetes. AETs are not meant to be used as screening values, because toxicity might be observed in some samples at values below the AET, which is the concentration above which biological effects are expected to occur. Nevertheless, it should be noted that concentrations of cobalt in both samples were less than the AET. Cobalt concentrations in both samples (7.2 mg/kg and 7.3 mg/kg) only slightly exceeded the 6.4 mg/kg background value, and concentrations in both samples were less than the 8.4 mg/kg maximum background concentration (see Table 7-1 of the Zone J RFI).

Iron

USEPA Region 4 does not have a sediment ESV for iron. The only marine sediment guideline provided by Buchman (2008) for iron is an AET of 220,000 mg/kg for *Neanthes*. AETs are not meant to be used as screening values, but concentrations of iron at AOC 695 (30,000 mg/kg and 32,300 mg/kg) were less than the AET. Iron concentrations in both samples exceeded the 23,600 mg/kg background value, but were less than the 33,000 mg/kg maximum background concentration (see Table 7-1 of the Zone J RFI).

Manganese

USEPA Region 4 does not have a sediment ESV for manganese. The only marine sediment guideline provided by Buchman (2008) for manganese is an AET of 260 mg/kg for *Neanthes* polychaetes. Manganese concentrations at AOC 695 exceeded the AET in one sample (301 mg/kg), and the concentration in the other sample (255 mg/kg) was slightly less than the AET. Manganese concentrations in both samples exceeded the 216 mg/kg background value, as well as the 240 mg/kg maximum concentration in background samples (Table 7-1 of Zone J RFI).

Nickel

Nickel concentrations (17 mg/kg and 17.4 mg/kg) slightly exceeded the 15.9 mg/kg ESV, with a maximum HQ of 1.1 (Table R1-1). The ESV is the TEL; the PEL for nickel is 42.8 mg/kg

(MacDonald, 1994). Nickel concentrations in both samples exceeded the 12.4 mg/kg background value, and slightly exceeded the 15 mg/kg maximum background concentration (see Table 7-1 of the Zone J RFI). The maximum screening HQ of 1.1 is not particularly high, and the concentrations in both samples were well below the PEL, but since the concentrations are between the TEL and the PEL, the occurrence and/or severity of effects to benthic receptors is uncertain. The relatively low HQs and similarity to background values, however, suggest that site-related risk posed by nickel is probably not significant.

Thallium

USEPA Region 4 does not have a sediment ESV for thallium. Sediment screening values were not provided in Buchman's (2008) *Screening Quick Reference Tables*, and were not located elsewhere. Thallium was detected in one sample at AOC 695, with a concentration of 3.3 mg/kg. Thallium was not detected in background samples, but MDLs in background samples ranged from 1.8 to 4.7 mg/kg, so thallium was not elevated relative to MDLs in background samples. The absence of sediment toxicity threshold data prevents an assessment of the thallium data at AOC 695.

Vanadium

USEPA Region 4 does not have a sediment ESV for vanadium. The only marine sediment guideline provided by Buchman (2008) for vanadium is an AET of 57 mg/kg for *Neanthes*. Vanadium concentrations in both samples at AOC 695 (61.4 mg/kg and 66.2 mg/kg) exceeded the AET, indicating potential risk to benthic receptors. Vanadium concentrations in both samples also exceeded the 48.8 mg/kg background value, but only slightly exceeded the 61 mg/kg maximum background concentration.

R1.4.2 Potential Risk to Wildlife via the Food Chain

Whereas Section R1.4.1 discussed potential risk to benthic organisms, this section discusses potential risks to piscivorous wildlife via the food chain. Food-chain modeling was conducted to evaluate potential risks to representative piscivorous receptors from ingested doses of arsenic, chromium, and nickel, which are the COPCs at AOC 695 that are known to bioaccumulate. See Appendix Q for methodology used to evaluate risk via the food chain, and for a description of the conservative and average scenarios used in the evaluation.

Based on maximum detected concentrations and conservative assumptions for body weights and food ingestion, food chain No Observed Adverse Effects Level (NOAEL) HQs for the mink exceeded 1.0 for arsenic, chromium, and nickel, while NOAEL HQs for the green heron exceeded 1.0 for chromium (Table R1-2). Under the same conservative scenario, all Lowest Observed

Adverse Effects Level (LOAEL) HQs were less than 1.0 (Table R1-2). In the average scenario, all food chain HQs were less than 1.0 for the mink and green heron (Table R1-3). The average food chain scenario (Table R1-3) provides a less conservative evaluation of risk compared to the maximum food chain scenario, but it does conservatively assume area use factors of 1.0, meaning the representative receptors are assumed to forage exclusively in the area where samples were collected. Piscivorous birds and mammals forage over large areas and would obtain only a fraction of their food from the area where the two sediment samples were collected. Because the food chain HQs in the conservative scenario are not especially high (ranging from 1.6 to 3.0) and all were less than 1.0 in the average scenario, risks to piscivorous birds and mammals from arsenic, chromium, and nickel are minor.

R.1.5 UNCERTAINTIES

Uncertainty is associated with all aspects of the ecological assessment methodology. Some uncertainties were discussed in Section R.1.4. This section provides a summary of the uncertainties, and focuses on those that have not been previously discussed.

There are several aspects of uncertainty associated with the sediment dataset for AOC 695. First, the dataset consisted of only two samples. Although the collection of only two samples was in accordance with the RFI work plan (Section 10.7.1 of the EnSafe [1999] RFI), such a small dataset results in uncertainty in the characterization of the extent of contamination. This is especially relevant when the precise location of the contaminant source is uncertain, as at AOC 695. Specifically, the only remnant of the former locomotive shed is a partially submerged cement foundation approximately 50 feet from the east bank of the river. An additional uncertainty related to the dataset is that the two sediment samples from AOC 695 were collected in 1997; the extent to which samples collected 14 years ago represent current conditions is unclear. A further uncertainty related to the dataset is that is concentrations of metals detected in the two samples might not be due to operations at the former locomotive shed. The EnSafe (1999] RFI states that waste materials associated with AOC 695 are solvents and degreasers, but no explanation or further discussion of contaminants possibly associated with the electric locomotive shed is presented in the report. Solvents and degreasers were not detected in sediment, but that is no surprise, considering the former locomotive shed apparently has not been operational since 1925. Furthermore, when (or if) Building 119 was demolished and/or removed is uncertain. Finally, detection limits for some non-detected analytes exceeded screening values. For example, detection limits of most PAH compounds were about 820 µg/kg to 890 µg/kg (see laboratory analytical data provided in this appendix), while USEPA Region 4 ESVs for most PAHs are 330 µg/kg.

Uncertainty in risk characterization of sediment contamination at AOC 695 results from the lack of toxicity data regarding the cumulative toxicity of metals. Concentrations of some metals slightly exceeded USEPA Region 4 ESVs, and appear to pose only minor potential risks to benthic receptors when assessed individually, but the extent to which these same concentrations of metals might contribute to cumulative toxicity is uncertain. Hazard indices for metals were not calculated since the toxic mechanisms of metals are complex and it is difficult to ascertain the degree to which metals produce effects by the same toxic mechanism.

There is uncertainty in the likelihood of risk to benthic receptors when contaminant concentrations exceed a particular toxicity threshold (such as a TEL) but are less than a probable effects threshold (such as a PEL). A rough guide for determining the likelihood of risk is to examine whether a concentration slightly exceeds the TEL or greatly exceeds the TEL; obviously, higher concentrations pose more risk than lower concentrations. Nevertheless, is difficult to predict the occurrence and/or severity of effects of concentrations between the TEL and the PEL.

R.1.6 ECOLOGICAL RISK SUMMARY

Sediment concentrations of three metals (arsenic, chromium, and nickel) exceeded their respective USEPA Region 4 ESVs, indicating potential risk to benthic receptors. Screening HQs were not particularly high, with maximum HQs of 2.4 for arsenic, 1.2 for chromium, and 1.1 for nickel. Maximum concentrations of arsenic, chromium, and nickel were well below their respective PEL values. The relatively low HQs and similarity to background values suggest that potential site-related risks posed by arsenic, chromium, and nickel are not significant.

There are no USEPA Region 4 ESVs for aluminum, beryllium, cobalt, iron, manganese, thallium, and vanadium, all of which were detected in sediment at AOC 695. In addition, sediment toxicity thresholds from other sources are sparse for these metals. Concentrations of beryllium, cobalt, iron, thallium, and vanadium were either within the range of background sediment concentrations or only slightly outside the range of background sediment concentrations. Sediment concentrations of aluminum and manganese exceeded their respective AETs and background concentrations.

A notable uncertainty for the AOC 695 evaluation is the source of the sediment COPCs. Solvents and degreasers are the presumed contaminants associated with former locomotive operations at the site, and the presence of metals such as aluminum and manganese, although at higher concentrations than in background samples, might not be due to former activities at the site.

Clouter Island is not industrialized, but much of the Cooper River in the general vicinity of Clouter Island is highly industrialized. Metals detected at AOC 695 could be the result of nearby industrial activities, ship-related activities, or erosion of dredge spoil from Clouter Island. Although sediment concentrations of arsenic, chromium, nickel, aluminum, beryllium, cobalt, iron, manganese, thallium, and vanadium at AOC 695 exceeded their respective background values (defined as twice the average concentrations in 10 reference samples from the Charleston Harbor estuary), the concentrations tended to be within the range of background sediment concentrations or only slightly outside the range of background concentrations. In addition, concentrations of the 10 COPCs at AOC 695 were not especially elevated relative to concentrations at Zone J. Furthermore, concentrations of arsenic, chromium, and nickel were well below their respective PEL values. Overall, ecological risks related to former operations at the site are considered to be negligible or minor at worst.

REFERENCES

Note: Except for references shown below, all references cited in the ecological risk assessment for AOC 695 are the same as those cited in the ecological risk assessment for Zone J, and are included in the References Section of the Zone J RFI.

EnSafe, Inc., 1999. Zone K RCRA Facility Investigation Report. Volumes I through V. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina. June 11.

EnSafe, Inc., 2002. Zone K Clouter Island RFI Report Addendum. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina. September.

TABLE R1-1
ECOLOGICAL CHEMICALS OF POTENTIAL CONCERN
AOC 695 SEDIMENT
ZONE K
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Sample 695000101	Sample 695000201	Background Value(1)	Ecological Screening Value	Hazard Quotient (2)	COPC (Yes/No)	Rationale for COPC Selection (3)
Inorganics (mg/kg)							
ALUMINUM	33300	29900	21440	NA	NA	Yes	ABG
ARSENIC	17.7	15.5	12.0	7.24	2.4	Yes	ASV & ABG
BARIUM	33	30.1	34.6	NA	NA	No	BBG
BERYLLIUM	1.6	1.5	1.1	NA	NA	Yes	ABG
CALCIUM	6000	6770	53260	NA	NA	No	Nutrient
CHROMIUM	60.3	57.7	43.5	52.3	1.2	Yes	ASV & ABG
COBALT	7.3	7.2	6.4	NA	NA	Yes	ABG
COPPER	9.6	9.1	14.9	18.7	0.5	No	BSV
IRON	32300	30000	23600	NA	NA	Yes	ABG
LEAD	14.8	13.9	18.1	30.2	0.5	No	BSV
MAGNESIUM	7750	7280	6426	NA	NA	No	Nutrient
MANGANESE	255	301	216	NA	NA	Yes	ABG
NICKEL	17	17.4	12.4	15.9	1.1	Yes	ASV & ABG
POTASSIUM	4940	4370	3046	NA	NA	No	Nutrient
SODIUM	11600	10100	13880	NA	NA	No	Nutrient
THALLIUM	1.9U	3.3	ND	NA	NA	Yes	ESV & BG NA
VANADIUM	66.2	61.4	48.8	NA	NA	Yes	ABG
ZINC	64.5	53.5	71.5	124	0.5	No	BSV

Footnotes:

NA: Ecological screening value not available.

(1) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.

(2) Hazard quotient = maximum detected concentration ÷ ecological screening value.

(3) COPC rationale codes:

For selection as a COPC:

ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 1).

ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.

ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.

For elimination as a COPC:

BSV: Maximum detected concentration was equal to or less than the ecological screening value.

BBG: Maximum detected concentration was less than the background value.

Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

TABLE R1-2
FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - CONSERVATIVE SCENARIO
AOC 695
ZONE K
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
Inorganics				
Arsenic	1.6	0.4	0.9	0.5
Chromium	1.7	0.1	1.8	0.3
Nickel	3.0	0.4	0.95	0.3

Notes:
Cells are shaded if the HQ is greater than 1.0.
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

TABLE R1-3
FOOD CHAIN MODEL - ECOLOGICAL HAZARD QUOTIENTS
PISCIVOROUS RECEPTORS - AVERAGE SCENARIO
AOC 695
ZONE K
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
Inorganics				
Arsenic	0.2	0.03	0.2	0.1
Chromium	0.2	0.01	0.5	0.1
Nickel	0.2	0.03	0.2	0.1

Notes:
HQ - Ecological Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

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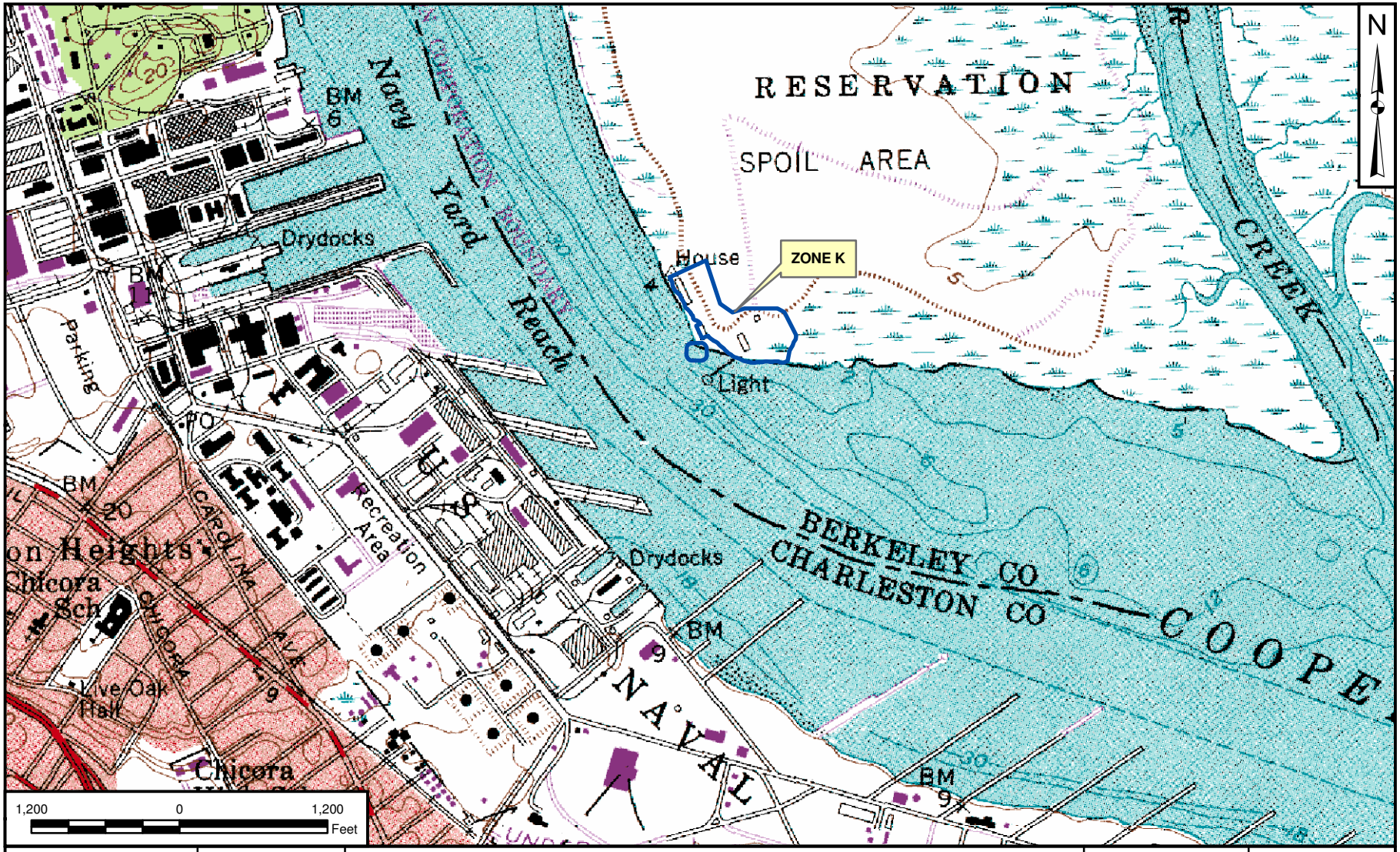

DRAWN BY	DATE
S. PAXTON	11/01/11
CHECKED BY	DATE
M. WHITTEN	11/01/11
REVISED BY	DATE
SCALE	
AS NOTED	

NAVFAC

ZONE K SITE VICINITY MAP
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	CTO 017
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
R - 1	0

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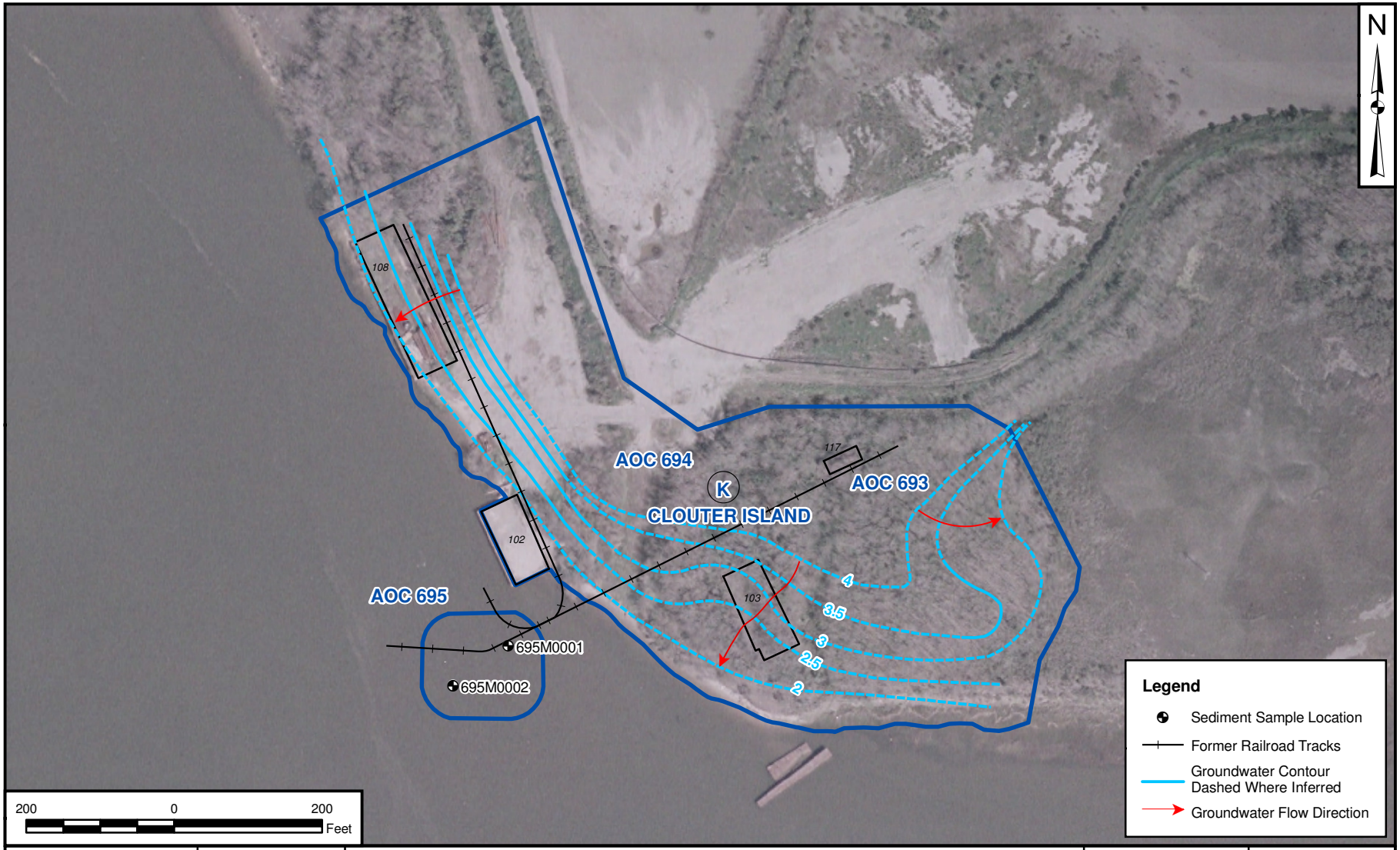

DRAWN BY	DATE
S. PAXTON	11/02/11
CHECKED BY	DATE
M. WHITTEN	11/02/11
REVISED BY	DATE
___	___
SCALE	
AS NOTED	

NAVFAC

ZONE K MAP
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
1284	CTO 017
APPROVED BY	DATE
___	___
APPROVED BY	DATE
___	___
FIGURE NO.	REV
R - 2	0

LABORATORY ANALYTICAL DATA FOR
AOC 695 SEDIMENT SAMPLES -
COPIED FROM APPENDIX E OF ENSAFE (1999)

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

CATION							
	SAMPLE ID ------->	695-M-0001-01	695-M-0002-01				
	ORIGINAL ID ----->	695M000101	695M000201				
	LAB SAMPLE ID --->	7954-02	7954-01				
	ID FROM REPORT -->	695M000101	695M000201				
	SAMPLE DATE ----->	07/22/97	07/22/97				
	DATE ANALYZED --->	08/07/97	08/07/97				
	MATRIX ---------->	Sediment	Sediment				
	UNITS ---------->	ME	ME				
CAS #	Parameter	7954 VAL	7954 VAL				
9999900-04-3	Cation Exchange Capacity	83.4	92.				

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

CYANIDE

	SAMPLE ID ------->	695-N-0001-01		695-N-0002-01			
	ORIGINAL ID ------>	695N000101		695N000201			
	LAB SAMPLE ID --->	7954-02		7954-01			
	TD FROM REPORT -->	695N000101		695N000201			
	SAMPLE DATE ----->	07/22/97		07/22/97			
	DATE EXTRACTED -->	08/12/97		08/12/97			
	DATE ANALYZED --->	08/13/97		08/13/97			
	MATRIX ---------->	Sediment		Sediment			
	UNITS ---------->	MG/KG		MG/KG			
CAS #	Parameter	7954	VAL	7954	VAL		
57-12-5	Cyanide (CN)	0.26	U	0.25	U		

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

HEXACHROME

SAMPLE ID ------->	695-M-0001-01		695-M-0002-01				
ORIGINAL ID ----->	695M000101		695M000201				
LAB SAMPLE ID --->	7954-02		7954-01				
ID FROM REPORT -->	695M000101		695M000201				
SAMPLE DATE ----->	07/22/97		07/22/97				
DATE ANALYZED --->	07/23/97		07/23/97				
MATRIX ---------->	Sediment		Sediment				
UNITS ---------->	MG/KG		MG/KG				
CAS # Parameter	7954	VAL	7954	VAL			
18540-29-9 Chromium (Hexavalent)	2.	U	0.2	U			

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

ORGANOTINS								
	SAMPLE ID ------->	695-M-0001-01		695-M-0002-01				
	ORIGINAL ID ----->	695M000101		695M000201				
	LAB SAMPLE ID --->	970633-02		970633-01				
	ID FROM REPORT -->	695M000101		695M000201				
	SAMPLE DATE ----->	07/22/97		07/22/97				
	DATE EXTRACTED -->	08/05/97		08/05/97				
	DATE ANALYZED --->	08/22/97		08/22/97				
	MATRIX ---------->	Sediment		Sediment				
	UNITS ---------->	UG/L		UG/L				
CAS #	Parameter	7954	VAL	7954	VAL			
683-18-1	Dibutyltin	49.	U	49.	U			
1118-46-3	Monobutyltin	49.	U	49.	U			
1461-25-2	Tetrabutyltin	49.	U	49.	U			
1461-22-9	Tributyltin	49.	U	49.	U			

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

REDOX

SAMPLE ID ------->	695-M-0001-01		695-M-0002-01				
ORIGINAL ID ----->	695M000101		695M000201				
LAB SAMPLE ID --->	7954-02		7954-01				
ID FROM REPORT -->	695M000101		695M000201				
SAMPLE DATE ----->	07/22/97		07/22/97				
DATE ANALYZED --->	07/25/97		07/25/97				
MATRIX ---------->	Sediment		Sediment				
UNITS ---------->	MV		MV				
CAS # Parameter	7954	VAL	7954	VAL			
9999000-78-2 REDOX	157.		232.				

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

SW-VOA

SAMPLE ID ------->	695-N-0001-01		695-N-0002-01				
ORIGINAL ID ----->	695N000101		695N000201				
LAB SAMPLE ID --->	7954-02		7954-01				
ID FROM REPORT -->	695N000101		695N000201				
SAMPLE DATE ----->	07/22/97		07/22/97				
DATE ANALYZED --->	07/25/97		07/25/97				
MATRIX ---------->	Sediment		Sediment				
UNITS ---------->	UG/KG		UG/KG				
CAS # Parameter	7954	VAL	7954	VAL			
74-87-3 Chloromethane	14.	U	12.	U			
75-01-4 Vinyl chloride	14.	U	12.	U			
74-83-9 Bromomethane	14.	U	12.	U			
75-00-3 Chloroethane	14.	U	12.	U			
67-64-1 Acetone	83.	U	60.	U			
75-15-0 Carbon disulfide	14.	U	12.	U			
75-35-4 1,1-Dichloroethene	14.	U	12.	U			
75-09-2 Methylene chloride	14.	U	12.	U			
75-34-3 1,1-Dichloroethane	14.	U	12.	U			
156-59-2 cis-1,2-Dichloroethene	14.	U	12.	U			
156-60-5 trans-1,2-Dichloroethene	14.	U	12.	U			
67-66-3 Chloroform	14.	U	12.	U			
71-55-6 1,1,1-Trichloroethane	14.	U	12.	U			
110-75-8 2-Chloroethyl vinyl ether	14.	U	12.	U			
78-93-3 2-Butanone (MEK)	27.	U	25.	U			
56-23-5 Carbon tetrachloride	14.	U	12.	U			
108-05-4 Vinyl acetate	27.	U	25.	U			
107-06-2 1,2-Dichloroethane	14.	U	12.	U			
71-43-2 Benzene	14.	U	12.	U			
79-01-6 Trichloroethene	14.	U	12.	U			
124-48-1 Dibromochloromethane	14.	U	12.	U			
78-87-5 1,2-Dichloropropane	14.	U	12.	U			
75-27-4 Bromodichloromethane	14.	U	12.	U			
10061-01-5 cis-1,3-Dichloropropene	14.	U	12.	U			
108-88-3 Toluene	14.	U	12.	U			
10061-02-6 trans-1,3-Dichloropropene	14.	U	12.	U			
75-25-2 Bromoform	14.	U	12.	U			
79-00-5 1,1,2-Trichloroethane	14.	U	12.	U			
108-10-1 4-Methyl-2-Pentanone (MIBK)	27.	U	25.	U			
591-78-6 2-Hexanone	27.	U	25.	U			
127-18-4 Tetrachloroethene	14.	U	12.	U			
108-90-7 Chlorobenzene	14.	U	12.	U			
79-34-5 1,1,2,2-Tetrachloroethane	14.	U	12.	U			
100-41-4 Ethylbenzene	14.	U	12.	U			
100-42-5 Styrene	14.	U	12.	U			
1330-20-7 Xylene (Total)	14.	U	12.	U			

*** Validation Complete ***

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

SW846-META

SAMPLE ID -------->	695-N-0001-01		695-N-0002-01					
ORIGINAL ID ----->	695N000101		695N000201					
LAB SAMPLE ID --->	7954-02		7954-01					
ID FROM REPORT -->	695N000101		695N000201					
SAMPLE DATE ----->	07/22/97		07/22/97					
DATE EXTRACTED -->	08/12/97		08/12/97					
DATE ANALYZED --->	08/13/97		08/13/97					
MATRIX ---------->	Sediment		Sediment					
UNITS ---------->	MG/KG		MG/KG					
CAS # Parameter	7954	VAL	7954	VAL				
7429-90-5 Aluminum (Al)	33300.		29900.	J				
7440-36-0 Antimony (Sb)	0.96	U	0.82	UJ				
7440-38-2 Arsenic (As)	17.7		15.5					
7440-39-3 Barium (Ba)	33.	J	30.1	J				
7440-41-7 Beryllium (Be)	1.6	J	1.5	J				
7440-43-9 Cadmium (Cd)	0.25	U	0.16	U				
7440-70-2 Calcium (Ca)	6000.		6770.					
7440-47-3 Chromium (Cr)	60.3		57.7					
7440-48-4 Cobalt (Co)	7.3	J	7.2	J				
7440-50-8 Copper (Cu)	9.6	J	9.1	J				
7439-89-6 Iron (Fe)	32300.		30000.					
7439-92-1 Lead (Pb)	14.8		13.9					
7439-95-4 Magnesium (Mg)	7750.		7280.					
7439-96-5 Manganese (Mn)	255.		301.					
7439-97-6 Mercury (Hg)	0.09	U	0.08	U				
7440-02-0 Nickel (Ni)	17.	J	17.4	J				
7440-09-7 Potassium (K)	4940.	J	4370.	J				
7782-49-2 Selenium (Se)	1.6	U	1.4	U				
7440-22-4 Silver (Ag)	0.67	U	0.66	U				
7440-23-5 Sodium (Na)	11600.		10100.					
7440-28-0 Thallium (Tl)	1.9	U	3.3	J				
7440-62-2 Vanadium (V)	66.2		61.4					
7440-66-6 Zinc (Zn)	64.5		53.5					
7440-31-5 Tin (Sn)	14.7	U	12.6	U				

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

SW846-PEST

SAMPLE ID ------->	695-N-0001-01		695-N-0002-01				
ORIGINAL ID ----->	695N000101		695N000201				
LAB SAMPLE ID --->	7954-02		7954-01				
ID FROM REPORT -->	695N000101		695N000201				
SAMPLE DATE ----->	07/22/97		07/22/97				
DATE EXTRACTED -->	07/28/97		07/28/97				
DATE ANALYZED --->	08/14/97		08/14/97				
MATRIX ---------->	Sediment		Sediment				
UNITS ---------->	UG/KG		UG/KG				
CAS # Parameter	7954	VAL	7954	VAL			
319-84-6 alpha-BHC	4.61	U	4.23	U			
319-85-7 beta-BHC	4.61	U	4.23	U			
319-86-8 delta-BHC	4.61	U	4.23	U			
58-89-9 gamma-BHC (Lindane)	4.61	U	4.23	U			
76-44-8 Heptachlor	4.61	U	4.23	U			
309-00-2 Aldrin	4.61	U	4.23	U			
1024-57-3 Heptachlor epoxide	4.61	U	4.23	U			
959-98-8 Endosulfan I	4.61	U	4.23	U			
60-57-1 Dieldrin	8.95	U	8.21	U			
72-55-9 4,4'-DDE	8.95	U	8.21	U			
72-20-8 Endrin	8.95	U	8.21	U			
33213-65-9 Endosulfan II	8.95	U	8.21	U			
72-54-8 4,4'-DDD	8.95	U	8.21	U			
1031-07-8 Endosulfan sulfate	8.95	U	8.21	U			
50-29-3 4,4'-DDT	8.95	U	8.21	U			
72-43-5 Methoxychlor	46.1	U	42.3	U			
53494-70-5 Endrin ketone	8.95	U	8.21	U			
7421-93-4 Endrin aldehyde	8.95	U	8.21	U			
5103-71-9 alpha-Chlordane	4.61	U	4.23	U			
5103-74-2 gamma-Chlordane	4.61	U	4.23	U			
8001-35-2 Toxaphene	461.	U	423.	U			
12674-11-2 Aroclor-1016	89.5	U	82.1	U			
11104-28-2 Aroclor-1221	182.	U	167.	U			
11141-16-5 Aroclor-1232	89.5	U	82.1	U			
53469-21-9 Aroclor-1242	89.5	U	82.1	U			
12672-29-6 Aroclor-1248	89.5	U	82.1	U			
11097-69-1 Aroclor-1254	89.5	U	82.1	U			
11096-82-5 Aroclor-1260	89.5	U	82.1	U			

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

SW846-SVOA

SAMPLE ID ------->	695-N-0001-01		695-N-0002-01				
ORIGINAL ID ----->	695N000101		695N000201				
LAB SAMPLE ID --->	7954-02		7954-01				
ID FROM REPORT -->	695N000101		695N000201				
SAMPLE DATE ----->	07/22/97		07/22/97				
DATE EXTRACTED -->	07/28/97		07/30/97				
DATE ANALYZED --->	08/06/97		08/02/97				
MATRIX ---------->	Sediment		Sediment				
UNITS ---------->	UG/KG		UG/KG				
CAS # Parameter	7954	VAL	7954	VAL			
110-86-1 Pyridine	890.	U	820.	UJ			
108-95-2 Phenol	890.	U	820.	U			
111-44-4 bis(2-Chloroethyl)ether	890.	U	820.	U			
95-57-8 2-Chlorophenol	890.	U	820.	U			
541-73-1 1,3-Dichlorobenzene	890.	U	820.	U			
106-46-7 1,4-Dichlorobenzene	890.	U	820.	U			
100-51-6 Benzyl alcohol	890.	U	820.	U			
95-50-1 1,2-Dichlorobenzene	890.	U	820.	U			
95-48-7 2-Methylphenol (o-Cresol)	890.	U	820.	U			
108-60-1 2,2'-oxybis(1-Chloropropane)	890.	U	820.	U			
106-44-5 4-Methylphenol (p-Cresol)	890.	U	820.	U			
621-64-7 N-Nitroso-di-n-propylamine	890.	U	820.	U			
67-72-1 Hexachloroethane	890.	U	820.	U			
98-95-3 Nitrobenzene	890.	U	820.	U			
78-59-1 Isophorone	890.	U	820.	U			
88-75-5 2-Nitrophenol	890.	U	820.	U			
105-67-9 2,4-Dimethylphenol	890.	U	820.	U			
65-85-0 Benzoic acid	4600.	U	4200.	U			
111-91-1 bis(2-Chloroethoxy)methane	890.	U	820.	U			
120-83-2 2,4-Dichlorophenol	890.	U	820.	U			
120-82-1 1,2,4-Trichlorobenzene	890.	U	820.	U			
91-20-3 Naphthalene	890.	U	820.	U			
106-47-8 4-Chloroaniline	890.	U	820.	U			
87-68-3 Hexachlorobutadiene	890.	U	820.	U			
59-50-7 4-Chloro-3-methylphenol	890.	U	820.	U			
91-57-6 2-Methylnaphthalene	890.	U	820.	U			
77-47-4 Hexachlorocyclopentadiene	890.	U	820.	U			
88-06-2 2,4,6-Trichlorophenol	890.	U	820.	U			
95-95-4 2,4,5-Trichlorophenol	2200.	U	2000.	U			
91-58-7 2-Chloronaphthalene	890.	U	820.	U			
88-74-4 2-Nitroaniline	2200.	U	2000.	U			
131-11-3 Dimethyl phthalate	890.	U	820.	U			
208-96-8 Acenaphthylene	890.	U	820.	U			
606-20-2 2,6-Dinitrotoluene	890.	U	820.	U			
99-09-2 3-Nitroaniline	2200.	U	2000.	U			
83-32-9 Acenaphthene	890.	U	820.	U			

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

SW846-SVOA

	SAMPLE ID ------->	695-M-0001-01		695-M-0002-01				
	ORIGINAL ID ------>	695M000101		695M000201				
	LAB SAMPLE ID --->	7954-02		7954-01				
	ID FROM REPORT -->	695M000101		695M000201				
	SAMPLE DATE ------>	07/22/97		07/22/97				
	DATE EXTRACTED -->	07/28/97		07/30/97				
	DATE ANALYZED --->	08/06/97		08/02/97				
	MATRIX ---------->	Sediment		Sediment				
	UNITS ---------->	UG/KG		UG/KG				
CAS #	Parameter	7954	VAL	7954	VAL			
51-28-5	2,4-Dinitrophenol	2200.	U	2000.	U			
100-02-7	4-Nitrophenol	2200.	U	2000.	U			
132-64-9	Dibenzofuran	890.	U	820.	U			
121-14-2	2,4-Dinitrotoluene	890.	U	820.	U			
84-66-2	Diethylphthalate	890.	U	820.	U			
7005-72-3	4-Chlorophenylphenylether	890.	U	820.	U			
86-73-7	Fluorene	890.	U	820.	U			
100-01-6	4-Nitroaniline	2200.	U	2000.	U			
534-52-1	2-Methyl-4,6-Dinitrophenol	2200.	U	2000.	U			
86-30-6	N-Nitrosodiphenylamine	890.	U	820.	U			
103-33-3	Azobenzene	890.	U	820.	U			
101-55-3	4-Bromophenyl-phenylether	890.	U	820.	U			
118-74-1	Hexachlorobenzene	890.	U	820.	U			
87-86-5	Pentachlorophenol	2200.	U	2000.	U			
85-01-8	Phenanthrene	890.	U	820.	U			
120-12-7	Anthracene	890.	U	820.	U			
86-74-8	Carbazole	890.	U	820.	U			
84-74-2	Di-n-butylphthalate	890.	U	820.	U			
206-44-0	Fluoranthene	890.	U	820.	U			
129-00-0	Pyrene	890.	U	820.	U			
85-68-7	Butylbenzylphthalate	890.	U	820.	U			
91-94-1	3,3'-Dichlorobenzidine	890.	U	820.	U			
56-55-3	Benzo(a)anthracene	890.	U	820.	U			
218-01-9	Chrysene	890.	U	820.	U			
117-81-7	bis(2-Ethylhexyl)phthalate (BEHP)	890.	U	820.	U			
117-84-0	Di-n-octyl phthalate	890.	U	820.	U			
205-99-2	Benzo(b)fluoranthene	890.	U	820.	U			
207-08-9	Benzo(k)fluoranthene	890.	U	820.	U			
50-32-8	Benzo(a)pyrene	890.	U	820.	U			
193-39-5	Indeno(1,2,3-cd)pyrene	890.	U	820.	U			
53-70-3	Dibenz(a,h)anthracene	890.	U	820.	U			
191-24-2	Benzo(g,h,i)perylene	890.	U	820.	U			

CHARLESTON - ZONE K SOIL
CHARLESTON ZONE K SOIL
SWMU 695 SOIL SAMPLES

TOC

	SAMPLE ID ------->	695-M-0001-01		695-M-0002-01			
	ORIGINAL ID ----->	695M000101		695M000201			
	LAB SAMPLE ID --->	7954-02		7954-01			
	ID FROM REPORT -->	695M000101		695M000201			
	SAMPLE DATE ----->	07/22/97		07/22/97			
	DATE ANALYZED --->	07/29/97		07/29/97			
	MATRIX ---------->	Sediment		Sediment			
	UNITS ---------->	%		%			
CAS #	Parameter	7954	VAL	7954	VAL		
9999900-01-4	Total Organic Carbon (TOC)	6.		5.			

FOOD CHAIN MODEL CALCULATIONS

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
AOC 695
ZONE K
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
Inorganics									
Arsenic	1.77E+01	0.00E+00	0.690	1.22E+01	1.71E+00	1.04	4.55	1.65E+00	3.76E-01
Chromium	6.03E+01	0.00E+00	0.468	2.82E+01	4.18E+00	2.4	58.17	1.74E+00	7.19E-02
Nickel	1.74E+01	0.00E+00	2.320	4.04E+01	5.18E+00	1.7	14.77	3.05E+00	3.51E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.550	kg	Cf = Contaminant concentration in fish or invertebrates
Food Ingestion Rate = (If)	0.0678	kg/day	Cs = Contaminant concentration in sediment
Water Ingestion Rate = (Iw)	0.000	L/day	Cw = Contaminant concentration in water
Sediment Ingestion Rate = (Is)	0.0064	kg/day	

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for inorganic chemicals were multiplied by sediment concentrations to derive estimated prey concentrations.

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS MAMMALS REPRESENTED BY THE MINK
AVERAGE SCENARIO
AOC 695
ZONE K
NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Pesticides and PCBs									
Inorganics									
Arsenic	1.66E+01	0.00E+00	0.143	2.37E+00	1.56E-01	1.04	4.55	1.50E-01	3.43E-02
Chromium	5.90E+01	0.00E+00	0.100	5.90E+00	4.54E-01	2.4	58.17	1.89E-01	7.80E-03
Nickel	1.72E+01	0.00E+00	0.486	8.36E+00	3.98E-01	1.7	14.77	2.34E-01	2.69E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.568	kg	Cf = Contaminant concentration in fish
Food Ingestion Rate = (If)	0.0227	kg/day	Cs = Contaminant concentration in sediment
Water Ingestion Rate = (Iw)	0.000	L/day	Cw = Contaminant concentration in water
Sediment Ingestion Rate = (Is)	0.0021	kg/day	

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for inorganic chemicals were multiplied by sediment concentrations to derive estimated prey concentrations.

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO
AOC 695
ZONE K
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Maximum Sediment Concentration (mg/kg)	Maximum Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Inorganics									
Arsenic	1.77E+01	0.00E+00	0.690	1.22E+01	2.03E+00	2.24	4.51	9.08E-01	4.51E-01
Chromium	6.03E+01	0.00E+00	0.468	2.82E+01	4.86E+00	2.66	15.63	1.83E+00	3.11E-01
Nickel	1.74E+01	0.00E+00	2.320	4.04E+01	6.40E+00	6.71	18.57	9.53E-01	3.44E-01

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.2	kg	Cf = Contaminant concentration in fish
Food Ingestion Rate = (If)	0.031	kg/day	Cs = Contaminant concentration in sediment
Water Ingestion Rate = (Iw)	0.000	L/day	Cw = Contaminant concentration in water
Sediment Ingestion Rate = (Is)	0.0016	kg/day	

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for inorganic chemicals were multiplied by sediment concentrations to derive estimated prey concentrations.

FOOD CHAIN HAZARD QUOTIENTS FOR PISCIVOROUS BIRDS REPRESENTED BY THE GREEN HERON
AVERAGE SCENARIO
AOC 695
ZONE K
CHARLESTON NAVAL COMPLEX, NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Average Sediment Concentration (mg/kg)	Average Surface Water Concentration (mg/L)	BSAF[1]	Estimated Fish or Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
Inorganics									
Arsenic	1.66E+01	0.00E+00	0.143	2.37E+00	4.53E-01	2.24	4.51	2.02E-01	1.01E-01
Chromium	5.90E+01	0.00E+00	0.100	5.90E+00	1.25E+00	2.66	15.63	4.71E-01	8.01E-02
Nickel	1.72E+01	0.00E+00	0.486	8.36E+00	1.30E+00	6.71	18.57	1.94E-01	7.03E-02

Notes:
Cells are shaded if the hazard quotient (HQ) is greater than 1.0
Dose=[(If×Cf)+(Is×Cs)+(Iw×Cw)]/BW

Body Weight = (BW)	0.212	kg	Cf = Contaminant concentration in soil
Food Ingestion Rate = (If)	0.030	kg/day	Cs = Contaminant concentration in sediment
Water Ingestion Rate = (Iw)	0.000	L/day	Cw = Contaminant concentration in water
Sediment Ingestion Rate = (Is)	0.0015	kg/day	

[1] BSAF = Biota-sediment-accumulation factor. BSAFs for inorganic chemicals were multiplied by sediment concentrations to derive estimated prey concentrations.

APPENDIX R.2

HUMAN HEALTH RISK ASSESSMENT

R2.0 HUMAN HEALTH RISK ASSESSMENT AOC 695

R2.1 INTRODUCTION

This Human Health Risk Assessment (HHRA) presents a quantitative and qualitative assessment of the potential risks to public health posed by chemicals in sediments at AOC 695 of the Charleston Naval Complex (CNC), Charleston, South Carolina. AOC 695 consists of former Building 119, an electric locomotive shed, which operated from approximately 1922 until 1925. The original location of Building 119 was on a railroad trestle that extended over the Cooper River. Two sediment samples were collected for AOC 695 for the Zone K RCRA Facility Investigation Report (EnSafe, 1999). As stated in the Zone K RCRA Facility Investigation Report, risks from AOC 695 were to be evaluated as part of the Zone J risk assessment.

This HHRA is being performed to evaluate potential risks due to ingestion of fish by a recreational fisherman assumed to eat fish caught in the Cooper River in the vicinity of AOC 695. The overall objective of the HHRA is to determine the potential for health risks in the absence of remedial action at the site and, if action is required, to focus the evaluation of remedial action alternatives.

The following current United States Environmental Protection Agency (USEPA) risk assessment guidance documents were used to develop the framework for the HHRA:

- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A) (USEPA, 1989).

- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Washington, D.C. Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6 03 (USEPA, 1991).

- Distribution of Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. OSWER, Washington, D.C. (USEPA, 1993a).

- Exposure Factors Handbook. Office of Health and Environmental Assessment, Washington, D.C. EPA/600/P 95/002Fa (USEPA, 1997a).

- Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA, 2001a).

- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Office of Emergency and Remedial Response (OERR), Washington, D.C. OSWER 9285.6-10 (USEPA, 2002).

An HHRA consists of five components: data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Sections R2.2 through R2.6 contain detailed discussions of the five components of the HHRA.

Three major circumstances relating to chemical contamination and environmental fate and transport must be present in order for a risk assessment to proceed: (1) Contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; (2) potential exposure points must exist; and (3) human receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure. If any one of the factors listed above is absent, the exposure pathway is incomplete, and risks are not quantitatively evaluated.

R2.2 DATA EVALUATION

Data evaluation, the first component of an HHRA, is a two-step, medium-specific task involving the compilation and evaluation of analytical data. The first step involves the creation of the analytical database and an evaluation of data usability for purposes of HHRA. The second step of the data evaluation is the selection of a medium-specific list of chemicals of potential concern (COPCs) which are used to quantitatively or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a toxicity screen (i.e., a comparison of site contaminant concentrations to conservative toxicity screening values) and a background screen (i.e., a comparison of site concentrations to background concentrations).

R2.2.1 Data Usability

Data from two sediment samples collected in July 1997 from AOC 695 were used to assess potential risks to human receptors. Appendix E of the EnSafe (1999) RFI provides laboratory analytical data reports for samples collected during the Zone K investigation; the laboratory analytical data for the two sediment samples collected at AOC 695 (695M000101 and 695M000201) are provided in Section R.1 of this appendix, and are excerpted from Appendix E of the EnSafe (1999) report. Analytical data validation reports can be found in Appendix F of the EnSafe (1999) report.

R2.2.2 Selection of Contaminants of Potential Concern

This section explains how COPCs were selected. COPCs evaluated in the ecological risk assessment were selected as COPCs for the HHRA. USEPA Region 4 sediment Ecological Screening Values (ESV) were used as the screening values for purposes of selecting COPCs for both human and ecological risk assessment.

Background concentrations are concentrations of chemicals that would exist absent the influence of site operations. Background samples were obtained from locations that have not been influenced by site operations. A background sediment dataset representing regional baseline reference (background) conditions has been developed and approved by representatives of the South Carolina Department of Health and Environmental Control (SCDHEC) and other Natural Resource Trustees (TtNUS, 2008). The background dataset consists of 10 sediment samples from representative locations in Charleston Harbor. The background concentration used in the COPC selection table is twice the average background concentration.

The essential nutrients (calcium, magnesium, potassium, and sodium) were not identified as COPCs in this assessment. These inorganic chemicals are naturally abundant in environmental matrices and are toxic only at high doses. There are no ESVs for these nutrients and there have been no activities at AOC 695 that would have resulted in releases of high concentrations of these nutrients.

The applicable decision rules for the selection of COPCs are explained briefly below and were previously presented in the September 2008 QAPP for the Zone J Supplemental RFI:

- If the maximum site sediment concentration exceeds the ESV or if a screening value is not available for a chemical, the maximum detected concentration will be compared to twice the average background concentration. Then, a chemical with a maximum concentration less than or equal to twice the average background concentration will be eliminated from further consideration, and a chemical with a maximum concentration that exceeds twice the background concentration will be considered to be an COPC and will be retained for further evaluation.

R2.2.3 COPCs Selected for HHRA

Eighteen inorganics were detected in sediment samples collected from AOC 695. Table R2-1 presents the comparisons of the maximum detected concentrations to ESVs and background concentrations. Ten inorganics (aluminum, arsenic, beryllium, chromium, cobalt, iron, manganese, nickel, thallium, and vanadium) were retained as COPCs. Table R2-2 shows the chemicals retained as COPCs for sediment at AOC 695.

R2.3 EXPOSURE ASSESSMENT

The exposure assessment component of a baseline HHRA defines and provides a means to evaluate, quantitatively or qualitatively, the type and magnitude of human exposure to chemicals present at or migrating from a site. A foundation of the exposure assessment is the conceptual site model (CSM), which identifies site characteristics including potential contaminant sources, contaminant release mechanisms, transport routes, receptors, and other appropriate information. CSMs consider both current and future site scenarios for AOC 695.

Estimated chemical intakes developed during the exposure assessment are evaluated for complete exposure pathways in the risk characterization to produce quantitative estimates of cancer and non-cancer risk. A complete exposure pathway has three components: 1) a source of chemicals that can be released to the environment, 2) a route of contaminant transport through an environmental medium, and 3) an exposure or contact point for a human receptor. As outlined in the QAPP for Zone J (TtNUS, 2008), the only exposure pathway evaluated in this HHRA is fish consumption.

R2.3.1 Sources of Environmental Contamination

The contaminant sources at AOC 695 are wastes associated with the former electric locomotive shed. The EnSafe (1999) RFI states (page 10.7.1) that waste materials associated with AOC 695 are solvents and degreasers.

R2.3.2 Potential Migration Routes

Erosion of sediment is probably the only significant contaminant migration pathway at AOC 695. Specifically, storms and currents could uncover buried wastes that might exist at the site. Conversely, storms and currents could deposit sediment and re-bury wastes that were previously uncovered at the site. Any waste material remaining at the underwater site of AOC 695 would be either at the sediment-surface water interface or buried beneath sediment. Contaminants on the sediment surface could disperse into the water column.

R.2.3.3 Potential Current and Future Receptors of concern and Exposure Pathways

The HHRA for AOC 695 evaluates risks to recreational fisherman who are assumed to periodically catch and consume fish from the study area. Because actual fish tissue samples were not collected, the chemical concentrations in fish tissue were derived/estimated based on available sediment data. This assumes that chemicals in sediment are bioaccumulated and bioconcentrated in fish tissue; this would be most likely for bottom-dwelling fish such as flounder.

R.2.3.4 Chemical Intake Estimation

The methodologies and techniques used to estimate exposure intakes are presented in this section. Traditionally, exposures evaluated in the HHRA are based on the concept of a reasonable maximum exposure (RME) only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, 1989). However, subsequent risk assessment guidance (USEPA, 1992) indicates the need to address an average case or central tendency exposure (CTE). To provide a full characterization of potential exposure, both RME and CTE intakes/scenarios are evaluated in the HHRA.

Exposure assumptions used to estimate chemical intakes in the HHRA are summarized in Table R2-3 and Table R2-4 for RME and CTE scenarios respectively. The fraction ingested (FI) of 0.1 (10 percent) was used for fish/crabs caught in the Cooper River near AOC 695. This assumes that 10 percent of the fish/crabs caught and ingested by the recreational fisherman come for the study area. Fish tissue concentrations (for purposes of evaluating risks associated with human consumption) were calculated by modifying the ecological equation used to calculate the concentrations of inorganic COPCs found in food items of mammals. Biota-sediment-accumulation factors (BSAFs) and a dry to wet weight conversion factor of 0.25 were multiplied by the sediment concentration to estimate fish tissue concentrations (Sample, 1997).

Non-carcinogenic intakes are estimated using the concept of an average annual exposure. Carcinogenic intakes are calculated as an incremental lifetime exposure, which assumes a life expectancy of 70 years.

Intakes for the fish ingestion exposure route were estimated using the following equation (USEPA, 1989):

$$\text{Intake} = \frac{(C_{Fish} \text{ x IR x FI x EF x ED})}{(\text{BW x AT})}$$

Where:

Intake	=	ingestion intake (mg/kg-day)
C_{FISH}	=	fish tissue concentration (mg/kg)
IR	=	ingestion rate (kg/meal)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (meals/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
		for noncarcinogens, AT = ED x 365;
		for carcinogens, AT = 70 years x 365 days/year

R.2.3.5 Calculation of Exposure Point Concentrations

The exposure point concentration (EPC), which is calculated for COPCs only, is an estimate of the chemical concentration within an exposure unit (EU) likely to be contacted over time by a receptor and is used to estimate exposure intakes. An EU is defined as the area typically encountered/traversed by a receptor under a particular land use scenario. For example, a residential lot with an area of ¼ acre to 2 acres is often used for the evaluation of a hypothetical future resident. However, the size of an EU selected for HHRA is typically based on the distribution of the chemical concentrations in a medium as well as on presumed receptor activity patterns.

There are only two sediment samples for AOC 695, therefore the EPCs for the RME and CTE case were defined as the maximum detected concentration. Sample and duplicate analytical results were averaged for statistical use before the EPC was calculated. One-half the method detection limit was used for non-detected values.

Table R2-5 summarizes the EPCs used in this HHRA.

R2.4 TOXICITY ASSESSMENT

The objective of a toxicity assessment is to identify the potential for human health hazards and adverse effects in exposed populations. Quantitative estimates of the relationship between the magnitude and type of exposures and the severity or probability of human health effects are defined for the identified COPCs. Quantitative toxicity values [cancer slope factors (CSFs), reference doses (RfDs), and reference concentrations (RfCs)] determined during this component of the risk assessment were integrated with outputs of the exposure assessment to characterize the potential for adverse health effects for each receptor group. A cancer slope factor/unit risk factor is an indicator of the potency of a chemical carcinogen (i.e., the greater the CSF/IUR, the more potent the carcinogen). An RfD/RfC is the dose/concentration at which or below which adverse non-carcinogenic effects are not anticipated.

RfDs and CSFs used in the HHRA were obtained from the following primary literature sources:

- Integrated Risk Information System (IRIS) (Online).

- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical specific basis when requested by USEPA's Superfund program.

- Other Toxicity Values – These sources include but are not limited to California Environmental Protection Agency (Cal EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b).

Although toxicity criteria can be found in several toxicological sources, USEPA's IRIS on-line database is the preferred source of toxicity values. This database is continuously updated and values presented have been verified by USEPA. The ORNL RSLs Table may be used as a source of toxicity criteria when toxicity criteria are not available from the aforementioned references. The toxicity criteria for the constituents selected as COPCs are presented in Tables R2-6 through R2-9.

Toxicity criteria are available for different forms of chromium (trivalent and hexavalent), which is considered to be more toxic in the hexavalent state. Where only total chromium data are available, all of the chromium were assumed to be hexavalent chromium.

R2.5 RISK CHARACTERIZATION

Potential risks (non-carcinogenic and carcinogenic) to human receptors from the potential exposures outlined in the exposure assessment are quantitatively determined during the risk characterization component of the baseline HHRA. Both RME and CTE estimates are generated. The quantitative estimates of risk are calculated in accordance with the risk assessment methods outlined in USEPA guidance (USEPA, 1989).

R2.5.1 Quantitative Analysis of Chemicals

Quantitative estimates of risk for chemicals other than lead are calculated according to risk assessment methods outlined in USEPA guidance (USEPA, 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities, referred to as incremental lifetime cancer risks (ILCRs), based on CSFs. Non-carcinogenic risk estimates are presented in the form of hazard quotients (HQs) that are determined through a comparison of intakes with published RfDs or RfCs.

ILCR estimates are generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = (\text{Estimated Exposure Intake})(\text{CSF})$$

If the above equation results in an ILCR greater than 0.01, the following equation will be used:

$$ILCR = 1-[exp(-Estimated\ Exposure\ Intake)(CSF)]$$

An ILCR of 1 x 10^{-6} indicates that the exposed receptor has a one in-one million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons.

As mentioned previously, non-carcinogenic risks will be assessed using the concept of HQs and Hazard Indices (HIs). The HQ for a COPC is the ratio of the estimated intake or concentration to the RfD or RfC, as follows:

$$HQ_i = \frac{Intake(Concentration)}{RfD_i(RfC)}$$

An HI was generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of non-carcinogenic (threshold) effects.

R2.5.2 Interpretation of Risk Assessment Results

To interpret the quantitative risk estimates and to aid risk managers in determining the need for remediation, quantitative risk estimates were compared to typical USEPA risk benchmarks. The USEPA has defined a “target cancer risk” range of 1 x 10^{-4} to 1 x 10^{-6} (i.e., a one-in-ten-thousand to one-in-one-million chance of developing cancer). HQs and HIs are typically evaluated using a value of 1.0. Generally, adverse non-carcinogenic health effects are not anticipated if an HQ or HI, developed on a target organ/effect-specific basis, does not exceed 1.0.

R2.5.3 Results of the Risk Characterization

This section contains a summary of the results of the risk characterization for AOC 695. Quantitative risk estimates for potential recreational fisherman are developed for those chemicals identified as COPCs. Potential cancer risks and hazard indices were calculated for current/future recreational fishermen under the RME and CTE scenarios and are summarized in Tables R2-10 and R2-11.

Ingestion of fish was identified as a potential exposure pathway evaluated in this HHRA. No fish tissue samples were collected at AOC 695. However, sediment samples were collected from Cooper River. Consequently, fish tissue concentrations were approximated based on the chemical concentrations measured in the sediments of Cooper River, and were evaluated in the HHRA.

R2.5.3.1 Non-carcinogenic Risks – RME

Cumulative HIs for the recreational fisherman (HI = 2) exceed unity (Table R2-10); however, HIs calculated on a target organ/target effect-specific basis do not exceed unity. Therefore, unacceptable non-carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

R.2.5.3.2 Carcinogenic Risks – RME

Cumulative ILCRs for the recreational fisherman consuming fish taken from the Cooper River at AOC 695 are 7 x 10^{-5}, which are within the USEPA's target risk range of 10^{-4} to 10^{-6} (Table R2-10). Therefore, unacceptable carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

R2.5.3.3 Non-carcinogenic Risks – CTE

Cumulative HIs for the recreational fisherman (HI = 0.6) consuming fish from the Cooper River at AOC 695 were less than unity (Table R2-11). Therefore, unacceptable non-carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

R2.5.3.4 Carcinogenic Risks – CTE

Cumulative ILCRs for the recreational fisherman consuming fish from AOC 695 under the CTE scenario are 6.6 x 10^{-6} (Table R2-11), which are within USEPA's target risk range of 10^{-4} to 10^{-6}. Therefore, unacceptable carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

R2.6 UNCERTAINTY ANALYSIS

There is uncertainty associated with all aspects of a baseline human health risk assessment. A summary of the uncertainties, including a discussion of how they may affect the final risk numbers, is provided in this section.

Sources of uncertainty in the selection of COPCs include the current status of the predictive databases; the grouping of samples; the numbers, types, and distributions of samples; and the procedures used to include or exclude constituents as COPCs. Sources of uncertainty associated with the exposure assessment include the values used as input variables for a given intake route or scenario, the assumptions made to determine exposure point concentrations, and the predictions regarding future land use and population characteristics. Uncertainty in the toxicity assessment is related to the quality of the existing toxicity data needed to support dose response relationships and the weight of evidence used to determine the carcinogenicity of COPCs. Uncertainty in risk characterization includes that associated

with exposure to multiple chemicals and the cumulative uncertainty from combining conservative assumptions made in earlier steps of the risk assessment process.

Whereas there are various sources of uncertainty, the direction of uncertainty can be influenced by the assumptions employed during the various phases of the risk assessment, including selection of COPCs and selection of values for dose response relationships. Throughout the process, assumptions are biased toward a margin of safety so that the final calculated risks are overestimated.

Generally, risk assessments carry two types of uncertainty: measurement and informational uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements. This type of uncertainty is associated with the analytical data collected for each site. The risk assessment reflects the accumulated variances of the individual values used.

Informational uncertainty stems from inadequate availability of information needed to complete the toxicity and exposure assessments. Often, this gap is significant, such as the absence of information on the effects of low doses of chemicals on human receptors, on the biological mechanism of action of a chemical, or the behavior of a chemical in soil.

Once the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to account for uncertainties in the development of exposure assumptions, conservative estimates must be made to ensure that the particular assumptions made are protective of sensitive subpopulations or the maximally exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can magnify the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward over predicting both carcinogenic and non-carcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

This interpretation is especially relevant when the risks exceed the point of departure for defining "acceptable" risk. For example, when risks calculated using a high degree of uncertainty are less than an acceptable risk level (i.e., 10^{-4} to 10^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed an acceptable risk level (i.e., 10^{-4} to 10^{-6}); a conclusion can be difficult unless uncertainty is considered.

R2.6.1 Uncertainty in Data Evaluation

The most significant issues related to uncertainty in COPC selection are the screening levels that are used, the absence of screening levels for a few chemicals detected in the site media, and elevated detection limits for some compounds. A brief discussion of each of these issues is provided in the remainder of this section.

R2.6.1.1 COPC Screening Levels

There is some uncertainty associated with choosing COPCs based on ESVs. Maximum concentrations were also screened against USEPA Region 3 Fish Risk Based Screening Levels. There were no significant differences between the COPCs selected using the Fish Risk Based Screening Levels and the ESVs.

R2.6.1.2 Chemicals without Established Screening Levels

Risk-based screening levels are currently not available for some constituents (e.g., barium, calcium, magnesium, manganese, potassium, sodium and vanadium). Having no toxicity screening values for some compounds adds to the uncertainty in the risk assessment both in regard to the selection of COPCs and the subsequently calculated risks.

R2.6.2 Uncertainty in the Exposure Assessment

Uncertainty in the exposure assessment arises because of the determination of site conditions, the selection of receptors and scenarios, the estimation of exposure point concentrations, and the selection of exposure parameters. Each of these is discussed below.

R2.6.2.1 Site Use

The current site use patterns are well established, thereby limiting the uncertainty associated with site use assumptions. Recreational fishing in Cooper River is the only site use of interest for this risk assessment.

R2.6.2.2 Exposure Point Concentrations

Significant uncertainty is associated with the EPCs for fish tissue concentrations. The EPCs were estimated based on chemical concentrations in sediments because actual fish tissue data are not available for Cooper River. This assumes that the fish taken by the recreational fisherman are routinely contacting the sediments (i.e., are likely to be bottom-dwelling species) and that significant bioaccumulation is occurring between the sediments and the fish. However, this assumption may result

in a significant over-estimation of risk if the species typically taken by the recreational fisherman are not routinely in contact with the sediments. Conservatively, bioaccumulation factors published for invertebrates were used to calculate fish tissue concentrations for the inorganics because of the lack of fish-specific sediment bioaccumulation factors.

R2.6.2.3 Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and the anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors is minimal because they are considered to be well defined.

R2.6.2.4 Exposure Parameters

Each exposure factor selected for use in this HHRA has some associated uncertainty. Generally, exposure factors are based on surveys of physiological and lifestyle profiles across the United States. The attributes and activities studied in these surveys generally have a broad distribution. To avoid underestimation of exposure, in most cases, the USEPA guidelines (USEPA, 1991) for the RME receptor were used, which generally specify the use of the 95th percentile for most parameters. Therefore, the selected values for the RME receptor represent the upper bound of the observed or expected habits of the majority of the population.

Generally, the uncertainty can be assessed quantitatively for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from statistical analyses on human population characteristics. Often, the database used to summarize a particular exposure parameter (i.e., body weight) is quite large. Consequently, the values chosen for such variables in the RME scenario have low uncertainty.

Many of the exposure parameters used to calculate exposures and risks in this report were selected from a distribution of possible values, including USEPA guidance (USEPA, 1991, 1993a, 1997a, 2004). For the RME scenario, a combination of high-end and average inputs was used with the overall goal that the final risk estimate be an approximately 95th percentile risk estimate. This risk number is used in risk management decisions but does not indicate what a more average or typical exposure might be or what risk range might be expected for individuals in the exposed population.

R2.6.3 Uncertainty in the Toxicity Assessment

Uncertainties associated with the toxicity assessment (determination of RfDs, RfCs, URFs, and CSFs and use of available criteria) are presented in this section.

Uncertainty associated with the toxicity assessment is associated with hazard assessment and dose response evaluations for the COPCs. The hazard assessment deals with characterizing the nature and strength of the evidence of causation or the likelihood that a chemical that induces adverse effects in animals will also induce adverse effects in humans. Hazard assessment of carcinogenicity is evaluated as a weight of evidence determination, using the USEPA methods. Positive animal cancer test data suggest that humans contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data often suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans.

Uncertainty in hazard assessment arises from the nature and quality of the animal and human data. Uncertainty is reduced when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose related; when pharmacokinetic data indicate a similar fate in humans and animals; when postulated mechanisms of toxicity are similar for humans and animals; and when the chemical of concern is structurally similar to other chemicals for which the toxicity is more completely characterized.

Uncertainty in the dose response evaluation includes the determination of a CSF/URF for the carcinogenic assessment and derivation of an RfD/RfC for the non-carcinogenic assessment. Uncertainty is introduced from interspecies (animal to human) extrapolation, which, in the absence of quantitative pharmacokinetic or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Uncertainty also results from intraspecies variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so intragroup biological variation is minimal, but the human population of concern may reflect a great deal of heterogeneity, including unusual sensitivity or tolerance to the COPC. Even toxicity data from human occupational exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly (the "healthy worker effect") and those not unusually sensitive to the chemical are likely to be occupationally exposed. Finally, uncertainty arises from the quality of the key study from which the quantitative estimate is derived and the database. For cancer effects, the uncertainty associated with dose response factors is mitigated by assuming the 95 percent upper bound for the slope factor. Another source of uncertainty in carcinogenic assessments is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multistage model, which is used in nearly all quantitative estimations of human risk from animal

data, is based on a non-threshold assumption of carcinogenesis. Evidence suggests, however, that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are not carcinogenic. Therefore, the use of the linearized multistage model is conservative for chemicals that exhibit a threshold for carcinogenicity.

For noncancer effects, additional uncertainty factors may be applied in the derivation of the RfD/RfC to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for noncancer effects arises from the use of an effect level in the estimation of an RfD/RfC when "no adverse effect level" data (i.e., non-cancer threshold data) are not available or such data are limited. An uncertainty factor is usually applied to estimate a no effect level. Additional uncertainty arises in the estimation of an RfD/RfC for chronic exposure from subchronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no effect level in the subchronic study. Uncertainty in the derivation of RfDs/RfCs is mitigated by the use of uncertainty and modifying factors that normally range between 3 and 10. The resulting combination of uncertainty and modifying factors may reach 1,000 or more.

The derivation of dermal RfDs and CSFs from oral values may cause uncertainty. This is particularly the case when no gastrointestinal absorption rates are available in the literature or when only qualitative statements regarding absorption are available.

R2.6.4 Uncertainty in the Risk Characterization

Uncertainty in risk characterization results from assumptions made regarding additivity of effects from exposure to multiple COPCs from various exposure routes. High uncertainty exists when summing noncancer risks for several substances across different exposure pathways. This assumes that each substance has a similar effect and/or mode of action. Even when compounds affect the same target organs, they may have different mechanisms of action or differ in their fate in the body, so additivity may not be an appropriate assumption. However, the assumption of additivity is considered because in most cases it represents a conservative estimate of risk.

Risks to any individual may also be overestimated by summing multiple assumed exposure pathway risks for any single receptor. Although every effort was made to develop reasonable scenarios, not all individual receptors may be exposed via all pathways considered.

Finally, the risk characterization does not consider antagonistic or synergistic effects. Little or no information is available to determine the potential for antagonism or synergism for the COPCs. Because chemical specific interactions cannot be predicted, the likelihood for risks to be over predicted or under predicted cannot be defined, but the methodology that was used is based on current USEPA guidance.

Uncertainty in the risk characterization also results from the fact that, barium was eliminated as COPCs on the basis of twice the average background concentration being greater than the site maximum:

R2.7 SUMMARY

The baseline HHRA for AOC 695 was performed to characterize the potential risks to likely human receptors under current and potential future land use. Potential receptors retained for quantitative evaluation included current/future recreational fisherman. Fish tissue concentrations (estimated using sediment concentrations) were evaluated in the assessment.

Summary of Chemicals of Potential Concern

The COPCs at AOC 695 based on ESVs and background values are aluminum, arsenic, beryllium, chromium, cobalt, iron, manganese, nickel, thallium, and vanadium.

Summary of Cancer and Non-cancer Risk Estimates for Environmental Media at AOC 695 – Reasonable Maximum Exposure Scenario

Cancer and non-cancer risk estimates calculated for recreational fisherman at AOC 695 were compared to the following risk management benchmarks:

- The USEPA "target cancer risk" range of 1×10^{-4} to 1×10^{-6} (i.e., a one-in-ten-thousand to one-in-one-million chance of developing cancer).

- HQ/HI value of 1.0. Generally, adverse non-carcinogenic health effects are not anticipated if an HQ or HI, developed on a target organ/effect-specific basis, does not exceed 1.0.

Cumulative HIs for the recreational fisherman (HI = 2) exceeds unity however HIs calculated on a target organ/target effect specific basis do not exceed unity. Therefore, unacceptable non-carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

Cumulative ILCRs for recreational fishermen consuming fish from Cooper River near AOC 695 (7×10^{-5}) are within the USEPA's target risk range of 10^{-4} to 10^{-6}. Therefore, unacceptable carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.

Summary of Cancer and Non-cancer Risk Estimates for Environmental Media at AOC 695 – Central Tendency Exposure Scenario

Cumulative HIs for the recreational fishermen consuming fish from Cooper River AOC 695 exceed unity, but HIs calculated on a target organ/target effect specific basis do not exceed unity. Therefore, unacceptable non-carcinogenic risks are not anticipated for the recreational fisherman at AOC 695. Cumulative ILCRs for the recreational fishermen consuming fish from AOC 695 under the CTE scenario were within USEPA's target risk range of 10^{-4} to 10^{-6}.

TABLE R2-1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMCIALS OF POTENTIAL CONCERN
AOC 695 ZONE K
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical	Sample 695000101	Sample 695000201	Background Value(1)	Ecological Screening Value	COPC (Yes/No)	Rationale for COPC Selection (2)
Inorganics (mg/kg)						
ALUMINUM	33300	29900	21440	NA	Yes	ABG
ARSENIC	17.7	15.5	12.0	7.24	Yes	ASV & ABG
BARIUM	33	30.1	34.6	NA	No	BBG
BERYLLIUM	1.6	1.5	1.1	NA	Yes	ABG
CALCIUM	6000	6770	53260	NA	No	Nutrient
CHROMIUM	60.3	57.7	43.5	52.3	Yes	ASV & ABG
COBALT	7.3	7.2	6.4	NA	Yes	ABG
COPPER	9.6	9.1	14.9	18.7	No	BSV
IRON	32300	30000	23600	NA	Yes	ABG
LEAD	14.8	13.9	18.1	30.2	No	BSV
MAGNESIUM	7750	7280	6426	NA	No	Nutrient
MANGANESE	255	301	216	NA	Yes	ABG
NICKEL	17	17.4	12.4	15.9	Yes	ASV & ABG
POTASSIUM	4940	4370	3046	NA	No	Nutrient
SODIUM	11600	10100	13880	NA	No	Nutrient
THALLIUM	1.9 U	3.3	ND	NA	Yes	ESV & BG NA
VANADIUM	66.2	61.4	48.8	NA	Yes	ABG
ZINC	64.5	53.5	71.5	124	No	BSV

Footnotes:
(1) Twice the average concentration in sediment samples collected from 10 reference locations in Charleston Harbor (Spectra Tech 2006); ND indicates that the analyte was not detected in any of the 10 reference samples.
(2) COPC rationale codes:
For selection as a COPC:
ASV & ABG: Maximum detected concentration exceeded the ecological screening value and exceeded the background value (background defined in footnote 1).
ABG: Maximum detected concentration exceeded the background value, and ecological screening value not available.
ESV & BG NA: Ecological screening value not available and analyte was not detected in any of 10 reference samples.
For elimination as a COPC:
BSV: Maximum detected concentration was equal to or less than the ecological screening value.
BBG: Maximum detected concentration was less than the background value.
Nutrient: Calcium, magnesium, potassium, and sodium are nutrients that were not considered to be COPCs.

Shaded chemical indicates that the chemical was retained as a COPC.
Acronyms:
COPC: Chemical of Potential Concern
NA: Ecological screening value not available.

TABLE R2-2

CHEMICALS RETAINED AS COPCS
ZONE K - AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Parameter	**Sediment**
Inorganics	
Aluminum	**X**
Arsenic	**X**
Beryllium	**X**
Chromium	**X**
Cobalt	**X**
Iron	**X**
Manganese	**X**
Nickel	**X**
Thallium	**X**
Vanadium	**X**

Notes:
X - Chemical was retained as a COPC.

TABLE R2-3

SUMMARY OF EXPOSURE INPUT PARAMETERS (RME)
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Exposure Parameter	Cooper River
	Adult Recreational Fisherman
All Exposures	
C_{fish} (mg/kg)	Estimated[1]
ED (years)	30
BW (kg)	70[2]
AT_n (days)	10,950[2]
AT_c (days)	25,550[2]
Ingestion of Fish	
IR (kg/meal)	0.025[3]
BSAF (L/kg)	Chemical Specific
FI (unitless)	0.1
EF (meals/year)	350

Notes:
AT_c = Averaging time for carcinogenic effects
AT_n = Averaging time for noncarcinogenic effects
BW = Body weight
BSAF = Chemical specific biota sediment accumulation factor
C_{fish} = Exposure concentration for fish
ED = Exposure duration
EF = Exposure frequency
FI = Fraction ingested from contaminated source
IR = Ingestion rate

1 - Estimated from sediment concentrations (see text).
2 - USEPA, 1989: Risk Assessment Guidance for Superfund.
Vol 1: Human Health Evaluation Manual, Part A.
3 - USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.

TABLE R2-4

SUMMARY OF EXPOSURE INPUT PARAMETERS (CTE)
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Exposure Parameter	Cooper River Adult Recreational Fisherman
All Exposures	
C_{fish} (mg/kg)	Estimated[1]
ED (years)	9
BW (kg)	70
AT_n (days)	3,285[2]
AT_c (days)	25,550
Ingestion of Fish	
IR (kg/meal)	0.008[1]
BCF (L/kg)	Chemical Specific
FI (unitless)	0.1
EF (meals/year)	350

Notes:
AT_c = Averaging time for carcinogenic effects
AT_n = Averaging time for noncarcinogenic effects
BW = Body weight
BSAF = Chemical specific biota sediment accumulation factor
C_{fish} = Exposure concentration for fish
ED = Exposure duration
EF = Exposure frequency
FI = Fraction ingested from contaminated source
IR = Ingestion rate

1 - USEPA, 1997: Exposure Factors Handbook. EPA/600/8-95/002FA.
2 - USEPA, 1989: Risk Assessment Guidance for Superfund.
Vol 1: Human Health Evaluation Manual, Part A.

TABLE R2-5

EXPOSURE POINT CONCENTRATION
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Parameter	**AOC 695** **Fish Tissue (mg/kg)**
Inorganics	
Aluminum	5330
Arsenic	2
Beryllium	0.26
Chromium	4.5
Cobalt	1.2
Iron	5170
Manganese	48.2
Nickel	6.5
Thallium	0.53
Vanadium	10.6

Notes:
Maximum detected concentration was used for all exposure point concentrations.
Estimated fish concentrations were convereted to wet weight by multiplying by 0.25.

TABLE R2-6

NON-CANCER TOXICITY DATA -- ORAL/DERMAL
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s) [3]	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Inorganics										
ALUMINUM	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Body Weight	100	PPRTV	10/23/2006
ARSENIC	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	2/17/2009
BERYLLIUM	Chronic	2.0E-03	mg/kg/day	0.007	1.4E-05	mg/kg/day	Gastrointestinal System	300/1	IRIS	2/17/2009
CHROMIUM[4]	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Respiratory	300/3	IRIS	2/17/2009
COBALT	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	CVS, Immune, Neurological, Reproductive	NA	PPRTV	8/25/2008
IRON	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	GS	1.5	PPRTV	9/11/2006
MANGANESE (soil)[5]	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	Neurological	1/1	IRIS	2/17/2009
NICKEL	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300/1	IRIS	2/17/2009
THALLIUM	Chronic	6.5E-05	mg/kg/day	1	6.5E-05	mg/kg/day	Hair Loss, Liver	3000/1	PPRTV	4/1/2009
VANADIUM	Chronic	5.0E-03	mg/kg/day	0.026	1.3E-04	mg/kg/day	Hair Loss	300	PPRTV	4/1/2009

Notes:
1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
4 - Values are for hexavalent chromium.
5 - Adjusted IRIS value in accordance with USEPA Region I Risk Update Number 4, November 1996.
6 - Values are for mercuric chloride.

Definitions:
CNS = Central Nervous System
CVS = Cardiovascular system
GS = Gastrointestinal
IRIS = Integrated Risk Information System
NA = Not Available.
PPRTV = Provisional Peer Reviewed Toxicity Values

TABLE R2-7

NON-CANCER TOXICITY DATA -- INHALATION
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD(1)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Inorganics									
ALUMINUM	Chronic	5.0E-03	mg/m^3	1.4E-03	(mg/kg/day)	CNS	300	PPRTV	10/23/2006
ARSENIC	Chronic	1.50E-05	mg/m^3	4.3E-06	(mg/kg/day)	NA	NA	Cal EPA	12/1/2008
BERYLLIUM	Chronic	2.0E-05	mg/m3	5.7E-06	(mg/kg/day)	Respiratory	10/1	IRIS	10/19/2011
CHROMIUM	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Respiratory	300/1	IRIS	2/18/2009
COBALT	Chronic	6.0E-06	mg/m^3	1.7E-06	(mg/kg/day)	Respiratory	NA	PPRTV	8/25/2008
IRON	NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	Chronic	5.0E-05	mg/m^3	1.4E-05	(mg/kg/day)	CNS	1000/1	IRIS	2/18/2009
NICKEL	Chronic	9.00E-05	mg/m^3	2.6E-05	(mg/kg/day)	NA	NA	ATSDR	9/1/2005
THALLIUM	NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - Extrapolated RfD = RfC *$20m^3$/day / 70 kg

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry

CNS = Central Nervous System

Cal EPA = California Environmental Protection Agency

IRIS = Integrated Risk Information System

NA = Not Applicable

PPRTV = Provisional Peer Reviewed Toxicity Values

TABLE R2-8

CANCER TOXICITY DATA -- ORAL/DERMAL
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal(1)	Absorbed Cancer Slope Factor for Dermal(2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Inorganics								
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A / Known/likely human carcinogen	IRIS	2/19/2009
BERYLLIUM	NA	NA	NA	NA	NA	Carcinogenic potential cannot be determined	IRIS	2/19/2009
CHROMIUM	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
COBALT	NA	NA	NA	NA	NA	NA	NA	NA
IRON	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
NICKEL	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	NA	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
VANADIUM	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. EPA/540/R/99/005.
2 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

IRIS = Integrated Risk Information System.
NA = Not Available.

TABLE R2-9

CANCER TOXICITY DATA -- INHALATION
ZONE K AOC 695
CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Inorganics							
ALUMINUM	NA	NA	NA	NA	NA	NA	NA
ARSENIC	4.3E-03	$(ug/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A / Known/likely human carcinogen	IRIS	2/19/2009
BERYLLIUM	2.4E-03	$(ug/m^3)^{-1}$	8.4E+00	$(mg/kg/day)^{-1}$	B1 /Known/likely human carcinogen	IRIS	4/8/2011
CHROMIUM	8.4E-02	$(ug/m^3)^{-1}$	2.9E+02	$(mg/kg/day)^{-1}$	A / Known human carcinogen	IRIS	2/19/2009
COBALT	9.0E-03	$(ug/m^3)^{-1}$	3.2E+01	$(mg/kg/day)^{-1}$	NA	PPRTV	8/25/2008
IRON	NA	NA	NA	NA	NA	NA	NA
MANGANESE	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
NICKEL	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$(mg/kg/day)^{-1}$	NA	Cal EPA	6/1/2009
THALLIUM	NA	NA	NA	NA	D / Not classifiable as to human carcinogenicity	IRIS	2/19/2009
VANADIUM	NA	NA	NA	NA	NA	NA	NA

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

Definitions:

Cal EPA = California Enviornmental Protection Agency.

IRIS = Integrated Risk Information System.

NA = Not Available.

USEPA(2) = USEPA, PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures, September 1996, EPA/600/P-96/001F.

TABLE R2-10

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

ZONE K AOC 695

NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Finfish/Shellfish	AOC 695	Ingestion	Aluminum	8330	MG/KG	1.2E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.9E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.3
				Arsenic	3.1	MG/KG	4.5E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.8E-05	1.1E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.4
				Beryllium	0.40	MG/KG	5.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.4E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.01
				Chromium	7.1	MG/KG	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.1
				Cobalt	1.80	MG/KG	2.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	6.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.2
				Iron	8080	MG/KG	1.2E-01	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.4
				Manganese (Soil)	75	MG/KG	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.6E-03	(mg/kg/day)	7.0E-02	(mg/kg/day)	0.0
				Nickel	10.1	MG/KG	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.5E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0
				Thallium	0.83	MG/KG	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.8E-05	(mg/kg/day)	6.5E-05	(mg/kg/day)	0.4
				Vanadium	16.6	MG/KG	2.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.1
			Exp. Route Total								6.8E-05					2
		Exposure Point Total									6.8E-05					2
	Exposure Medium Total										6.8E-05					2
Medium Total											6.8E-05					2
										Total of Receptor Risks Across All Media	6.8E-05				Total of Receptor Hazards Across All Media	2

TABLE R2-11

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURES

ZONE K AOC 695

NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Finfish/Shellfish	AOC 695	Ingestion	Aluminum	8330	MG/KG	1.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.1
				Arsenic	3.1	MG/KG	4.4E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.6E-06	3.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Beryllium	0.40	MG/KG	5.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.4E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)	0.002
				Chromium	7.1	MG/KG	1.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0
				Cobalt	1.80	MG/KG	2.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.1
				Iron	8080	MG/KG	1.1E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.1
				Manganese (Soil)	75	MG/KG	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	8.3E-04	(mg/kg/day)	7.0E-02	(mg/kg/day)	0.01
				Nickel	10.1	MG/KG	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.1E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.01
				Thallium	0.83	MG/KG	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.1E-06	(mg/kg/day)	6.5E-05	(mg/kg/day)	0.1
				Vanadium	16.6	MG/KG	2.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	1.8E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0
			Exp. Route Total								6.6E-06					0.6
		Exposure Point Total									6.6E-06					0.6
	Exposure Medium Total										6.6E-06					0.6
Medium Total											6.6E-06					0.6
										Total of Receptor Risks Across All Media	6.6E-06				Total of Receptor Hazards Across All Media	0.6

TABLE R2-12

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

ZONE K AOC 695

CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Finfish/Shellfish	AOC 695	Aluminum	- -	--	- -	--	- -	Body Weight	0.3	- -	- -	0.3
			Arsenic	7E-05	--	- -	--	7E-05	Skin, CVS	0.4	- -	- -	0.4
			Beryllium	- -	--	- -	--	- -	GS	0.01	- -	- -	0.01
			Chromium	- -	--	- -	--	- -	Respiratory	0.1	- -	- -	0.1
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.2	- -	- -	0.2
			Iron	- -	--	- -	--	- -	GS	0.4	- -	- -	0.4
			Manganese (Soil)	- -	--	- -	--	- -	CNS	0.04	- -	- -	0.04
			Nickel	- -	--	- -	--	- -	Body Weight	0.02	- -	- -	0.02
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0.4	- -	- -	0.4
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.1	- -	- -	0.1
			Chemical Total	7E-05	--	- -	--	7E-05		2	- -	- -	2
		Exposure Point Total						7E-05					2
	Exposure Medium Total							7E-05					2
Medium Total								7E-05					2
Receptor Total							Receptor Risk Total	7E-05				Receptor HI Total	2

Total Body Weight HI	0.3
Total CNS HI	0.2
Total CVS HI	0.6
Total GS HI	0.4
Total Immune HI	0.2
Total Liver HI	0.4
Total Skin HI	0.4
Total Hair Loss HI	0.6

TABLE R2-13

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURES

ZONE K AOC 695

NORTH CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Finfish/Shellfish	AOC 695	Aluminum	- -	--	- -	--	- -	Body Weight	0.1	- -	- -	0.1
			Arsenic	7E-06	--	- -	--	7E-06	Skin, CVS	0.1	- -	- -	0.1
			Beryllium	- -	--	- -	--	- -	GS	0.002	- -	- -	0.002
			Chromium	- -	--	- -	--	- -	Respiratory	0.0	- -	- -	0.0
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.1	- -	- -	0.1
			Iron	- -	--	- -	--	- -	GS	0.1	- -	- -	0.1
			Manganese (Soil)	- -	--	- -	--	- -	CNS	0.01	- -	- -	0.01
			Nickel	- -	--	- -	--	- -	Body Weight	0.01	- -	- -	0.01
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0.1	- -	- -	0.1
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.0	- -	- -	0.0
			Chemical Total	7E-06	--	- -	--	7E-06		1	- -	- -	1
		Exposure Point Total						7E-06					1
	Exposure Medium Total							7E-06					1
Medium Total								7E-06					1
Receptor Total							Receptor Risk Total	7E-06				Receptor HI Total	1

Total Body Weight HI	0.1
Total CNS HI	0.1
Total CVS HI	0.2
Total GS HI	0.1
Total Immune HI	0.1
Total Liver HI	0.1
Total Skin HI	0.1
Total Hair Loss HI	0.2

TABLE R2-14

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURES

ZONE K AOC 695

noth CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Finfish/Shellfish	AOC 695	Aluminum	- -	--	- -	--	- -	Body Weight	0	- -	- -	0
			Arsenic	7E-05	--	- -	--	7E-05	Skin, CVS	0	- -	- -	0
			Chromium	- -	--	- -	--	- -	Respiratory	0.1	- -	- -	0.1
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0	- -	- -	0
			Iron	- -	--	- -	--	- -	GS	0	- -	- -	0
			Manganese (Soil)	- -	--	- -	--	- -	CNS	0.0	- -	- -	0.0
			Nickel	- -	--	- -	--	- -	Body Weight	0.0	- -	- -	0.0
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0	- -	- -	0
			Vanadium	- -	--	- -	--	- -	Hair Loss	0	- -	- -	0
			Chemical Total	7E-05	--	- -	--	7E-05		2	- -	- -	2
		Exposure Point Total						7E-05					2
	Exposure Medium Total							7E-05					2
Medium Total								7E-05					2
Receptor Total							Receptor Risk Total	7E-05				Receptor HI Total	2

Total Body Weight HI	0
Total CNS HI	0
Total CVS HI	1
Total GS HI	0
Total Immune HI	0
Total Liver HI	0
Total Skin HI	0
Total Hair Loss HI	1

TABLE R2-15

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURES

ZONE K AOC 695

north CHARLESTON NAVAL COMPLEX, CHARLESTON SOUTH CAROLINA

Scenario Timeframe: CURRENT/FUTURE
Receptor Population: RECREATIONAL USER
Receptor Age: ADULT

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Finfish/Shellfish	AOC 695	Aluminum	- -	--	- -	--	- -	Body Weight	0.1	- -	- -	0.1
			Arsenic	7E-06	--	- -	--	7E-06	Skin, CVS	0.1	- -	- -	0.1
			Chromium	- -	--	- -	--	- -	Respiratory	0.0	- -	- -	0.0
			Cobalt	- -	--	- -	--	- -	CVS, Immune, CNS	0.1	- -	- -	0.1
			Iron	- -	--	- -	--	- -	GS	0.1	- -	- -	0.1
			Thallium	- -	--	- -	--	- -	Hair Loss, Liver	0.1	- -	- -	0.1
			Vanadium	- -	--	- -	--	- -	Hair Loss	0.0	- -	- -	0.0
			Chemical Total	7E-06	--	- -	--	7E-06		1	- -	- -	1
		Exposure Point Total						7E-06					1
	Exposure Medium Total							7E-06					1
Medium Total								7E-06					1
Receptor Total							Receptor Risk Total	7E-06				Receptor HI Total	1

Total Body Weight HI	0.1
Total CNS HI	0.1
Total CVS HI	0.2
Total GS HI	0.1
Total Immune HI	0.1
Total Liver HI	0.1
Total Skin HI	0.1
Total Hair Loss HI	0.2

APPENDIX S

RESPONSES TO SCDHEC AND SCDNR COMMENTS ON THE RFI REPORT FOR ZONE J

S.1 RESPONSE TO SCDHEC AND SCDNR COMMENTS ON THE RFI REPORT FOR ZONE J, REV. 1, DATED NOVEMBER 2011

S.2 RESPONSE TO SCDHEC AND SCDNR INFORMAL REVIEW COMMENTS ON THE RFI REPORT FOR ZONE J, REV. 2, DATED SEPTEMBER 2012

S.1 RESPONSE TO SCDHEC AND SCDNR COMMENTS ON THE RFI REPORT FOR ZONE J, REV. 1, DATED NOVEMBER 2011

BOARD:
Paul C. Aughtry, III
Chairman

Edwin H. Cooper, III
Vice Chairman

Steven G. Kisner
Secretary

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

BOARD:
Henry C. Scott

M. David Mitchell, MD

Glenn A. McCall

Coleman F. Buckhouse, MD

March 22, 2012

David Criswell, P.E.
BRAC PMO SE
4130 Faber Place Drive
Suite 202
N. Charleston, SC 29405

RE: Review of *RCRA Facility Investigation Report for Zone J*
Charleston Naval Complex (CNC)
SC0 170 022 560

Dear Mr. Criswell:

The Corrective Action Engineering and the Hydrogeology Sections of the South Carolina Department of Health and Environmental Control (Department) received the above referenced report on November 28, 2011. The Department reviewed the document and provides the following engineering and risk assessment comments.

The response to the review of these comments should be included in either change pages or a revised version of the report. In addition, response to comments should be submitted. If you have any questions regarding this issue, please contact me at (803) 896-4218.

Sincerely,

Meredith Amick, P.E., Environmental Engineer
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

cc: Dann Spariosu, PhD, EPA Region 4 (via email) Gary Foster, CH2MHill
Annie Gerry, Hydrogeology Geoff Pope, Tetra Tech
Christine Sanford-Coker, EQC Region 7, Charleston

BOARD:
Paul C. Aughtry, III
Chairman

Edwin H. Cooper, III
Vice Chairman

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Secretary

D H E C

PROMOTE PROTECT PROSPER

C. Earl Hunter, Commissioner

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BOARD:
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Coleman F. Buckhouse, MD

ENGINEERING COMMENTS
Prepared by Meredith Amick
Charleston Naval Complex
March 22, 2012

1. Because dredge spoils with historical exceedences and potential munitions from Zone J are being placed on Clouter Island, this information should be considered during the investigation of AOCs 693 and 694.
2. Data quality for the data collected in response to the 2008 Supplemental RFI QAPP should be discussed as there are some elevated MDLs in this data and significant amount of U data. Additionally data quality was the driver for the additional sampling proposed in the 2008 Supplemental RFI QAPP.
3. Please provide a map showing the dredged areas (by both the SC State Ports Authority and US Army Corp of Engineers) in Zone J.
4. Please provide a map showing all of the AOCs being recommended for NFA in this document.
5. Please provide 1 full hard copy of the Appendices of the revised document for the file.
6. In Tables 4-1 through 4-8 please indicate which samples have MDLs higher than the screening values.
7. In Tables 4-1 through 4-8 the definition of UJ should be discussed.
8. Please discuss why Table 4-2 and Table 4-4 only show one of three sample locations over time for Noisette and Shipyard Creek, respectively.
9. Table 4-8 states that Chrysene was detected in sample location 556M0007 in April 2008 at 840 ug/kg however, Table 4-5 states it was detected at 880 ug/kg. Please correct the discrepancy.
10. On Page 6-21 please ensure that the Summary of Chemical of Potential Concern for Zone J Table is provided all on one page for ease of review.
11. Please provide the Weights of Evidence for recommendation of NFA in table format in the Conclusion and Recommendations section.

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Meredith Amick, P.E., Environmental Engineering Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Kent Krieg, Risk Assessor
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

KMK

DATE: March 22, 2012

RE: Charleston Naval Complex (CNC)
Charleston, South Carolina

Document:
RCRA Facilities Investigation report for Zone J
Dated November 2011

The above referenced document by TetraTech, NUS has been reviewed. The Department has the following risk related comments:

Specific Comments:

1. 6.5.2 Interpretation of Risk Assessment Results, page 6-12 and R2.5.2 Interpretation of Risk Assessment Results, page R2-8.
   The Department would like to emphasize that remedy selection is a site specific decision and 'No Further Action' should not be automatically set to 10^{-4}. SCDHEC may require further remedial action in the event that the incremental lifetime cancer risks are between $1x10^{-4}$ to $1x10^{-6}$ per USEPA RAGS - Part B guidance. This risk management decision will be made by the risk managers.

2. 6.6.12 Chemicals without Established Screening Levels, page 6-17.
   Although the utilized screening values are described earlier in the document, to prevent confusion, please add 'Ecological' into the title or change the first sentence to start with 'Ecological risk-based screening levels…"

3. 6.7 Summary, page 6-21.
   BEHP is listed as COPC for the Cooper River Sediment. It does not appear within the text discussion COPCs on page 6-5. Please correct this discrepancy to keep the COPC lists consistent.

4. 6.5.3 Results of the Risk Characterization, page 6-13; 6.7 Summary of Cancer and Non-Cancer Risk Estimates for Environmental Media at Zone J, page 6-22 to 6-23 ; R2.5.3 Results of the Risk Charaterization, page R2-9; R2.7 Summary, page R2-15.
   Please include the calculated ILCR values if they are above $1x10^{-6}$ (if they fall within or above the target risk management range) to help summarize the overall risk for both exposure summaries for future reference.
   [i.e. ...Noisette Creek ($6x10^{-6}$) and Shipyard Creek ($9x10^{-6}$) were less than...]

5. Table R2-7
   There is a typo listing mercury as a COPC rather than Manganese.

6. Table R2-10 and Table R2-11.
   Please provide the RAGs D Calculation Tables for the Zone K risk assessment within Appendix R. As provided, only the Summary tables are present.

If you need any further information, feel free to contact me at (803) 896-4262.

Subject: FW: Zone J RFI Comments
Attachments: ZoneJ_RFI_DNRcomments.pdf

From: Sanford, Art F CTR NAVFACHQ, BRAC PMO [mailto:art.sanford.ctr@navy.mil]
Sent: Wednesday, April 11, 2012 2:42 PM
To: Pope, Geoff
Cc: Criswell, David CIV NAVFACHQ, BRAC PMO
Subject: FW: Zone J RFI Comments

Geoff,

Here are DNR comments.

Art

-----Original Message----------
From: Priscilla Wendt [mailto:WendtP@dnr.sc.gov]
Sent: Wednesday, April 11, 2012 2:13 PM
To: 'Amick, Meredith'
Cc: Sanford, Art F CTR NAVFACHQ, BRAC PMO
Subject: RE: Zone J RFI Comments

Hi, Meredith and Art,
Attached are SCDNR's comments on the Zone J RFI Report. Please forward them to anyone else who might need to see them.

Thanks!

Priscilla

SCDNR Comments on Zone J RCRA Facility Investigation Report (November 2011)

1. **pp. ES-1 and 1-2:** Change "Macallow" to "Macalloy".

2. **Section 1.3.2:** A location map or aerial photo that shows the boundaries of all AOCs and SWMUs associated with Zone J, including both remediated and unremediated sites, should be included in the report. In addition, a list of remediated AOCs/ SWMUs associated with Zone J and contaminants associated with these AOCs/ SWMUs should be included in this section. This information facilitate the identification of specific upland contaminant sources that may have (or still are) contributing to high sediment contaminant concentrations in Zone J.

3. **Section 4.3:** The concentrations of several PAHs were exceptionally high at station 556M000503 in the Cooper River, nine of which exceeded ER-M and/or Probable Effects Levels (PELs) for aquatic organisms. Please clarify whether or not there was any evidence that these high concentrations of PAHs were attributable to AOC 692 ("Free Product along the Cooper River"). If so, this free product should be removed as soon as possible, regardless of the results of the human health or ecological risk assessments.

4. **Tables 4-2, 4-4 and 4-6**: Please explain why these tables include the results from only one of three samples collected in each waterbody.

5. **Section 5.0:** Please explain why dioxin and furan congeners were not included in the list of COPCs for Zone J, particularly since sediment testing data collected in support of various maintenance dredging projects have shown elevated levels of these contaminants in the vicinity of the Charleston Naval Complex.

6. **Section 7.0 Ecological Risk Assessment:** In the 2008 dataset, several contaminants exceeded the less conservative ER-M and/ or Probable Effects Levels (PELs) for aquatic organisms in one or more of the three waterbodies encompassed by Zone J. These include mercury in Noisette Creek; dieldrin, chromium and zinc in Shipyard Creek; and, several individual PAHs, as well as total PAHs, copper and zinc in the Cooper River. In addition, food chain modeling showed that several bioaccumulative contaminants had Ecological Hazard Quotients (HQs) that substantially exceeded 1.0 for piscivorous mammals and birds, even under the less conservative "average scenario". Nevertheless, the report concludes that the risk to these ecological receptors (mink and green heron) is minimal, largely because it is assumed that the contaminated area is small relative to the foraging areas of these receptor species, or that the contaminated sediments will be subject to maintenance dredging at some point. It should be noted that those dredged sediments are typically placed in an upland confined disposal facility (CDF) where birds and mammals may have even greater access to prey living in the contaminated dredge spoil. It should also be noted that three sediment samples in each water

body may be insufficient to assume that the contaminated area is relatively small, and therefore warrants the application of an Area Use Factor (AUF) less than 1. In summary, the SCDNR believes it may be premature to recommend no further action either in Zone J or in the AOCs associated with Zone J. Further consideration should be given to better defining the source and spatial extent of contamination in each waterbody, at least for those contaminants that exceed PELs and/or produce an HQ greater than 1.0 under the less conservative "average scenario".

Responses to 3/22/2012 Comments of Annie Gerry (SCDHEC, Hydrology Section)

Comment 1: *Because dredge spoils with historical exceedances and potential munitions from Zone J are being placed on Clouter Island, this information should be considered during the investigation of AOCs 693 and 694.*

Response: The locations on Clouter Island where dredge spoils are deposited will be verified, and if applicable, the Corrective Measures Study being generated for AOCs 693 and 694 will evaluate dredge spoils with historical exceedances and potential munitions.

Comment 2: *Data quality for the data collected in response to the 2008 Supplemental RFI QAPP should be discussed as there are some elevated MDLs in this data and significant amount of U data. Additionally data quality was the driver for the additional sampling proposed in the 2008 Supplemental RFI QAPP.*

Response: The only sample collected in 2008 in which MDLs were elevated relative to USEPA Region 4 sediment ecological screening values (ESVs) was sample 556M000503. That sample was analyzed for PAHs at a 50x dilution (see Appendix O) due to the high concentrations of PAHs in the sample (for example fluoranthene at 41,000 µg/kg), so the elevated MDLs for PAHs in that sample were unavoidable. Nevertheless, only three non-detected PAHs (2-methylnaphthalene, dibenzo(a,h)anthracene, and naphthalene) in sample 556M000503 had MDL values that exceeded Region 4 ESVs. The analytical results for sediment samples collected in April 2008, as well as MDLs and USEPA Region 4 sediment ESVs, are presented in a new table entitled *Table 4-1 Analytical Results of Sediment Samples Collected in April 2008.* As shown in the new Table 4-1, only three non-detected PAHs and bis(2-ethylhexylphthalate) in sample 556M000503 had MDL values that exceeded Region 4 ESVs.

Comment 3: *Please provide a map showing the dredged areas (by both the SC State Ports Authority and US Army Corp of Engineers) in Zone J.*

Response: Figure 1-4 of the EnSafe (2003a) report entitled *Zone J Storm Water Effluent Evaluation Report* (included as Appendix B of the current RFI) is a dredge map of the area encompassing Zone J. See the fourth paragraph of Section 1.4 of the RFI for information supporting the conclusion that Cooper River sediment sampling locations 054M0001, 556M0007, and 556M0005 are within the "Naval Base Maintenance Dredging" area shown in Figure 1-4 of the EnSafe (2003a) report.

Comment 4: *Please provide a map showing all of the AOCs being recommended for NFA in this document.*

Response: A figure showing the AOCs in question has been added to the document. The new figure is numbered as Figure 1-3 in the Rev 2 document and the ""Zone J Sediment Sample Location Map" (Figure 1-3 in the November 2011 Rev 1 document) has been renumbered as Figure 1-4 in the Rev 2 document.

Comment 5: *Please provide 1 full hard copy of the Appendices of the revised document for the file.*

Response: A full hard copy of the appendices has been provided.

Comment 6: *In Tables 4-1 through 4-8 please indicate which samples have MDLs higher than the screening values.*

Response: There are no non-detected analytes with MDLs higher than screening values in any samples shown in Tables 4-1 and 4-3 of the November 2011 document (renumbered as Tables 4-2 and 4-4 in the Rev 2 document). Table 4-5 of the November 2011 document (renumbered as Table 4-6 in the Rev 2 document), which shows analytes that were detected in Cooper River samples in 2008, indicates that sample 556M000503 had three non-detected analytes (2-methylnaphthalene, dibenzo(a,h)anthracene, and naphthalene) with MDLs higher than screening values. As discussed in the response to Comment 2, a new Table 4-1 *(Analytical Results of Sediment Samples Collected in April 2008)* indicates that 2-methylnaphthalene, dibenzo(a,h)anthracene, naphthalene, and bis(2-ethylhexylphthalate) in sample 556M000503 had MDL values that exceeded Region 4 ESVs. The reason that bis(2-ethylhexyl)phthalate is shown in Table 4-1 of the Rev 2 document but is not shown in Table 4-6 of the Rev 2 document is that Table 4-1 shows all chemicals analyzed, while Table 4-6 shows only the chemicals that were detected.

Tables 4-2, 4-4, 4-6, 4-7, and 4-8 of the November 2011 document (renumbered as Tables 4-3, 4-5, 4-7, 4-8, and 4-9, respectively, in the Rev 2 document) provide a comparison of analytical data in the 1994-1997, 2005, and 2008 sampling events; these tables were generated to facilitate evaluations of contaminant trends over time, which is discussed in Sections 4 and 7. MDLs for the 1994-1997 data are not available. MDLs for numerous analytes in the 2005 data exceeded screening values; that issue is discussed in Section 1.3.3 (Zone J Sediment Sampling Report [May 2006]) and is what prompted the 2008 sampling.

Comment 7: *In Tables 4-1 through 4-8 the definition of UJ should be discussed.*

Response: The following footnote, which is paraphrased from *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA, 2008), has been added to each of the tables that contain data with a "UJ qualifier": 'The analyte was not detected above the reported detection limit. However, the reported detection limit is approximate and may or may not represent the actual limit necessary to accurately and precisely measure the analyte in the sample."

Comment 8: *Please discuss why Table 4-2 and Table 4-4 only show one of three sample locations over time for Noisette and Shipyard Creek, respectively.*

Response: As explained in Section 3.2 and in the fourth paragraph of Section 4.0, only one of the three 2008 sample locations in Noisette Creek and one of three 2008 sample locations in Shipyard Creek was sampled prior to 2008. The fourth paragraph in Section 4.0 has been revised to more clearly explain this.

Comment 9: *Table 4-8 states that chrysene was detected in sample location 556M0007 in April 2008 at 840 µg/kg however, Table 4-5 states it was detected at 880 µg/kg. Please correct the discrepancy.*

Response:
Table 4-8 of the November 2011 document (renumbered as Table 4-9 in the Rev 2 document) has been revised to indicate the correct chrysene concentration of 880 µg/kg (as per Appendix 0).

Comment 10: *On Page 6-21 please ensure that the Summary of Chemical of Potential Concern for Zone J Table is provided all on one page for ease of review.*

Response:
The "Summary of Chemicals of Potential Concern for Zone J" list has been revised as requested.

Comment 11: *Please provide the Weights of Evidence for recommendation of NFA in table format in the Conclusion and Recommendations section.*

Response: A new table (Table 8-1), entitled *Summary of Conclusions and Recommendations,* has been added to Section 8.

Responses to 3/22/12 Comments of Kent Krieg (SCDHEC, Corrective Action Engineering Section)

Comment 1: *6.5.2 Interpretation of Risk Assessment Results, page 6-12 and R2.5.2 Interpretation of Risk Assessment Results, page R2-8.*
The Department would like to emphasize that remedy selection is a site specific decision and 'No Further Action' should not be automatically set to 10^{-4}. SCDHEC may require further remedial action in the event that the incremental lifetime cancer risks are between $1x10^{-4}$ to $1x10^{-6}$ per USEPA RAGS - Part B guidance. This risk management decision will be made by the risk managers.

Response: The text discussing risk management decisions has been removed from Section 6.5.2 and from Section R2.5.2 of Appendix R.

Comment 2: *6.6.1.2 Chemicals without Established Screening Levels, page 6-17.*
Although the utilized screening values are described earlier in the document, to prevent confusion, please add 'Ecological' into the title or change the first sentence to start with 'Ecological risk-based screening levels..."

Response: The text has been revised as requested.

Comment 3: *6.7 Summary, page 6-21.*
BEHP is listed as COPC for the Cooper River Sediment. It does not appear within the text discussion of COPCs on page 6-5. Please correct this discrepancy to keep the COPC lists consistent.

Response: BEHP was not detected in the three sediment samples from the Cooper River (see Table 6-3). Therefore BEHP was not selected as a COPC for Cooper River sediment. The summary list of COPCs in Section 6.7 has been revised to remove BEHP as a COPC for Cooper River sediment.

Comment 4: *6.5.3 Results of the Risk Characterization, page 6-13; 6.7 Summary of Cancer and Non-Cancer Risk Estimates for Environmental Media at Zone J, page 6-22 to 6-23 ; R2.5.3 Results of the Risk Characterization, page R2-9; R2.7 Summary, page R2-15.*
Please include the calculated ILCR values if they are above $1x10^{-6}$ (if they fall within or above the target risk management range) to help summarize the overall risk for both exposure summaries for future reference. [i.e. ...Noisette Creek ($6x10^{-6}$) and Shipyard Creek ($9x10^{-6}$) were less than...]

Response: The calculated ILCR values have been included in the appropriate sections as requested if they fall within or above the target risk management range. The RME risks for Noisette Creek are 6×10^{-7} (Table 6-12) and do not fall within or above the target risk management range.

Comment 5: *Table R2-7*
There is a typo listing mercury as a COPC rather than Manganese.

Response: Table R2-7 has been revised to indicate that manganese (not mercury) is a COPC.

Comment 6: *Table R2-10 and Table R2-11.*
Please provide the RAGs D Calculation Tables for the Zone K risk assessment within Appendix R. As provided, only the Summary tables are present.

Response: RAGs Tables 7 and 9 have been added to Appendix R as requested; these are numbered as Tables R2-10 through R2-13. The original Tables R2-10 and R2-11 have been renumbered as Tables R2-14 and R2-15.

Responses to 4/11/12 Comments of Priscilla Wendt (SCDNR)

Comment 1: *pp. ES-1 and 1-2: Change "Macallow" to "Macalloy".*

Response: The typographical error has been revised as requested.

Comment 2: *Section 1.3.2: A location map or aerial photo that shows the boundaries of all AOCs and SWMUs associated with Zone J, including both remediated and unremediated sites, should be included in the report. In addition, a list of remediated AOCs/ SWMUs associated with Zone J and contaminants associated with these AOCs/ SWMUs should be included in this section. This information facilitate the identification of specific upland contaminant sources that may have (or still are) contributing to high sediment contaminant concentrations in Zone J.*

Response: Location maps of all AOCs and SWMUs associated with Zone J, and site-related contaminants for those AOCs and SWMUs, are included in appendices of the Rev 2 RFI. A figure showing the six AOCs discussed in Section 1.3.2 has been provided in the Rev 2 RFI; these are the AOCs for which final decisions regarding remediation have not been made. The new figure is numbered as Figure 1-3 in the Rev 2 document and the ""Zone J Sediment Sample Location Map" (Figure 1-3 in the Rev 1 document) has become Figure 1-4 in the Rev 2 document.

Comment 3: *Section 4.3: The concentrations of several PAHs were exceptionally high at station 556M000503 in the Cooper River, nine of which exceeded ER-M and/or Probable Effects Levels (PELs) for aquatic organisms. Please clarify whether or not there was any evidence that these high concentrations of PAHs were attributable to AOC 692 ("Free Product along the Cooper River"). If so, this free product should be removed as soon as possible, regardless of the results of the human health or ecological risk assessments.*

Response: Section 1.3.2 of the RFI has been revised to include a subsection entitled "Other Contaminant Sources"; the new subsection discusses the process by which spills at CNC are reported to the National Response Center. The new subsection also discusses the "Ever Reach Spill" that occurred in Charleston Harbor in 2002. In addition, the description of AOC 692 in Section 1.3.2 has been revised as it contained outdated information regarding spill responses.

Regarding the question of whether high concentrations of PAHs at sample location 556M000503 are attributable to AOC 692 ("Free Product along the Cooper River"), there is no available evidence to indicate that the high concentrations of sediment PAHs are attributable to AOC 692. However, it does not seem likely that PAHs in surface sediment collected in April 2008 are due to free product discovered in the vicinity prior to 1995.

Comment 4: *Tables 4-2, 4-4 and 4-6: Please explain why these tables include the results from only one of three samples collected in each water body.*

Response: As explained in Section 3.2 and in the fourth paragraph of Section 4.0, only one of the three 2008 sample locations in Noisette Creek and one of three 2008 sample locations in Shipyard Creek was sampled prior to 2008. Therefore, Table 4-2 (Noisette Creek) and Table 4-4 (Shipyard Creek) of the November 2011 document (renumbered as Tables 4-3 and 4-5, respectively, in the Rev 2 document) are comparisons of the same location over three sampling events. Tables 4-6, 4-7, and 4-8 of the November 2011 document (renumbered as Tables 4-7, 4-8, and 4-9, respectively, in the Rev 2 document), each compare a single Cooper River location over three sampling events. Section 4.0 of the Rev 2 RFI has been revised to more clearly explain this. In addition, an explanatory footnote has been added to the tables for Noisette Creek and Shipyard Creek.

Comment 5: *Please explain why dioxin and furan congeners were not included in the list of COPCs for Zone J, particularly since sediment testing data collected in support of various maintenance dredging projects have shown elevated levels of these contaminants in the vicinity of the Charleston Naval Complex.*

Response: The laboratory analyses of sediment samples collected in 2008 were based on information collected during numerous historical investigations that identified COPCs for the five areas of interest. Dioxins and furans were investigated in several sampling events at sites associated with Zone J. For example, Section 6 of the *Storm Water Effluent Evaluation Report*, included in the Zone J RFI as Appendix B, indicates that in sampling events conducted between 1995 and 2000, dioxins and furans were analyzed in samples collected at SWMU 39 (soil and groundwater), SWMU 42 (soil), AOC 505 (soil), SWMU 44 (soil and groundwater), AOC 700 (soil), SWMU 47 (soil and groundwater), AOC 516 (soil and groundwater), AOC 670 (soil), AOC 637 (soil and groundwater), AOC 706 (soil), SWMU 3 (soil and groundwater), and SWMU 11 (soil). These AOCs and SWMUs are located within drainage basins associated with Noisette Creek or Shipyard Creek. The *Storm Water Effluent Evaluation Addendum* presents similar information for AOCs and SWMUs in drainage basins associated with the Cooper River. At sites where dioxins and furans were contaminants of concern, contaminated soil was removed via "dig and haul" remedial actions. At other sites, dioxins and furans were eliminated as COPCs based on evaluations of the analytical data. Therefore, laboratory analyses of sediment samples collected in April 2008 did not include dioxins and furans. A paragraph has been added to Section 1.3.3 of the RFI (in the subsection entitled *Quality Assurance Project Plan for Supplemental RFI at Zone J March 2008*) discussing this. In addition, Section 4.0 of the RFI has been revised to present the compounds for which the 2008 samples were analyzed and to refer the reader to Section 1.3.3 for an explanation of why dioxins and furans were not analyzed in samples collected in 2008.

Comment 6: *Section 7.0 Ecological Risk Assessment: In the 2008 dataset, several contaminants exceeded the less conservative ER-M and/ or Probable Effects Levels (PELs) for aquatic organisms in one or more of the three waterbodies encompassed by Zone J. These include mercury in Noisette Creek; dieldrin, chromium and zinc in Shipyard Creek; and, several individual PAHs, as well as total PAHs, copper and zinc in the Cooper River. In addition, food chain modeling showed that several bioaccumulative contaminants had Ecological Hazard Quotients (HQs) that substantially exceeded 1.0 for piscivorous mammals and birds, even under the less conservative "average scenario". Nevertheless, the report concludes that the risk to these ecological receptors (mink and green heron) is minimal, largely because it is assumed that the contaminated area is small relative to the foraging areas of these receptor species, or that the contaminated sediments will be subject to maintenance dredging at some point. It should be noted that those dredged sediments are typically placed in an upland confined disposal facility (CDF) where birds and mammals may have even greater access to prey living in the contaminated dredge spoil. It should also be noted that three sediment samples in each water body may be insufficient to assume that the contaminated area is relatively small, and therefore warrants the application of an Area Use Factor (AUF) less than 1. In summary, the SCDNR believes it may be premature to recommend no further action either in Zone J or in the AOCs associated with Zone J. Further consideration should be given to better defining the source and spatial extent of contamination in each waterbody, at least for those contaminants* that exceed PELs and/or produce an HQ greater than 1.0 under the less conservative "average scenario".

Response Regarding Shipyard Creek: Area Use Factors in the food chain model (Section 7.5.5.2) have been revised to evaluate the potential risk to representative receptors assuming a "worst case" scenario; i.e., that contamination by bioaccumulative COPCs exists within the stream plus associated marsh from the most upstream sample location all the way to the headwaters of Shipyard Creek. In addition, sediment data from a sampling event in the 1990s for two samples collected upstream of the 2008 samples indicate that inclusion of sediment data from the two historical upstream samples would not significantly alter the results of the average food chain model scenario. In other words, the average concentrations derived from the three-sample 2008 dataset are similar to the average concentrations of the dataset comprised of those three samples plus the two upstream samples collected in the 1990s. Furthermore, Section 8 (Conclusions and Recommendations) of the RFI has been revised to mention that the impacts to the marsh and aquatic habitats that would result from sediment remediation might be more harmful than current contaminant concentrations.

Response Regarding Noisette Creek: Area Use Factors in the food chain model (Section 7.5.4.2) have been revised to evaluate the potential risk to representative receptors assuming a "worst case" scenario;

i.e., that contamination by bioaccumulative COPCs exists within the stream plus associated marsh from the most downstream sample location all the way to confluence of Noisette Creek and the Cooper River. The text has been revised to point out that the mercury (the primary COPC in Noisette Creek) concentrations in Cooper River sediment samples were less than the ecological screening value, justifying the use of the mouth of Noisette Creek (rather than farther into the river) in revisions to the Area Use Factors.

Response Regarding Cooper River: Section 7.5.6.3 of the RFI has been revised to discuss contaminated dredge material that is deposited on Clouter Island, especially regarding the likely dilution of contaminated spoils by subsequent dredge spoil application from other (less-contaminated) areas. The locations on Clouter Island where dredge spoils are deposited will be verified, and if applicable, the Corrective Measures Study being generated for AOCs 693 and 694 will evaluate contaminated dredge spoils.

S.2 RESPONSE TO SCDHEC AND SCDNR INFORMAL REVIEW COMMENTS ON THE RFI REPORT FOR ZONE J, REV. 2, DATED SEPTEMBER 2012

RESPONSE TO SCDHEC/SCDNR INFORMAL REVIEW COMMENTS (DECEMBER 2012)

RCRA FACILITY INVESTIGATION REPORT FOR ZONE J AT CHARLESTON NAVAL COMPLEX (SEPTEMBER 2012)

CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

Comments are shown in bold font. Responses follow each comment and are shown in regular font.

RESPONSE TO 12/6/12 COMMENT OF MEREDITH AMICK, PE (SCDHEC)

Comment 1: Please add a sentence to the end of the first paragraph (*of Response to SCDHEC 3/22/2012 Comment #6*) that states the difference in tables 4-1 and 4-6 (i.e. 4-1 includes bis-2) is that table 4-1 lists all constituents analyzed and table 4-6 lists all constituents with detections.

Navy Response to Amick Comment 1: Agree. The following sentence has been added to the end of the first paragraph of Response to SCDHEC 3/22/2012 Comment #6, "*The reason that bis(2-ethylhexyl)phthalate is shown in Table 4-1 of the Rev 2 document but is not shown in Table 4-6 of the Rev 2 document is that Table 4-1 shows all chemicals analyzed, while Table 4-6 shows only the chemicals that were detected.*"

RESPONSES TO 12/5/12 COMMENTS OF KENT KRIEG (SCDHEC)

Comment 1: Appendix P - Table 7.1 RME, pg. 17 - *Copper River RME* - Table is of Shipyard Creek risk, rather than Copper River. (pg. 17 doesn't match the calculation values as summarized on pg. 18).

Navy Response to Krieg Comment 1: Agree. Table 7.1 RME in the Rev 2 Appendix P mistakenly shows Shipyard Creek results. The table has been corrected to show RME results for the Cooper River.

Comment 2: R2.5.3.3 - *Non-carcinogenic Risks -CTE* - The cumulative HI risk is listed at HI=2, where Table R2-11 shows it as 1 (0.6). Most likely RTE scenario was referenced.

Navy Response to Krieg Comment 2: Agree. The text in Section R.2.5.3.3 (Non-carcinogenic Risks – CTE) was mistakenly referencing the RME scenario. The text in Section R.2.5.3.3 has been replaced with the following, "*...Cumulative HIs for the recreational fisherman (HI = 0.6) consuming fish from the Cooper River at AOC 695 were less than unity (Table R2-11). Therefore, unacceptable non-carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.*"

Comment 3: R2.5.3.4 - Carcinogenic Risks - CTE - The actual risk was left off this risk summary, please at 6.6 x 10^{-6} into the text similar to R2.5.3.2 (see Krieg comment #4).

Navy Response to Krieg Comment 3: Agree. The text has been revised to state, "*...Cumulative ILCRs for the recreational fisherman consuming fish from AOC 695 under the CTE scenario are 6.6 x 10^{-6} (Table R2-11), which are within USEPA's target risk range of 10^{-4} to 10^{-6}. Therefore, unacceptable carcinogenic risks are not anticipated for the recreational fisherman at AOC 695.*"

Comment 4: Table R2-12 does not summarize table R2-10 HIs accurately. Summary only shows 0.5 risk when the total risk is 2.

Navy Response to Krieg Comment 4: Agree. Table R2-12 has been revised to accurately summarize the results in Table R2-10.

RESPONSES TO 12/10/12 COMMENTS OF PRISCILLA WENDT (SCDNR)

Comment 1: Please provide additional clarification on the following responses to SCDNR comments (of April 11, 2012) on the Zone J RFI Report (Revision 2, September 2012), as contained in Appendix S of the RFI Report:

Regarding Previous Response to Comment #3: Please clarify whether or not any "free product" or other evidence of past oil spills was observed along the Cooper River shoreline (AOC 692) during the 2008 sampling event. Please add a sentence clarifying this point to the text discussing AOC 692 on pp. 1-4 and 1-5.

Navy Response to Wendt Comment Regarding Previous Response to Comment #3: No free product nor any other evidence of past oil spills was observed along the Cooper River shoreline during the 2008 sampling event. A sentence clarifying this will be added to the text discussing AOC 692.

Comment Regarding Previous Response to Comment #5: As stated in this response, soil and/or groundwater from several AOCs and SWMUs were tested for dioxins and furans; however, no statement is made regarding sediments. [a] Please clarify whether or not any of the earlier investigations of Zone J included analyses of dioxin/furan congeners in sediments, and if so, what those results showed regarding dioxin/furan Toxic Equivalency Quotients (TEQs). [b] Also, please clarify which of the AOCs/SWMUs cited in this response had dioxins/furans as contaminants of concern and where "dig and haul" remedial actions were conducted. [c] Please clarify whether or not any of these AOCs/SWMUs might have been sources of dioxin/furan congeners to Zone J sediments prior to remediation.

Navy Response to Wendt Comment Regarding Previous Response to Comment #5[a]: Dioxins and furans have not been analyzed in Zone J sediments, but dioxins and furans were analyzed in approximately 10 percent of soil and groundwater samples collected early in the investigations of AOCs and SWMUs located in drainage basins that discharge to Zone J. A technical memorandum entitled *Proposed Approach for Addressing Dioxin (TEQ) in Soils at CNC Sites* (CH2MHill, 2002) was presented to the CNC BRAC Cleanup Team in 2002. The technical memorandum summarized TEQ data for over 500 samples of surface soil and subsurface soil collected from CNC sites and background areas. Basewide TEQ concentrations in surface soil averaged 11.6 ng/kg (0.0116 µg/kg) and basewide TEQ concentrations in subsurface soil averaged 5.2 ng/kg (0.0052 µg/kg) (CH2MHill, 2002). All TEQ results were less than the USEPA policy-based target soil cleanup level of 1 µg/kg for unrestricted land use.

A copy of this technical memorandum is attached to this Response to Comments and will be included in an appendix of the revised Zone J RFI.

Additionally, the earlier investigations mentioned in the previous response to Comment 5 (*Zone J RFI Storm Water Effluent Evaluation Report* [EnSafe, 2003a] and the *Zone J RFI Storm Water Effluent Evaluation Report Addendum* [EnSafe, 2003b]) examined soil data, groundwater data, environmental incident reports, and sewer cross-connect reports to determine the COPCs for further evaluation and linkages to CNC sites. The CNC BRAC Cleanup Team, after evaluating the EnSafe (2003a; 2003b) reports and the CH2MHill (2002) memorandum, determined that analyses of sediments at Zone J for dioxins and furans were not necessary based on the lack of upland sources of these compounds.

Navy Response to Wendt Comment Regarding Previous Response to Comment #5[b]: The comment refers to the two following sentences:

> "...At sites where dioxins and furans were contaminants of concern, contaminated soil was removed via 'dig and haul' remedial actions. At other sites, dioxins and furans were eliminated as COPCs based on evaluations of the analytical data."

These two sentences were based on statements made by SCDHEC representatives during a meeting at the SCDNR office in Charleston, SC, on May 29, 2012; the meeting was attended by representatives of

SCDNR, SCDHEC, and Tetra Tech, plus a Navy Contractor, and the two sentences were included in Section 1.3.3 of the Rev 2 RFI. Subsequent to the September 2012 Rev 2 RFI, a copy of the CH2MHill (2002) technical memorandum mentioned above (*Proposed Approach for Addressing Dioxin (TEQ) in Soils at CNC Sites*) was obtained from SCDHEC's files. As previously discussed, the technical memorandum indicates that dioxin/furan TEQ results in all soil samples collected at CNC were less than the USEPA policy-based target soil cleanup level of 1 µg/kg for unrestricted land use. Based on this, dioxins and furans were not final contaminants of concern at any sites, and remedial actions based on dioxins/furans were not conducted at any sites. Section 1.3.3 will be revised to clarify this.

Navy Response to Wendt Comment Regarding Previous Response to Comment #5[c]: Available soil data support the conclusion that AOCs and SWMUs at CNC are not sources of dioxins and furans in Zone J sediments. Specifically, the CH2MHill (2002) technical memorandum mentioned above indicates that TEQ results in more than 500 soil samples collected throughout CNC were less than 1 µg/kg; basewide TEQ concentrations in surface soil averaged 11.6 ng/kg (0.0116 µg/kg) and basewide TEQ concentrations in subsurface soil averaged 5.2 ng/kg (0.0052 µg/kg). Thus, the CNC soil data presented in the CH2MHill technical memorandum did not identify any Navy sources of dioxins and furans above the USEPA soil cleanup level of 1 µg/kg, and AOCs and SWMUs that are located in drainage basins that discharge to Zone J are not believed to have ever been significant contributors of dioxins and furans to Zone J.

Comment Regarding Previous Response to Comment #6: The report concludes that ecological risk to upper level trophic groups in all three water bodies is minimal, and, therefore, further investigation or remediation in Zone J is not warranted. Since this conclusion is heavily dependent on the assumption that the AUF is substantially less than 1 for each of the ecological receptor species included in the food chain analyses, tables showing the HQs calculated using the smaller AUFs should be included in (or separately from) those tables showing the HQs calculated using an AUF = 1 (i.e., Tables 7-7, 7-8, 7-10, 7-11, 7-13 and 7-14).

Navy Response to Wendt Comment Regarding Previous Response to Comment #6: Agree. Tables 7-8, 7-11, and 7-14, which present results of food chain modeling in the less conservative, or "average" scenario, will be revised as requested to show the HQs calculated using area use factors (AUFs) less than 1.0. In addition, two tables (7-15 and 7-16) have been added to show the food chain HQs calculated using only the data from sediment sample 054M000103. Tables 7-7, 7-10, and 7-13 do not need to be revised, because they present food chain modeling results in the conservative scenario in which the AUF was 1.0; indicating that the home range of each representative receptor was conservatively assumed to be equal in size to the contaminated portion of the water body in question.

ATTACHMENT

TECHNICAL MEMORANDUM: PROPOSED APPROACH FOR ADDRESSING DIOXIN (TEQ) IN SOILS AT THE CNC SITES (CH2M HILL, INC., 2002)

Proposed Approach for Addressing Dioxin (TEQ) in Soils at the CNC Sites

PREPARED FOR:	CNC BCT
PREPARED BY:	Vijaya Mylavarapu/CH2M HILL
COPIES:	Dean Williamson/CH2M HILL
DATE:	March 6, 2002

Introduction

For all sites at which dioxins in soil have been reviewed so far by CH2M Jones, soil TEQ results have been below the EPA policy-based target cleanup level ("action level") of 1 ug/kg for unrestricted land use. During review of several RFI report addenda, DHEC has suggested that although DHEC does not expect to require active remediation at sites with dioxins in soil below the 1 ppb EPA action level, DHEC would like CH2M Jones to conduct a risk assessment for dioxins at sites where dioxins are detected above residential RBCs (typically a value below background concentrations).

CH2M Jones has responded that because the ultimate outcome for the remedial decision will not change based on the risk assessment and because of the large number of sites involved, a more efficient method for addressing dioxins in soil other than a large number of risk assessments would be of benefit to the BCT members. This issue was discussed at the February 2002 BCT meeting and it was agreed that CH2M Jones would review and summarize basewide TEQ values for comparison purposes and would propose a pathway forward for this issue.

In addition, Tony Hunt also recalled that the CNC BCT had previously reached some agreements on this same issue and indicated that he would forward any materials related to these decisions to the team.

Summary of Previous CNC BCT Agreements on Addressing TEQs

The past agency review discussions on TEQs were recently forwarded by Tony Hunt to the BCT members. The following conclusions were drawn from review of this material.

- Ted Simon/EPA did an analysis of Zone H TEQ data in 1995, developed an exposure scenario pertinent to Zone H sites, and recommended use of the EPA's exposure limit value of 1 ug/kg (ppb) as the target for Zone H sites. For sites with TEQs below 1 ppb, he concluded that no action is needed due to lack of excessive human health risks.
- DHEC in 1998 concluded that conducting site-by-site risk assessments for dioxins was not necessary, as part of the review of the Zone C RFI report. DHEC recommended that a qualitative discussion related to TEQs be included for the Zone C RFI report, as none of the soil concentrations exceeded 1 ppb level.

Based on these previous BCT conclusions and agreements for Zone C, it is not necessary to conduct site-by-site risk assessments for TEQs, if TEQ concentrations in soil are below 1 ppb. A qualitative discussion of TEQs should be apropriate where soil TEQs are less than 1 ppb. If TEQs are above 1 ppb, a risk assessment may be necessary.

Summary of Zone and Basewide TEQ Values in Soil

Attached Tables 1 to 3 present the data summaries for the TEQ levels within different zones of CNC for both surface and subsurface soils. These data include all site and background (grid) soil samples . Inspection of these tables indicates that no TEQ results for any soil samples within the CNC exceeded 1 ppb concentration.

Based on the previous discussions and data presented in these tables, CH2M Jones proposes to use the approach advocated for the Zone C RFI report and include a qualitative discussion of the TEQs for sites with TEQ data.

Table 1: TCDD Equivalent Concentrations in Surface Soil by Zone at CNC

Surface Soil							
Zone	Units	Samples	Detects	Average (detects+non detects)	Average Detect	Minimum	Maximum
B	ng/kg	3	3	3.3	3.3	0.56	8.4
C	ng/kg	19	19	6.0	6.0	0.46	65
D	ng/kg	1	1	3.4	3.4	3.4	3.4
E	ng/kg	62	62	2.3	2.3	0.23	46
F	ng/kg	13	13	2.0	2.0	0.23	12
G	ng/kg	20	20	51	51	0.29	970
H	ng/kg	119	119	19	19	0.66	428
I	ng/kg	53	53	1.7	1.7	0.23	11
K	ng/kg	40	40	3.9	3.9	0.32	39
K-Clouter	ng/kg	4	4	1.3	1.3	0.30	3.9

Table 2: TCDD Equivalent Concentrations in Subsurface Soil by Zone at CNC

Subsurface Soil							
Zone	Units	Samples	Detects	Average (detects+non detects)	Average Detect	Minimum	Maximum
A	ng/kg	4	4	0.72	0.72	0.63	0.90
C	ng/kg	13	13	0.75	0.75	0.31	2.5
E	ng/kg	28	28	1.2	1.2	0.16	6.8
F	ng/kg	1	1	0.86	0.86	0.86	0.86
G	ng/kg	5	4	34	42	0.42	160
H	ng/kg	63	63	8.9	8.9	0.41	57
I	ng/kg	17	17	0.40	0.40	0.084	0.91
K	ng/kg	26	25	1.1	1.1	0.35	3.4
K-Clouter	ng/kg	1	1	0.30	0.30	0.30	0.30

Table 3: CNC Base-wide TCDD Equivalent Concentrations in Surface and Subsurface Soil

Media	Units	Samples	Detects	Average (detects+non detects)	Average Detects	Minimum	Maximum
SS	ng/kg	346	346	11.56	11.56	0.23	970
SB	ng/kg	158	156	5.14	5.20	0.08	160