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FINAL REMEDIAL INVESTIGATION REPORT FOR SITE 4 NCBC GULFPORT MS
11/1/2009
TETRA TECH

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

Rev. 2
11/13/09

Remedial Investigation Report
for
Site 4 – Golf Course Landfill

Naval Construction Battalion Center Gulfport
Gulfport, Mississippi

Contract Task Order 0283

November 2009

NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

Rev. 2
11/13/09

REMEDIAL INVESTIGATION REPORT
AT
SITE 4 - GOLF COURSE LANDFILL

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
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NAS Jacksonville
Jacksonville, Florida 32212-0030

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ACRONYMS

2.4-D	2.4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacedic acid
ABB-ES	ABB Environmental Services, Inc.
ACH	air exchanges rate
AET	apparent effects level
Ah	aryl hydrocarbon
AHR	aryl hydrocarbon receptor
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
BCF	bioconcentration factor
BHC	benzene hexachloride
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
BTOC	below top of casing
°C	degrees Celsius
Cal EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environment Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
cm^2	square centimeters
cm/sec	centimeters per second
COPC	chemical of potential concern
CSF	cancer slope factor
CSM	conceptual site model
CTE	central tendency exposure
CVOC	chlorinated volatile organic compound
DAF	dilution/attenuation factor
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DGPS	differential global positioning system
DNA	deoxyribonucleic acid
DOD	U.S. Department of Defense

ACRONYMS (CONTINUED)

DON	Department of the Navy
DPT	direct push technology
EPC	exposure point concentration
ERA	ecological risk assessment
ESV	Ecological Screening Value
EU	exposure unit
°F	degrees Fahrenheit
FDEP	Florida Department of Environmental Protection
feet/foot	feet per foot
feet/min	feet per minute
FID	flame ionization detector
FS	feasibility study
feet/day	feet per day
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HLA	Harding Lawson Associates
HO	Herbicide Orange
HpCDD	heptachlorodibenzodioxin
HPDD	heptachlorodibenzodioxin
HQ	hazard quotient
HSA	hollow stem auger
HSDB	Hazardous Substance Data Bank
IAS	Initial Assessment Study
IDW	investigation-derived waste
ILCR	incremental lifetime cancer risk
IR	Installation Restoration
IRA	interim remedial action
IRIS	Integrated Risk Information System
K_d	distribution coefficient
kg	kilograms
kg/mg	kilograms per milligram
K_{oc}	organic carbon partition coefficient
K_{ow}	octano/water partition coefficient
L/day	liters per day

ACRONYMS (CONTINUED)

LOAEL	lowest-observed-adverse-effects level
MCEQ	Mississippi Commission on Environmental Quality
MCL	Maximum Contaminant Level
MDEP	Michigan Department of Environmental Protection
MDEQ	Mississippi Department of Environmental Quality
mg/cm_2	milligrams per square centimeter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
MI	mobility index
MRL	minimum risk level
msl	mean sea level
NA	not applicable or not available
NAVFAC SE	Naval Facilities Engineering Command Southeast
Navy	United States Department of the Navy
NCBC	Naval Construction Battalion Center
NCEA	National Center for Environmental Assessment
NCF	Naval Construction Force
ND	nondetect
NEPA	National Environmental Policy Act
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center
ng/L	nanograms per liter
ng/kg	nanograms per kilogram
NOAA	National Oceanographic and Atmospheric Administration
NOAEL	no-observed-adverse-effects level
NTU	Nephelometric Turbidity Unit
OCDD	octachlorodibenzodioxin
OCDF	octachlorodibenzofuran
ORP	oxidation reduction potential
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OSWER	Office of Solid Waste and Emergency Response
PAH	polyncyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxin
PCE	tetrachloroethene
PEC	probable effects concentration

ACRONYMS (CONTINUED)

PeCDD	pentachlorodibenzodioxin
pg/L	picograms per liter
ppb	preliminary remediation goal
PPRTV	Provisional Peer Reviewed Toxicity Value
ppq	parts per quadrillion
PRG	preliminary remediation goal
PVC	polyvinyl chloride
RAGS	Risk Assessment Guidance for Superfund
RBC	risk-based concentration
RDA	recommended daily allowance
RfC	Reference Concentration
RfD	Reference Dose
RI	remedial investigation
RME	reasonable maximum exposure
S	solubility
SDWA	Safe Drinking Water Act
SLERA	Screening Level Ecological Risk Assessment
SMDP	Scientific/Management Decision Points
SQL	sample quantitation limit
SSL	Soil Screening Level
SVOC	semivolatile organic compound
SWL	static water level
TAL	Target Analyte List
TCA	trichloroethane
TCDD	tetrachlorodibenzo dioxin
TCE	trichloroethene
TCL	Target Compound List
TEC	threshold effects concentration
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalency Quotient
TOC	total organic carbon
TRG	Target Remedial Goal
TRV	toxicity reference value
TtNUS	Tetra Tech NUS, Inc.
UCL	Upper Confidence Limit
µg/kg	micrograms per kilogram

ACRONYMS (CONTINUED)

µg/L	micrograms per liter
USAF	United States Air Force
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VDEQ	Virginia Department of Environmental Quality
VF	volatilization factor
VOC	volatile organic compound
VP	vapor pressure
WHO	World Health Organization

EXECUTIVE SUMMARY

Tetra Tech NUS, Inc. (TtNUS) under contract to the United States Department of the Navy, Naval Facilities Command Southeast (NAVFAC SE), has conducted a remedial investigation (RI) at the Site 4 - Golf Course Landfill, Naval Construction Battalion Center (NCBC) Gulfport, located in Gulfport, Mississippi. The Site 4 - Golf Course Landfill, located in the western part of NCBC Gulfport. This RI Report was prepared under the Comprehensive Long-term Environmental Action Navy (CLEAN) III, Contract No. N62467-94-D-0888.

PURPOSE OF REPORT

The primary objective of this RI was to characterize current environmental conditions at Site 4 due to past landfill operations and to provide the basis for a remedy selection that is protective of human health and the environment. These goals included: adequate characterization of the site contaminants; definition of site dynamics (including contaminant migration pathways, transportation mechanisms, and potential receptors); and definition of site risks. Given the historical operations and the types and volumes of materials disposed of in this landfill, the presumptive remedy framework was deemed appropriate for Site 4. The presumptive remedy for municipal waste landfills is containment with a low-permeability cover.

Previous investigations at Site 4 focused on determining the distribution of landfill materials at the site and the presence or absence of Herbicide Orange (HO) related dioxin contamination. Therefore, the RI included collection and analysis of additional soil, groundwater, surface water, and sediment samples to evaluate the nature and extent of other contaminants, particularly chlorinated solvents, previously documented at the site.

SITE HISTORY

Site 4 is an approximately 13 acre former landfill located in the western section of NCBC Gulfport, northeast of the intersection of 7th Street and Canal No. 1. The Site 4 landfill was operated from 1966 until 1972 and was the only operating landfill on the base at that time. Waste material was disposed of in trenches, burned daily, and then covered with fill. Building and infrastructure debris were disposed of at the site following Hurricane Camille in 1969. Contamination was first reported from the area designated as Site 4 in 1995.

PREVIOUS INVESTIGATION

Site 4 was first identified and evaluated in the Initial Assessment Study (IAS) completed in 1985, which recommended a confirmation study. Additional studies include: Confirmation Study (also known as Verification Study, 1987), Surface Water/Sediment Delineation Study (1995), Interim Remedial Action (IRA) (1997), and Groundwater Monitoring Report (1999).

These investigations have included geophysical surveys, monitoring well installation, and soil, groundwater, and sediment sampling; however, these investigations did not completely determine the nature and extent of contamination at the site. Results of these studies indicated the presence of contaminants at concentrations above Mississippi Department of Environmental Quality (MDEQ) Tier 1 Screening Levels for the respective media.

Dioxin analytical results at Site 4 indicated widespread, low levels of dioxin and furan congeners in the groundwater. Several volatile organic compounds (VOCs) were reported above screening levels at Site 4, including vinyl chloride (VC), 1,2-dichloroethene (DCE), and trichloroethene (TCE). The presence of these VOCs is likely due to the disposal of chlorinated cleaning compounds reported to have taken place at this landfill. The period of landfill activities (1966-1972) and the ratios of breakdown chemicals (VC) to parent chemicals (TCE) suggest that significant degradation has taken place.

NATURE AND EXTENT OF CONTAMINATION

Previous investigations and the IRA at the site focused on HO-related contaminants; therefore, additional samples from each media were collected and analyzed to evaluate the nature and extent of other contaminants that may have been released at the site. The analytical results from the sampling efforts were screened against the appropriate MDEQ Tier 1 (unrestricted) Target Remedial Goals (TRGs.)

The geophysical investigations indicate the presence of buried disposal cells from landfill operations. A variety of land-filled debris, including wire, wood, household garbage and construction debris were observed during intrusive activities at the site. Some of the material and the soil matrix showed indications of burning. These findings are consistent with the reported disposal activities at Site 4. The detections of chlorinated volatile organic compounds (CVOCs) at Site 4 suggest that landfill disposal is the source of contamination.

Surface and shallow subsurface soils in this area are primarily gray and brown sand to sandy clay. The uppermost 2 feet in most areas is made up of fill material used in the construction of the golf course. Interpretation of data from the gauging events at Site 4 indicates that groundwater flow in the shallow groundwater interval is to the northwest. The estimated average groundwater velocity for the shallow

wells at Site 4 was calculated at 1.7 feet per day (feet/day). The estimated average groundwater velocity for the deep wells at Site 4 was calculated at 0.06 feet/day.

Analytical data from the soil sampling events reported herbicides, pesticides, VOCs, SVOCs and PCBs below regulatory standards. However, dibenzo(a,h)anthracene was detected in one subsurface soil sample at a concentration greater than the unrestricted TRG, but less than the restricted TRG. Additionally, dioxins were detected in both of the subsurface soil samples submitted for dioxin analysis. The octachlorodibenzodioxin (OCDD) and heptachlorodibenzo-p-dioxin (HpCDD) congeners were at concentrations one or two orders of magnitude greater than the tetrachlorodibenzo dioxin (TCDD) concentration. The dioxin toxicity equivalency quotient (TEQ) calculated from the Site 4 soil samples were less than the unrestricted Tier 1 TRG for TCDD. Lastly, arsenic was detected in the majority of the subsurface soil samples at concentrations greater than the Tier 1 unrestricted TRG. Two of these locations had arsenic concentrations greater than the restricted TRG.

A dissolved CVOC plume was delineated in the southern part of Site 4. Concentrations of VC, cis-1,2-DCE, trans-1,2-DCE, and TCE in groundwater exceeded the Tier 1 TRGs. The plume appears to have an area of approximately 48,000 square feet. Comparison of analytical data from shallow and deep well pairs indicate that the CVOC plume is limited to the uppermost sand zone of the shallow surficial aquifer, to a depth of approximately 24 feet, and has not migrated vertically. The CVOC plume has migrated to northwest side of Canal No. 1, indicating that the canal is not a hydraulic barrier. Decreasing CVOC concentrations, up to 50 percent, were noted in two monitoring wells that were sampled in 2004 and 2006; however, DPT samples and samples taken from monitoring wells installed in 2006 had higher CVOC concentrations than previously seen at the site. Data collected to this point suggest that the phenomena known as DCE/VC stall has occurred in the dissolved CVOC plume at Site 4. DCE/VC stall in groundwater systems results when insufficient electron acceptors or substrates or adverse environmental conditions prevent further biologically mediated reductive dechlorination of VOCs to innocuous compounds. Additionally, iron and antimony were detected in the groundwater samples above TRG. SVOC, herbicides, pesticides and PCBs concentrations in the groundwater samples were less than the Tier 1 TRGs.

Benzo(a)pyrene was detected in one sediment sample at a concentration greater than the restricted TRG and in two sediment samples at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-CD)pyrene were also detected in one sediment sample at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Concentrations of other SVOCs detected in sediment samples from Site 4 were less than screening criteria.

OCDD, octachlorodibenzofuran (OCDF), and heptachlorodibenzodioxin (HPDD) were detected in one surface water sample. TCDD was not detected in this sample and the TEQ was less than the Tier 1 TRG for TCDD. Most of the 2,3,7,8 chlorinated dioxin and furan congeners were detected in one or more of the sediment samples analyzed for dioxins at Site 4. TCDD was detected in all three of the sediment samples. The dioxin TEQ for two sediment samples was greater than the unrestricted TRG and less than the restricted TRG. TCDD contributes less than 1 percent of the total concentration of 2,3,7,8 chlorinated congeners, which suggests that HO may not be the major contributor of dioxins and furans in the Site 4 sediment. Additionally, arsenic was detected in most of the sediment samples at concentrations greater than the Tier 1 unrestricted TRG.

HUMAN HEALTH RISK ASSESSMENT

A Human Health risk Assessment (HHRA) was performed to evaluate exposure to contaminants in subsurface soil, groundwater, surface water, and sediment at Site 4. Estimated risks for site workers, occupational workers, construction/excavation workers, and trespassers/recreational users assumed to be exposed to site media were less than or within United States Environmental Protection Agency (USEPA) and MDEQ risk benchmarks. The quantitative risk evaluation indicated that potential adverse health effects may be associated with the hypothetical future residential use of groundwater. The maximum detected concentrations of several VOCs and arsenic in groundwater also exceeded USEPA and MDEQ primary maximum contaminant levels (MCLs). However, there is uncertainty in the risk estimates calculated for exposure to contaminants in groundwater and the numerical risk results are likely overestimated. In addition, the residential groundwater use scenario is evaluated to be conservative and to provide information to risk managers for Site 4. The groundwater underlying and downgradient of Site 4 is not currently used as a source of drinking water and there are no plans to develop this resource in the future. Residential risks estimated for other site media (subsurface soil, surface water, and sediment) were within USEPA and MDEQ benchmarks.

ECOLOGICAL RISK ASSESSMENT

Concentrations of a number of contaminants in Canal No. 1 sediment and surface water were elevated above conservative screening levels and associated with potential risk to ecological receptors. The detected contaminants, while possibly associated with the Site 4 - Golf Course Landfill, may also have been transported from other areas of NCBC Gulfport via storm water runoff through ditches that connect to Canal No.1. When conservative assumptions used in the ecological risk assessment (ERA) are re-evaluated and factors that affect potential exposures such as quality and size of the habitat, and actual use of the site by modeled receptors are considered, the overall level of ecological risk associated with the cited contamination in Canal No. 1 is considered to be minimal.

CONCLUSIONS AND RECOMMENDATIONS

CVOCs and iron were detected in Site 4 groundwater at concentrations exceeding MDEQ risk-based screening criteria. The CVOC plume is limited to the southern part of the site. Polycyclic aromatic hydrocarbon (PAHs) and arsenic were detected in site subsurface soil exceeding MDEQ risk-based screening criteria for unrestricted site use. PAHs, dioxins, and arsenic were detected in sediments from Canal No. 1 exceeding MDEQ risk-based screening criteria for unrestricted site use. Concentrations of analytes detected in surface water samples collected from Canal No. 1 were less than the MDEQ risk-based screening criteria.

The HHRA identified risk to human receptors exposed to site groundwater exceeding USEPA and MDEQ benchmarks. The Screening Level Ecological Risk Assessment (SLERA) indicated that risk to ecological receptors did not exceed USEPA and MDEQ benchmarks.

The CVOC plume in Site 4 groundwater will require measures to eliminate or minimize exposure by active cleanup, engineering controls, and/or institutional controls. A treatability study has been conducted to evaluate the effectiveness of bioaugmentation to remediate the CVOC plume.

This RI has identified the extent of the site and determined the potential impacts posed to human health and ecological receptors. The types of materials identified in the landfill are consistent with a presumptive remedy landfill as extended to military facilities. The current soil cover is not adequate for permanent site closure under either MDEQ or USEPA regulations.

However, the migration of contaminants from the groundwater to surface water or sediment in the adjacent canal is likely, based on similar patterns of reported analytes and locations of maximum concentrations. The result is a number of elevated ecological risks that will require active remediation to prevent further exposure. Potential risks associated with the consumption of local shallow groundwater will need to be prevented via institutional controls.

Based on the results of the RI, a feasibility study (FS) is recommended using the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidelines. The FS should focus on addressing potential adverse health effects that may be associated with the future residential use of groundwater and the ecological concerns associated with surface soil and sediment at the site. The FS will incorporate the presumptive remedy strategy, including a low permeability cover in conjunction with sediment removal and a permanent lining of the canal to prevent recontamination in the future. Long-term monitoring and maintenance of the soil cover will be required.

1.0 INTRODUCTION

TtNUS under contract to the United States Department of the Navy, NAVFAC SE, has conducted this RI at Site 4, NCBC Gulfport, located in Gulfport, Mississippi. Site 4 is the Golf Course Landfill, located in the western part of NCBC Gulfport. This RI report was prepared under the CLEAN III, Contract No. N62467-94-D-0888.

1.1 PURPOSE OF REPORT

The primary objectives of the RI are:

- Adequate characterization of the site conditions.
- Definition of site dynamics, including contaminant migration pathways, transportation mechanisms, and potential receptors.
- Determination of site risks to human and ecological receptors.

Achieving these objectives will provide the basis for a remedy selection that is protective of human health and the environment. The USEPA has established the presumptive remedy framework for achieving each of these goals while streamlining the investigation process.

In order to achieve these primary objectives, samples from various media were collected and analyzed to evaluate sources, pathways, and receptors at and adjacent to the landfill. From 1996 to 2003, previous investigations at Site 4 focused on determining the distribution of landfill materials at the site and the presence or absence of HO-related dioxin contamination.

Responses to MDEQ comments dated August 9, 2009 for the Remedial Investigation Report for the Site 4 – Golf Course Landfill at NCBC Gulfport dated October, 17, 2007 (Rev. 1) are included as Appendix G.

1.2 PRESUMPTIVE REMEDY PROCESS

Based on historical patterns of remedy selection for common categories of sites, including landfills, the USEPA encourages the selection of Presumptive Remedies (*Presumptive Remedies: Policies and Procedures*, USEPA, 1993e) to increase the consistency in remedy selection and to streamline the investigative process. Following the Groundwater Monitoring Evaluation Study [Harding Lawson Associates (HLA), 1998], it was determined that a presumptive remedy for Site 4 was the best course of action based on the characteristics of the materials in the landfill and low concentrations of the contaminants reported in the surficial aquifer. Based on USEPA guidance, a containment remedy

involving a low permeability cover was incorporated into the site strategy to be consistent with USEPA Guidance (USEPA, 1993e) and *Presumptive Remedy for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Municipal Landfills* (USEPA, 1993f), amended by the *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills* (USEPA, 1996), as well as MDEQ policy requiring a low-permeability cover (containment) for this category of landfill as outlined in the Mississippi Commission on Environmental Quality (MCEQ) Solid Waste Management Regulations (MCEQ, 2005).

The presumptive remedy for Site 4 is containment of the existing disposal cells and direct treatment of groundwater contamination that is or could become mobilized beyond the extent of the disposal cell cover. The actions taken to implement containment of Site 4 will include a low permeability cover of the disposal cells coupled to a concrete lining of the adjacent canal. The sediment in the canal will be removed prior to the placement of the concrete lining to ensure a stable base and to remove any residual contamination.

A previously identified CVOC plume has also been characterized and will be treated as part of the remedy process for Site 4. As is consistent with the presumptive remedy process, the selected remedy will treat the source area as well as the plume to prevent further migration in the short term and result in elimination of the CVOC plume in the long term.

1.3 INVESTIGATION USING PRESUMPTIVE REMEDY STRATEGY

The presumptive remedy process for landfills includes a streamlined approach to the RI based on the types of remedial actions most likely to be selected. Because the presumptive remedy includes a cover and containment, there is less emphasis on extensively characterizing the soil and groundwater within individual disposal cells and within the landfill itself. Rather, the investigation is focused on determining the potential impact to the media/receptors adjacent to or downgradient of the disposal area (USEPA, 1993f and 1996).

The primary objectives of the RI at Site 4 included:

- Determination of the extent of the waste disposal area.
- Identification of the types of materials disposed and the potential contaminants of concern.
- Determination of the extent and sources of mobile contaminants in the soil and groundwater.
- Assessment of the impact to other potential receptors such as the surface water and sediment in Canal No.1 and the surficial aquifer.

- Assessment of the existing cover.
- Evaluation of the risks posed to human health and the local ecology.
- Evaluation and incorporation of long-term land re-use plans.
- Assessment of the landfill gas.

According to the *Presumptive Remedy for CERCLA Municipal Landfill* (USEPA, 1993f), as extended to military landfills (USEPA, 1996)

> "It is important to note that full characterization of the landfill's contents is not necessary or appropriate for selecting a remedial action for presumptive remedy sites (USEPA, 1993f); rather sampling efforts should focus on characterizing areas where contaminant migration is suspected."

This is the area where the presumptive remedy RI differs from the traditional approach. This RI includes sampling in and around individual disposal cells to ensure that there were not significant military hazardous wastes within the landfill that would have precluded a presumptive remedy response, but does not include a complete evaluation of the nature and extent of contamination in the disposal area.

There have been significant surficial changes to the site since landfill operations ceased in 1972. First, the site was covered with approximately 2 feet of soil when it was closed. In 1977, an unknown amount of additional fill was brought in when the site was incorporated into the base golf course. Then in 1997, an additional 2 to 4 feet of fill material was brought in during golf course improvement and expansion activities. Due to the existing cover currently on the site, the surface soil will be evaluated to determine if this material will be suitable as part of the final cover. This will be completed as part of the feasibility study and remedial design that will determine the final cover for the site.

1.4 SITE BACKGROUND

NCBC Gulfport is located in the western part of Gulfport, Mississippi, in the southeastern part of Harrison County, about 2 miles north of the Gulf of Mexico (Figure 1-1). Nine sites at NCBC Gulfport, including Site 4, were identified in the IAS as potential threats to human health or the environment (Envirodyne Engineers, 1985). Contamination was first reported from the area designated as Site 4 during the Surface Water/Sediment Delineation Study conducted in 1995 [ABB Environmental Services, Inc. (ABB-ES), 1995].

1.4.1 Site Description

Site 4 is an approximately 4 acre former landfill located in the western section of NCBC Gulfport. The landfill area is located northeast of the intersection of 7th Street and Canal No. 1 and is adjacent to the driving range at the Pine Bayou Golf Course (Figure 1-2). The western boundary of the landfill is adjacent to Canal No. 1.

Canal No. 1 at Site 4 is approximately 30 feet wide and approximately 4 feet deep. Storm water runoff from the areas surrounding Site 4 flows into various tributary ditches which feed into Canal No. 1, which collects the runoff from Drainage Area 5 (Figure 1-2). Surface water in Canal No. 1 flows to the north and eventually leaves the NCBC Gulfport at Outfall 1, located at 28th Street.

1.4.2 Site History

Based on a thorough review of disposal practices and interviews with site workers during the IAS (NEESA, 1985), it was determined that approximately 16,000 tons of solid waste were disposed of at the site between 1966 and 1972. The solid waste, generated by base activities, was placed in trenches and burned on a daily basis prior to backfill. Flammable liquid wastes generated by the base were often used as accelerants. These liquid wastes included fuels, oils, and solvents. Reports indicate that in the later years of operation, liquid wastes in drums and Hurricane Camille rubble were also disposed in the trenches.

1.4.3 Previous Investigations

Five previous environmental investigations have been conducted at Site 4.

- IAS (1985)
- Confirmation Study (1987)
- Surface Water/Sediment Delineation Study (1995)
- IRA (1997)
- Groundwater Monitoring Study (1998)

These investigations have included geophysical surveys, monitoring well installation, and soil, groundwater, and sediment sampling, but did not completely determine the nature and extent of contamination at the site. Results of these studies indicated the presence of contaminants at concentrations above MDEQ Tier 1 Screening Levels for the respective media.

IAS - 1985

Objective

The IAS identified the potential threats to human health and the environment (NEESA, 1985) from the handling and disposal of wastes at NCBC Gulfport. The IAS included a records search, an on-site survey including a geophysical survey to define site boundaries, a site ranking, and generation of an outline for the Confirmation Study.

Sampling Program

No samples were collected.

Results

Nine potentially contaminated sites were identified based on the records search, site inspections and interviews with base personnel (active and retired).

Recommendations

A recommendation was made to proceed with a Confirmation Study on six sites, including Site 4. Site 8 was not included because of on-going remedial actions.

Confirmation Study (also known as the Verification Study) - 1987

Objective

The Confirmation Study was a follow-up to the 1985 IAS to determine if the identified sites posed any threats to human health and the environment.

Sampling Program

At Site 4, three monitoring wells were installed and one co-located surface water and sediment sample was collected from Canal No. 1. All samples were analyzed for VOCs, SVOCs, pesticides, herbicides, and metals.

Results

Surface water, groundwater, and sediment samples were collected from locations at Site 4 (HLA, 1987). The sampling locations were on the south and west sides of Site 4, under the assumption that groundwater flowed to the south. This assumption was incorrect, therefore, the groundwater sample locations were up- or cross-gradient of the source areas. Contaminant concentrations were all less than the screening levels in the groundwater samples collected for this investigation. Surface water and sediment results included detections of metals and SVOCs below screening criteria.

Recommendations

The study was considered inconclusive due to the lack of downgradient groundwater samples. The recommendations included additional sampling of all environmental media.

Surface Water and Sediment Delineation Study - 1995

Objective

The overall objective of this sampling program was to identify and delineate all media impacted by the storage and handling of HO and associated dioxins. While the study focused on Site 8 and associated drainage systems, Site 4 was included in the program because it was operated contemporaneously with Site 8. The specific objectives for Site 4 were to:

- Install and sample monitoring wells to determine if the site was impacting local groundwater – with emphasis on HO and associated contaminants.
- Collect samples from the seeps emanating from the bank of the landfill and draining into Canal No.1.
- Evaluate the impact to Canal No.1 by collecting surface water and sediment samples.

Sampling Program

During this study, four monitoring wells were placed at the site, two downgradient and two within the landfill adjacent to the largest geophysical anomalies. Four co-located surface water and sediment samples were collected within Canal No. 1 and two seep samples were collected from the bank along the north side of Canal No. 1 at Site 4. The groundwater, seeps, and two of the surface water and sediment samples were analyzed for VOC, SVOC, pesticides, PCB, herbicides, and dioxin. The two remaining surface water and sediment samples were analyzed for dioxins only.

Results

The results of the groundwater and seep sampling indicated that the disposal of HO in the landfill was unlikely. Dioxins were detected at concentration ranging from 0.65 parts per quadrillion (ppq) up to 26.4 ppq in the groundwater samples collected from these wells (all less than the benchmark of 30 ppq). One of the dioxin samples from a seep had a dioxin result 82.9 picograms per liter (pg/L), well above the drinking water screening level. This concentration of dioxins in surface water is also above current USEPA ecological screening criteria. The types of congeners in that seep sample were consistent with the byproducts of incineration. Typically, solid wastes were burned in the disposal trenches before they were covered.

In other analyses, CVOCs were reported in monitoring well GPT-04-05. The maximum levels were: VC [37 parts per billion (ppb)], 1,2-DCE (180 ppb), and TCE (4.7 ppb).

The results of the surface water and sediment samples were all below screening values.

The groundwater potentiometric surface confirmed that shallow groundwater flow was to the northwest and not to the south as had been previously thought.

Recommendations

The recommendations for Site 4 were to address the dioxin contamination in the seep and continue the groundwater investigation to delineate the CVOC plume. Both recommendations were implemented in the actions described below.

Interim Removal Action - 1997

Objective

Conduct an Interim Action to prevent the seeps along the south side of Site 4 from impacting surface water quality by placing activated carbon beds along the bank. The action included a small soil and groundwater investigation prior to the placement of the carbon beds.

Sampling Program

Direct push sampling of soil and groundwater near subsurface magnetic anomalies identified during a geophysical investigation (Morrison-Knudsen, 1995). The study included 10 soil and 3 groundwater samples.

Results

Arsenic concentrations above Tier 1 Risk Screening levels for soil were detected, as well as low levels of dioxins and furans. The TCDD congener was not detected; again supporting the non-HO source. Activated carbon traps were installed to intercept groundwater discharging from seeps into Canal No. 1. Post interim action sampling of the seeps was conducted over a 3 year period. Dioxin results were consistently reported as non-detect.

Note: The presumptive remedy for Site 4 includes removal of the carbon beds prior to the placement of the permanent cap and lining of Canal No.1.

Groundwater Monitoring Report - 1999

Objective

An in-depth study of groundwater conditions was conducted at Site 4, with a focus on the potential for dioxins and furans, particularly those congeners that could be related to the disposal of HO (HLA, 1998). In addition, a 6-month hydrologic analysis of the surface water (Canal No.1) and the surficial aquifer at Site 4 was completed to evaluate the potential for a groundwater to surface water pathway.

Sampling Program

The sampling program was conducted in two phases.

Phase 1: The DPT investigation at Site 4 began around the disposal cells identified during the original geophysical investigation conducted in 1997. While the size and orientation of these cells have a great deal of variety, none of the cells could be excluded on that basis. Samples were analyzed for a full suite of analytes based on the wide array of disposal activities and, therefore, the wide variety of potential contaminants at this site.

The sampling strategy at Site 4 utilized the geophysical data, which outlined the potential disposal cells, to guide the collection of discrete groundwater samples at the bottom of the disposal cells. All samples at Site 4 were collected from a depth of up to 20 feet. Samples were collected from a greater depth at contact with a silty clay, encountered at a depth ranging from 20 to 30 feet below land surface (bls). In total, 14 groundwater samples were collected and analyzed for a full suite of analyses (including dioxins and furans).

The hydrologic monitoring at Site 4 involved the installation of three piezometers adjacent to Canal No.1 at distances of 5, 15, and 25 feet. A still well was installed in the Canal to monitor surface water levels. Pressure transducers were installed in the piezometers and the still well and readings were logged for 6 months.

Phase 2: Phase 2 activities at Site 4 included the installation of five shallow (15 to 30 feet bls) and two intermediate (35 to 55 feet bls) depth monitoring wells. Of the shallow wells, GPT-04-09 and GPT-04-12 were installed to monitor upgradient conditions, GPT-04-10 and GPT-04-15 were located to monitor downgradient conditions, and GPT-04-13 was installed to characterize contaminant levels identified during Phase 1 activities. Intermediate wells GPT-04-11 and GPT-04-14 were installed to monitor the lower part of the surficial aquifer (vertical extent wells). One replacement well was also installed; GPT-04-07 was replaced and renamed GPT-04-08. These monitoring wells were resampled during the RI in 2004.

Results

As expected, given that Site 4 was a landfill, large amounts of debris were encountered during DPT activities. The disposal cells appeared to be covered by approximately 5 feet of fill material. No debris was encountered west of Canal No. 1.

Phase 1 dioxin results at Site 4 indicated widespread, low levels of dioxin in the groundwater. Results ranged from nondetect (ND) to a high of 1.88 ppq (R4002), which is well below the MCL of 30 ppq established by the USEPA (1996c). The main congeners observed in these samples were OCDD and

HpCDD, indicating that HO is not a likely source. The types of congeners associated with HO include TCDD and pentachlorodibenzodioxin (PeCDD). When other more highly chlorinated congeners (HpCDD and OCDD) are reported, other sources (e.g., incineration and wood treatment byproducts) are suspected.

Several VOCs were reported above MCLs and Tier 1 TRGs at Site 4. At sample R4008, VC (result 21 ppb, which exceeded the MCL of 2 ppb), 1,2-DCE (result 220 ppb, MCL 70 ppb) and TCE (result 12 ppb, MCL 5 ppb) exceeded MCLs. VC was found at R4007 at the MCL (result 2 ppb). The locations of R4007 and R4008 are near the monitoring well GPT-4-5, which had VC and 1,2-DCE above MCLs in 1997 (ABB-ES, 1999), in the southwestern portion of the site.

Other organic compounds detected, but below MCLs include dichlorodiphenyldichloroethene (DDE) and dichlorodiphenyltrichloroethane (DDT) at samples R4009 and R4010. Carbon disulfide was detected in R4015 at levels well below the Tier 1 TRG. Phthalates and acetone were detected in several samples at levels which could be indicative of laboratory contamination or the breakdown of plasticizers in flexible plastic or rubber debris.

The Phase 1 data from Site 4 did not indicate high levels of dioxin contamination in the areas studied. Furthermore, the lack of TCDD and PeCDD reduce the potential that a significant source of HO derived from prior disposal operations at the site. However, other organic compounds were disposed of at the site, and a resulting plume of 1,2-DCE and VC above MCLs exists at the southwest corner of the site, as indicated by several sampling points. Further investigative activities were continued in Phase 2.

Groundwater samples from the area of the DCE and VC plume identified during Phase 1 confirmed levels of VC (65 ppb), 1,2-DCE (540 ppb), TCE (22 ppb), and 1,1,2-trichloroethane (TCA) (9 ppb) all of which are above MCLs (USEPA, 1996) and TRGs. GPT-04-14 was installed in this plume area and the screen of well GPT-04-14 was set at a depth of 35 feet, which is on top of silty-clay strata. GPT-04-13, the shallower well paired with GPT-04-14, did not contain similar VOC compounds, but did contain numerous SVOC compounds, including carbazole (5 ppb) above the risk-based concentration (RBC) value.

In general, direct push groundwater dioxin results at Site 4 indicated widespread, low levels of dioxin and furan congeners in the groundwater. The main congeners observed in the DPT samples were OCDD and HpCDD, indicating that herbidice orange is not a likely source. In fact, the frequent burning of wastes in the Site 4 trenches is the likely source of the OCDD and HpCDD dioxins (Arienti, *et al*, 1988). No TCDD was reported from any of the groundwater samples.

The VOC plume was shown to be in the lower area (20 to 35 feet bls) of the surficial aquifer near the clay-bearing zone. The presence of these VOCs is likely due to the disposal of chlorinated cleaning compounds reported to have taken place at this landfill. The period of these disposal activities (1966-1972) and the ratios of breakdown chemicals (VC) to parent chemicals (TCE) suggest that significant degradation has taken place.

The 6-month hydrologic analysis showed groundwater from Site 4 is at a higher elevation than the surface water in Canal No. 1, indicating that Canal No.1 is a gaining stream. Seep samples collected at Site 4 (two rounds) have confirmed the activated carbon traps intercept the low level dioxin contamination present in groundwater before it enters Canal No. 1. No other remedial and/or removal actions were conducted at the site.

Summary

Phase 1 and Phase 2 sampling results produced a lack of significant dioxin results, no TCDD, and the complete absence of 2,4-dichlorophenoxyacedic acid (2,4-D) or 2,4,5-trichlorophenoxyacedic acid (2,4,5-T) (ingredients of HO) indicating that it is unlikely that HO was disposed of at Site 4. The reported congeners are consistent with the landfilling practice of incineration prior to covering disposal cells.

Phase 1 and 2 sampling in the area of GPT-04-14 indicated the presence of a CVOC plume including VC, 1,2-DCE, TCE, and 1,1,2-TCA, all of which were above the MCLs established for those chemicals. The VOC plume is in the lower reaches (20 to 35 feet bls) of the surficial aquifer near the silty-clay zone. In this area, the gradient of the surficial aquifer is nearly flat. The stronger vertical gradient is not likely to aid the downward migration of contamination significantly deeper due to the presence of the silty-clay strata. The presence of these VOCs is likely due to the disposal of chlorinated cleaning compounds reported to have taken place at this landfill. The age of these activities (1966-1972) and the ratios of breakdown chemicals (VC) to parent chemicals (1,1,2-TCA) suggest that significant degradation has taken place.

At wells GPT-04-13 and GPT-04-15, carbazole was reported at 5 ppb, which is at the RBC value. GPT-04-15 is downgradient of the reported limits of landfill activities of this site, so some migration of carbazole, along with several other polynuclear aromatic hydrocarbon (PAH) compounds, appears possible.

The other compounds reported in groundwater samples collected at this site include a variety of pesticides and semivolatile compounds at levels below MCL and RBC values. The types and levels of the pesticides found are consistent with a long-term landscape maintenance program associated with a golf course. The SVOC compounds reported in the groundwater samples are also consistent with the disposal practice of diesel and fuel oil burning and disposal.

Based on the analysis of Site 4 findings, the plume of VOCs (including VC, 1,2-DCE, TCE, and 1,1,2-TCA) that are above MCLs was not completely defined laterally, and future activities to more fully assess the plume were recommended. Based on the disposal history of the site, as well as the results from the studies described above, Site 4 was recommended for the Presumptive Remedy process described earlier in this chapter.

1.4.4 Remedial Investigation Objectives

As discussed in Section 1.3, the objective of the Presumptive Remedy RI was to:

- Determination of the extent of the waste disposal area.
- Identification of the types of materials disposed and the potential contaminants of concern.
- Determination of the extent and sources of mobile contaminants in the soil and groundwater.
- Assessment of the impact to other potential receptors such as the surface water and sediment in Canal No.1 and the surficial aquifer.
- Assessment of the existing cover.
- Evaluation of the risks posed to human health and the local ecology.
- Evaluation and incorporation of long-term land re-use plans.
- Assessment of the landfill gas.

While a significant volume of data existed for the site, previous investigations and the IRA at the site focused on HO-related contaminants. To achieve the objectives listed above, the RI conducted at Site 4 included the following activities:

- Geophysical Survey
- DPT soil and groundwater sampling
- Monitoring well installation and sampling
- Surface water and sediment sampling
- Surface soil sampling
- Aquifer characterization
- Treatability Study

This RI Report will present and evaluate these activities in detail.

1.5 PRELIMINARY REMEDIAL ACTION OBJECTIVES

As a first step in developing containment alternatives, remedial action objectives were developed based on the investigations listed above. The presumptive remedy remedial action objectives focus on containment and are:

- Preventing direct contact with landfill contents.
- Minimizing infiltration and resulting contaminant leaching to groundwater.
- Controlling surface water runoff and erosion.
- Controlling landfill gas (if necessary).

The CVOC plume investigation and remediation is considered a non-presumptive remedy of a hot spot, based on the unique solution that will be developed and implemented.

1.6 REPORT ORGANIZATION

This report consolidates the results of the previous sampling activities and the RI sampling event. This report is organized into eight chapters:

1.0 Introduction
2.0 Study Area Investigation
3.0 Physical Characteristics of the Study Area
4.0 Nature and Extent of Contamination
5.0 Contaminant Fate and Transport
6.0 Human Health Risk Assessment
7.0 Screening Level Ecological Risk Assessment
8.0 Summary and Conclusions

The following appendices are included with this report:

Appendix A – Geophysics Data
Appendix B – Field Data
Appendix C – Validated Laboratory Data
Appendix D – Human Health Risk Assessment Supporting Data
Appendix E – Food Chain Modeling
Appendix F – Additional Studies
Appendix G – Regulatory Review Comments

2.0 STUDY AREA INVESTIGATION

This chapter provides the details of the RI at Site 4. Data were collected during this RI to:

- Determine the extent of the waste disposal area.
- Identify the types of materials disposed of in the landfill.
- Identify the potential contaminants of concern.
- Support the delineation of the horizontal and vertical extent of the waste disposal area.
- Confirm that landfill contents meet the municipal-type waste definition.
- Determine the extent and sources of mobile contaminants in the soil and groundwater.
- Assess the impact to other potential receptors such as the surface water and sediment in Canal No.1 and the surficial aquifer.

Additional data collected to support the FS included:

- An existing cover assessment to evaluate the suitability of the current cover material for use in the final remedy.
- An assessment of landfill gas generation to determine if a gas collection layer in the landfill cover will be required.

The RI at Site 4 included the following studies:

- Geophysical Investigation
- Subsurface soil sampling
- DPT groundwater screening
- Monitoring well installation and sampling
- Treatability Study
- Surface water and sediment sampling
- Aquifer characterization

The following subsections discuss each of these studies in detail.

2.1 GEOPHYSICAL INVESTIGATION

An important early requirement of the presumptive remedy RI for landfills is to adequately characterize the extent of the disposal area or waste area delineation. A geophysical survey was conducted at Site 4 to locate individual disposal cells and to determine the extent of the landfill. Additional focus was placed on the area adjacent to the CVOC plume identified in 1995 with the goal of locating the source area(s). Identification of these disposal cells and buried waste was used to focus the placement of soil and groundwater sample locations. The geophysical survey was completed using an EM-61 time-domain metal detector and a magnetometer. The magnetometer survey was performed over a 2-acre area with 20-foot grid node spacing (Figure 2-1) and the EM-61 survey was performed over a 2-acre area with 10-foot grid node spacing (Figure 2-2). The geophysics data are included in Appendix A.

2.2 SOIL AND VADOSE ZONE INVESTIGATIONS

The subsurface soil and vadose zone investigations were implemented with the following objectives:

- Support the waste area delineation.
- Confirm that landfill contents meet the municipal-type waste definition.
- Perform an existing cover assessment.
- Determine if landfill gas generation will require a gas collection layer in the landfill cover.

The existing cover assessment and landfill gas assessment were conducted to support the FS.

Surface Soil Investigation

The upper 4 to 7 feet of soil at the site consists of fill material placed on the site after it was closed in 1972. The surface soil investigation was conducted in 2007 to support the Site 4 FS and determine if the current surface soil can be integrated into a final cover. The guidelines for a low permeability soil cover, integral to the containment strategy of the presumptive remedy, require hydraulic conductivity values in the 10^{-5} centimeter per second (cm/sec) range to be considered suitable. The sampling of the surface soil (from 0 to 2 feet) included six environmental samples analyzed for the parameters listed in Table 2-1, six hydraulic conductivity samples collected using a Shelby tube, and six grain size samples. The locations of these surface soil samples are shown on Figure 2-3.

Landfill Gas Evaluation

In addition to the environmental samples discussed above, a landfill (methane) gas survey was conducted to support the FS and determine if the final cover will need to include a venting system. The evaluation included the collection and field analysis of vadose zone gas samples from five locations at Site 4.

Subsurface Soil Investigation – 2004

The areal extent of the waste disposal area was delineated using geophysical methods; therefore, a drilling program was completed to vertically characterize the extent of the landfill material. The subsurface soil study included the collection and analysis of soil samples to determine if the waste types observed in the waste area correspond with reported operating history.

Ten drilling locations were selected for continuous sample collection from the surface to approximately 40 feet bls. These locations are shown on Figure 2-3 with the white soil boring symbol. The vertical profiling was terminated after two successive split spoon (4 feet) samples into the first occurrence of the silty/sandy gray clay. The drilling locations were selected to coincide with the margins of the waste area and proximity to the major anomalies within the waste area (Figures 2-1 and 2-2). The interval selected for laboratory analysis from each soil boring was based on a combination of factors such as the bottom of the disposal cell, site stratigraphy, and field flame ionization detector (FID) screening results. Soil boring logs are included in Appendix B. Groundwater samples were also collected from these 10 borings as described in Section 2.3.

The soil samples collected from the borings were analyzed for target compound list (TCL) VOCs, TCL SVOCs, TCL pesticides and PCBs, Appendix IX organophosphorus pesticides, Appendix IX chlorinated herbicides, target analyte list (TAL) inorganics (metals and cyanide), and total organic carbon (TOC). Two soil samples were also analyzed for dioxins and furans. The sample analyses for the soil borings are summarized in Table 2-1. Validated laboratory data are included in Appendix C.

2.3 GROUNDWATER INVESTIGATIONS

Several phases of groundwater investigations were conducted for the Site 4 RI. To make interpretation easier, DPT and monitoring well symbols have been color coded by phase (year) of installation on the following figures. Figure 2-3 includes DPT sample locations and Figure 2-4 includes monitoring well locations. These investigations included:

- DPT Screening 2004: 10 full suite (white symbols) and 15 VOC-only (green symbols) DPT groundwater samples were collected in 2004 to screen the site and provide the initial evaluation of the nature of groundwater contaminants at the site. These locations are shown on Figure 2-3.
  - Full suite samples: 04GP01 through 04GP10
  - VOC only samples: 04GP11 through 04GP25

- DPT CVOC Delineation 2006: The CVOC plume was delineated in 2006 by collecting 20 additional DPT groundwater samples analyzed on site with a mobile laboratory. These samples are shown on Figure 2-3 as the yellow symbols.
  - Mobile Laboratory CVOC samples: 04GP26 through 04GP45.

- Monitoring Well Installation and Sampling (monitoring well samples were analyzed for constituents shown on Table 2-1):

  2004: 13 monitoring wells were sampled in 2004. Seven new monitoring wells were installed and sampled, and are shown as green symbols on Figure 2-4. Six existing monitoring wells, from the 1999 Groundwater Monitoring Study, were sampled and are depicted as white symbols on Figure 2-4:

  - Five new monitoring wells: GPT-04-16 through GPT-04-20.
  - Two replacement monitoring wells: GPT-04-10R and GPT-04-11R.
  - Six existing monitoring wells: GPT-04-08, GPT-04-09, and GPT-04-12 through GPT-04-15.

  - 2006: 17 monitoring wells were sampled in 2006. Ten new monitoring wells, depicted using yellow symbols on Figure 2-4 (GPT-04-21 through GPT-04-30) were installed and sampled based on the results of the 2004 investigations, seven existing wells (GPT-04-12 through GPT-04-20) were resampled.

2.3.1 DPT Groundwater Screening

Groundwater screening samples were collected at Site 4 to evaluate the horizontal and vertical extent of groundwater contamination. The groundwater screening investigation was conducted utilizing DPT methods to allow for rapid collection of groundwater samples from discrete vertical intervals and to reduce the amount of investigation-derived waste (IDW) produced during the investigation.

Groundwater screening samples for full suite analysis were collected from 10 soil boring locations (04GP01 through 04GP10) distributed across the site (Figure 2-3). One sample interval was selected for laboratory analysis from each location based on site stratigraphy and field FID screening results. The sample analyses for the DPT groundwater screening are summarized in Table 2-1. Validated laboratory data are included in Appendix C.

Fourteen additional locations (04GP11 through 04GP24), also shown on Figure 2-3, were sampled only for TCL VOCs and were analyzed by a local laboratory for a quick turnaround time.

2.3.2 Monitoring Well Installation and Sampling

Based on the results of the geophysical investigation and DPT screening, five additional permanent monitoring wells were installed at Site 4 in 2004. These new wells (in conjunction with eight existing monitoring wells) further defined and characterized the groundwater contamination. The locations of the monitoring wells are shown in Figure 2-4. Groundwater samples were collected from both the five new monitoring wells and eight existing wells and analyzed for the parameters shown on Table 2-1.

The groundwater samples were also analyzed for dissolved hydrogen, light gases, selected anions, and TOC to provide data for the contaminant fate and transport evaluation. Groundwater quality parameters including pH, conductivity, temperature, dissolved oxygen, and turbidity were measured with field instruments at each monitoring well during the sampling activities. The groundwater sample log sheets are included in Appendix B. Validated laboratory data are included in Appendix C.

The monitoring wells at Site 4 were installed using hollow-stem auger (HSA) drilling techniques. The wells were constructed of 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) flush-threaded casing with 10-feet, 0.01-in. slotted PVC pre-packed screens. The shallow monitoring wells (GPT-04-16, GPT-04-18, and GPT-04-20) were installed to total depths of approximately 13 or 14 feet. Deeper monitoring wells were installed to total depth of approximately 40 feet (GPT-04-17) and 50 feet (GPT-04-19). A filter pack of clean, 20/40 silica sand was installed from the bottom of the borehole to 2 feet above the top of the screen. A bentonite pellet seal or fine sand seal, approximately 4 feet thick, was installed above the 20/40 sand filter pack. The remainder of the annulus of the borehole was grouted with cement/bentonite slurry. The monitoring wells were completed at ground surface with flush mount vaults, as specified in the Southern Division Specifications for Monitoring Well Completion and Abandonment (NFESC, 1999). The horizontal location and top of casing elevation for each of the monitoring wells was surveyed by a Mississippi-licensed professional land surveyor. The details of the monitoring well installations are summarized in Table 2-2.

2.3.3 CVOC Delineation

An additional investigation was conducted in 2006 to delineate the extent of the CVOC plume in Site 4 groundwater. The follow up work was delayed due to impact of Hurricane Katrina on the Gulfport area. DPT groundwater samples were collected at 20 locations for CVOC analysis by an on-site mobile laboratory. Three to four groundwater samples were collected per location, based on the depth to groundwater at the location and the depth at which the first competent clay layer was encountered, typically about 24 feet below grade. Boring and sample logs are included in Appendix B. Validated laboratory data are included in Appendix C.

Ten additional monitoring wells were installed, based on the data collected during the DPT investigation. The wells were installed using the same techniques detailed in Section 2.3.2. A cluster of three wells was installed at the location of the highest CVOC concentrations detected in the DPT portion of the delineation. GPT-04-21 is a shallow well, with a total depth 16 feet, designed to bracket the water table. GPT-04-22 was installed to a total depth of 24 feet, at the top of the first clay layer. GPT-04-23 is a double cased well with a total depth of 38 feet. An 8 inch diameter outer casing was installed to a depth of 25 feet to avoid allowing contaminants from above the clay to migrate deeper.

Two clusters of paired shallow and deep wells were installed at the downgradient edge of the CVOC plume. GPT-04-25 and GPT-04-26 were installed on the southeast side of Canal No. 1 and GPT-04-28 and GPT-04-29 were installed on the northwest side. The shallow wells (GPT-04-25 and GPT-04-28) were installed to total depths of 16 feet. The deep wells in these pairs (GPT-04-26 and GPT-04-29) were installed to total depths of 35 to 38 feet. Outer casings were not used on these deep wells because CVOC concentrations were much lower in these areas. Three additional shallow monitoring wells, GPT-04-24, GPT-04-27, and GPT-04-30 were also installed to allow future monitoring of the CVOC plume.

2.3.4 Treatability Study Baseline Sampling

Three temporary monitoring points were installed in the area of the CVOC plume to create a test cell to allow ongoing monitoring of the effectiveness of the application of a lactate substrate (to support anaerobic conditions) and the installation of dechlorinator microbes (Figure 2-3, at the location of wells GPT-04-21, GPT-04-22, and GPT-04-23). In addition to VOC analysis, soil and groundwater samples were collected and analyzed for a variety of geochemical parameters to provide baseline data to evaluate changes in aquifer conditions and contaminant concentrations resulting from application of the microbes and lactate substrate. These analyses are listed under the “fate and transport” section of Table 2-1. The results of the treatability testing will be published in the FS to support selection of an appropriate remedial alternative for the CVOC plume.

2.4 SURFACE WATER AND SEDIMENT INVESTIGATION

Surface water and sediment samples were collected from Canal No. 1 at Site 4 during the investigation to evaluate conditions within the canal. Surface water samples were collected at three locations (Figure 2-3). Sediment samples were collected at eight locations (Figure 2-3).

The surface water sample locations were spaced evenly along the length of the canal adjacent to Site 4. Sample 04SW0101 was located at the downstream end of Site 4 and sample 04SW0301 was collected at an upstream location. Co-located sediment samples were collected at the three surface water sample locations. Water quality parameters including pH, conductivity, temperature, dissolved oxygen, and

turbidity were measured with field instruments at each surface water sampling location at the time of sample collection.

As shown on Table 2-1, the surface water samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, Appendix IX chlorinated herbicides, Appendix IX organophosphorus pesticides, TAL metals, and cyanide. The upstream and downstream surface water samples, 04SW0101 and 04SW0301, were also analyzed for dioxins and furans. Validated laboratory data are included in Appendix C.

Eight sediment samples were collected from Canal No. 1 at Site 4 (Figure 2-3). The sediment sample locations were spaced evenly along the length of the canal adjacent to Site 4. Sample 04SB0101 was located at the downstream end of Site 4 and 04SD0801 was collected at the upstream end. The sediment samples were collected from a depth of 0 to 6 inches using a stainless steel hand auger. The sediment samples were analyzed for TCL pesticides and PCBs, TCL VOCs, TCL SVOCs, Appendix IX chlorinated herbicides, TAL metals, and cyanide. The upstream and downstream sediment samples (04SD0101 and 04SD0801) were also analyzed for dioxins and furans. The sample analyses for the sediment samples are summarized in Table 2-1.

2.5 AQUIFER CHARACTERIZATION

Rounds of static water level (SWL) measurement data were recorded from Site 4 monitoring wells in 2004 and 2006. The SWL measurement data and the elevations of the well top of casings were used to determine the groundwater elevation at each monitoring well. The groundwater elevations were used to determine groundwater flow direction and horizontal and vertical hydraulic gradients at the site.

Slug tests were conducted in three shallow wells and two deeper wells at Site 4. Each test was performed by displacing a volume of water with a PVC rod of known volume and recording the recharge rate of the displaced water in the well. The recharge rate was recorded using an electronic data logger and pressure transducer.

Rising head (slug out) tests were conducted in each well. Calculations were performed using the Aqtesolv™ aquifer characterization program. The Bouwer and Rice solution was calculated for each of the slug tests. Slug test data and calculations used to determine hydraulic conductivity are included in Appendix B. The geometric means of the slug test results for the shallow zone and the deep zone were calculated and were used to represent the average hydraulic conductivity for each of the aquifer zones.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

NCBC Gulfport is located in the western part of the city of Gulfport, Mississippi, in southeastern Harrison County, about 2 miles north of the Gulf of Mexico. NCBC Gulfport occupies approximately 1,100 acres and has an elevation averaging approximately 30 feet above mean sea level.

3.1 SURFACE FEATURES

The northwest edge of the disposal area at Site 4 is defined by a section of Canal No. 1, a primary drainage feature that drains the western part of the Base (Figure 3-1). The drainage ditch at Site 4 is approximately 4 feet deep and 30 feet wide. The site is bordered on all sides by facilities of the Pine Bayou golf course. Large trees are present on the northwest side of Canal No. 1. The site topography is relatively flat on either side of Canal No. 1, with elevations of 20 to 21 feet on the northwest side of the canal and adjacent to the southeast side. The ground surface slopes upward to elevations of 28 feet to the southeast of the canal.

NCBC is located in the Gulf Coast Flatwoods physiographic division, which extends along the southern coast of Harrison County. Topography in this area is a series of wet, poorly drained depressions between better drained areas of slightly higher elevation.

3.2 METEOROLOGY

The Gulfport area has a mild climate with warm and humid summers [average temperature of 82 degrees Fahrenheit (°F)] and mild winters (average temperature of 52 °F). The mean annual precipitation is 63.5 inches and individual storms are often intense and may produce large 24-hour precipitation totals. The Mississippi coast is subject to hurricanes between June 1st and November 30th.

During the RI investigation activities in 2004, drought conditions were occurring along the Mississippi Coast, and little or no precipitation was recorded. In 2006, a more normal rainfall regime had returned, and more frequent precipitation occurred.

3.3 SURFACE WATER HYDROLOGY

NCBC Gulfport is located in the coastal plain physiographic province of southern Mississippi. This area is typically drained by small streams flowing southeast toward the coast. Surface water in the vicinity of NCBC Gulfport is abundant. Storm water runoff is collected in a series of ditches and canals and directed off base. Large precipitation events tend to produce small stream and ditch flooding due to relatively high stream flow velocities.

At Site 4, Canal No. 1 marks the western boundary of the site and is the primary drainage ditch for the western portion of the base (Figure 3-2). As part of the Turkey Creek drainage basin, Canal No.1 is a year round stream that flows north from Site 4 and exits the base at Outfall 1. As shown on Figure 3-3, Canal No.1 continues north from the base along Canal Road until it joins Turkey Creek. From there, surface water is conveyed to the east until it enters Gulfport Lake and the Back Bay of Biloxi, Mississippi.

As part of a base-wide groundwater monitoring investigation (ABB-ES, 1999), a hydrologic monitoring station was installed at Site 4 to collect data for evaluating the interaction of site groundwater and the surface water in Canal No. 1. Water level data were recorded from Canal No. 1 and a piezometer installed adjacent to the canal; a rainfall gauge recorded precipitation data. The hydrologic station was operated from November 1998 to May 1999. The results of the hydrologic monitoring (as reported in ABB-ES, 1999) are summarized below:

- Water levels in the piezometer were typically 2.5 feet higher than the water levels in the canal during the monitoring period (winter and spring).
- Groundwater and surface water levels were highest in November and decreased overall through the monitoring period.
- Both surface water and groundwater levels responded quickly to precipitation events.
- The magnitude of water level change in the piezometer was one fourth of the change in surface water level during precipitation events.
- Surface water levels recovered within hours of precipitation events, whereas groundwater recovery took up to a week.

These data indicated that groundwater from the shallow surficial aquifer and surface water from Canal No. 1 are closely linked at Site 4 and that the groundwater can discharge to Canal No. 1 during most of the year. Groundwater seeps on the south bank of Canal No. 1 have historically been present during wetter parts of the year. As a gaining stream, Canal No.1 must be considered a potential groundwater to surface water pathway.

3.4 GEOLOGY

Data collected from soil borings advanced at Site 4 were used to evaluate the lithologic and stratigraphic conditions which may influence contaminant fate and transport at the site.

3.4.1 Site Stratigraphy

Surface and shallow subsurface soils in this area are primarily gray and brown sand to sandy clay with varying amounts of gravel and minor clay horizons. The uppermost 2 feet in most areas is fill material used in the construction of the golf course over the landfill. Large pieces of concrete and other landfill material are present from 4 to 8 feet bls. Below the landfill material, typical lithologies are light brown and gray fine sands and silty fine sands. These strata are typical of Pleistocene and Recent terrace and stream valley deposits. Some horizons contain stringers of fine, subrounded quartz gravel or shell fragments. These lithologies are found to depths of approximately 24 feet. The top of the thin gray clayey silt layer is encountered at depths of approximately 20 to 24 feet, depending on site topography. This fine-grained layer is persistent across the site with thicknesses ranging from two to five feet. Below the first clayey-sand layer, a gray silty sand and sand lithologies are present to depths of 35 to 40 feet. At approximately 40 feet bls, a much more plastic green-gray clayey silt layer occurs. This layer is persistent across the site and based on other sites investigated at NCBC Gulfport (HLA, 1999b), and ranges from 10 to 50 feet thick. Depending on the types of contaminants observed in this study, this layer may represent an aquitard that separates the shallow surficial aquifer from deeper water bearing units. Figure 3-4 is a site plan showing the line of cross section for Figure 3-5, an east/west oriented cross section of the lithology of Site 4.

3.4.2 Regional Geology

NCBC Gulfport is located in the coastal plain of southern Mississippi, which is underlain by a series of estuarine or deltaic sediments that dip southwestward toward the delta of the Mississippi River (Shows, 1970). These sediments range in age from Miocene to Recent and are not readily separated into stratigraphic units. The uppermost beds are Pleistocene and Recent terrace and stream valley deposits. The uppermost stratigraphic formation in the coastal plain area is the Pamlico Sand. The Pamlico Sand formation is approximately 60 to 70 feet thick and is composed of fine silt, sands, and shale or clay. The Pamlico Sand is underlain by the following older formations:

- Citronelle Formation, approximately 100 feet thick.
- Graham Ferry Formation, alternating layers of sand, shale, and clay ranging from 125 to 250 feet thick.
- Upper and Lower Pascagoula Formations, alternating layers of sand, shale, and clay with shell and boulders approximately 1,100 feet thick.

3.5 SOILS

Surface and shallow subsurface soils identified from soil borings at Site 4 are primarily sand and silty sand with minor clay horizons. Native soils typically begin at depth of 2 feet on the northwest side of Canal No. 1. Landfill debris was frequently encountered at depths from 2 to 8 feet on the southeast side of the canal in areas of higher elevation.

3.5.1 Soil Classification

The Soil Survey of Harrison County [United States Department of Agriculture (USDA), 1975] identifies the soil type at Site 4 as Atmore silt loam, a poorly drained soil developed in loamy material and commonly found on broad flats and in drainageways. This soil type is typically silt loam and clay loam and is strongly acidic to extremely acidic. Permeability is moderate in the upper part of the soil horizon and slow in the lower part. Available water capacity is medium to high. The water table is at the surface during wet periods and runoff is slow.

3.6 HYDROGEOLOGY

Hydrogeologic data were collected to evaluate movement of groundwater in the shallow surficial aquifer at the site. The lithologies at Site 4 are consistent with the typical surficial aquifer of the Mississippi Coastal Plain, composed of undifferentiated alluvium and the Pamlico sand terrace deposits (recent to Pleistocene in age). The Pamlico Sand formation is approximately 60 to 70 feet thick and is composed of fine sands and shale or clay.

Depth to groundwater and groundwater elevation were used to determine the site specific groundwater flow direction and water table gradient. Groundwater flow velocity at the site was estimated using the hydraulic conductivity values determined for selected site monitoring wells and the water table gradient data.

3.6.1 Static Water Level and Groundwater Elevations

The depth to groundwater at NCBC Gulfport ranges from approximately 2 to 10 feet and is controlled primarily by surface topography. SWL measurement data were recorded from Site 4 monitoring wells in September 2004 and September 2006 (Table 3-1). The top of casing elevations of the monitoring wells were surveyed by professional land surveyors. The SWL measurement data and the elevations from the well top of casing survey were used to determine relative groundwater elevations at each well.

In September 2004, the SWL measurements in the shallow wells ranged from 2.11 feet below top of casing (BTOC) in GPT-04-15, adjacent to Canal No. 1, to 8.08 feet BTOC in GPT-04-13, located on the

elevated area southeast of Canal No. 1. The groundwater elevations in the shallow wells ranged from 18.88 feet in GPT-04-15 to 21.60 feet in GPT-04-18 and GPT-04-19, which are located approximately 160 feet southeast of Canal No. 1.

In September 2006, the SWL measurements in the shallow wells ranged from 0.48 feet BTOC in GPT-04-27, adjacent to Canal No. 1, to 7.10 feet BTOC in GPT-04-12, located on the elevated area southeast of Canal No. 1. The groundwater elevations in the shallow wells ranged from 17.98 feet in GPT-04-28, located at the southwest corner of the site, to 22.49 feet in GPT-04-21 located on the elevated area southeast of Canal No. 1.

In September 2004, the SWL measurements in the deep wells ranged from 2.27 feet BTOC in GPT-04-20, adjacent to Canal No. 1, to 7.08 feet BTOC in GPT-04-09, located on the elevated area southeast of Canal No. 1. The groundwater elevations in the deep wells ranged from 17.40 feet in GPT-04-11R, which is located adjacent to Canal No. 1 in the northeastern part of the site, to 21.36 feet in GPT-04-09.

In September 2006, the SWL measurements in the deep wells ranged from 1.83 feet BTOC in GPT-04-29, adjacent to Canal No. 1, to 8.57 feet BTOC in GPT-04-23, located on the elevated area southeast of Canal No. 1. The groundwater elevations in the deep wells ranged from 18.15 feet in GPT-04-20, which is located adjacent to Canal No. 1, to 21.02 feet in GPT-04-23.

3.6.2 Groundwater Flow Direction

To evaluate the direction of groundwater flow at the site, the groundwater elevations from the site monitoring wells were plotted on a site map (Figures 3-6 and 3-7). Groundwater elevation isocontours were drawn from the plotted data. Groundwater flow direction is predicted to be perpendicular to the elevation isocontours. Interpretation of data from the gauging events at Site 4 indicates that groundwater flow in the shallow groundwater interval is to the northwest.

3.6.3 Horizontal Hydraulic Gradient

The average horizontal groundwater gradient across the site was calculated from the groundwater elevations measured in shallow monitoring wells and the estimated groundwater flow direction.

The groundwater flow gradient was determined using the following equation:

$$I \equiv \frac{h_1 - h_2}{d}$$

where:

I = the hydraulic gradient

h_1 = the water elevation at point 1, the highest value

h_2 = the water elevation at point 2, the lowest value

d = the horizontal distance between point 1 and point 2 parallel to the direction of groundwater flow

The highest and lowest groundwater elevation values measured in the monitoring wells from each aquifer zone (shallow and deep) were used to determine the difference in groundwater elevation across the site. The horizontal distance between the high and low groundwater elevation points was measured parallel to the estimated groundwater flow direction. The horizontal groundwater gradients are summarized in Table 3-2.

In 2004, the horizontal hydraulic gradient in the shallow wells at Site 4 was 0.009 feet per foot (feet/foot) in the northeastern part of the site and 0.008 feet/foot in the southeastern part of the site. In 2006, the hydraulic gradient had doubled to 0.018 feet/foot in the southeastern part of the site. This change in magnitude probably reflects the change from drought conditions to a more normal precipitation and recharge regime. The geometric mean of the hydraulic gradient values from the shallow wells is 0.012 feet/foot.

In 2004, the horizontal hydraulic gradient in the deep wells at Site 4 was 0.004 feet/foot. In 2006, the hydraulic gradient had doubled to 0.010 feet/foot. This change in magnitude is similar to changes observed in the shallow wells, and again probably reflects the change from drought conditions to a more normal precipitation and recharge regime. The geometric mean of the hydraulic gradient values from the deep wells is 0.006 feet/foot.

In general, the horizontal hydraulic gradients in the shallow wells were roughly twice that of the deep wells. The difference in gradient between the zones most likely represents the variations in surface topography, which more strongly influences the water table wells, whereas the effects of topography are muted in the deeper wells.

3.6.4 Vertical Hydraulic Gradient

The vertical groundwater gradient was estimated from the groundwater elevations measured in the shallow and deep monitoring well pairs installed at the site. The vertical gradient is determined from the difference in groundwater elevation in the adjacent shallow and deep monitoring wells and the vertical separation of the screened intervals of the monitoring wells. The vertical separation of each well cluster is the difference in depth below grade of the bottom of the shallow well screened interval and the top of

the deep well screened interval. If the groundwater elevation in the shallow well in a cluster is higher than the groundwater elevation in the deep well, the vertical gradient is negative, or downward. If the groundwater elevation in the shallow well in a cluster is lower than the groundwater elevation in the deep well, the vertical gradient is positive, or upward. The vertical gradients are summarized in Table 3-3.

In general, the vertical gradients were downward across the site. The downward vertical gradient may indicate that infiltration and recharge are prevalent at Site 4. The vertical gradients in the well pairs measured in 2004 were downward. In 2006, the vertical gradients were also downward in most of the well pairs. Upward gradients were noted in well pairs GPT-04-25/26 and GPT-04-28/29, which are located at the southwest corner of the site.

3.6.5 Hydraulic Conductivity

Hydraulic conductivity values for Site 4 were estimated using the data from slug tests conducted in selected monitoring wells. The slug test data and a summary of the results are included in Appendix B. The geometric mean of the hydraulic conductivity values reported for the shallow wells at Site 4 is approximately 0.03 feet per minute (feet/minute) or 43 feet per day (feet/day). The slug test data indicate less than an order of magnitude variation in hydraulic conductivity in the shallow surficial aquifer.

The geometric mean of the hydraulic conductivity values reported for the deep wells at Site 4 is approximately 0.002 feet/minute or 2.9 feet/day. This hydraulic conductivity value is an order of magnitude less than the value for the shallow wells. The slug test data indicate an order of magnitude variation in hydraulic conductivity in the deep wells that were tested, as compared to almost no variation in the shallow wells.

3.6.6 Horizontal Groundwater Flow Velocity

Potential horizontal movement of groundwater at the site may be estimated in terms of transportation by natural flow in the saturated zone while assuming groundwater flow follows Darcy's Law. Darcy's Law may be expressed as:

$$V \equiv \frac{(K * I)}{\eta}$$

where:

V = average velocity

K = hydraulic conductivity

η = effective porosity

I = average hydraulic gradient

Data from soil borings advanced during the DPT investigation indicate that fine grained sand and silty or clayey sand is the typical lithology at the site. Review of standard literature suggests that a representative effective porosity for this lithology is approximately 30 percent (Heath, 1983).

Using an average hydraulic conductivity of 43 feet/day, an average hydraulic gradient of 0.012 feet/foot, and an effective porosity value of 30 percent, the estimated average groundwater velocity for the shallow wells at Site 4 was calculated at 1.7 feet/day.

Using an average hydraulic conductivity of 2.9 feet/day, an average hydraulic gradient of 0.006 feet/foot, and an effective porosity value of 30 percent, the estimated average groundwater velocity for the deep wells at Site 4 was calculated at 0.06 feet/day.

3.6.7 Regional Hydrogeology

In the Gulfport area, geologic units containing fresh water are of Miocene to recent age. Aquifers are composed predominantly of sand beds that are irregular in thickness and horizontal extent. There are no thick, consistently traceable confining units between aquifers (Shows, 1970).

The uppermost aquifer is the surficial aquifer. The surficial aquifer sediments are composed of undifferentiated alluvium and the Pamlico sand terrace deposits (recent to Pleistocene in age). The Pamlico Sand formation is approximately 60 to 70 feet thick and is composed of fine sands and shale or clay. Depth to groundwater in the surficial aquifer is variable, depending on local topography and precipitation, but generally ranges from 4 to 7 feet. Locally, shallow groundwater flow in the surficial aquifer is northwest toward Turkey Creek, which empties into Bernard Bayou and eventually into the Gulf of Mexico via the Mississippi Sound. Generally, this aquifer is not used for potable water supply.

Beneath the surficial aquifer are aquifers within the Citronelle Formation and the Graham Ferry Formation (Pliocene), as well as the Pascagoula, Hattiesburg, and Catahoula Formations (Miocene). Boundaries between the aquifers are vaguely defined, if at all. These aquifers are composed of sands and discontinuous clays. These are a major source of potable water in the Gulfport area.

The water wells in the Citronelle Formation are used for both domestic and industrial water supply. Supply wells in the Upper and Lower Pascagoula Formations provide the majority of fresh water used in the Coastal Plain. The Hattiesburg Formation becomes increasingly brackish with depth and salt water is encountered near the base of this unit (approximately 2,000 feet below sea level).

3.7 DEMOGRAPHY AND LAND USE

NCBC Gulfport is located in the western part of the city of Gulfport, Mississippi, in southeastern Harrison County. Biloxi, the largest city in Harrison County, is located 7 miles east of Gulfport and Pass Christian is located 7 miles to the west.

NCBC Gulfport is an active military facility. The primary mission is the support of battalions of the Naval Construction Force (NCF) and the storage and maintenance of pre-positioned War Reserve Material Stock. NCF support consists of both homeport services and deployed support. Additional missions include tenant support and services to other activities in the region.

Land uses on base include training activities, equipment and materials storage, maintenance areas, recreational facilities, and residential housing for military personnel. Land use in the offbase areas adjacent to NCBC Gulfport is primarily residential.

Site 4 is located on part of the base golf course, therefore, recreational users and trespassers, as well as site and maintenance workers, are expected to use the site.

3.8 ECOLOGY

Site 4 is located in the northwest corner of the base. Areas to the east of the site are developed and used as training facilities. The area to the north of the Pine Bayou golf course is currently undeveloped.

3.8.1 Aquatic Habitats

Canal No. 1 at Site 4 is part of the network of interconnected ditches and canals that convey storm water on the base. The on-base ditches at NCBC Gulfport are generally straight and uniform in width, lacking the morphological properties of a natural stream. Aquatic plants may grow in stable sand and gravel banks near and below water levels. The north bank of the ditch is low, allowing inundation in times of heavy rain. The steep slopes on the south side of the ditch limit over bank flooding. Wading birds, fish, and benthic organisms have been observed in the ditches and canals on the base.

3.8.2 Terrestrial Habitats

Site 4 is located on the Pine Bayou golf course. Ground cover at the site is predominantly pavement and maintained lawn. Large trees are present on the northwest side of Canal No. 1, but native understory is limited. Vegetation along the sides of the ditch is periodically cut to control tree growth. No wetlands are located adjacent to the ditch in the vicinity of Site 4. On-site wildlife may temporarily use Site 4 but, due

to lack of suitable cover, wildlife use is assumed to be infrequent. Snakes, turtles, frogs, nutria, and Canada geese have been observed at the site.

3.8.3 Species of Concern

A request for a listing of species of concern was sent to the Heritage Program of the Mississippi Museum of Natural Science. A response from the Heritage Program dated February 24, 2003, cited no occurrences of state or federal listed or proposed endangered or threatened plants or animals on NCBC Gulfport.

4.0 NATURE AND EXTENT OF CONTAMINATION

As stated in Section 1.0, the goal of the RI is to provide the information necessary to: adequately characterize the site, define site dynamics, and define risks. Section 4.0 presents the characterization of the site by: identifying the types of materials disposed, evaluating the extent and sources of contaminants that could impact receptors outside the boundary of the containment area (cap), and developing potential contaminants of concern for each of the impacted media based on screening against MDEQ Tier 1 TRG criteria. Potential contaminants of concern for ecological receptors will be developed and evaluated in Section 7.0.

Soil and sediment sample results were compared to Tier 1 restricted and unrestricted soil TRGs. Groundwater and surface water sample results were compared to Tier 1 groundwater TRGs. Surface water sample results were also compared to MDEQ surface water criteria where available.

The *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills* (USEPA, 1996a) identifies the waste characteristics of military landfills that allow the application of the Presumptive Remedy guidance. The guidance states that appropriate characteristics include:

- Risks are low-level except for “hot spots.”
- Treatment of wastes is usually impractical due to the volume and heterogeneity of the waste.
- Waste types include household, commercial, nonhazardous sludge, and industrial waste solids.
- Lesser quantities of hazardous wastes are present as compared to municipal wastes.
- Land application units, surface impoundments, injection wells, and waste piles are not included.

The guidance further states that it is anticipated that military landfills will have industrial solid waste, paints (and paint thinners), pesticides, transformer oils, and other solvents in relatively low proportion to the volume of municipal wastes – including construction debris, commercial/household type garbage, and yard wastes. The types of waste that would exclude a military site from presumptive remedy consideration include: chemical warfare agents, munitions, and other explosives. Based on the site history, the operational history of the base, and the results from previous investigations, Site 4 would qualify for presumptive remedy consideration.

To specifically examine the contaminant sources at Site 4 and to begin the definition of site dynamics, the following sections describe the types, distribution, and trends of contaminants present in the various media.

4.1 WASTE DISPOSAL BOUNDARY AND CONTAMINANT SOURCES

The first requirements of the Presumptive Remedy RI for landfills are to adequately characterize the extent of the disposal area and determine if the types of wastes at the site are appropriate for a presumptive remedy.

4.1.1 Waste Disposal Boundary

At Site 4, the waste disposal boundary was established by evaluating the results of the magnetometer survey (shown on Figure 2-1) and the EM-61 survey (shown on Figure 2-2). Both the EM-61 and magnetometer results indicated a roughly rectangular landfill comprised of many smaller disposal cells or trenches that are approximately 800 feet (northeast-southwest) by 200 feet (northwest-southeast). The landfill area as defined by the geophysical survey is approximately 3.7 acres. The site is currently bounded on the northwest by Canal No. 1, on the south by 7th Street, and the east and northeast by existing structures.

Within the landfill area, both geophysical methods detected a significant increase of buried material in the southwestern portion of the site. The source of the CVOC plume has also been identified in the southwestern portion of the site.

The higher level responses on the EM-61 in several areas were influenced by the steel rebar in the golf cart paths. Examples are on the northeastern portion of the landfill as indicated by the linear northwest-southeast trending anomalies and on the western boundary with a linear east-west anomaly.

Visual observations of the drilling cuttings at 45 locations (Figure 2-3) further aided the definition of the waste disposal area. Those observations noted a variety of landfill debris, including wire, wood, household-type garbage and construction debris. In addition, these observations confirmed that the geophysical survey was an effective method in accurately determining the waste disposal boundaries of the landfill. Some of the material and the soil matrix showed indications of burning. These findings are consistent with the reported disposal activities at Site 4 and are consistent with the types of wastes allowed under a presumptive remedy.

4.1.2 Contaminant Sources

A review of disposal practices and interviews with site workers during the IAS (Envirodyne Engineering, 1985) determined that approximately 16,000 tons of solid wastes were disposed of at the site between 1966 and 1972. The solid waste, generated by base activities, was placed in trenches and burned on a daily basis prior to backfill. Flammable liquid wastes generated by the base were often used as

accelerants. These liquid wastes included fuels, oils, and solvents. In later years, reports indicate that liquid wastes in drums and Hurricane Camille rubble were also disposed of in the trenches.

4.2 SOILS AND VADOSE ZONE

Surface and subsurface samples were collected during several phases of investigation. Details are provided below.

4.2.1 Subsurface Soil

Subsurface soil samples were collected from 10 soil boring locations at Site 4 (samples 04GP01 through 04GP10, as indicated by the white symbols on Figure 2-3 and with results on Figure 4-1). At each of these 10 locations, soil samples were collected continuously from split spoons from the surface to approximately 40 feet bls. All samples were screened using field headspace techniques. The sample from each boring selected for off-site laboratory analysis was based on the screening results and field observations of the soil and/or debris. The majority of the samples were collected from the saturated zone at the bottom of the landfill material. The headspace screening results are summarized in Table 4-1. As shown on Table 4-1 the highest field screening results were from the southwestern area of the site at locations 04GP08 and 04GP10, which corresponds to the area of elevated geophysical signatures and the location of the CVOC plume in the groundwater.

Subsurface soil samples collected were analyzed for a full suite of analytes (TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, Appendix IX organophosphorus pesticides, Appendix IX chlorinated herbicides, dioxins, and TAL inorganics). The soil boring locations are shown on Figure 4-1. Organic analytes detected in soil samples are summarized in Table 4-2. Inorganic analytes detected in soil samples are summarized in Table 4-3.

4.2.1.1 Volatile Organics

A variety of VOCs, including ketones, aromatics, and CVOCs were detected in the subsurface soil samples from Site 4 (Table 4-2). The reported concentrations of VOCs in Site 4 soil were all less than the unrestricted Tier 1 TRGs. The following summarizes the nature and extent of positive detections.

- Acetone and carbon disulfide were detected in all of the soil samples at the site without any discernible trend in area or with depth. The detections were significantly below the TRG screening values.
- At 04GP02 (4-6 feet bls), 2-butanone, ethylbenzene, isopropylbenzene, and xylenes were detected. No trend is obvious since this was the only location to have positive detections. The

corresponding groundwater sample for 04GP02 reported detections of 2-butanone, acetone, and carbon disulfide, although at a fraction of the corresponding groundwater TRG.

- Vinyl chloride was detected at 04GP08, which corresponded with a VC exceedance from the groundwater collected from 04GP08. It should be noted that 04GP08 is within the identified CVOC plume, many of the groundwater samples in the area of 04GP08 contained a range of CVOCs at levels exceeding both the restricted and unrestricted TRG.
- The presence of CVOCs is consistent with base operations that have included the use of solvents in degreasing activities, particularly the degreasing of new military equipment from manufacturers.

4.2.1.2 Semivolatile Organics

Dibenzo(a,h)anthracene was detected at 04GP02 at an estimated concentration of 210 micrograms per kilogram (µg/kg) which exceeds the unrestricted TRG of 87 µg/kg, but is less than the restricted TRG of 784 µg/kg (Table 4-2 and Figure 4-1). Dibenzo(a,h)anthracene concentrations were less than the standard laboratory detection limits in the other soil characterization samples collected at Site 4. Other SVOCs and PAHs were detected at concentrations less then the unrestricted TRG in 04GP02 as well. The following summarizes the nature and extent of positive detections.

- Dibenzo(a,h)anthracene was only detected in a single soil sample.
- There were no observable trends across the site or with depth.
- 04GP02 is adjacent to the largest magnetic anomaly in the northern portion of the site.
- The SVOC constituents in 04GP02 confirm the possible disposal and use of fuels as an accelerant at the site during trash incineration activities.
- The corresponding SVOC groundwater sample results did not produce an observable trend.

4.2.1.3 Pesticides/PCBs

Several pesticides were detected at 04GP02. The results (Table 4-2) show concentrations of dichlorodiphenyldichloroethane (DDD) and DDE, breakdown products from the pesticide DDT, at levels well below the unrestricted Tier 1 TRGs (Figure 4-1). The pesticide chlordane, alpha and gamma, were reported at 04GP02 but were below the TRG.

PCB and organophosphorus pesticide concentrations reported for the Site 4 soil samples submitted for laboratory analysis were less than the standard laboratory detection limits. The following summarizes the nature and extent of positive detections.

- In general, the detection of the reported pesticides was not part of a site-wide trend. The reported pesticides are consistent with those in use during landfill operation. The low concentration of pesticides and the lack of site-wide occurrence, indicates either localized use or the disposal of small quantities of pesticides at or near 04GP02.
- There were no positive detections of pesticides in the corresponding groundwater sample at 04GP02.
- The lack of PCBs generally and Aroclor-1260 specifically, indicate a lack of electrical transformer disposal.

4.2.1.4 Herbicides

There were no positive detections of any herbicides.

4.2.1.5 Dioxins

Dioxins were detected in both of the soil samples submitted for dioxin analysis, collected at soil borings 04GP05 and 04GP07. OCDD and HpCDD congeners were detected in both of the samples. 2,3,7,8 TCDD was reported only in 04SB0701, collected at 04GP07, at 1.4 nanograms per kilogram (ng/kg) (parts per trillion). The OCDD and HpCDD congeners were at concentrations one or two orders of magnitude greater than the TCDD concentration. The dioxin TEQs calculated from the Site 4 soil samples were less than the unrestricted Tier 1 TRG for TCDD.

- Overall, the predominance of OCDD and HpCDD over TCDD and the lack of furans indicate that incineration is a likely source for the reported dioxins (Arienti, 1988).
- The presence of TCDD means that HO cannot be totally ruled out as a source. However, the extremely low concentrations suggest a very small quantity (if any) and does not support identifying HO as a significant contaminant source.
- The lack of the primary HO ingredients (the herbicides 2,4-D and 2,4,5-T) lend further evidence to a non-HO source.

The site-wide trends for dioxins were more completely studied during the groundwater investigation and are discussed in Section 4.3.5.

4.2.1.6 Inorganics

Metals were frequently detected in the 10 soil samples submitted for inorganic analyses (Table 4-3). Arsenic was detected in each of the 10 soil samples. Arsenic concentrations in two of these samples (Figure 4-1) were greater than the Tier 1 restricted TRG of 3.82 milligrams per kilogram (mg/kg:)

04SB0701	7.6 mg/kg
04SB0201	4.2 mg/kg

Arsenic concentrations in seven of these samples (Figure 4-1) were greater than the Tier 1 unrestricted TRG of 0.426 mg/kg, but less than the restricted TRG:

04SB0301	1.9 mg/kg
04SB0401	0.88 mg/kg
04SB0501	2.4 mg/kg
04SB0601	0.79 mg/kg
04SB0801	1.4 mg/kg
04SB0901	2 mg/kg
04SB1001	1.8 mg/kg

The arsenic concentration reported for 04SB0101, 0.27 mg/kg, was less than the unrestricted TRG. The detected concentrations of arsenic in the Site 4 soil samples are typical for coastal plain soils in Mississippi (Pettry and Switzer, 2001) and are probably not attributable to releases from landfill materials.

Aluminum, barium, calcium, chromium, copper, iron, magnesium, manganese, vanadium, and zinc were detected in all of the soil samples at concentrations less than the Tier 1 unrestricted TRGs (TRGs are not established for calcium or magnesium). Other metals and cyanide were detected in one or more of the soil samples at concentrations less than the TRGs (TRGs are not established for potassium or sodium).

- The types and ranges of inorganics, particularly arsenic, are consistent with regional background levels that have been significantly influenced by industrial and agricultural activities (Pettry and Switzer, 2001).
- There were no observable trends in the concentration of metals across Site 4.
- This is consistent with the base history where there is a lack of significant metal working and refinishing.

4.2.1.7 Summary of Subsurface Soil Analytical Results

VOCs

- Detected VOC concentrations in the soil samples were less than the Tier 1 unrestricted TRGs.
- There was a correlation between soil concentrations of CVOCs and groundwater VOCs in the area of 04GP08 and the previously identified CVOC plume.
- The CVOC concentrations are limited to the southwestern portion of the site.
- The vertical extent of contamination was determined through groundwater sampling as discussed in the next section.
- The source of the CVOCs is likely the degreasing solvents used in base operations contemporaneous with landfill activities.

SVOCs

- Dibenzo(a,h)anthracene was detected in one soil sample at a concentration greater than the unrestricted TRG, but less than the restricted TRG.
- Concentrations of other SVOCs in the soil samples were less than the Tier 1 unrestricted TRGs.
- There were no observable trends across the site either areal or with depth.

Pesticides and PCBs

- Several pesticides were detected in Site 4 soil samples at concentrations less than the Tier 1 unrestricted TRGs.
- The concentrations were consistent with the use and/or disposal of small quantities of DDT and chlordane.
- Concentrations of PCBs were less than standard laboratory detection limits.
- The areal extent appears to be limited to the disposal cells in the northern portion of the site. Based on groundwater data (discussed below), the vertical extent is limited to the depth of the disposal cell, approximately 10 feet bls.
- The lack of PCBs in general and Aroclor-1260 specifically, indicates a that a history of transformer disposal at Site 4 is unlikely.

Herbicides

- Herbicide concentrations in the soil samples were less than standard laboratory detection limits.
- The primary HO ingredients (the herbicides 2,4-D and 2,4,5-T) were not detected in any of the samples, indicating that HO was not significantly used or disposed of at Site 4.

Dioxins

- Dioxins were detected in both of the soil samples submitted for dioxin analysis. The OCDD and HpCDD congeners were at concentrations one or two orders of magnitude greater than the TCDD concentration. The dioxin TEQs calculated from the Site 4 soil samples were less than the unrestricted Tier 1 TRG for TCDD.
- As stated above, the lack of the primary HO ingredients (the herbicides 2,4-D and 2,4,5-T) lend further evidence to a non-HO source for dioxins reported at Site 4.

Inorganics

- Arsenic was detected in 9 of the 10 soil samples at concentrations greater than the Tier 1 unrestricted TRG. Two of these locations had arsenic concentrations greater than the restricted TRG (Figure 4-1). The detected concentrations of arsenic at Site 4 are typical for coastal plain soils in Mississippi (Pettry and Switzer, 2001). Other metals and cyanide were detected at concentrations less than the Tier 1 unrestricted TRGs.
- The operational history of the base does not include significant metal working and/or refinishing. The concentrations and lack of any discernible trends are consistent with the reported history of NCBC Gulfport.

The results of the soil analytical program are consistent with the containment strategy of the presumptive remedy and the direct observation of the field samples confirmed the waste disposal area defined by the geophysical investigation.

4.2.2 Surface Soil and Cover Evaluation

Surface soil samples were collected from six soil boring locations at Site 4, samples 04SS01 through 04SS06, as indicated by the square symbols on Figure 2-3. The surface soil samples were collected from clean fill material above the landfill material.

Surface soil samples collected were analyzed for a full suite of analytes (TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL inorganics). The soil sampling locations are shown on Figure 4-1. Analytes detected in surface soil samples are summarized in Table 4-4.

Metals were frequently detected in the surface soil samples (Table 4-4). Arsenic was detected in five of the six surface soil samples. The arsenic concentration in one of these samples was greater than the Tier 1 restricted TRG of 3.82 mg/kg:

04SS0301 5.6 mg/kg

Arsenic concentrations in four of these samples were greater than the Tier 1 unrestricted TRG of 0.426 mg/kg, but less than the restricted TRG:

04SS0101	3.4 mg/kg
04SS0201	2.5 mg/kg
04SS0401	1.5 mg/kg
04SS0601	1.5 mg/kg

The arsenic concentration reported for 04SS0501 was less than the laboratory detection limit. The detected concentrations of arsenic in the Site 4 soil samples are typical for coastal plain soils in Mississippi (Pettry and Switzer, 2001) and are probably not attributable to releases from landfilled materials.

Aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, vanadium, and zinc, as well as cyanide were frequently detected in the surface soil samples at concentrations less than the Tier 1 unrestricted TRGs (TRGs are not established for calcium or magnesium).

Concentrations of organic analytes in the surface soil samples collected at Site 4 were less than the Tier 1 unrestricted TRGs. Some of the pesticides and inorganics detected in the surface soil samples were at concentrations exceeding the ecological screening values (ESVs) used as ecological screening criteria.

The presumptive remedy strategy for Site 4 includes the installation and maintenance of a low permeability cover. Strategically covering the existing surface will remove important exposure pathways – direct exposure to surface soil, and erosion and transport of surface soil from the landfill. Data from grain size analysis for the soil samples collected at Site 4 indicate that the golf course fill material installed over the landfill ranged from 70 to 79 percent sand and only 6 to 12 percent clay. Hydraulic conductivities in this material ranged from 1.2×10^{-4} to 7.9×10^{-5} centimeters per second. Geotechnical analytical results are included in Appendix A.

4.3 GROUNDWATER

Groundwater samples were collected during several phases of investigation that included both DPT and monitoring well sampling. These investigations included:

- DPT Screening 2004: 10 full suite (white symbols) and 15 VOC-only (green symbols) DPT groundwater samples were collected in 2004 to screen the site and provide the initial evaluation of the nature of groundwater contaminants at the site. These locations with results are shown on Figure 4-2.

  - Full suite samples: 04GP01 through 04GP10
  - VOC-only samples: 04GP11 through 04GP25

- DPT CVOC Delineation 2006: The CVOC plume was delineated in 2006 by collecting 20 additional DPT groundwater samples for analysis with a mobile laboratory. These samples with results are shown on Figure 4-2 as the yellow symbols.
  - Mobile Lab CVOC samples: 04GP26 through 04GP45

- Monitoring Well Installation and Sampling (monitoring well samples were analyzed for constituents shown on Table 2-1):
  - 2004: 13 total monitoring wells were sampled in 2004. Seven new monitoring wells were installed and sampled, are shown as green symbols on Figure 4-3. Six existing monitoring wells, from the 1999 Groundwater Monitoring Study, were sampled and are depicted as white symbols on Figure 4-3:
    - Five new monitoring wells: GPT-04-16 through GPT-04-20
    - Two replacement monitoring wells: GPT-04-10R and GPT-04-11R
    - Six existing monitoring wells: GPT-04-08, GPT-04-09, and GPT-04-12 through GPT-04-15.
  - 2006: 17 monitoring wells were sampled in 2006. Ten new monitoring wells, depicted using yellow symbols on Figure 2-4 (GPT-04-21 through GPT-04-30) were installed and sampled based on the results of the 2004 investigations. Seven existing wells (GPT-04-12 through GPT-04-20) were also resampled.

The presumptive remedy strategy for Site 4 includes containment via a Subtitle D type landfill cover for the waste disposal area. The goal of the drilling and groundwater sampling program is to provide the data necessary to answer the following questions:

- Is the waste observed in the landfill consistent with the use of presumptive remedy?
- Do site dynamics support a containment strategy?
- Are there “hotspots” that require additional delineation?
- Will the “hotspots” require additional treatment?
- After reviewing the remedial action objectives, do we need additional non-presumptive remedies to be included in the containment alternatives?

The results of the drilling and groundwater investigations are discussed by analyte group below.

4.3.1 Volatile Organics

Between 2004 and 2006, groundwater samples were collected from 45 DPT locations (Figure 4-2) and 30 monitoring wells (Figure 4-3) and analyzed for TCL VOCs (Tables 4-5 through 4-10). Areally, these samples were collected across the entire waste disposal area, as well as upgradient, cross-gradient, and downgradient locations. Vertically, groundwater samples were collected from depths ranging from as shallow as 4 feet up to 50 feet bls as shown on Table 2-2. The DPT locations from the 2006 screening analyzed groundwater from multiple depths to better characterize the types and distribution of contaminants at Site 4. The positive detections from that screening are presented in Table 4-5.

The nature and extent of VOCs at Site 4 are best described by subdividing the site into two halves. The northern half of the site has randomly distributed detections of both halogenated and non-halogenated VOCs; the southern half includes a well-defined halogenated (chlorinated) VOC plume. For descriptive purposes, the site will be divided along a line from GPT-04-12 and GPT-04-24. The following paragraphs describe the nature and extent of these VOCs in greater detail.

VOCs - Northern Half of Site 4

As stated above, the northern half of Site 4 is best characterized as having randomly distributed detections of both halogenated and non-halogenated VOCs. The results do not exceed TRG screening levels (see Figures 4-2 and 4-3), but several trends are noteworthy.

- The VOC detections in the northern portion of the site are random and discontinuous, as exemplified by the detections at 04GP02 and GPT-04-10R when compared with the non-detections at adjacent locations 04GP04, 04GP05, GPT-04-08. The variability of detections is likely due to a random disposal pattern at the landfill. Therefore, no general trends can be drawn or interpreted across the northern half of the site.
- The vertical extent appears to be limited to the upper 20 feet of the saturated zone. The vertical delineation wells across the site are GPT-04-23 (50 feet bls), GPT-04-26 (38 feet bls), and GPT-04-29 (35 feet bls). The associated groundwater samples from these wells were all reported as non-detections.
- The horizontal or areal trend of VOC contaminants was defined using both DPT and monitoring well samples. The results from the DPT samples (Figure 4-2) 03, 04, 05, 16, 17, 21, and 38, as well as monitoring well GPT-04-09 (Figure 4-3) demonstrate that the VOCs in groundwater do not extend significantly beyond the boundary of the waste disposal area.

VOCs - Southern Half of Site 4

A CVOC plume has been identified and characterized in the southern half of Site 4. Unlike the northern half of Site 4, the VOC detections tend to be restricted to a well-defined plume. In addition, samples from the southern half of the site tend to report far fewer non-halogenated VOCs, with the only notable exception being acetone. Therefore, several significant trends and conclusions regarding the nature and extent of VOCs can be interpreted from the data:

- The CVOC plume includes the following primary constituents: VC, cis-1,2-DCE, trans-1,2-DCE, and TCE at concentrations greater than Tier 1 TRGs. Tables 4-5 and 4-6 summarize the characterization and delineation data for the CVOCs.
- The source area for these CVOCs appears to be centered near the DPT sample 04GP28 shown on Figure 4-2. Similarly elevated CVOCs were reported in the groundwater sample from the nearby monitoring well GPT-04-16, shown on Figure 4-3. Table 4-7 summarizes the DPT groundwater characterization sampling. In the source area, the maximum concentrations of the primary constituents, in micrograms per liter (µg/L) are as follows (the TRG is in parentheses):
  - VC: 1600 micrograms per liter (µg/L) (2 µg/L)
  - cis-DCE: 970 µg/L (70 µg/L)
  - trans-DCE: 800 µg/L (100 µg/L)
  - TCE: 120 µg/L (5 µg/L)
- The concentrations in the plume decrease downgradient (west-southwest) and are defined horizontally in all directions by the non-detections in the following DPT samples shown on Figure 4-2:

04GP14	04GP20	04GP30	04GP33
04GP42	04GP35	04GP15	04GP26
04GP31	04GP40	04GP38	04GP36
04GP16	04GP27	04GP32	04GP41
04GP37	04GP22		

- The maximum areal dimensions of the CVOC plume are approximately 400 feet (east-west) by 120 feet (north-south).
- The vertical extent of the plume is defined by the non-detects in the deeper wells at the site. GPT-04-23 was installed in the source area of the plume at approximately 50 feet bls and had no detected VOCs. GPT-04-26 and GPT-04-29 were installed downgradient of the source area at depths of 38 and 35 feet, respectively, to investigate the potential for low density non-aqueous

phase liquid contamination. Groundwater samples from both GPT-04-26 and GPT-04-29 reported non-detections.

- Based on the groundwater VOC information, a detailed analysis of the plume is presented in Figure 4-4. This figure presents a color contour evaluation of the most widespread constituent of the VOC plume, VC, to better evaluate the horizontal extent of the plume. In addition, the call-out box presents a cross-section of the plume to visually depict the vertical extent of CVOCs.
- Given the age and ratios of the primary constituents of the plume, natural attenuation at the site appears to have stalled and is not a viable alternative to consider in the FS.
- The vertical extent of the plume appears to be limited by the presence of the sandy clay layers between 22 and 30 feet bls.
- The localized source area for the CVOCs indicate than an individual disposal cell is likely responsible for the plume. The most likely source for the CVOCs is the disposal of degreasing solvents, either in bulk or as part of a liquid accelerant.

4.3.2 Semivolatile Organics

Concentrations of SVOCs in the DPT characterization groundwater samples were less than standard laboratory detection limits as shown on Table 4-9.

A variety of SVOCs, including 4-methylphenol, caprolactam, dibenzofuran, and PAHs (acenaphthene, fluoranthene, fluorene, phenanthrene, and pyrene) were detected in the monitoring well groundwater samples from Site 4 (Table 4-10) although the reported concentrations of SVOCs in Site 4 monitoring wells were less than the Tier 1 TRGs. While below screening levels, several trends from the SVOC sampling were noted:

- The detections were randomly distributed across the site within the waste disposal area.
- Concentrations of SVOCs rapidly decreased with depth, and were non-detect in the three deepest monitoring wells at the site: GPT-04-23, GPT-04-26, and GPT-04-29.
- The source of the SVOCs is likely associated with the disposal of and use of fuels as accelerants for landfill waste.

4.3.3 Pesticides/PCBs

Pesticide and PCB concentrations in the groundwater samples submitted for laboratory analysis were less than standard laboratory detection limits.

4.3.4 Herbicides

Herbicide concentrations in the groundwater samples submitted for laboratory analysis were less than standard laboratory detection limits. The lack of chlorinated herbicides is an important finding. Considering the lack of detections of 2,4-D or 2,4,5-T, it is unlikely that HO was disposed of at Site 4.

4.3.5 Dioxins

Dioxins were detected in three of the monitoring well samples submitted for dioxin analysis, 04GW1301 (GPT-04-13), 04GW1401 (GPT-04-14) and 04GW1701 (GPT-04-17). The OCDD congener was detected in all three of these samples (Table 4-10). The HpCDD congener was detected only in 04GW1401. TCDD concentrations were less than standard laboratory detection limits. The dioxin TEQs calculated from the Site 4 groundwater samples were less than the Tier 1 TRG for TCDD.

4.3.6 Inorganics

Metals were frequently detected in the groundwater samples submitted for inorganic analyses. Iron was detected in each of the 10 DPT groundwater samples collected for site characterization. Iron concentrations in four of these samples were greater than the Tier 1 TRG of 11,000 µg/L (Table 4-11):

04GP0301	14,400 J µg/L
04GP0501	13,100 J µg/L
04GP0601	17,300 J µg/L
04GP0801	66,600 J µg/L

Iron was detected in 12 of the 13 monitoring well samples collected for site characterization. Iron concentrations in three of these samples were greater than the Tier 1 TRG (Table 4-12):

04GW1301	24,200 µg/L
04GW1601	48,000 µg/L
04GW1901	15,700 µg/L

Unfiltered and filtered iron samples were collected from the three temporary monitoring points and one monitoring well as part of the baseline evaluation for the treatability study. Iron concentrations in two of the unfiltered samples were greater than the TRG:

GPT-04-16	38,600 µg/L unfiltered / 6,890 µg/L filtered
04MP01	23,200 µg/L unfiltered / 20,400 µg/L filtered

04MP02	1,720 µg/L unfiltered / 1,200 µg/L filtered
04MP03	9,440 µg/L unfiltered / 5,120 µg/L filtered

The baseline evaluation for the treatability study was used to determine if site conditions, including the availability of dissolved iron to microbes, were suitable for enhanced bioremediation. Comparison of the unfiltered to filtered results indicates decreased iron concentration in the filtered samples, which suggests that a significant percentage of total iron in Site 4 groundwater samples may be due to incorporation of particulates in the sample, rather than dissolved iron.

Antimony was detected in one groundwater sample, from monitoring well GPT-04-14. The antimony concentration in sample 04GW1401 was 26.3 µg/L, greater than the Tier 1 TRG of 6 µg/L. The antimony concentrations in the other 12 monitoring wells and the 10 DPT characterization groundwater samples were less than standard laboratory detection limits (Tables 4-11 and 4-12).

Barium, calcium, magnesium, manganese, and sodium were detected in all of the DPT characterization and monitoring well groundwater samples. Barium and manganese concentrations less than the Tier 1 TRGs (TRGs are not established for calcium, magnesium, or sodium). Other metals and cyanide were detected in one or more of the groundwater samples at concentrations less than the TRGs.

The most notable trend for inorganics in groundwater was the rapid decrease in concentration with depth. Groundwater samples from the deeper wells, GPT-04-23, GPT-04-26 and GPT-04-29 reported non-detections for inorganics. This suggests the elevated results were associated with site activities and that the sandy clay layers observed at the site may be acting as an effective barrier to significant vertical migration of inorganics.

4.3.7 Summary of Groundwater Analytical Results

The following is a summary of the groundwater data presented above:

- A dissolved CVOC plume was delineated in the southern part of Site 4. Concentrations of VC, cis-1,2-DCE, trans-1,2-DCE, and TCE in groundwater exceeded the Tier 1 TRGs. The plume appears to have an area of approximately 48,000 square feet.
- Comparison of analytical data from shallow and deep well pairs indicate that the CVOC plume is limited to the uppermost sand zone of the shallow surficial aquifer, to a depth of approximately 24 feet, and has not migrated vertically.
- The CVOC plume has migrated to northwest side of Canal No. 1, indicating that the canal is not a hydraulic barrier.

- Data suggests that the phenomena known as DCE stall has occurred in the dissolved CVOC plume at Site 4. DCE stall in groundwater systems results when insufficient electron acceptors or substrates or adverse environmental conditions prevent further biologically mediated reductive dechlorination of VOCs.
- Detected SVOC concentrations in the monitoring well samples were less than the Tier 1 TRGs. Concentrations of SVOCs in the DPT groundwater samples were less than standard laboratory detection limits.
- Pesticide and PCB concentrations in the groundwater samples were less than standard laboratory detection limits.
- Herbicide concentrations in the groundwater samples were less than standard laboratory detection limits.
- The dioxin TEQs calculated from the Site 4 groundwater samples were less than the Tier 1 TRG for TCDD.
- Iron was detected in four DPT groundwater samples and three monitoring well groundwater samples at concentrations greater than the TRG. Comparison of unfiltered iron sample results to filtered iron results suggest that a significant percentage of total iron concentrations may result from transported particulates, rather than dissolved iron concentrations.
- Antimony was detected in one monitoring well sample at a concentration greater than the TRG. Other metals were detected in the groundwater samples at concentrations less than the Tier 1 TRGs.
- Detected cyanide concentrations in the groundwater samples were less than the Tier 1 TRG.

4.3.8 Presumptive Remedy Strategy Analysis

- The types of wastes observed in the landfill were predominantly household type wastes, confirming the reports of 16,000 tons of “household type garbage, construction debris, paper, and plastic” in the IAS.
- The refuse, garbage, and debris were the predominant constituents of the landfill with low proportions of solvents and fuels.
- The vast majority of detections were below screening levels, with the notable exception of the CVOC “hotspot” in the southern portion of the site.
- The CVOC plume required additional delineation to evaluate the extent and potential impact to local receptors.

- The presence of the CVOC plume beyond the boundary of the waste disposal area will require additional treatment in addition to the presumptive remedy containment strategy for the landfill.
- The interaction between the layers of silt and sandy clay and the contaminants at the site appear to have created a vertical barrier to migration. While not a true aquaclude, these lower permeable layers restrict movement of the contaminants such that the containment strategy of a low-permeability cover should be effective in reducing future migration of contaminants and will be retained to be evaluated in the FS.

4.4 SURFACE WATER AND SEDIMENTS

The presumptive remedy strategy for Site 4 includes the removal of the existing sediment to provide a suitable base for the lining of Canal No.1 with a concrete and/or rip-rap cover. Strategically, removing sediment and lining Canal No.1 eliminates the transport mechanism of the seeps into surface water and sediment and will remove three important exposure pathways: surface water, sediment, and the seeps along the bank of the landfill. However, the primary reason to line Canal No.1 is to support the containment strategy of the waste disposal area by preventing erosion along the bank that could undercut the landfill and expose wastes over time.

Since the sediment will be removed from Canal No.1, the surface water and sediment analytical data will help to determine if the site dynamics support the overall containment strategy. In addition, the sediment data will be important when evaluating the best disposal options for the sediment during the FS.

The thickness of the “muck” that has accumulated in Canal No.1 was noted during sediment sampling to support the estimation of the volume of sediment that will be removed during remedial activities. This information will be presented at the end of this section.

Three surface water samples and eight sediment samples were collected from Canal No. 1 during characterization activities (Figure 4-5). The surface water and sediment samples were analyzed for a full suite of analytes including TCL VOCs, TCL SVOCs, pesticides and PCBs, organophosphorus pesticides, chlorinated herbicides, TAL metals and cyanide, and dioxins. Surface water analytical results are compared to USEPA Region IV ESVs and the Tier 1 TRGs for groundwater and the sediment analytical results are compared to the USEPA Region IV ESVs and the Tier 1 TRGs for soil.

4.4.1 Volatile Organics

Acetone, TCE, and toluene were detected in surface water sample 04SW0301 at concentrations less than the Tier 1 groundwater TRGs and the USEPA ESVs (Table 4-13). Concentrations of other VOCs in the surface water samples were less than standard laboratory detection limits.

A variety of VOCs, including ketones, cycloalkanes, and CVOCs were detected in the sediment samples from Site 4 (Table 4-14). The reported concentrations of VOCs in Site 4 sediments were less than the unrestricted Tier 1 TRGs. In terms of an identifiable trend, the detected VOCs did not appear to increase or decrease in relation to upstream or downstream of the waste disposal area. USEPA Region IV has not established sediment ESVs for the VOCs that were detected at Site 4.

4.4.2 Semivolatile Organics

SVOC concentrations in the surface water samples submitted for laboratory analysis were less than standard laboratory detection limits (Table 4-13).

Several SVOCs were detected in the Site 4 sediment samples (Table 4-14). Benzo(a)pyrene was detected in one sediment sample, 04SD0501, at a concentration of 1,800 µg/kg, which is greater than the restricted TRG of 784 µg/kg and the ESV of 330 µg/kg. Sediment sample 04SD0501 was collected from the middle reach of Canal No. 1, at the approximate center of the site. This location is approximately 50 feet downstream of a bridge constructed from creosote treated lumber. Benzo(a)pyrene was detected in two sediment samples, 04SD0201 (240 µg/kg) and 04SD0401 (99 µg/kg), at concentrations greater than the unrestricted TRG of 87.5 µg/kg, but less than the restricted TRG.

Dibenzo(a,h)anthracene was also detected in 04SD0501 at a concentration of 540 µg/kg, which exceeds the unrestricted TRG of 87.5 µg/kg and the ESV of 330 µg/kg, but is less than the restricted TRG of 784 µg/kg (Table 4-14). Dibenzo(a,h)anthracene concentrations were less than the standard laboratory detection limits in the other sediment samples collected at Site 4.

Benzo(a)anthracene was also detected in 04SD0501 at a concentration of 1,600 µg/kg, which exceeds the unrestricted TRG of 875 µg/kg and the ESV of 330 µg/kg, but is less than the restricted TRG of 7,840 µg/kg (Table 4-14). The reported benzo(a)anthracene concentrations in three of the sediment samples were less than the Tier 1 TRG. Benzo(a)anthracene concentrations were less than the standard laboratory detection limits in the other sediment samples collected at Site 4.

Benzo(b)fluoranthene was also detected in 04SD0501 at a concentration of 2,500 µg/kg, which exceeds the unrestricted TRG of 875 µg/kg, but is less than the restricted TRG of 7,840 µg/kg (Table 4-14). Benzo(b)fluoranthene concentrations were less than the standard laboratory detection limits in the other sediment samples collected at Site 4.

Indeno(1,2,3-CD)pyrene was also detected in 04SD0501 at a concentration of 980 µg/kg, which exceeds the unrestricted TRG of 875 µg/kg, but is less than the restricted TRG of 7,840 µg/kg (Table 4-14).

Indeno(1,2,3-CD)pyrene concentrations were less than the standard laboratory detection limits in the other sediment samples collected at Site 4.

Concentrations of other SVOCs detected in sediment samples from Site 4 were less than screening criteria.

4.4.3 Pesticides/PCBs

The pesticide and PCB concentrations reported for the surface water samples submitted for laboratory analysis were less than standard laboratory detection limits (Table 4-13).

Several pesticides and one PCB, Aroclor-1260, were detected in the sediment samples collected at Site 4 (Table 4-14). The reported concentrations of alpha chlordane, gamma chlordane, 4-4' DDD, 4-4' DDT and Aroclor-1260 were less than the unrestricted Tier 1 TRGs; however, concentrations of each of these analytes did exceed ESVs in one or more of the sediment samples. The risk posed to ecological receptors by pesticides and PCBs in Site 4 sediment are discussed more fully in Section 7.0.

4.4.4 Herbicides

Herbicide concentrations in the surface water and sediment samples submitted for laboratory analysis were less than standard laboratory detection limits.

4.4.5 Dioxins

OCDD, OCDF, and HPDD were detected in surface water sample 04SW0301 at concentrations less than the Tier 1 groundwater TRGs (Table 4-13). TCDD was not detected in this sample and the TEQ was less than the Tier 1 TRG and the ESV for TCDD. Concentrations of other dioxins in the surface water samples were less than standard laboratory detection limits.

Most of the 2,3,7,8 chlorinated dioxin and furan congeners were detected in one or more of the sediment samples analyzed for dioxins at Site 4 (Table 4-15). TCDD was detected in all three of the sediment samples (two field samples and one field duplicate). Sediment sample 04SD08 was the most upstream sediment sample and 04SD01 was the most downstream sediment sample.

The TCDD concentration reported for 04SD0801, 8 nanograms per kilogram (ng/kg), was greater than the unrestricted TRG of 4.26 ng/kg, but less than the restricted TRG of 38.2 ng/kg. TCDD concentrations in the other two sediment samples analyzed for dioxins, 04SD0101 at 1.3 ng/kg and 04SD0101D at 1.4 ng/kg, were less than the unrestricted TRG for TCDD. The dioxin TEQs for 04SD0801, 32.6 ng/kg, and

for 04SD0101D, 4.36 ng/kg, were greater than the unrestricted TRG and the ESV and less than the restricted TRG.

4.4.6 Inorganics

Arsenic, barium, calcium, iron, magnesium, manganese, potassium, and sodium were detected in all of the surface water samples (Table 4-13) at concentrations less than the Tier 1 TRGs (TRGs are not established for calcium, magnesium, potassium, or sodium). Other metals and cyanide were detected in one or more of the surface water samples at concentrations less than the TRGs. Barium, iron, and manganese concentrations in most or all of the surface water samples exceeded the ESVs. Cyanide was reported in field duplicate sample 04SW0101D at an estimated concentration of 6.4 J µg/L, which exceeded the ESV of 5.2 µg/L. The cyanide concentration for 04SW0101 was less than the laboratory detection limit.

Metals were frequently detected in the Site 4 sediment samples (Table 4-16). Arsenic was detected in five of the sediment samples at concentrations greater than the Tier 1 restricted TRG of 3.82 mg/kg:

04SD0201	5.4 mg/kg
04SD0401	5.6 mg/kg
04SD0501	5 mg/kg
04SD0601	5.7 mg/kg
04SD0801	4.8 mg/kg

Arsenic was detected in the other three sediment samples at concentrations greater than the Tier 1 unrestricted TRG of 0.426 mg/kg:

04SD0101	0.74/1.3 mg/kg (field duplicate result)
04SD0301	2.1 mg/kg
04SD0701	2.9 mg/kg

The detected concentrations of arsenic in the sediment samples are typical for sediments derived from coastal plain soils in Mississippi (Pettry and Switzer, 2001).

Aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, sodium, vanadium, and zinc were detected in most of the sediment samples at concentrations less than the Tier 1 unrestricted TRGs (TRGs are not established for calcium, magnesium, or sodium). Beryllium, cobalt, cyanide, nickel, potassium, and thallium were detected in one or more of the sediment samples at concentrations less than the TRGs (a TRG has not been established for potassium). Lead was the single

inorganic analyte that was reported in sediment samples at concentrations greater than ESVs. Lead was reported in 04SD0401 (43.4 J mg/kg) and 04SD0501 (38.2 J mg/kg) which exceed the ESV of 30.2 mg/kg. The risk posed to ecological receptors by metals in Site 4 sediment are discussed more fully in Section 7.0.

4.4.7 Summary of Surface Water and Sediment Analytical Results

The following is a summary of the surface water and sediment data presented above:

- Benzo(a)pyrene was detected in one sediment sample at a concentration greater than the restricted TRG and in two sediment samples at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-CD)pyrene were also detected in one sediment sample at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Concentrations of other SVOCs detected in sediment samples from Site 4 were less than screening criteria.
- OCDD, OCDF, and HPDD were detected in one surface water sample. TCDD was not detected in this sample and the TEQ was less than the Tier 1 TRG and ESV for TCDD. Concentrations of other dioxins in the surface water samples were less than standard laboratory detection limits.
- TCDD was detected at both of the sediment sample locations analyzed for dioxin. The dioxin TEQs for the sediment samples were greater than the unrestricted TRG and ESV and less than the restricted TRG. The lack of corresponding HO ingredients (the herbicides 2,4-D and 2,4,5-T) suggest a source for the TCDD that is not HO. The significant volume of treated railroad ties and other lumber used to construct the nearby golf course bridges may provide the source. Furthermore, the physical properties of dioxins and furans result in tight binding to soil particles making it unlikely that a landfill to sediment pathway is the sole (or even primary) source for the reported concentrations.
- Arsenic was detected in the eight sediment samples at concentrations greater than the Tier 1 unrestricted TRG, but less than the ESV. Five of these locations had arsenic concentrations greater than the restricted TRG. The detected concentrations of arsenic at Site 4 are typical for coastal plain soils in Mississippi. Other metals and cyanide were detected at concentrations less than the Tier 1 unrestricted TRGs, lead was detected in two sediment samples at concentrations greater than the ESV.
- The concentrations and frequency of detection for non-volatile constituents were generally higher than adjacent results in the groundwater at Site 4. This relationship suggests that seeps along

the bank of the landfill can not be the sole source for these contaminants. Other likely sources include:

- Large amounts of treated lumber in the golf course bridges upstream of the site.
- Several large parking lots and equipment training areas upstream of the Site.
- Golf course maintenance activities.

- One additional consideration is the nature of the muck currently lining Canal No.1. This highly organic material is very effective at binding and trapping organic compounds such as pesticides, SVOCs, and dioxins. Removal of this muck will effectively remove these contaminants.
- The evaluation of the sediment showed an average thickness of approximately 2.5 feet of muck above a firmer silty, fine sand bottom. Given an average width of 20 feet and a length of approximately 1000 feet, the removal of this muck will result in a volume of nearly 2,000 cubic yards for disposal.
- The results of the surface water and sampling study support the overall presumptive remedial strategy of containment and the specific remedial action objectives of removing sediment/cover for Canal No.1 and minimizing infiltration at Site 4.

4.5 AIR

Air samples were not collected from Site 4 during the RI because the concentrations of volatile contaminants previously detected in soil and groundwater were relatively low. Air monitoring was conducted during the site investigation to identify potential exposure to higher concentrations of volatile contaminants.

4.6 NATURE AND EXTENT CONCLUSIONS

As discussed in this chapter, one of the primary objectives of the investigative program was to evaluate the nature and extent of the materials disposed of at Site 4 and to determine if the resulting site conditions meet the requirements to continue to pursue the current presumptive remedy strategy.

The *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills* (USEPA, 1996) identifies the waste characteristics of military landfills that allow the application of the Presumptive Remedy guidance. The guidance states that appropriate characteristics include:

- *Risks are low-level except for "hot spots."* The results of sampling were generally below TRG screening levels except for the groundwater plume and the organic rich muck in the canal.

- *Treatment of wastes is usually impractical due to the volume and heterogeneity of the waste*. The vast majority of the material at Site 4 is nonhazardous debris and household type wastes.
- *Waste types include household, commercial, nonhazardous sludge, and industrial waste solids.* The IAS reports that 16,000 tons of nonhazardous solids and debris were disposed of in the cells across the site, this general type of waste was confirmed during drilling activities.
- *Lesser quantities of hazardous wastes are present as compared to municipal wastes*. The hotspots at the site represent a very small volume of the total waste.
- *Land application units, surface impoundments, injection wells, and waste piles are **not** included*. There is no reported history, nor any visual evidence, of these at Site 4.

The guidance further states that, it is anticipated that military landfills will have industrial solid waste, paints (and paint thinners), pesticides, transformer oils, and other solvents in relatively low proportion to the volume of municipal wastes – including construction debris, commercial/household type garbage, and yard wastes. The types of waste that would exclude a military site from presumptive remedy consideration include: chemical warfare agents, munitions, and other explosives.

Based on the site investigation results, Site 4 has the acceptable characteristics necessary to continue with the presumptive remedy. However, the chlorinated plume will require direct action and the incorporation of additional remedial action objectives into the overall remedial strategy. The following chapter, *Fate and Transport,* will examine the potential impact to local receptors and support refinement of the remedial action objectives necessary to address the contaminant pathways.

5.0 CONTAMINANT FATE AND TRANSPORT

The behavior of contaminants released into the environment, particularly the potential for a contaminant to migrate from the release area and persist in an environmental medium, can influence whether the release will result in an adverse human health or ecological effect. The fate and transport discussion for this report is limited to the groups of chemicals that were detected during the Site 4 sampling events at concentrations greater than the TRGs established by the State of Mississippi.

5.1 POTENTIAL ROUTES OF MIGRATION

The movement of contaminants in the environment will be controlled by certain properties of the contaminant and the availability of suitable pathways for contaminant movement.

5.1.1 Physical and Chemical Factors Affecting Contaminant Mobility

The following properties can be used to evaluate the potential environmental mobility and fate of site contaminants:

- Specific gravity
- Vapor pressure
- Water solubility
- Octanol/water partition coefficient
- Organic carbon partition coefficient
- Henry's Law constant
- Bioconcentration factor
- Mobility index

Table 5-1 presents the physical and chemical properties of the organic compounds detected at Site 4. The relative mobilities of metals as a function of environmental conditions are provided in Table 5-2.

5.1.1.1 Specific Gravity

Specific gravity is the ratio of the weight of a given volume of pure chemical at a specified temperature to the weight of the same volume of water at a given temperature. Specific gravity is used to determine whether a chemical will have a tendency to float or sink in water when present as a pure chemical or at very high concentrations. Non-aqueous phase chemicals with a specific gravity greater than 1 will tend to

sink, and chemicals with a specific gravity less than 1 will tend to float. The groups of chemicals detected at Site 4, CVOCs, dioxins, and PAHs generally have a specific gravity greater than 1.

5.1.1.2 Vapor Pressure

Vapor pressure provides an indication of the rate at which a chemical volatilizes from both soil and water. Chemicals with higher vapor pressures are expected to enter the atmosphere much more readily than chemicals with lower vapor pressures. Volatilization is a significant loss process for VOCs in surface water or surface soil and is of primary importance at environmental interfaces such as surface soil/air and surface water/air. Volatilization is not as important when evaluating contaminated groundwater and subsurface soils that are not exposed to the atmosphere. Vapor pressures for halogenated VOCs are typically one or more orders of magnitude higher than vapor pressures of dioxins or PAHs and volatilization is not significant for metals other than mercury.

5.1.1.3 Water Solubility

The rate at which a chemical may be leached from a solid matrix (soil, waste deposit) by infiltrating precipitation is proportional to its water solubility. More soluble chemicals are more readily leached than less soluble chemicals. The water solubilities presented in Table 5-1 indicate that TCE is slightly more soluable than PAHs, which are not especially water soluble, and several orders of magnitude more soluble than dioxins.

The solubility of inorganics is strongly influenced by their valence state(s) and forms (hydroxides, oxides, carbonates, etc.). The solubility is also dependent on pH, oxidation reduction potential (ORP), temperature, and other ionic species in solution (the Debye-Huckel theory). The solubility products reported in the literature vary with the type of complex formed, but generally it can be noted that, for example, cadmium and copper complexes are more soluble than lead and nickel complexes.

5.1.1.4 Octanol/Water Partition Coefficient

The octanol/water partition coefficient (K_{ow}) is a measure of the equilibrium partitioning of chemicals between octanol and water. A linear relationship between the K_{ow} and the uptake of chemicals by fatty tissues of animal and human receptors (the bioconcentration factor) has been established. It is also useful in characterizing the sorption of compounds by organic soils where experimental values are not available. Dioxins and PAHs are more likely to partition to fatty tissues than the more soluble VOCs. The K_{ow} is also used to estimate bioconcentration factors in aquatic organisms.

5.1.1.5 Organic Carbon Partition Coefficient

The organic carbon partition coefficient (K_{oc}) indicates the tendency of a chemical to adhere to soil particles containing organic carbon. Chemicals with a high K_{oc} generally have low water solubilities and vice versa. This parameter may be used to infer the relative rates at which the more mobile chemicals (ketones, monocyclic aromatics, and halogenated aliphatics) partition to groundwater. Most dioxins and PAHs are relatively immobile in the soil and are preferentially bound to the soil. These compounds are not as likely to be transported in the dissolved phase by groundwater to the same extent as compounds with higher water solubilities. However, these preferentially bound chemicals are easily transported by erosional processes when they are present in surface soils and the soil particles to which they have adsorbed are mobilized.

5.1.1.6 Henry's Law Constant

Both the vapor pressure and the water solubility are of use in determining volatilization rates from surface water bodies and from groundwater. The ratio of these two parameters, the Henry's Law constant, is used to calculate the equilibrium chemical concentrations in the vapor (air) phase versus the liquid (water) phase for the dilute solutions commonly encountered in environmental settings. In general, chemicals having a Henry's Law constant of less than 1×10^{-5} atmosphere-m^3/mole should volatilize very little and be present only in minute amounts in the atmosphere or soil gas. For chemicals with a Henry's Law constant greater than 5×10^{-3} atmosphere-m^3/mole volatilization and diffusion in soil gas could be significant.

5.1.1.7 Bioconcentration Factor

The bioconcentration factor (BCF) represents the ratio of aquatic-animal-tissue concentration to water concentration. The ratio is both contaminant and species specific. When site-specific values are not measured, literature values are used or the BCF is derived from the octanol/water coefficient. Many of the dioxins and PAHs will bioconcentrate at levels three to five orders of magnitude greater than those concentrations found in the water, whereas TCE does not bioconcentrate to any significant degree.

5.1.1.8 Distribution Coefficient

The distribution coefficient (K_d) is a measure of the equilibrium distribution of a chemical or ion in soil/water systems. The distribution of organic chemicals is a function of both the K_{oc} and the amount of organic carbon in the soil. For ions (e.g., metals), K_d is the ratio of the concentration adsorbed on soil surfaces to the concentration in water. Distribution coefficients for metals vary over several orders of magnitude because the K_d is dependent on the size and charge of the ion and the soil properties governing exchange sites on soil surfaces. Coulomb's Law predicts that the ion with the smallest

hydrated radius and the largest charge will be preferentially accumulated over ions with larger radii and smaller charges.

5.1.1.9 Mobility Index

The mobility index (MI) is a quantitative assessment of chemical mobility in the environment based on the water solubility (S), vapor pressure (VP), and the K_{oc} of a given material (Laskowski, et. al., 1983):

$$MI = \log ((S*VP)/K_{oc})$$

The MI for a given chemical is evaluated using the following scale (Ford and Gurba, 1984):

Relative MI	Mobility Description
> 5	extremely mobile
0 to 5	very mobile
-5 to 0	slightly mobile
-10 to –5	immobile
< -10	very immobile

TCE has a MI close to 5 and is considered very mobile. Pesticides such as BHC have MIs between -5 and -10, and are classified as immobile. Lighter molecular weight PAHs, such as naphthalene, have MIs ranging from -5 to 0 and are considered slightly mobile, and the heavier molecular weight PAHs, e.g., benzo(a)pyrene, and dioxins are classified as very immobile having MIs less than -10 (Table 5-1).

5.1.2 Potential Pathways for Contaminant Migration

Based on the evaluation of existing conditions at Site 4, the following potential contaminant transport pathways may exist at the site:

- Leaching of soil contaminants to groundwater
- Migration of groundwater contaminants
- Volatilization from soil or groundwater

5.1.2.1 Leaching of Soil Contaminants to Groundwater

Contaminants that adhere to soil particles or have accumulated in soil pore spaces can be remobilized and transported to the groundwater as a result of infiltration or precipitation. The rate and extent of this leaching are influenced by:

- The depth of the water table
- Amount of precipitation
- Rate of infiltration
- The physical and chemical properties of the soil
- The physical and chemical properties of the contaminant

The mobility of chemicals at Site 4 will be influenced by the relatively shallow water table, potentially high rates of precipitation, and the sandy soil in the area which may allow a higher rate of infiltration. The contaminants identified at Site 4 (dioxins, metals and CVOCs) generally have physical and chemical properties that result in low mobility and higher persistence in the environment.

5.1.2.2 Migration of Groundwater Contaminants

Contaminants can migrate in either a dissolved phase or as an immiscible liquid. A contaminant that is present in water above its solubility concentration will form an immiscible liquid. Based on the specific gravity of the contaminant, it will either float or sink in the water. In the case of chlorinated solvents (e.g., chloroform), the contaminant will sink in the water because it has a higher specific gravity than water. Subsurface transport of the immiscible contaminants is governed by a set of factors different from those of dissolved contaminants.

The groundwater data at Site 4 do not provide evidence of immiscible contaminants at concentrations exceeding water solubility levels. Solvents were detected at concentrations less than their water solubilities. Therefore, the migration of groundwater contaminants, for the most part, is likely governed by factors that govern the movement of dissolved contaminants. Three general processes govern the migration of dissolved constituents in groundwater: advection, dispersion, and retardation. Advection is a process by which solutes are carried by groundwater movement. Dispersion is a mixing of contaminated and uncontaminated water during advection. Retardation is a slowing of contaminant migration caused by the reaction of the solute with the aquifer soil.

Contaminant concentrations may be affected by one or more mechanisms during transport. Volatilization or precipitation may physically transform contaminants. Contaminants may be chemically transformed through photolysis, hydrolysis, or oxidation/reduction. Contaminants may also be biologically transformed by biodegradation.

Hydrogeologic data were collected to evaluate movement of groundwater in the shallow surficial aquifer at Site 4. These data were used to estimate the site-specific groundwater flow direction and groundwater flow velocity.

5.1.2.3 Volatilization from Soil or Groundwater

Chemicals in soil can migrate into ambient air either as vapors or by adhering to particulate matter (dusts). Chemicals that have a significant volatility are likely to enter ambient air as vapors. These chemicals are generally considered to be compounds with Henry's Law Constants greater than 1.0×10^{-5} and molecular weights less than 200. Chemicals with lower Henry's Law Constants and higher molecular weights are more likely to enter ambient air on particulate matter carried by winds.

Once in groundwater, volatile chemicals may migrate or they may volatilize through the capillary zone and overlying soil layers into ambient air or inside buildings. Chemicals in the vapor phase may migrate horizontally or vertically and can enter buildings through cracks in the foundation or through foundation walls. Once inside buildings, the air concentrations in buildings are subject to various factors, such as building dimensions and ventilation rates. Upon entering ambient air, the vapors are not expected to persist for long periods of time having half-lives in the atmosphere typically measured in hours or a few days. The air concentrations of vapors in ambient air are likely to be quickly diluted by the action of winds. Vapors may also be released directly to ambient air from soil or groundwater during excavation activities.

Many of the contaminants detected in soil and groundwater samples at Site 4 (metals, PAHs, and dioxins) are not especially volatile and are not expected to vaporize into the air. Air monitoring was conducted during the site investigation due to the potential for dust/particulate exposure. Because most of the site is grass covered, little dust was generated under normal conditions. However, there is a potential for particulate exposure in areas without grass if the soil is heavily disturbed (e.g., during an excavation).

5.2 CONTAMINANT PERSISTENCE

The life span of the contaminants once released to the environment is controlled by the susceptibility of the contaminant to certain chemical and biological processes that may degrade the contaminants and reduce their remaining mass.

5.2.1 <u>CVOCs</u>

In general, CVOCs are subject to abiotic dehydrohalogenation. This process is an elimination reaction that results in the formation of an ethene from a saturated halogenated compound. Research indicates that microbial degradation of highly chlorinated ethanes is a relatively slow process. Chlorinated ethenes are subject to degradation via the action of soil microorganisms. The biodegradation of these compounds in the soil matrix is dependent on the abundance of microflora, nutrient availability, soil reaction (pH), temperature, etc. Data collected from the site (Table 5-3) suggest that conditions suitable for reductive

chlorination are present (e.g. reducing groundwater conditions, adequate TOC). However, the CVOC concentrations at the site have changed little over time, indicating that one or more factor is limiting the reductive dechlorination process. A microbial census conducted of the treatability study showed extremely low levels of naturally occuring dehalogenating bacteria at the site. Bioaugmentation technology is currently under evaluation as part of the treatability study.

Hydrolysis, photolysis, and oxidation are generally not considered to be significant fate processes for the chlorinated ethanes. Limited hydrolysis of saturated aliphatics (i.e., alkanes) may occur, but it does not appear to be a significant degradation mechanism for unsaturated species (i.e., alkenes).

Monocyclic aromatics are subject to degradation via the action of both soil and aquatic microorganisms. The biodegradation of these compounds in the soil matrix is dependent on the abundance of microflora, macronutrient availability, soil reaction (pH), temperature, etc.

Although these compounds are amenable to microbial degradation, it is not anticipated that degradation will occur at an appreciable rate, although macronutrient availability is not known.

Under certain conditions, volatilization is a significant fate process for these compounds. Volatilization is only significant at the air-soil or air-water interface. Compounds may volatilize rapidly to the atmosphere from soil or surface water due to low soil adsorption. Adsorption should not be considered as an important fate for these types of compounds when compared to more hydrophobic compounds. BCF factors indicate that these compounds should not bioaccumulate.

5.2.2 PAHs

SVOCs as a class of compounds, and PAHs in particular, are considered to be persistent in the environment. SVOCs in soil are much more likely to bind to soil and be transported via mass transport mechanisms than to go into solution. PAHs are subject to degradation via aerobic bacteria but may be relatively persistent in the absence of microbial population or macronutrients such as phosphorus and nitrogen. Landspreading applications have indicated that PAHs are highly amenable to microbial degradation in soil. The rate of degradation is influenced by temperature, pH, oxygen concentrations, initial chemical concentrations, and moisture. Photolysis, hydrolysis, and oxidation are not important fate processes for the degradation of PAHs in soil.

5.2.3 Dioxins

Dioxins and furans are considered to be very persistent in the environment. They are not very soluble in water and tend to remain affixed to soil particles. Once associated with soils and sediments dioxins

degrade slowly and may persist for many years. In the atmosphere, vapor-phase TCDD may be degraded by reaction with hydroxyl radicals and direct photolysis. Particulate-phase TCDD may be physically removed from air by wet and dry deposition. The vapor phase undergoes degradation, but the importance of this, given the small fraction of dioxins normally in the vapor phase, is not well quantified.

If released to water, TCDD will predominantly be associated with sediments and suspended material. TCDD near the water's surface may experience some photodegradation. Partitioning from the water column to sediment and suspended material will occur. Volatilization from the water column may be important, but adsorption to sediment will limit the overall rate by which TCDD is removed from water. The persistence half-life of TCDD in lakes has been estimated to be in excess of 1.5 years. Bioconcentration in aquatic organisms has been demonstrated.

If released to soil, TCDD is not expected to leach. Photodegradation on terrestrial surfaces may be an important transformation process. Volatilization from soil surfaces during warm conditions may be a major removal mechanism. Studies regarding the persistence of TCDD on soil surfaces range from less than 3 years to as much as 50 years. Screening studies have shown that TCDD is generally resistant to biodegradation. The major route of exposure to the general population results from incineration processes and exhausts from leaded gasoline engines.

5.2.4 Metals

Metals are highly persistent environmental contaminants. They do not biodegrade, photolyze, or hydrolyze. Metals released to the environment generally adsorb to the soil matrix (as compared to being part of the soil structure) and bioaccumulate. Because metals are frequently incorporated into the soil matrix and remain bound to particulate matter, they also migrate from the source areas via bulk movement processes (erosion).

5.3 CONTAMINANT MIGRATION

The mobility of the contaminants, once released to the environment, is controlled by the physical properties of the contaminant, which determine whether the contaminant partitions to more mobile media (air or groundwater) or less mobile media (soil or sediment particles).

5.3.1 Halogenated VOCs

Halogenated aliphatics [e.g., tetrachloroethene (PCE,), TCE, and DCE] are generally volatile compounds and are typically considered to be fairly soluble in water with a low capacity for retention by soil organic carbon; therefore, these organic compounds are frequently detected in groundwater. The high volatility

and water solubility of these chemicals dominate their fate the environment. These chemicals may migrate through the soil column after being released by a spill event or by subsurface waste burial as infiltrating precipitation solubilizes them. Some fraction of these chemicals is retained by the soil, but most will continue migrating downward to the water table. Upon reaching the water table migration occurs primarily in the direction of the horizontal hydraulic gradient.

Compounds with specific gravities greater than that of water (e.g., TCE) are often used in various industrial applications such as degreasing. If a large enough spill of these solvents occurs, these chemicals may also migrate as a bulk liquid but will not stop at the water table (i.e., these chemicals will mix with or sink into the aquifer).

5.3.2 SVOCs

SVOCs are generally considered to be fairly immobile chemicals in the environment because they are large molecules with high organic carbon partition coefficients and low solubilities when compared to the volatile organics. However, some of the lighter molecular weight PAHs (a subgroup of SVOCs), such as naphthalene, are more water soluble and environmentally mobile. SVOC compounds in the soil generally do not migrate vertically to a great extent and are more likely to adhere to soil particles and be removed from the site via surface runoff and erosional processes.

PAHs are frequently released to the environment through emissions from the incineration of municipal and chemical wastes, in exhaust from internal combustion engines. The PAHs detected at Site 4 may have been a by-product of wastes burned at the site.

PAHs generally have very low solubilities, vapor pressures, and Henry's Law constants and high K_{oc} and K_{ow}. The low-molecular-weight PAHs (e.g., acenaphthene, anthracene, fluorene, phenanthrene) may volatilize from surface waters, and the high-molecular-weight PAHs (e.g., benzo(a)pyrene, benzo(a)anthracene, chrysene, etc.) are less likely to volatilize. PAHs in soil are much more likely to bind to soil and be transported via mass transport mechanisms than to go into solution.

5.3.3 Dioxins

Dioxins, particualarly 2,3,7,8-TCDD are usually released to the environment through emissions from the incineration of municipal and chemical wastes, in exhaust from automobiles using leaded gasoline, and from the improper disposal of certain chlorinated chemical wastes. The dioxins detected at Site 4 may have been a by-product of wastes burned at the site.

Dioxins are not considered to be very mobile in the environment. They are not very soluble in water and tend to remain affixed to soil particles. Dioxins are multimedia pollutants and once released to the environment become distributed between environmental compartments. In the atmosphere they exist in both the gaseous phase and bound to particles, depending on the environmental conditions, and are deposited on soil, vegetation, and water bodies by wet and dry deposition or in mist. Soil runoff can transfer dioxins from land to water. In water bodies dioxins rapidly adsorb to organic matter and subsequently settle out in sediments.

5.3.4 Metals

The mobility of metals is influenced primarily by their physical and chemical properties, in combination with the physical and chemical characteristics of the soil matrix. Factors that assist in predicting the mobility of inorganic species are the soil/pore water pH, soil/pore water oxidation reduction potential (ORP) of groundwater, and cation exchange capacity. The mobility of metals generally increases with decreasing soil pH and cation exchange capacity (Table 5-2).

Because inorganics are frequently incorporated into the soil matrix and remain bound to particulate matter, they also migrate from the source areas via bulk movement processes (erosion). The larger, non-colloidal soil particles (greater than 0.45 micron) are not generally considered to be mobile in groundwater. Metals are also more mobile under acidic conditions. In these cases, it is possible for metals to migrate vertically through the soil column and reach the groundwater.

The detected concentrations of arsenic in soil and sediment samples at Site 4 may be attributed to naturally occurring conditions. Pettry and Switzer, 2001, evaluated arsenic concentrations in soil in Mississippi and reported data from five sample locations in the coastal flatwoods in Jackson County and one from Hancock County. The reported concentrations of arsenic in the coastal flatwoods samples ranged from 0.38 mg/kg to 4.78 mg/kg. The arsenic levels reported at Site 4 were in the lower end of the background samples from the area.

6.0 HUMAN HEALTH RISK ASSESSMENT

This baseline HHRA was performed to characterize and quantify potential health risks at Site 4, Golf Course Landfill, NCBC Gulfport. The objective of the risk assessment is to determine whether detected concentrations of chemicals within the study areas pose a significant threat to potential human receptors under current and/or future land use. The risk assessment for Site 4 is based on chemical data for subsurface soil, groundwater, surface water, and sediment collected during the field investigation conducted in August and September 2004. Surface soil was not evaluated in the quantitative risk assessment because waste at the site was disposed of in trenches and covered with clean soil as part of the landfill operation, and later, the site was covered with additional fill material. Surface soil data collected in 2007 as part of the existing cover evaluation were screened against MDEQ risk based criteria to determine suitability for use in the final remedy.

The potential risks to human receptors are estimated based on the assumption that no actions are taken to control contaminant releases. The baseline risk assessment consists of five major components:

- Data evaluation and identification of chemicals of potential concern (COPCs)
- Identification of significant exposure pathways
- Toxicity assessment
- Estimation of potential human health risks
- Characterization of uncertainty in the risk assessment

Section 6.1 lists USEPA and MDEQ guidance used to prepare the baseline HHRA. Section 6.2 describes the methods used to evaluate data usability for the risk assessment. Methods for selecting COPCs to be evaluated quantitatively in the risk assessment are described in Section 6.3. COPCs are selected to represent those compounds likely to have the highest potential health risk, based on chemical concentration, toxicity, and mobility. The COPC screening process involves comparing maximum site concentrations to risk-based screening levels.

Section 6.4 presents an overview of the Exposure Assessment, which characterizes potential receptor populations and the pathways by which they may come into contact with contaminants at the site. Discussions of current and future land uses, potential human receptors, exposure scenarios, and methods used to estimate chemical intakes are included. In addition, specific exposure parameters used to calculate chemical intakes are presented. The chemical intake estimates are based on chemical concentrations at receptor locations, human activity patterns, physiological factors, and exposure duration and frequency. Current and reasonable future exposure scenarios are developed on the basis of site characteristics, land use and zoning plans, human activity patterns, potential chemical migration pathways, and other pertinent

information. A concise Conceptual Site Model (CSM) illustrating the potential receptors and exposure pathways evaluated in the risk assessment is also presented. In accordance with current USEPA guidance, chemical intakes (and risks) are estimated for both central tendency exposure (CTE) and reasonable maximum exposure (RME) conditions. The evaluation of the CTE and RME is intended to bracket the likely potential levels of risk at a site.

Section 6.5 presents an overview of the Toxicity Assessment and the chemical-specific toxicity criteria used in quantifying potential human health risks. When integrated with chemical intake estimates developed in the Exposure Assessment, these toxicity factors provide a basis for quantifying potential human health risks. Methods used for characterizing risks associated with non-carcinogenic and carcinogenic effects for exposure to COPCs are presented in Section 6.6.

The quantitative risk estimates are based on a number of assumptions about exposure and toxicity. Thus, the risk estimates may over- or underestimate the level of potential human health risks associated with a site. The Uncertainty Analysis (Section 6.7) describes in qualitative and semi-quantitative terms the sources of uncertainty in the risk assessment. Section 6.8 presents the summary and conclusions of the risk assessment.

6.1 RISK ASSESSMENT GUIDANCE

The following guidance was used to prepare the HHRA:

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

- RAGS, Volume I. Human Health Evaluation Manual: Standard Default Exposure Factors. (USEPA, 1991b).

- Supplemental Guidance to RAGS: Calculating the Concentration Term. (USEPA, 1992b).

- Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening. Region 3 Technical Guidance Manual Risk Assessment. (USEPA, 1993b).

- Distribution of Preliminary Review Draft: "Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure". (USEPA, 1993c).

- Soil Screening Guidance: Technical Background Document. (USEPA, 1996c).

- Exposure Factors Handbook. (USEPA, 1997c).

- RAGS, Human Health Evaluation Manual, Part D: "Standardized Planning, Reporting, and Review of Superfund Risk Assessments" (RAGS Part D) (USEPA, 2001b).

- Risk Evaluation Procedures for Voluntary Cleanup and Development of Brownfield Sites, MDEQ (MDEQ, 2002).

- Supplemental Guidance For Developing Soil Screening Levels For Superfund Sites, OSWER 9355.4-24, Office of Solid Waste and Emergency Response Washington, D.C. (USEPA, 2002b).

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

- Final Work Plan for RI at Site 4, Golf Course Landfill, NCBC Gulfport, Mississippi. (TtNUS, 2004).

- RAGS: Volume I, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment) Interim Guidance. (USEPA, 2004b).

In addition, USEPA's online database, Integrated Risk Information System (IRIS) (USEPA, 2006b), was used to identify the most recently published toxicity criteria for the identified COPCs.

6.2 DATA EVALUATION

Information associated with data usability for Site 4 is provided in this section.

The HHRA presented in this report is based on the most recent analytical data collected at Site 4 (the data were collected as part of the field investigation conducted by TtNUS in August and September 2004). Historical soil, groundwater, surface water, and sediment data collected in the Surface Water and Sediment Delineation Study 1995 (ABB-ES, 1997), the soil and groundwater sampling conducted by Morrison-Knudson in 1997, and data collected for the Groundwater Monitoring Report (HLA, 1999a) were not used in the quantitative risk assessment. A summary of the analytical data from these investigations in presented in Section 3.1 of the Work Plan for the RI at Site 4 (TtNUS, 2004). A comparison of the historical data with the data collected in 2004 indicates that the concentrations of VOCs in groundwater are similar, with the concentrations of the 2004 samples being slightly higher than the concentrations of the historical samples and the concentrations of dioxins/furans in the groundwater

samples collected in 2004 are similar to the concentrations reported in the historical samples. In addition, concentrations of dioxins/furans in groundwater were less than USEPA MCLs in both the historical and 2004 samples. Based on these comparisons, the results and conclusions of the risk assessment for Site 4 are probably not affected by the exclusion of the historical data from the risk assessment. All analytical data used in the quantitative estimation of potential risks were subject to data evaluation. A discussion of data validation protocol is provided in Section 7.2 of the Work Plan (TtNUS, 2004).

Fixed base laboratory analytical results for target analytes from the field investigation were used in the quantitative risk evaluation. Unfiltered results for groundwater and surface water are used to assess risks associated with these media. Field measurements and data regarded as unreliable (i.e., qualified as "R" during the data validation process) were not used in the quantitative risk assessment. Analytical data qualified as estimated (“J”, or “UJ”) were used, even though the reported positive concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the risk assessment; however, the associated uncertainty is expected to be negligible compared with the other uncertainties inherent in the risk evaluation process (i.e., uncertainties with land uses, exposure scenarios, toxicological criteria, etc.). Analytical data qualified for blank contamination were used in the baseline risk assessment. When determining exposure concentrations via statistical procedures, analytical results qualified because of blank contamination and nondetect results were conservatively assumed to be present at concentrations equal to one-half the sample-specific quantitation limit.

6.3 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the HHRA to those site-related constituents that dominate overall potential risks. Screening of site data against RBCs is used to focus the risk assessment on meaningful chemicals and exposure routes.

In general, a chemical is selected as a COPC and retained for further quantitative risk evaluation in the HHRA if the maximum detection in a sampled medium exceeds a conservative screening value(s) and the chemical is determined to be present at concentrations exceeding background levels, if available. Chemicals eliminated from further evaluation at this time are assumed to present minimal risks to potential human receptors.

6.3.1 Derivation of Screening Criteria

Screening concentrations based on USEPA Region IX Preliminary Remediation Goals (PRGs), MDEQ TRGs, and USEPA MCLs were used to select COPCs for Site 4. The risk-based screening concentrations (i.e., those based on the Region 9 PRGs) correspond to a systemic Hazard Quotient (HQ) of 0.1 (for noncarcinogens) or a lifetime cancer risk of 1×10^{-6} (for carcinogens). Note that the Region 9 PRGs are based on a HQ of 1.0 and the screening concentrations are based on a HQ of 0.1. The PRGs used as screening levels for non-carcinogenic chemicals have been divided by a factor of 10 to further account for the potential cumulative effects of several chemicals affecting the same target organ or producing the same adverse non-carcinogenic health effect.

Screening levels based on the following standards/criteria were used to select COPCs for soil:

- USEPA Region IX PRGs for Residential Soil (USEPA, 2004c)
- MDEQ Tier 1 TRGs for restricted and unrestricted land use (MDEQ, 2002)
- USEPA generic soil screening levels (SSLs) for the inhalation of volatiles and fugitive dusts calculated online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from the USEPA's Soil Screening Guidance (USEPA, 1996c).

Screening levels based on the following criteria were used to select COPCs for sediment:

- USEPA Region IX PRGs for Residential Soil (USEPA, 2004c)
- MDEQ Tier 1 TRGs for restricted and unrestricted land use (MDEQ, February 2002)

Screening levels based on the following criteria were used to select COPCs for groundwater and surface water:

- USEPA Region IX PRGs for tap water (USEPA, 2004c)
- MDEQ Tier 1 TRGs for groundwater (MDEQ, 2002)
- USEPA MCLs (USEPA, 2004d)

If the maximum concentration of a constituent exceeds any of these criteria, then the chemical was selected as a COPC and carried through the quantitative risk assessment.

Soil data were also compared to USEPA Generic SSLs for migration from soil to groundwater (calculated online at http://risk.lsd.ornl.gov/calc_start.shtml based on methodology from the USEPA's Soil Screening Guidance (USEPA, 1996c). The soil-to-groundwater SSLs were not used to select COPCs for

quantitative risk evaluation, but to provide an evaluation of potential impact of chemicals detected in soil on groundwater. Exceedances of the soil-to-groundwater SSLs are discussed in Section 6.3.2.

Lead as a COPC

Limited criteria are available to evaluate the potential risks associated with lead. There are no RBCs for this chemical because USEPA has not developed toxicity values [i.e., Cancer Slope Factors (CSFs), Reference Doses (RfDs)] for lead. However, recommended screening levels are available for lead in soil that are used to indicate the need for response activities.

Guidance from both the Office of Prevention, Pesticides, and Toxic Substances (OPPTS) and the Office of Solid Waste and Emergency Response (OSWER) recommend 400 mg/kg as the lowest screening level for lead-contaminated soil in a residential setting where children are frequently present (USEPA, 1994a). OPPTS identifies 2,000 to 5,000 mg/kg as an appropriate range for areas where contact with soil by children in a residential setting is less frequent. A value of 400 mg/kg was used as the screening level for soil and sediment in the HHRA for Site 4.

The Safe Drinking Water Act (SDWA) Action Level (15 µg/L) was used as the screening level for lead in groundwater and surface water.

Essential Nutrients and Chemicals without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium were not identified as COPCs because these inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals (e.g., benzo(g,h,i)perylene, phenanthrene, and 2-methylnaphthalene). Appropriate surrogates were selected for some of these chemicals based on similar chemical structures. Pyrene was used as the surrogate for benzo(g,h,i)perylene and phenanthrene, and naphthalene was used as the surrogate for 2-methylnaphthalene.

Determination of Site-Related Chemicals (Background Evaluation)

No background or upgradient sample data are available for NCBC Gulfport. Therefore, a background screen (i.e., a comparison of site-data to background data) was not used in the selection of COPCs.

A discussion of the chemicals identified as COPCs and the rationale for their selection are provided in the following sections.

6.3.2 COPC Selection for Subsurface Soil

This section presents the results of the COPC selection process for subsurface soil. The contamination at Site 4 originated from solid and liquid wastes that were disposed of in trenches and burned. The trenched areas were eventually backfilled with clean soil. The liquid wastes consisted of fuels, oils, solvents, paints, and paint thinners. Solid wastes, such as infrastructure debris, were also disposed of at the site. The COPC screening process for subsurface soil and the results of the screening are presented in Table 6-1. The subsurface soil data set consists of 10 samples collected from 10 to 12 feet bls during the field investigation conducted in 2004. The following chemicals were retained as COPCs for subsurface soil:

- PAHs – benzo(a)anthracene, dibenzo(a,h)anthracene
- Inorganics – aluminum, arsenic, iron, vanadium

These constituents were identified as COPCs in subsurface soil because maximum concentrations exceeded one or more of the human health risk screening levels for residential land use (i.e., USEPA Region IX risk-based screening levels for residential soil and/or MDEQ Tier 1 TRGs for restricted and unrestricted land use). The maximum detected concentrations of aluminum, iron, and vanadium exceeded the screening levels [set at a Hazard Index (HI) of 0.1], but did not exceed the USEPA Region IX PRGs and MDEQ Tier 1 TRGs for restricted and unrestricted land use. The maximum concentration of benzo(a)anthracene exceeded the Region 9 risk-based screening level but was less than the MDEQ Tier 1 TRGs for restricted and unrestricted land use. No site-specific background data are available for NCBC Gulfport. Therefore, background screen was not used in the COPC selection process. However, the concentrations of aluminum, arsenic, iron, and vanadium are well within naturally occurring background levels found in U.S. soil (Dragun, 1988). In addition, the maximum concentration of arsenic (7.6 mg/kg) is within the range of background concentrations determined in a study of arsenic in Mississippi soils performed by Mississippi State University in 2001 (Pettry and Switzer, 2001). Based on a comparison of site-data to the available background data presented in the scientific literature, the concentrations of aluminum, arsenic, iron, and vanadium detected in subsurface soil at Site 4 are naturally occurring.

The maximum concentrations were also compared to USEPA Generic SSLs for migration from soil to air (inhalation), when available. As shown in Table 6-2, the maximum concentrations of all constituents were less than the inhalation SSLs. Therefore, potential risks from inhalation of chemicals detected in soil are expected to be minimal and this pathway is not evaluated further in the risk assessment.

Migration of Chemicals from Subsurface Soil to Groundwater

Maximum concentrations in subsurface soil were also compared to the USEPA SSLs for a dilution/attenuation factor of 1 (DAF = 1) for the protection of groundwater (USEPA, 1996c). The following chemicals were detected in the subsurface soils at maximum concentrations exceeding the COPC screening levels for contaminant migration from soil to groundwater:

- VC
- PAHs [benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenzofuran]
- Dioxins/furans
- Inorganics (aluminum, arsenic, chromium, cobalt, manganese, selenium, thallium)

These exceedances of SSLs may indicate the potential for chemicals in soil to leach to groundwater and impact water quality. However, of the organic chemicals that exceeded the migration-to-groundwater SSLs, only VC, dibenzofuran, and dioxins/furans were detected in groundwater samples collected at the site. VC and dibenzofuran were only detected in 1 of 10 subsurface soil samples, and dibenzofuran was detected in 1 of 23 groundwater samples. Dioxins/furans were detected in 2 of 2 subsurface soil samples and two dioxin congeners (HpCDD and OCDD) were detected in 3 of 13 groundwater samples. However, the turbidity readings in two of these groundwater samples were greater than 10 Nephelometric Turbidity Units (NTU). Consequently, the high turbidity levels may have affected the analysis of the groundwater samples. For example, the highest groundwater concentration of OCDD occurred in a sample from permanent monitoring well 04GW1701; the turbidity reading for the sample was 260 NTU. Also, note that the maximum 2,3,7,8-TCDD TEQ concentration in subsurface soil (0.0026 µg/kg) is less that the PRG of 1 µg/kg established for 2,3,7,8-TCDD in USEPA OSWER 9200.4-26, Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites (USEPA, 1998). The soil data for organic chemicals suggests that the subsurface soils are not a significant residual contaminant source for groundwater contamination at Site 4. It is more likely that the liquid wastes deposited directly in the trenches are the source of the groundwater (and surface water and sediment) contamination at the site. Further evidence of this is the fact that most of the CVOCs (i.e., 1,1-DCA, 1,1-DCE, 1,2-DCA, 1,2-DCE, and TCE) detected in groundwater samples were not detected in any of the subsurface soil samples.

Most of the metals exceeding the migration from soil-to-groundwater SSLs were detected in groundwater samples. However, cobalt and thallium were not detected in any groundwater samples, and selenium was detected in 1 of 23 groundwater samples. However, the maximum concentrations of these metals in soil (aluminum, arsenic, chromium, cobalt, manganese, selenium, and thallium) were at the low end of the range of soil background levels reported in the continental United States. (Dragun, 1998). In addition, the maximum groundwater concentrations of these metals were less than USEPA MCLs, MDEQ TRGs, and

Region 9 PRGS, with the exception of arsenic. Although arsenic concentrations reported for one groundwater sample (11.4 mg/L in sample 04GW1401) slightly exceeded the MCL the concentrations of arsenic at the site are within Mississippi background levels for soil (see preceding information). The available data indicate that groundwater quality at Site 4 has not been adversely impacted by the migration of metals from soil to groundwater.

An additional factor to consider IS the fact that the SSLs (DAF = 1) are very conservative because a DAF of 1 assumes that no dilution or attenuation occurs as a chemical migrates from soil to groundwater. The USEPA in the Soil Screening Guidance (USEPA, 1996c) recommends that a DAF of 20 be used as the default DAF and states that "A DAF of 20 is protective for sources up to 0.5 acre in size". Analyses presented in the SSL Guidance indicate that it can be protective of larger sources as well. If SSLs for a DAF of 20 were used in the comparisons presented in Table 6-2, only the maximum concentrations of aluminum, arsenic, and cobalt would exceed their respective SSLs. However, as discussed previously, the concentrations of the metals detected in subsurface soil may be within naturally occurring background levels.

6.3.3 COPC Selection for Groundwater

Table 6-3 presents details of the COPC selection process for groundwater at Site 4 which is based on analytical data for 38 unfiltered groundwater samples collected in 2004. Please note that the COPC screening for groundwater presented in Table 6-3 is based on a dataset consisting of combined permanent monitoring well and temporary well data. Use of data for temporary well (hydropunch) samples which typically exhibit elevated turbidity tends to increase the number of chemicals selected as COPCs (particularly the number of dioxins/furans and metals selected as COPCs). The following chemicals were retained as COPCs for groundwater:

- Volatiles (1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, benzene, TCE, and VC)
- Dibenzofuran
- Dioxins/Furans
- Inorganics (aluminum, antimony, arsenic, barium, chromium, iron, manganese, and vanadium)

Concentrations of 1,2-DCA, benzene, dibenzofuran, dioxins/furan congeners, aluminum, arsenic, barium, chromium, manganese, and vanadium exceeded the screening criteria based on USEPA Region IX PRGs, but were less than the USEPA MCLs and MDEQ TRGs. Sample turbidity appears to have affected the concentrations reported for several metals (i.e., aluminum, chromium, and vanadium) and the dioxin/furans selected as COPCs. The maximum concentrations of several metals were reported in hydropunch (DPT) samples with turbidity readings ranging from 114 NTU to 999 NTU, indicating that high levels of suspended particulate matter were present in the samples. In addition, aluminum and chromium

were not positively detected in any permanent monitoring well samples. As discussed above, the COPC selection for shallow groundwater was based on analytical data from both permanent monitoring wells and temporary (hydropunch) wells. However, the quantitative risk assessment was performed using only permanent monitoring well data. Potential risks associated with the temporary well data are presented and discussed in the Uncertainty Section (Section 6.7). No inorganic constituents were eliminated as COPCs on the basis of background because background groundwater data are not available for NCBC Gulfport.

6.3.4 COPC Selection for Surface Water

Table 6-4 summarizes the COPC selection process for surface water at Site 4. Three unfiltered surface water samples were collected to assess potential risks associated with discharges from the landfill to Canal No. 1. As indicated in the RI Workplan (TtNUS, 2004) seeps have been observed at the edge of the landfill discharging into Canal No. 1. The following chemicals were retained as COPCs for surface water:

- Tetrachloroethene (PCE)
- Dioxins/Furans
- Inorganics(arsenic, iron, manganese)

These constituents were identified as COPCs in surface water because the maximum concentrations exceeded one or more of the human health screening levels (i.e., USEPA Region IX risk-based screening concentrations and/or MDEQ Tier 1 TRGs for groundwater). The maximum concentrations of PCE, dioxins/furans, and arsenic exceeded the screening criteria based on USEPA Region IX PRGs, but were less than USEPA MCLs. The maximum detected concentrations of iron and manganese exceeded the screening levels (set at an HI of 0.1), but they did not exceed the USEPA Region IX PRGs. Note that the use of these criteria for surface water assumes that the surface water is used as a drinking source (i.e., potential receptors ingest 2 liters of water per day, 350 days per year). Drinking water criteria are used because surface water criteria for human health are currently not available. The use of these criteria for screening and risk assessment is conservative because it is unlikely that the water in Canal No. 1 downgradient of the site would ever be used as a source of drinking water.

6.3.5 COPC Selection for Sediment

Table 6-5 summarizes the COPC selection process for sediment at Site 4. Eight sediment samples were collected during the 2004 investigation. The following chemicals were retained as COPCs for sediment:

- PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene]
- Aroclor-1260
- Dioxins/Furans
- Inorganics (aluminum, arsenic, iron, thallium, and vanadium)

These constituents were identified as COPCs for sediment because the maximum detected concentrations exceeded the human health risk screening levels for residential land use (i.e., USEPA Region IX risk-based screening levels for residential soil and MDEQ Tier 1 TRGs for restricted and unrestricted land use). Benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and dioxins/furans were identified as COPCs because the maximum concentrations exceeded the Region 9 risk-based screening levels for residential land use and the MDEQ Tier 1 TRGs for unrestricted land use, but were less than the TRGs for restricted land use. Aroclor-1260 was identified as a COPC because the maximum concentration exceeded the Region 9 risk-based screening level for residential land use, but was less than the MDEQ Tier 1 TRGs for unrestricted and restricted land use. The maximum 2,3,7,8-TCDD TEQ concentration in sediment (0.0305 µg/kg) is less that the PRG of 1 µg/kg established for 2,3,7,8-TCDD by the USEPA (USEPA, 1998). The maximum detected concentrations of aluminum, iron, thallium, and vanadium exceeded the screening levels (set at an HI of 0.1) but they did not exceed the USEPA Region IX PRGs. No background data are available for sediment. However, the maximum concentrations of the metals identified as COPCs for sediment are within the range of naturally occurring soil levels found in the continental United States (Dragun, 1998). The use of the USEPA Region IX and MDEQ RBCs for soil to evaluate COPC concentrations in sediment is conservative because these criteria were established assuming residential land use scenarios (e.g., routine daily contact with soils). However, it is anticipated that a human receptor would be exposed to the sediments in Canal No. 1 on a less frequent basis than is assumed for a typical residential exposure to soil. Consequently, the use of soil criteria for COPC screening and risk estimation is likely to overestimate potential risks from exposure to sediment.

6.3.6 Summary

Table 6-6 summarizes the chemicals retained as COPCs for soil, groundwater, surface water, and sediment at Site 4. RAGS Part D tables for COPC selection are included in Appendix D-1.

6.4 EXPOSURE ASSESSMENT

The Exposure Assessment defines and evaluates the exposures that may be experienced by likely receptor populations at a site. In order to have an exposure, several factors must be present. First, there must be a source of contamination; second, there must be a mechanism through which a receptor can come into contact with contaminants in that medium; and third, there must actually (or potentially) be a receptor present at the point of contact.

The potential for exposure at Site 4 is based on several factors, including current and future land uses, human activity patterns, site access controls, chemical behavior in the environment, and the presence of human receptors. Based on these variables, exposure scenarios are developed which characterize the potential for human exposure under both current and future site conditions. The future scenario accounts for potential or anticipated changes in land use and site characteristics that may alter exposure conditions at the site. The Exposure Assessment assumes that, in general, chemical compositions for environmental media are identical under current and future site conditions. Under current conditions, potential human receptors are assumed to be exposed to surface water and sediment. Under future conditions, potential human receptors are assumed to be exposed to subsurface soil, groundwater, surface water, and sediment. Evaluation of exposure to subsurface soil assumes that the subsurface soil would be brought to the surface in a future excavation project or that construction/excavation workers would be exposed during ground-intrusive activities.

The Exposure Assessment presented in this section of the report describes the physical site setting and the potential receptors of concern, identifies the potential contaminant migration and exposure pathways, defines the contaminant concentrations at the point of exposure, and presents the equations used to quantify exposure in terms of contaminant intake (dose). Appendix D-1 presents calculations of the chemical-specific intakes for all receptors and exposure pathways and Appendix D-2 contains example calculations of the chemical intakes.

A summary of the potentially significant exposure pathways identified for quantitative evaluation for Site 4 is provided in Table 6-7. Rationales for the selection or elimination of exposure pathways are presented in RAGS-Part D Table 1 in Appendix D-1.

6.4.1 Land Use and Site Access

Site 4, Golf Course Landfill, is a former four acre landfill located northeast of the intersection of 7th Street and Colby Avenue. The site is adjacent to the driving range for Pine Bayou Golf Course and portions of the 1st, 9th and 18th holes of the golf course overlay the landfilled area. The northern boundary of the landfill is adjacent to Canal No. 1. The landfill was operated from 1966 until 1972 and was the only

operating landfill on the base at that time. Waste material was disposed of in trenches, burned daily, and then backfilled. Most, if not all, of the solid waste and some of the liquid and chemical waste generated at the installation were disposed of at Site 4 during the period of landfill operation (Envirodyne Engineers, 1985).

As indicated in the IAS, as much as 200,000 gallons of waste liquids were disposed of at the site including; fuels, oils, solvents (methylethylketone, toluene, xylene), paints, and paint thinners. In addition, 16,000 tons of solid waste was disposed at the landfill. Building and infrastructure debris were disposed at the site following Hurricane Camille in 1969.

Access to the site is not restricted and children are known to play frequently at the site.

6.4.2 Conceptual Site Model

The development of a 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. A well-developed CSM will allow for a better understanding of the risks at a site and will aid risk managers in identifying the potential need for both environmental sampling and remediation. The site-specific CSM for Site 4 is presented in this section and illustrated in Figure 6-1. Table 6-7 presents a summary of the exposure pathways that are addressed quantitatively for each human receptor. The CSM depicts the relationships among the following elements:

- Site sources of contamination
- Contaminant release mechanisms
- Transport/migration pathways
- Exposure routes/pathways, and
- Potential receptors

These elements of the CSM for Site 4 are discussed in the following sections.

6.4.2.1 Site Sources of Contamination/Release Mechanisms/Migration Pathways

Previous investigations have identified the following potential sources of contamination at Site 4:

- Liquid and solid wastes disposed of in the landfill, and
- Backfilled incineration by-products

Based on historical site data and sampling, the following parameters are among the site-related chemical contaminants known to be present or potentially present in environmental media at Site 4:

- VOCs
- SVOCs
- Dioxins/furans (According to the RI Work Plan, the presence of dioxins/furans, especially 2,3,7,8-TCDD and PeCDD, may be an indication that HO is the source of the detected dioxins and furans).
- Metals

The topography at Site 4 is relatively flat and the ground surface is primarily fill dirt and native sand with sparse vegetative cover. Canal No. 1 runs along the west side of the landfill. Surface water flows to the north where Canal No. 1 eventually exits the base property at 28th Street. Groundwater seeps have been observed discharging from the east (landfill) side of the drainage ditch that runs along the west side of the site. Average annual mean rainfall in the area is approximately 65 inches and individual storms are often intense with significant 24-hour rainfall totals. The storm events allow greater flow velocities which mobilize bedload sediments that are usually not disturbed under normal flow conditions. The groundwater at Site 4 is somewhat deeper than the surrounding area due to several feet of landfill cover. The cover material is a fine to medium sand with little silt which allows infiltration or seepage into the landfill. The top of the local confining clay layer was encountered at depths of approximately 30 feet bls.

Potential contaminant release mechanisms at Site 4 include the mobilization of contaminants from wastes buried in subsurface soil to the local groundwater as the result of infiltration of precipitation and dissolution of soluble contaminants. Soluble constituents may then continue to migrate downgradient to the south and southwest of the landfill. The dissolved contaminants in groundwater may also migrate downgradient with the natural flow of groundwater and discharge as seeps to Canal No. 1. Because the sources of contamination are the wastes buried in subsurface soil, erosion and overland transport of particulate matter from on-site surface soil do not appear to be important transport mechanisms at Site 4.

Based on historical information, plausible contaminant release and migration mechanisms for Site 4 include the following:

- Transport of subsurface soil contaminants to groundwater via infiltration, percolation, and migration within the groundwater aquifer.
- Migration of contaminants in groundwater (i.e., lateral migration) via seepage to Canal No. 1.

- Movement of contaminants in the surface water and sediment of Canal No. 1 northward to Outfall 1.
- Overflow from Canal No. 1 to nearby surface soil.
- Volatilization of VOCs from groundwater (e.g., into the indoor air of buildings).
- Migration of fugitive dusts and VOCs from subsurface soils if construction and excavation activities occur in the future.

Figure 6-1 shows the conceptual site model that illustrates these potential contaminant migration pathways.

6.4.2.2 Potential Receptors/Exposure Routes

NCBC Gulfport is an active facility and will remain active for the foreseeable future. Site 4 is currently a golf course and is expected to be used for this purpose in the foreseeable future. Access to the site is not restricted and children are known to play frequently on the site. Because the site is currently active and access is not limited, the baseline risk assessment considered receptor exposure under residential, industrial, and trespasser/recreational user land use scenarios. Based on current and potential future land use, the following potential receptors may be exposed to contaminated environmental media within the study area:

- **Site Worker** – A plausible receptor under current or future land use. This includes adult military or civilian personnel assigned routine daily maintenance tasks. This receptor is assumed to be exposed to soil (by ingestion, dermal contact, and inhalation), sediment (by ingestion and dermal contact), and surface water (by ingestion and dermal contact). Because surface soil data is not available for Site 4, this receptor (as well as the other potential receptors discussed below) are conservatively assumed to be exposed to COPCs in subsurface soil to aid in future risk management decisions. This scenario is unlikely and could only occur if subsurface soil were brought to the surface in a future construction/excavation project.

- **Trespassers/Recreational User (Adult and Adolescent)** – A plausible receptor under current or future land use. This receptor is assumed to be exposed to soil (by ingestion, dermal contact, and inhalation), sediment (by ingestion and dermal contact), and surface water (by ingestion and dermal contact).

- **Construction/Excavation Worker** – A plausible receptor under future land use. No construction activities are currently planned for the study area. Construction workers are considered for future

land use only and are assumed to be exposed to soil (by ingestion, dermal contact, and inhalation), sediment (by ingestion and dermal contact), groundwater (by dermal contact), and surface water (by ingestion and dermal contact).

- **Future Occupational Worker** – A plausible receptor under future land use, if the NCBC were to be developed for commercial/industrial uses. To provide information for risk management decisions, potential risks to future occupational workers are quantified in the risk assessment. These workers are assumed to be exposed to soil (by ingestion, dermal contact, and inhalation), sediment (by ingestion and dermal contact), and surface water (by ingestion and dermal contact).

- **On-Site Residents (Child and Adult)** – An unlikely receptor under future land use. Although this scenario is highly unlikely, a future residential scenario is typically evaluated in a risk assessment for decision making purposes. It is assumed that a hypothetical resident may be exposed to soil (by ingestion, dermal contact, and inhalation), sediment (by ingestion and dermal contact), groundwater (by ingestion, dermal contact, and inhalation of volatiles), and surface water (by ingestion and dermal contact).

6.4.3 CTE vs. RME

Traditionally, exposures evaluated in the HHRA were based on the concept of an RME only, which is defined as "the maximum exposure that is reasonably expected to occur at a site" (USEPA, 1989a). However, recent risk assessment guidance (USEPA, 1992b) indicates the need to address an average case or CTE.

To provide a full characterization of potential exposure, both RME and CTE are evaluated for Site 4. The available guidance (USEPA, 1993c) concerning the evaluation of CTE is limited and, at times, vague. Therefore, professional judgment was exercised when defining CTE conditions for a particular receptor. Exposure factors and assumptions for the CTE are presented and discussed in Section 6.4.5.

6.4.4 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 size of one quarter of an acre to 2 acres is often used for the evaluation of a hypothetical future resident. However, the size of an EU is typically based on the distribution of the chemical concentrations in a medium as well as on presumed receptor activity patterns. The EUs evaluated at Site 4 are based on the following:

- Soil: The area encompassed by the 10 subsurface soil samples collected in 2004.

- Groundwater: The area of the most highly contaminated section of the groundwater plume. (See below.)

- Surface Water and Sediment: The surface water and sediment of Canal No. 1.

The following guidelines were used to calculate the EPCs for soil, groundwater, surface water and sediment at Site 4:

- If a soil, surface water, or sediment dataset contained fewer than 10 samples, the EPC for the RME and CTE cases was defined as the maximum detected concentration.

- If a soil, surface water, or sediment dataset contained 10 or more samples, the 95-percent upper confidence limit (UCL) on the arithmetic mean, which was based on the distribution of the data set, was selected as the EPC for the RME and CTE cases. EPCs were calculated following USEPA's Calculating UCLs for EPCs at Hazardous Waste Sites (USEPA, 2002a) using the USEPA's ProUCL software and guidance (Singh, A., et al., April 2004). In general, the concentration selected for the EPC is the value recommended by the ProUCL software, subject to final review by a statistician.

- USEPA Region IV (USEPA, 2002a) makes an exception to the use of the UCL as the EPC for groundwater. According to the Region 4 guidance, groundwater EPCs should be the arithmetic average of the wells in the highly concentrated area of the plume. As discussed in Section 6.3.2, the dataset for groundwater consists of data from both permanent monitoring well and temporary well samples. The EPCs calculated for groundwater were based on permanent monitoring well data because permanent wells are more representative of the types of wells used for drinking water and because of the elevated turbidity levels reported for some groundwater samples collected from the temporary wells. Risks associated with exposure to chemical concentrations in the temporary wells are presented and discussed in the Uncertainty Section (Section 6.7). Using the Region 4 guidance, the EPCs for various classes of chemicals in groundwater were calculated using the following sample locations:

- For VOCs, the EPCs are the averages of COPC concentrations reported for samples collected from permanent monitoring wells GPT-04-13 (04GW1301) and GPT-04-16 (04GW1601).

- For dioxins/furans and dibenzofuran, the EPCs are the averages COPC concentrations reported for samples collected from permanent monitoring wells GPT-04-13 (04GW1301), GPT-04-14 (04GW1401), and GPT-04-17 (04GW1701).

- For metals, the EPCs are the averages of COPC concentrations reported for samples collected from permanent monitoring wells GPT-04-13 (04GW1301), GPT-04-14 (04GW1401), GPT-04-15 (04GW1501), GPT-04-16 (04GW1601), GPT-04-17 (04GW1701), GPT-04-18 (04GW1801), and GPT-04020 (04GW2001).

Prior to statistical analysis (e.g., distribution analyses, the calculation of basic descriptive statistics and UCLs, etc.), non-detect results were assigned a value of one-half the sample quantitation limit (SQL). Rejected values ("R" flagged during data validation) are eliminated from further consideration because they are regarded as unreliable. Estimated and biased values (flagged "J") are used at the reported value with the realization that some uncertainty is associated with the reported numerical result. When duplicate sample pairs are reported, the average of the duplicate pair was used for the statistical calculations.

As discussed in Section 6.5.2, the Toxicity Equivalence Factor (TEF) approach was used to evaluate the dioxin and furan congeners, and the EPC evaluated in this HHRA is the TEQ of 2,3,7,8-TCDD.

The EPCs for the chemicals identified as COPCs in environmental media at Site 4 are presented in Table 6-8 and the RAGS-Part D Tables in Appendix D-1. Support documentation for the calculation of the 95 percent UCLs and distributions of data sets for COPCs are presented in Appendix D-3.

6.4.5 Intake Estimation Methods and Exposure Parameters

To determine potential human health risks associated with Site 4, an estimate of chemical intake was made in accordance with current USEPA guidance. Exposure parameters and exposure concentrations are used to derive estimates of chemical intake for each exposure route, pathway, and receptor. The resulting chemical intakes are integrated with the toxicity factors discussed in Section 6.5 to develop quantitative risk estimates for potential receptors at the site. Intakes for the identified potential receptor groups are calculated using current USEPA risk assessment guidance (USEPA, 1989b and USEPA, 2004b) and presented in the risk assessment spreadsheets (Appendix D-1). In accordance with current USEPA guidance, chemical intakes (and risks) are estimated for both the CTE and RME conditions. Values of exposure parameters used to quantify exposure for each receptor are presented in Tables 6-9 and 6-10 for the RME and CTE, respectively.

The following sections present the equations used to estimate chemical intakes for the exposure routes identified for quantitative evaluation. Example calculations for estimated intakes are provided in Appendix D-2. Calculations of estimated intakes for all potential receptors are contained in Appendix D-1.

6.4.5.1 Exposure to COPCs in Soil/Sediment

The HHRA assumes that site workers, occupational workers, construction/excavation workers, trespassers (adults and adolescents), and potential future residents may come into contact with chemicals detected in subsurface soil or sediment at the site. Soil/sediment exposure routes are incidental ingestion and dermal contact. A description of the methods and assumptions used to quantify soil and sediment exposure follows.

Incidental Ingestion of Soil/Sediment. Intakes associated with soil ingestion are estimated using the following equation (USEPA, 1989b):

$$\text{Intake} = \frac{C \times IR \times EF \times ED \times CF}{BW \times AT}$$

where:

Intake	=	ingestion intake
C	=	chemical concentration in soil or sediment (mg/kg)
IR	=	soil/sediment ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days, noncarcinogens: 365 days/year x ED)
		(days, carcinogens: 365 days/year x 70 years)

Incidental ingestion rates for potential receptors are based on the recommendations contained in current risk guidance for the evaluation of the CTE and RME (USEPA, 1993c). Children are assumed to ingest more soil than adults as a result of normal behavior such as purposely placing dirty objects in their mouth and unintentional hand-to-mouth activities. The following ingestion rates are used to quantify risks in this HHRA: 200 milligrams per day (mg/day) for child residents, 100 mg/day for adult residents, adolescent trespassers, and occupational workers, and 50 mg/day for site workers. Construction workers are expected to have higher than average soil ingestion rates (330 mg/day) because of the increased potential for soil

contact typically associated with ground-intrusive activities (USEPA, 2002a). The fraction of soil ingested from the contaminated source is conservatively assumed to be 1.0.

Site workers are assumed to be exposed to soil 12 days/year for 9 years for the CTE and 24 days/year for 25 years for the RME. Future commercial workers are assumed to be exposed to soil 219 days/year for 9 years for the CTE and 250 days/year for 25 years for the RME. Workers involved in construction activities are assumed to be exposed to soil 30 days/year for one year for the RME and CTE. Adolescent trespassers are assumed to be exposed to soil 50 days/year for 11 years for the CTE and 100 days/year for 11 years for the RME. Adult trespassers are assumed to be exposed to soil 12 days/year for 19 years for the CTE and 24 days/year for 19 years for the RME. Residents are assumed to be exposed to soil 234 days per year for 9 years (2 years child + 7 years adult) for the CTE and 350 days/year for 30 years (6 years child + 24 years adult) for the RME.

For exposure to sediment, site workers and adult trespassers are assumed to be exposed 24 days/year for the RME and 12 days/year for the CTE. Adolescent trespassers are assumed to be exposed to sediment 30 days/year for the RME and 15 days/year for the CTE. Construction/excavation workers, occupational workers, and future residents are assumed to be exposed to sediment 30 days/year for the RME and CTE.

Adults (workers, trespassers, and residents) are assumed to weigh 70 kilograms (kg). The body weight for adolescent trespassers (ages 6 to 16) is specified as 45 kg, and the weight of the child resident (0 to 6 years) is assumed to be 15 kg.

Exposure parameters for the soil ingestion route are summarized in Tables 6-9 and 6-10.

<u>Dermal Absorption of Soil/Sediment.</u> Doses for dermal contact with soil and sediment are estimated using the following equation (USEPA, 2004b):

$$DEX = \frac{C \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT}$$

where:

DEX	=	dermal dose (mg/kg-day)
C	=	chemical concentration in soil or sediment (mg/kg)
SA	=	skin surface area available for contact (cm^2/day)
AF	=	soil-to-skin adherence factor (mg/cm^2)
ABS	=	absorption factor (unitless)

EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
CF	=	conversion factor (1×10^{-6} kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days, noncarcinogens: 365 days/year x ED)
		(days, carcinogens: 365 days/year x 70 years)

Exposed surface areas of the body available for dermal contact are determined for each receptor based on assumed human activities and clothing worn during exposure events. USEPA guidance (USEPA, 1997c and USEPA, 2004b) was used to develop the default assumptions concerning the amount of skin surface area available for contact for a receptor. The skin surface areas used in risk assessment calculations and the rationale for the selection of the surface areas are defined as follows:

- For adolescent trespassers, 25 percent of the total surface area is assumed to be available for contact with soil. This skin surface area is assumed to be 3,250 square centimeters (cm^2) for the RME and CTE scenarios (USEPA, 1997c).

- The head, hands, and forearms of site workers, occupational workers, and excavation/construction workers are assumed to available for contact (assuming that they wear a short-sleeved shirt, long pants, and shoes). As recommended in RAGS Part E (USEPA, 2004b), this skin surface area is assumed to be 3,300 cm^2 for the RME and CTE scenarios. This value represents the average of the fiftieth percentile areas of males and females more than 18 years old.

- For adult trespassers and adult residents assumed to be exposed to soil and sediment, the exposed surface areas available for contact are the values for the adult skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004b), 5,700 cm^2 for the RME and for the CTE. This skin area assumes that the head, hands, forearms, and lower legs of the adult are available for contact.

- For child residents assumed to be exposed to soil and sediment, the exposed surface areas available for contact are the values for child skin surface area for exposure to soil recommended in RAGS Part E (USEPA, 2004b), 2,800 cm^2 for the RME and for the CTE. This skin area assumes that the head, hands, forearms, lower legs, and feet of the child are available for contact.

The soil adherence factors and chemical-specific dermal absorption factors provided in RAGS Part E (USEPA, 2004b) are used to evaluate risks from exposure to soil. The following soil adherence factors are used for the RME and CTE exposure scenarios:

- Occupational and site workers – 0.2 milligrams per square centimeter (mg/cm^2) for the RME and 0.02 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004b).

- Construction workers – 0.3 mg/cm^2 for the RME and 0.1 mg/cm^2 for the CTE (Exhibit 3.3, USEPA, 2004b).

- Adult trespassers and adult residents – 0.07 mg/cm^2 for the RME and 0.01 mg/cm^2 for the CTE. (Exhibit 3.5, USEPA, 2004b).

- Adolescent trespassers – 0.4 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE. (Exhibit 3.3, USEPA, 2004b).

- Child residents – 0.2 mg/cm^2 for the RME and 0.04 mg/cm^2 for the CTE (Exhibit 3.5, USEPA, 2004b).

For the constituents identified as COPCs in soil and sediment, the following dermal absorption factors are used in this HHRA (USEPA, 2004b):

- PAHs - 0.13
- PCBs - 0.14
- Dioxins - 0.03
- Arsenic - 0.03
- Other metals and volatiles - not evaluated for dermal contact with soil (RAGS-Part E does not provide absorption factors for metals other than arsenic and cadmium).

The same exposure frequencies, exposure durations, and body weights previously identified for ingestion route of exposure are used to characterize dermal contact with soil and sediment. Exposure parameters for the soil/sediment dermal absorption route are summarized in Tables 6-9 and 6-10.

6.4.5.2 Exposure to Groundwater

Future residential and construction worker scenarios were developed for exposure to groundwater primarily using current risk assessment guidance (USEPA, 1989b, USEPA 1993c, and USEPA 2004b). The applicable groundwater exposure frequencies, exposure durations, and body weights for residents are identical to those previously identified for soil contact.

Ingestion of Groundwater. Intakes for direct ingestion of groundwater are estimated using the following general equation (USEPA, 1989b):

$$\text{Intake} = \frac{C \times IR \times EF \times ED}{BW \times AT}$$

where:

Intake	=	ingestion intake (mg/kg-day)
C	=	chemical concentration in groundwater (mg/L)
IR	=	ingestion rate (L/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days, noncarcinogens: 365 days/year x ED) (days, carcinogens: 365 days/year x 70 years)

Water ingestion rates for the adult resident are specified as 1.4 liters per day (L/day) (CTE) and 2.0 L/day (RME). For the child resident, water ingestion rates are 0.66 L/day (CTE) and 1.5 L/day (RME).

Dermal Contact with Groundwater

The following equations are used to estimate doses resulting from dermal contact with groundwater (USEPA, 2004b):

$$DAD = \frac{DA_{event} \times EV \times EF \times ED \times A}{BW \times AT}$$

where:

DAD	=	dermal dose (mg/kg-day)
DA_{event}	=	dose per event (mg/cm^2 /event)
EV	=	event frequency (events/day)
ED	=	exposure duration (years)
EF	=	exposure frequency (days/year)
A	=	skin surface area available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days, noncarcinogens: 365 days/year x ED)
		(days, carcinogens: 365 days/year x 70 years)

The absorbed dose per event (DA_{event}) is estimated using a nonsteady-state approach for organic compounds and a traditional steady-state approach for inorganics. The following equations apply for organic chemicals:

$$\text{If } t_{event} < t^*, \text{ then: } DA_{event} = 2 \times FA \times K_p \times C \times CF \times \left(\frac{\sqrt{6 \tau t_{event}}}{\pi} \right)$$

$$\text{If } t_{event} > t^*, \text{ then: } DA_{event} = FA \times K_p \times C \times CF \times \left(\frac{t_{event}}{1+B} + 2\tau \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right)$$

where:

t_{event}	=	duration of event (hour/event)
t^*	=	time it takes to reach steady-state conditions (hour)
FA	=	fraction absorbed (dimensionless) – chemical specific
K_p	=	permeability coefficient from water through skin (cm/hour)
C	=	concentration of chemical in surface water (mg/L)
τ	=	lag time (hour)
π	=	constant (unitless; equal to 3.1416)
CF	=	conversion factor (1×10^{-3} L/cm^3)
B	=	partitioning constant derived by Bunge Model (dimensionless)

Values for the chemical-specific parameters (t^*, K_p, τ, and B) are obtained from the USEPA dermal guidance. Details regarding the procedures used to derive the constants, as well as sample calculations, are provided in Appendix D-2.

The following equation was used to estimate DA_{event} for inorganics:

$$DA_{event} = K_p \times C \times t_{event}$$

The recommended default value of 1×10^{-3} was used for inorganic chemicals, unless chemical-specific data were available in RAGS - Part E.

Whole body contact was assumed for dermal contact with groundwater for the residential scenario. A value of 18,000 cm^2 is used for the adult resident for both the CTE and RME scenario (USEPA, 2004b). For the child resident, a skin surface area of 6,600 cm^2 is used for the CTE and RME scenarios. For excavation/construction workers exposed to groundwater, the exposed skin surface area is assumed to be 4,500 cm^2 (USEPA, 1997c). This assumes that the 25 percent of the total body surface area is available for contact with groundwater. The estimated length of time for a shower or bath is 10 minutes for the CTE and 15 minutes for the RME. Receptors are assumed to spend an additional 5 minutes in the bathroom following their shower or bath. Construction/excavation workers are assumed to be exposed to shallow groundwater in a trench 4 hours/day for the RME and 2 hours/day for the CTE. An event frequency of one per day is assumed for the CTE and RME (residents were assumed to take one shower or bath per day).

Exposure parameters for exposure to groundwater are summarized in Tables 6-9 and 6-10.

Inhalation of Volatiles in Groundwater (Residential Use)

Groundwater exposure may also result in inhalation of volatiles, typically for residential receptors who may be exposed while showering, bathing, washing dishes, etc. Inhalation exposures are estimated using a mass transfer model, developed specifically for this exposure route, in combination with an air intake estimation model. The mass transfer model accounts for inhalation that occurs during a shower and after a shower while the receptor remains in the closed bathroom. The method used is as follows (Foster and Chrostowski, 1987):

$$Intake_{si} = (S)(IR_{sh})(K)(EF)(ED) \ / \ (BW)(AT)(R_a)(CF)$$

$$K = D_s + \frac{\exp(-R_a \times D_t)}{R_a} - \frac{\exp R_a \times (D_s - D_t)}{R_a}$$

where:

$Intake_{si}$	=	intake of chemical "i" from water via inhalation (mg/kg/day)
S	=	volatile chemical generation rate (ug/m^3-min - shower)
IR_{sh}	=	inhalation rate (L/min)
EF	=	exposure frequency (showers/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time or period of exposure (days)
R_a	=	air exchange rate (min^{-1})
K	=	mass transfer coefficient (min)
D_s	=	shower duration (min)
D_t	=	total time in bathroom (min)
CF	=	conversion factor (1×10^6 ug-L/mg-m^3)

The estimated volatile chemical generation rate is based on two-phase film theory. The model uses contaminant-specific mass transfer coefficients, Henry's Law constants, droplet diameter, drop time, viscosity, and temperature. Shower inhalation rates are set at 10 L/min for adult and child residents (USEPA, 1989b). As indicated above, the total estimated length of time in the shower room is estimated at 15 minutes for the CTE and 20 minutes for the RME. Tables 6-9 and 6-10 present the exposure factor values for evaluating the inhalation of COPCs while showering with groundwater. The shower model calculations are presented in Appendix D-1.

Inhalation of Volatiles via Vapor Intrusion from Groundwater

Volatilization of chemicals from groundwater into indoor air may occur, thereby exposing individuals inside buildings or dwellings. Therefore, potential risks associated with chemical concentrations in indoor air as a result of vapor migration from impacted groundwater are evaluated for hypothetical future on-site residents. The Johnson and Ettinger Vapor Intrusion Model (USEPA, 2004a) is used to determine the indoor air concentration of a chemical that is present in groundwater. The model assumes that vapors of volatile chemicals are emitted from groundwater, migrate through surface and subsurface soil, through cracks in the building foundation, and accumulate in air inside buildings. The Johnson and Ettinger model assumes that residential dwellings have been constructed on the site and that the dimensions of these buildings and ventilation rates are typical of residential dwellings in the United States. The results of the vapor intrusion evaluation are presented in the uncertainty section (Section 6.7.3.6) due to the uncertainty associated with the EPCs generated using the Johnson and Ettinger volatilization model.

Exposure of Workers to Volatiles in a Construction/Utility Trench

Construction workers may be exposed to COPCs that have volatilized from groundwater when excavation exposes the shallow groundwater table. Construction worker exposure associated with the inhalation route was estimated in the following manner (USEPA, 1989a):

$$Intake_{ai} = \frac{(C_{ai})(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

where:

$Intake_{ai}$	=	intake of chemical "i" from air via inhalation (mg/kg/day)
C_{ai}	=	concentration of chemical "i" in air (mg/m^3)
IR_a	=	inhalation rate (m^3/hr)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 year x 365 days/year

The same exposure frequency and exposure time used to estimate intake from dermal contact with groundwater were used to evaluate intake from inhalation of VOCs from groundwater during construction activities.

There are no well-established models available for estimating migration of volatiles from groundwater into a construction/utility trench. To estimate the EPC for air in a construction trench, this HHRA uses the approach suggested by the Virginia Department of Environmental Quality (VDEQ, 2002), which is based on a combination of a vadose zone model (to estimate volatilization of gases from contaminated groundwater into a trench) and a box model (to estimate dispersion of the contaminants from the air inside the trench into the above-ground atmosphere). The VDEQ methodology is described in the following paragraphs.

The airborne concentration of a contaminant in a trench can be estimated using the following equation:

$$C_{air} = C_{GW} \times VF$$

where:

C_{air} = air concentration of contaminant in the trench µg/m^3

C_{GW} = concentration of contaminant in groundwater µg/L

VF = volatilization factor L/m^3

It is assumed that a construction project could result in an excavation of 15 feet bls or less. If the depth to groundwater at a site is less than 15 feet, the VDEQ model assumes that a worker would encounter groundwater when digging an excavation ditch or a trench. The worker would then have direct exposure to the groundwater. The worker would also be exposed to contaminants in the air inside the trench that would result from volatilization from the groundwater pooling at the bottom of the trench.

The following equation is used to calculate the volatilization factor (VF) for a trench less than 15 feet deep:

$$VF = (K_i \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600) / (ACH \times V)$$

where:

K_i	=	overall mass transfer coefficient of contaminant (cm/s)
A	=	area of the trench (m^2)
F	=	fraction of floor through which contaminant can enter (unitless)
ACH	=	air changes per hour (h^{-1}) = 360 h^{-1}
V	=	volume of trench (m^3)
10^{-3}	=	conversion factor (L/cm^3)
10^4	=	conversion factor (cm^2/m^2)
3,600	=	conversion factor (seconds/hour)

Studies of urban canyons suggest that if the ratio of trench width, relative to wind direction, relative to trench depth is less than or equal to 1, a circulation cell or cells will be set up within the trench that limits the degree of gas exchange with the atmosphere and, based upon measured ventilation rates of buildings, the air changes per hour (ACH) is assumed to be 2. Based upon the ratio of trench depth to the average wind speed, if the ratio of trench width to trench depth is greater than 1, the air exchange between the trench and above-ground atmosphere is not restricted, and the ACH is assumed to be 360. The exposure assessment performed for these HHRAs assumes the width-to-trench depth ratio is greater than 1; therefore, the ACH is set at 360.

K_i is calculated using the following equation:

$$K_i = 1 / \{(1/k_iL) + [(RT) / (H_i\ k_iG)]\}$$

where:

K_i	=	overall mass transfer coefficient of containment (cm/s)
k_iL	=	liquid-phase mass transfer coefficient of i (cm/s)
R	=	ideal gas constant (atm-m^3/mole-°K) = 8.2×10^{-5}
T	=	average system absolute temperature (°K) (Default = 298°K)
H_i	=	Henry's Law constant of i (atm-m^3/mole)
k_iG	=	gas-phase mass transfer coefficient of i (cm/s)

The formulas for calculating k_iL and k_iG are as follows:

$$k_iL = (MWO_2/MW_i)^{0.5} \times (T/298) \times kL,O_2$$

where:

k_iL	=	liquid-phase mass transfer coefficient of component i (cm/s)
MWO_2	=	molecular weight of oxygen (g/mole)
MW_i	=	molecular weight of component i (g/mole)
kL,O_2	=	liquid-phase mass transfer coefficient of oxygen at 25°C (cm/s) = 0002 cm/s

$$k_iG = (MWH_2O/MW_i)^{0.335} \times (T/298)^{1.005} \times kG,H_2O$$

where:

k_iG	=	gas-phase mass transfer coefficient of component i (cm/s)
MWH_2O	=	molecular weight of water (g/mole)
kG,H_2O	=	gas-phase mass transfer coefficient of water vapor at 25°C (cm/s)= 0.833 cm/s (USEPA, 1988b).

Chemical properties were obtained from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, 2002b). Data and calculations of the shower model and construction worker in a trench model are presented in Appendix D-1.

6.4.5.3 Exposure to Surface Water

Direct contact with surface water may occur while potential receptors are involved in work or play in Canal No. 1. Since swimming is not likely to occur in Canal No.1, this scenario assumes that receptors are exposed by incidental ingestion and dermal contact while wading. Ingestion of surface water is conservatively evaluated but it is not expected to be a significant exposure pathway for the wading scenario.

6.4.5.4 Incidental Ingestion of Surface Water

Potential receptors may incidentally ingest small amounts of surface water while wading in Canal No. 1. Intakes associated with ingestion of surface water were evaluated using the following equation (USEPA, 1989b):

$$\text{Intake}_{wi} = \frac{(C_{wi})(IR_w)(ET)(EF)(ED)}{(BW)(AT)}$$

where:

Intake_{wi}	=	intake of chemical "i" from water (mg/kg/day)
C_{wi}	=	concentration of chemical "i" in water (mg/L)
IR_w	=	ingestion rate for surface water (L/hour)
ET	=	exposure time for surface water (hour/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kg)
AT	=	averaging time (days);
		for noncarcinogens, AT = ED x 365 days/year;
		for carcinogens, AT = 70 years x 365 days/year

An ingestion rate of 0.01 L/hour is used for adults and adolescents under CTE and RME conditions and 0.05 L/hour for children (USEPA Region IV, 2000). Exposure times, which are based on professional judgment with consideration of anticipated activities, are specified as 1.0 hour/day for the CTE and RME. Because surface water and sediment exposure coincides, the same exposure durations and frequencies previously identified for exposure to sediment are used to evaluate inadvertent surface water ingestion. Exposure factor values for ingestion of surface water are summarized in Tables 6-9 and 6-10.

The same equations used to assess dermal exposure to groundwater are used to evaluate dermal exposure to surface water. The following skin surface areas are used for evaluating dermal exposure to surface water: 4,500 cm^2 is used as the exposed surface area for site workers, excavation/construction

workers, occupational workers, adult trespassers, and adult residents for the CTE and RME; 3,250 cm^2 is used for adolescent trespassers and 1,650 cm^2 is used as the exposed skin surface area for child residents. The exposed skin surface areas represent 25 percent of the total body area of each receptor. The same exposure times, frequencies, and durations used to assess ingestion of surface water were used to estimate intakes for dermal exposure.

6.5 TOXICITY ASSESSMENT

Oral and inhalation RfDs and CSFs used in the HHRA for Site 4 were obtained from the following primary literature sources:

- IRIS (online at http://www.epa.gov/iris/subst/index.html).

- 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 RfDs and CSFs 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 USEPA Region IX PRG tables and Region 3 RBC tables were also used as a source of toxicity criteria when these criteria were not available from the aforementioned references. The RfDs and CSFs for the constituents selected as COPCs for Site 4 are presented in Tables 6-11 through 6-14.

6.5.1 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are typically expressed as administered doses; therefore, these values are considered inappropriate for estimating the risks associated with dermal routes of exposure. Oral dose-response parameters based on administered doses must be adjusted to absorbed doses before the evaluation of estimated dermal exposure intakes is made.

The adjustment from administered to absorbed dose was made using chemical-specific absorption efficiencies published in available guidance [i.e., USEPA, 2004b (the primary reference), IRIS, ATSDR toxicological profiles, etc.] and the following equations:

$$RfD_{dermal} = (RfD_{oral})(ABS_{GI})$$

$$CSF_{dermal} = (CSF_{oral}) / (ABS_{GI})$$

where: ABS_{GI} = absorption efficiency in the gastrointestinal tract.

Absorption efficiencies used in the risk assessments reflect USEPA's current dermal assessment guidance (USEPA, 2004b).

6.5.2 Toxicity of Dioxin/Furans

The USEPA has classified 2,3,7,8-TCDD as a B2 carcinogen (probable human carcinogen). An oral CSF for 2,3,7,8-TCDD is not available in IRIS (USEPA, 2006b), but a value of 1.5×10^5 $(mg/kg/day)^{-1}$ is available in HEAST (USEPA, 1997b) and is specified in the Region 3 RBC and Region 9 PRG tables. The oral CSF is currently under review by USEPA and may be revised in the future (USEPA, 2003).

USEPA recommends that a TEF approach be used to evaluate chlorinated dioxin and furan congeners. The total amount of toxic dioxin and furan congeners present at a site is usually expressed as TEQ of 2,3,7,8-TCDD present. At the present time, the TEFs recommended by MDEQ guidance (MDEQ, 2002) are slightly different than the TEFs recommended by the World Health Organization (WHO) and currently proposed for use by the USEPA (USEPA, 2003). The following table presents the MDEQ and WHO TEFs.

	MDEQ TEFs	WHO TEFs
2,3,7,8-TCDD	1	1
2,3,7,8-PeCDD	0.5	1
2,3,7,8-HxCDD	0.1	0.1
7,8-HpCDD	0.01	0.01
OCDD	0.001	0.0001
Other CDDs	0	0
2,3,7,8-TCDF	0.1	0.1
1,2,3,7,8-PeCDF	0.05	0.05
2,3,4,7,8-PeCDF	0.5	0.5

	MDEQ TEFs	WHO TEFs
2,3,7,8-HxCDF	0.1	0.1
2,3,7,8-HpCDF	0.01	0.01
OCDF	0.001	0.0001
Other CDFs	0	0

TEQs calculated using both the MDEQ and WHO/USEPA TEFs are included in the COPC selection tables (Tables 6-1 through 6-5). The EPCs used in the risk assessment were calculated using the WHO and USEPA TEFs.

6.5.3 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 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 the concept of estimated orders of potential potency, which relate the potency of the other potentially carcinogenic PAHs to the potency of benzo(a)pyrene, as presented in current USEPA guidance (USEPA, 1993d). The equivalent oral and inhalation CSFs for these chemicals were derived by multiplying the CSFs for benzo(a)pyrene by the orders of potential potency.

6.5.4 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 at Site 4, speciation analyses were not completed for samples collected at Site 4. However, risks associated with this chemical were assessed by conservatively assuming that 100 percent of the chromium detected in an environmental medium is present in the hexavalent state.

6.5.5 Toxicity Criteria for TCE

Toxicity criteria (i.e., RfDs, CSFs) for TCE are not currently published on the USEPA's IRIS database or in HEAST. Toxicity values for TCE developed by the NCEA and the Cal EPA are currently presented in the Region 9 PRG tables. As per Navy policy, the Cal EPA values (Cal EPA, 2002) were used to estimate risks for TCE in this risk assessment. The uncertainty associated with the use of the Cal EPA toxicity values relative to current USEPA NCEA values is discussed in Section 6.7.4.4.

6.6 RISK CHARACTERIZATION

The baseline HHRA evaluates potential health risks associated with human exposure to chemicals present at Site 4. Quantitative risk estimates are based on the conservative assumption that an individual is exposed to multiple COPCs by multiple exposure pathways. In accordance with USEPA guidance, chemical- and pathway-specific risks are summed to provide estimates of total risk for a given receptor. Risk estimates are developed by integrating the chemical intake levels with chemical-specific toxicity factors. Risk assessment calculations are contained in Appendix D-1 and example calculations are provided in Appendix D-2.

Incremental Lifetime Cancer Risk (ILCR) estimates are generated for each COPC using estimated exposure intakes and published CSFs, as follows:

$$\text{ILCR} = \text{Estimated Exposure Intake} \times \text{CSF}$$

An ILCR of 1×10^{-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.

Non-carcinogenic risks are assessed using the concept of HQs and HIs. The HQ for a COPC is the ratio of the estimated intake to the RfD, as follows:

$$\text{HQ} = (\text{Estimated Exposure Intake}) / (\text{RfD})$$

An HI for a given exposure route is generated by summing the individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and is therefore not a true risk. It is simply a numerical indicator of the possibility of the occurrence of non-carcinogenic (threshold) effects.

6.6.1 Comparison of Quantitative Risk Estimates to Benchmarks

To interpret the quantitative risks and to aid risk managers in determining the need for remediation at a site, quantitative risk estimates are compared to typical risk benchmarks. Calculated ILCRs are interpreted using the USEPA's risk management range (1×10^{-6} to 1×10^{-4}), and HIs are evaluated using a value of 1.0 (unity). Given the presumptive remedy and the MDEQ requirements, the acceptable cancer risk level of 1×10^{-6} for cumulative (total) site risk was used instead of the USEPA range described above. This decision is based on the relatively few numbers of contaminants at Site 4 and MDEQ precedent.

The USEPA has defined the range of $1x10^{-6}$ to $1x10^{-4}$ as the ILCR target range for hazardous waste facilities addressed under the CERCLA. Individual or cumulative ILCRs greater than $1x10^{-4}$ are generally not considered protective of human health and may indicate the need for remediation. MDEQ has set an acceptable cancer risk level of $1x10^{-6}$ for cumulative (total) site risk.

An HI exceeding unity (1.0) indicates that there may be potential non-carcinogenic health risks associated with exposure. If an HI exceeds unity, target organ effects associated with exposure to COPCs are segregated (and the HI is calculated on a target organ/target effect basis). Only those chemicals that affect the same target organ(s) or exhibit similar critical effect(s) are regarded as truly additive. Consequently, it may be possible for a cumulative HI to exceed 1.0, but no adverse health effects are anticipated if the COPCs do not affect the same target organ or exhibit the same critical effect. Individual target organ HIs for all receptors are presented in the RAGS Part D tables (Table 9s) presented in Appendix D-1.

6.6.2 Risk Assessment Results

The baseline HHRA conducted for Site 4 evaluates the risks potentially incurred by site workers, future occupational workers, construction/excavation workers, adult and adolescent trespassers, and hypothetical future on-site residents. All potential receptors were evaluated for exposure to COPCs in subsurface soil (although this exposure scenario is very unlikely for most receptors), surface water, and sediment. Construction/excavation workers and residents were also evaluated for exposure to groundwater. Both RME and CTE exposure scenarios were evaluated. Risk estimates for trespassers and site workers represent potential risks under current and future land use. Construction/excavation workers, occupational workers, and on-site residents were evaluated for future land use only. Tables 6-15 and 6-16 contain a summary of the estimated risks for Site 4 for the RME and CTE, respectively. Calculations of the detailed, chemical-specific risks for Site 4 are included in Appendix D-1. The following sections discuss the results of the risk characterization.

6.6.2.1 Carcinogenic Risks - RME

Quantitative estimates of carcinogenic effects are presented in the form of ILCRs. The target risk range for carcinogenic effects, as defined by the USEPA, is $1x10^{-6}$ to $1x10^{-4}$. Estimated ILCRs for Site 4 are discussed in the following subsections. The carcinogenic risks calculated for the RME case are summarized in Table 6-15.

The ILCR for the construction/excavation worker was less than the lower limit of the USEPA's risk management range ($1x10^{-6}$). The total ILCRs for site workers, occupational workers, and trespassers (adolescent + adult) were within the USEPA's target risk range, $1x10^{-6}$ to $1x10^{-4}$ but slightly exceeded the

MDEQ goal for cumulative site risk ($1x10^{-6}$). These exceedances were primarily due to dioxins/furans in surface water by dermal contact.

The total ILCR for hypothetical future on-site residents (adult + child = $1x10^{-3}$) exceeds the upper limit of the USEPA's risk management range and the MDEQ goal for cumulative site risk ($1x10^{-6}$). The elevated residential risk is primarily due to exposure to VC, arsenic and dioxins/furans in groundwater. VC in groundwater accounts for approximately 75 percent of the total ILCR. Dioxins/furans in groundwater account for 15 percent and arsenic accounts for 5 percent of the total residential ILCR. Dioxins/furans in surface water and sediment in Canal No. 1 (residential ILCR = $8x10^{-6}$) account for less than one percent of the total residential ILCR.

ILCRs for exposure to COPCs in subsurface soil, surface water, and sediment are either less than or within the USEPA's risk management range for all receptors. The chemical-specific risks are presented in the RAGS-Part D tables located in Appendix D-1.

The carcinogenic risks calculated for the hypothetical future on-site residents are subject to the following sources of uncertainty:

- Although the maximum concentrations of dioxins/furans in soil and sediment in terms of 2,3,7,8-TCDD TEQs (0.0026 µg/kg in subsurface soil and 0.0305 µg/kg in sediment) exceeded risk-based screening levels, these TEQs are less than the PRG of 1 µg/kg established for 2,3,4,8-TCDD TEQs in USEPA OSWER 9200.4-26. The maximum TEQs for dioxins in groundwater (10 (pg/L) and in surface water (4.9 pg/L) are less than the current MCL for 2,3,7,8-TCDD (30 pg/L).

- Risks for dermal contact with dioxins/furans in groundwater and surface water are approximately an order of magnitude greater than risks estimated for the ingestion route of exposure. Dermal risks for groundwater and surface water were estimated using an USEPA model (USEPA, 2004b) that, according to the information present in the documentation for the model, may overestimate actual chemical intakes.

- Residents are assumed to be exposed to the groundwater from the most highly contaminated part of the groundwater plume. The estimation of risk assuming that the receptor is exposed simultaneously to the greatest COPC concentrations in groundwater across Site 4 may result in an overestimation of risk. In addition, the turbidity levels reported in some unfiltered samples used to calculate EPCs for some constituents (e.g., dioxins/furans) were high indicating the

presence of particulate matter in the samples. The presence of suspended matter in the samples may have affected the analytical results (i.e. resulted in elevated concentrations).

- Arsenic was detected in only 4 of 23 groundwater samples with an average concentration of 2.5 µg/L. Only the maximum concentration of arsenic (11.4 µg/L) slightly exceeds the MCL (10 µg/L); the average concentration is less the MCL. Note the risk estimate calculated assuming exposure to the MCL results in a cancer risk greater than $1x10^{-4}$. In addition, the range of arsenic concentrations detected in groundwater samples (3.3 – 11.4 ug/L) is within the range of naturally occurring levels in the United States reported in the literature (less than 1.0 – 30 ug/L) (Dragun, 1988).

- The carcinogenic risks from exposure to arsenic may be overestimated, based on the human body's ability to metabolize arsenic (See Uncertainty Analysis, Section 6.7.4.3).

- No inorganic constituents were eliminated as COPCs on the basis of background because background data are not available for NCBC Gulfport. Therefore, it is likely that the risk estimates for exposure to site-related COPCs in the media evaluated in the risk assessment were overestimated

- The residential groundwater scenario assumes that on-site groundwater is used as a source of domestic drinking water. However, because of the nature and projected use of the site, it is unlikely that the groundwater would be used as a source of potable water in the future.

The chemical-specific risks are presented in the RAGS-Part D tables located in Appendix D-1.

6.6.2.2 Non-carcinogenic Effects - RME

Quantitative estimates of non-carcinogenic (toxic) effects are presented in the form of HQs and HIs. As discussed above, the risk benchmark for HQs and HIs (calculated on a target organ specific basis) is 1 (USEPA, 1989b). Estimated HQs and HIs for Site 4 are discussed below.

Cumulative HIs for site workers, occupational workers, construction/excavation workers, adult trespassers, and adolescent trespassers under the RME scenario were less than unity (1), indicating that no toxic effects are anticipated for these receptors under the defined exposure conditions.

Cumulative HIs for the future adult and child residents were 5 and 11, respectively. Major contributors to the residential HIs were cis-1,2-DCE (child HI = 2), VC (child HI = 2), and iron (child HI = 3) in

groundwater. Risk estimates calculated for the ingestion route of exposure exceed those calculated for the dermal and inhalation routes of exposure.

The HIs for exposure to subsurface soil, surface water, and sediment were less than unity for all receptors.

The HIs calculated for the hypothetical future on-site residents are subject to the following sources of uncertainty:

- There is uncertainty associated with the toxicity criteria used to estimate potential risks for iron. The NCEA provisional RfD for iron, which is based on allowable daily intakes rather than adverse effect levels, was used to quantify risks for iron. Since the provisional RfD is not based on adverse health effects, the risks associated with iron are likely to be overestimated.

- As stated previously, no inorganic constituents were eliminated as COPCs on the basis of background because background groundwater data are not available for NCBC Gulfport.

- The residential groundwater scenario assumes that on-site groundwater is used as a source of domestic drinking water. However, because of the nature and projected uses of the site, it is unlikely that the on-site groundwater would be used as a source of potable water in the future.

6.6.3 CTE Evaluation

As discussed in Section 6.4.3, an evaluation of the potential risks associated with the CTE scenario is included to provide a measure of the central or average case exposure. Summaries of the estimated risks for the CTE scenarios are contained in Table 6-16.

6.6.3.1 Carcinogenic Risks - CTE

The ILCRs for construction/excavation workers and site workers were less than the lower limit of the USEPA's risk management range ($1.0x10^{-6}$). The total ILCRs for occupational workers and trespassers were within the USEPA's risk management range, $1x10^{-6}$ to $1x10^{-4}$ but exceeded the MDEQ goal for cumulative site risk ($1x10^{-6}$).

The total ILCR for hypothetical future on-site residents (adult + child = $2x10^{-4}$) exceeded the USEPA's risk management range and the MDEQ goal for cumulative site risk. The elevated residential risk is primarily due to exposure to VC, arsenic and dioxins/furans in groundwater. VC in groundwater accounts for

approximately 80 percent of the total ILCR. Dioxins/furans in groundwater account for 15 percent and arsenic accounts for 5 percent of the total residential ILCR.

6.6.3.2 Non-carcinogenic Effects - CTE

Target organ-specific HIs for construction/excavation workers, site workers, occupational workers, adolescent trespassers, adult trespassers, and future adult residents under the CTE scenario were less than unity (1), indicating that no toxic effects are anticipated for these receptors under the CTE exposure conditions. Cumulative HIs for the future child resident (HI = 7) exceeded unity. Major contributors (HIs greater than 1) to the residential child CTE HIs were cis-1,2-DCE, VC, and iron in groundwater.

6.7 UNCERTAINTY ANALYSIS

The baseline HHRA for Site 4 was performed in accordance with current USEPA guidance. However, there are varying degrees of uncertainty associated with the baseline HHRA. This section presents a brief summary of uncertainties inherent in the risk assessment and includes a discussion of how they may affect the quantitative risk estimates and conclusions of the risk analysis.

6.7.1 General Uncertainty in Risk Assessment

Uncertainty in the selection of COPCs is related to the current status of the predictive databases, the grouping 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 EPCs, 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 that consider safety factors are made so that the final calculated risks are overestimated and, therefore, conservative.

Generally, risk assessments carry two types of uncertainty: measurement and informational uncertainty. Measurement uncertainty refers to the usual variances that accompany 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 types 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 make sure that the particular assumptions made are protective of sensitive subpopulations and the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate 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^{-6}), the interpretation of no significant risk is typically straightforward. However, when risks calculated using a high degree of uncertainty exceed a risk level (i.e., 10^{-4}), a conclusion can be difficult unless uncertainty is considered.

6.7.2 Uncertainty in Selection of COPCs

A minor amount of uncertainty is associated with the selection of COPCs that may affect the numerical risk estimates presented in the risk assessment. The most significant issues related to uncertainty in COPC selection are the existing database (i.e., the use of validated or unvalidated sample results), the inclusion of chemicals potentially attributable to background, the screening levels that are used, the exclusion of historical data from the risk assessment, and the absence of screening levels for a few chemicals detected in the site media. A brief discussion of each of these issues is provided in the remainder of this section.

6.7.2.1 Existing Databases

The data used in the risk assessment for Site 4 were obtained from samples collected as part of the field efforts performed by TtNUS in 2004. No historical data were used for risk assessment purposes. All analytical data were validated according to the methodologies specified in the Work Plan (TtNUS, 2004). The qualification of data during the formal data validation process is not expected to compromise the results of the HHRA. Analytical data qualified as estimated were utilized, even though the reported positive concentrations or sample-specific quantitation limits may be somewhat imprecise. The use of estimated data adds to the uncertainty associated with the risk assessment. However, the associated uncertainty is expected to be negligible compared to the other uncertainties inherent in the risk evaluation process (i.e., uncertainties with land uses, exposure scenarios, toxicological criteria, etc.). Analytical data qualified for blank contamination were used in the baseline risk assessment. When determining exposure concentrations via statistical procedures, chemicals not detected were conservatively assumed to be present at concentrations equal to one-half the sample-specific quantitation limits. Analytical results for some chemicals qualified “R," unreliable, were not used in the risk assessment.

6.7.2.2 Exclusion of Historical Data from the Risk Assessment

Data collected from the most recent sampling events (2004) by TtNUS were used to evaluate potential risks for Site 4. Historical data collected for soil, groundwater, surface water, and sediment investigations conducted in 1994, 1997, and 1998 were not used in this assessment. Exclusion of the historical data from the risk assessment may result in uncertainty in the COPC selection and in the exposure concentrations used to quantitate risks. However, since the most recent data were used to assess risks, the uncertainty associated with the omission of historical data should be minimal, especially with regard to the volatile organic contamination present at Site 4. Volatile organic contaminants, the primary risk drivers for Site 4, are more subject to variation over time than other chemicals. In addition, as discussed in Section 6.2, comparisons of concentrations detected in the historical samples with concentrations detected in the 2004 samples indicated that the results and conclusions of the risk assessment were probably not affected by the exclusion of the historical data from the risk assessment.

6.7.2.3 Chemicals Potentially Attributable to Background

No chemicals in soil, groundwater, surface water, or sediment were eliminated as COPCs on the basis of background because neither facility-wide nor site-specific background data are available. This is an important consideration when interpreting the results of the HHRA for Site 4 because several metals (i.e., arsenic and iron) were identified as risk drivers for groundwater. Arsenic was only detected in 4 of 23 groundwater samples and the spatial distribution of arsenic in soil and groundwater samples across the site indicates that it is likely not site related. As indicated previously, concentrations of arsenic in soil and

groundwater are within naturally occurring levels in Mississippi and in the United States. The inclusion of some metals in the quantitative risk evaluation is likely to overestimate the risks for the site.

6.7.2.4 COPC Screening Levels

The use of risk-based screening levels for soil and groundwater based on conservative residential land use scenarios corresponding to an ILCR of 10^{-6} and HI of 0.1 should make certain that the significant contributors to risk from a site are evaluated. The elimination of chemicals that are present at concentrations that correspond to an ILCR less than 10^{-6} and an HI less than 0.1 should not affect the final conclusions of the risk assessment because these chemicals are not expected to cause a potential health concern at the concentrations detected.

6.7.2.5 Absence of COPC Screening Levels

Because of the lack of toxicity criteria, USEPA Region IX PRGs and MDEQ Tier 1 TRGs are not available for calcium, magnesium, sodium, and potassium. This may lead to a slight underestimation of potential risks. However, these inorganics are essential nutrients, commonly detected in environmental media.

Risk-based screening levels are also currently not available for several constituents detected at Site 4 (e.g., benzo(g,h,i)perylene, 2-methylnaphthalene, and phenanthrene). Therefore, screening levels available for surrogate chemicals were used as screening levels for these constituents. The use of surrogates is recommended by USEPA Region 1 (USEPA, 1999a). In the COPC selection for Site 4, the screening level for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene, and naphthalene is used as surrogate for 2-methylnaphthalene. The use of these surrogates may increase the uncertainty in the risk assessment. The direction of bias cannot be determined.

6.7.3 <u>Uncertainty in the Exposure Assessment</u>

Uncertainty in the exposure assessment arises because of the methods used to calculate EPCs, the determination of land use conditions, the selection of receptors and scenarios, and the selection of exposure parameters. Each of these is discussed below.

6.7.3.1 Uncertainty in the Elimination of Exposure Routes/Pathways

Potential risks were evaluated for all environmental media sampled at Site 4. However, surface soil was not evaluated in the risk assessment because contamination at the site was disposed of in trenches and covered with clean soil. Risks to COPCs in subsurface soil were quantitatively evaluated to account for the fact that exposure could occur if subsurface soil were brought to the surface in a future excavation project. The risks for exposure to subsurface soil presented in Tables 6-15 and 6-16 were less than or within

USEPA benchmarks for all receptors evaluated. Therefore, the impact of including risks for subsurface soil in the risks assessment is negligible. Surface water and sediment were evaluated for ingestion and dermal contact. Inhalation of volatiles from surface water and sediment was not evaluated because potential risks from inhalation are expected to be minimal for these media. In addition, predictive models are currently not available for these scenarios. The omission of these exposure pathways/routes may result in an underestimation of total risks for the site but the underestimation is expected to be minimal when compared to risks for other media and exposure routes.

6.7.3.2 Exposure Point Concentrations

Uncertainty is associated with the use of the 95 percent UCL on the mean concentration as the EPC. As a result of using the 95 percent UCL, the estimations of potential risk are most likely to be overestimated because this is a representation of the upper limit that potential receptors would be exposed to over the entire exposure period. In some cases (i.e., surface water and sediment), the maximum concentration was used as the EPC because the dataset contained less than 10 samples. The maximum concentration is also used when the UCL is greater than the maximum concentration. The use of the maximum concentration as the EPC tends to overestimate potential risks because receptors are assumed to be exposed continuously to the maximum concentration for the entire exposure period. Uncertainty is also introduced when the nondetects are assigned a value of one-half the quantitation limit when calculating the EPC. This may either overestimate or underestimate the risks to potential receptors.

As discussed in Section 6.6.2.1, the elevated risks calculated for Site 4 are primarily the result of exposure to COPC concentrations in the most highly contaminated permanent monitoring wells. Concentrations in wells 04GW1301 and 04GW1601 were used to estimate risks for VOCs; concentrations in wells 04GW1301, 04GW1401, and 04GW1701 were used to estimate risks for dioxins/furans and dibenzofuran; and concentrations in wells 04GW1301, 04GW1401, 04GW1501, 04GW1601, 04GW1701, 04GW1801, and 04GW2001 were used to estimate risks for metals. In order to eliminate some of the uncertainty associated with the use of concentrations from the most highly contaminated permanent monitoring wells as the basis of the groundwater risks, risk estimates for COPC concentrations detected in the other permanent and temporary wells were also calculated assuming residential exposures and are presented in the following table.

Groundwater Sample	Turbidity (NTU)	Cancer Risks Total Residential ILCR	Noncancer Effects Adult Resident HI	Noncancer Effects Child Resident HI
Permanent Monitoring Wells				
GPT-04-08	24	3E-4	1	3
GPT-04-09	99	1E-4	0.7	2
GPT-04-10	9	1E-4	0.8	2
GPT-04-11	200	1E-4	2	4
GPT-04-12	10	1E-4	1	2
GPT-04-13	17	5E-4	4	8
GPT-04-14	10	6E-4	4	9
GPT-04-15	0	1E-4	2	4
GPT-04-16	49	2E-3	8	20
GPT-04-17	260	1E-4	1	3
GPT-04-18	18	6E-4	0.8	2
GPT-04-19	56	5E-4	2	5
GPT-04-20	0	2E-4	2	5
DPT Wells (Temporary)				
04GP0101	260	6E-5	0.9	2
04GP0201	155	7E-5	1	6
04GP0301	114	1E-4	3	6
04GP0401	212	2E-4	2	5
04GP0501	999	7E-5	2	5
04GP0601	50	5E-5	2	6
04GP0701	999	5E-5	2	4
04GP0801	4	8E-5	9	20
04GP0901	8	7E-5	1	2
04GP1001	4	1E-4	2	4
04GP1101	NA	1E-3	2	5
04GP1201	NA	7E-4	3	6
04GP1301	NA	2E-3	5	11
04GP1801	NA	8E-5	0.4	1
04GP1901	NA	3E-4	1	3
04GP2401	NA	3E-4	0.6	1
04GP2501	NA	9E-5	0.2	0.6

Note: ND - No carcinogenic COPCs detected in these samples.

As shown above, ILCRs for individual wells range from $5x10^{-5}$ to $2x10^{-3}$ with on average ILCR of $4x10^{-4}$. VC, dioxins/furans, and arsenic were the primary contributors to the carcinogenic risks although these COPCs were not detected in all samples. VC was detected in 14 of 38 samples, dioxins/furans in 3 of 13 samples, and arsenic in 4 of 23 samples with only the concentration in one sample exceeding the MCL for arsenic. In addition, as indicated previously, it is likely that the concentrations of arsenic at the site are naturally occurring.

The target organ-specific non-carcinogenic HIs for child and/or adult residents exceeded unity for samples collected from most of the wells listed in the preceding table. The main contributors to these HIs were cis-1,2-DCE, TCE, VC, manganese, and iron. While turbidity appears be an important factor in the risks for metals, a clear correlation between turbidity and risk is not evident in all of the sample results evaluated. Note that no COPCs were detected in a number of samples (i.e., 04GP1401, 04GP1501, 04GP1601, 04GP1701, 04GP2001, 04GP2101, 04GP2201, and 04GP2301) and these samples are not listed in the above table.

6.7.3.3 Land Use

Uncertainty and conservatism may be introduced into the risk assessment when estimated risks are not based on current land use patterns. The risks calculated in this HHRA are based on current and projected land use at NCBC. Site 4 is currently used as a driving range for Pine Bayou Golf Course and parts of the 1st, 9th and 18th holes of the golf course overlay the landfilled area, and the site is expected to be used for this purpose in the future. Access to the site is not restricted and children are known to frequently play on the site. For this reason, recreational users/trespassers (adolescent and adult) were evaluated in the risk assessment and were assumed to be exposed 24 and 100 days a year, respectively. Much of the uncertainty in this risk assessment is related to groundwater usage (the elevated risks calculated for Site 4 are mainly due to exposure to groundwater). The risk assessment assumes that groundwater is used as a source of domestic drinking water. However, the groundwater is not currently used for this purpose and it is unlikely that groundwater at the site would be used a sources of potable water in the future.

6.7.3.4 Exposure Parameters

Each exposure factor selected for use in the risk assessment contains 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, USEPA guidelines (e.g., USEPA, 1991b) for the RME receptor were used, if applicable, which generally specify the use of the 95th percentile for most parameters. Therefore, the selected exposure factors for the RME receptor represent the upper bound of the observed or

expected practices which are characteristic of the majority of the population. Because the USEPA does not provide values for exposure factors for some receptors/pathways, professional judgment is used to determine some values. When using professional judgment, an effort was made to be reasonably conservative. However, the use of professional judgment adds uncertainty to the risk assessment.

Generally, uncertainty can be assessed for many assumptions made in determining factors for calculating exposures and intakes. Many of these parameters were determined from the statistical analyses of 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. For many parameters for which limited information exists (e.g., dermal absorption), greater uncertainty exists. For example, current USEPA guidance (USEPA, 2004b) does not provide dermal absorption factors for exposure to most metals (except arsenic and cadmium) and VOCs in soil. Therefore, risks for dermal contact with soil are not evaluated for metals other than arsenic and cadmium. Consequently, risks from exposure to soil may be underestimated by omitting metals and VOCs from the dermal risk assessment.

6.7.3.5 Uncertainty Associated with the Foster and Chrostowski Shower Model

Site-specific parameters, such as groundwater concentrations were used in the shower model, if possible. However, it was necessary to use model default values for most of the input parameters, such as contaminant-specific mass transfer coefficients, droplet diameter, drop time, viscosity, and temperature. The use of model default values tends to increase the uncertainty in the calculated risks. The direction of the uncertainty is not known, although the model default values are generally conservative and tend to overestimate air concentrations.

6.7.3.6 Uncertainty Associated with the Johnson and Ettinger Model

As discussed in Section 6.4.5.2, exposures by hypothetical residents to COPCs that may migrate from groundwater into indoor air were evaluated with USEPA's Johnson and Ettinger volatilization model (USEPA, 2004a). The results of the vapor intrusion evaluation are not included in the quantitative risk assessment presented in Section 6.6.2, because of the uncertainty associated with the air concentrations generated using the Johnson and Ettinger Model. Results of the evaluation and uncertainties associated with the risks are presented and discussed in the following paragraphs.

The Model results indicated that HIs for hypothetical future child and adult residents exposed to COPCs assumed to migrate from shallow zone groundwater through building foundations into indoor air are less than unity on a target organ basis, indicating that adverse non-carcinogenic effects are not anticipated for these receptors under the defined exposure conditions. The total (child + adult) ILCR for hypothetical

lifelong residents (ILCR = 1 x 10^{-4}) exposed to COPCs migrating from groundwater through building foundations into indoor air was equal to the upper limit of the USEPA's target risk range of 10^{-4} to 10^{-6} but exceeded the Michigan Department of Environmental Protection (MDEP) goal for total site risk (1 x 10^{-6}). VC accounted 99 percent of the total indoor inhalation risk based on a groundwater concentration of 88 ug/L.

HIs and ILCRs for occupational workers would be expected to be within acceptable levels because these receptors would be exposed to volatiles in indoor air on a less frequent basis than residential receptors. In addition, industrial facilities are typically larger than residential housing units and have larger air exchange rates, which would result in lower indoor air concentrations.

The results of the vapor intrusion modeling are subject to the following sources of uncertainty:

- Site-specific parameters were used in the model whenever possible. For example, site-specific values were used for depth to the water table and soil type. Model default values for soil bulk density and soil porosity were found to be within the range of values measured at the site and were used in model calculations. Site-specific values for building dimensions, soil-building pressure differential, seam crack width, and air-exchange rates were not available. Therefore, model default values were used for these parameters. Model default values were also used for residential dwelling dimensions based on owner-occupied and rental single-family detached residences in the United States. The use of model default values tends to increase the uncertainty in the calculated risks. The direction of the uncertainty is not known, although the model default values are generally conservative and tend to overestimate air concentrations. The default model air-exchange rate (0.45 per hour) was used to evaluate residential risks. As discussed in the model guidance, this air-exchange rate was based on typical residential building dimensions and ventilation rates.

- The default building parameters for the Johnson and Ettinger Model assume that the dimensions of buildings and ventilation rates are typical of residential dwellings in the United States. These include an air exchange rate of 0.45 per hour and residential building dimensions of 961 cm long by 961 cm wide by 488 cm high (approximately 16,000 cubic feet).

- The model assumes an infinite source and does not take into account transformation processes such as biodegradation. The analytical data for the site indicate that biodegradation of the VOCs detected in groundwater at Site 4 is occurring and concentrations are expected to decrease over time.

6.7.3.7 Uncertainty Associated with the VDEQ Model for Exposure to Vapors in a Trench

As discussed in Section 6.4.5.2, exposure of construction workers to vapors in a trench was evaluated by a vadose zone model recommended by the VDEQ to estimate volatilization of gases from contaminated groundwater into a trench. Site-specific parameters, such as groundwater concentrations were used in the model, if possible. However, it was necessary to use model default values for most of the input parameters. The use of model default values tends to increase the uncertainty in the calculated risks. The direction of the uncertainty was not known. One of most sensitive parameters, in terms of potential risk, is the air exchange rate (ACH) in the trench which was based on assumed trench dimensions (i.e., the ratio of trench width to depth). The risk assessment assumed that air exchange between the trench and above-ground atmosphere was not restricted (as opposed to a confined space) and may tend to underestimate risks. However, note that the model only gives the user two choices regarding the value of ACH, a very confined space which tends to greatly overestimate air concentrations in the trench or a less restricted space which results is lower air concentrations. The difference in vapor concentrations in a trench based on the two different ACHs is approximately 2 to 3 orders of magnitude. A detailed discussion of determination of the ACH is presented in Section 6.4.5.2.

6.7.4 Uncertainty in the Toxicological Evaluation

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

6.7.4.1 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; the magnitude of the response is clearly dose related; pharmacokinetic data indicate a similar fate in humans and animals; postulated mechanisms of toxicity are similar for humans and animals; and 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 for the carcinogenic assessment and derivation of an RfD or reference concentration (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 exposures 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 CSF. 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 noncarcinogenic. 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 or 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 or RfC, because this estimation is predicated on the assumption of a threshold below which adverse effects are not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arises in estimation of an RfD or 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 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 chemical-specific gastrointestinal absorption rates are not available in the literature or when only qualitative statements regarding absorption are available.

6.7.4.2 Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS-Part E (USEPA, 2004b), risks from dermal absorption from soil are to be quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-D, DDT, TCDD (and other dioxins), PAHs, PCBs, pentachlorophenol, and SVOCs because of the limited guidance available to estimate dermal absorption factors for other constituents. Therefore, the dermal route of exposure is evaluated quantitatively for these chemicals only. Risks for dermal exposure to metals (other than arsenic and cadmium) and VOCs identified as COPCs for soil or sediment were not quantified in the risk assessment. Consequently, potential risks may be underestimated by excluding these constituents from the dermal risk assessment calculations. The uncertainty is reduced somewhat due to the fact that no VOCs were identified as COPCs for soil or sediment at Site 4.

The ILCRs presented in RAGS-Part D tables in Appendix D-1 indicate that the risks from dermal contact with dioxins/furans in groundwater and surface water were one to two orders of magnitude greater than risks by ingestion. The dermal risks were calculated using a USEPA model presented in RAGS-Part E (USEPA, 2004b) which, according to the guidance, tends to overestimate intakes and risks for dermal contact for some chemicals (e.g., PAHs, PCBs, and dioxins). Appendices A and B of RAGS-Part E discuss the uncertainties in the permeability coefficients for these chemicals and the limitations of the dermal absorption model when evaluating chemicals, such as dioxins.

6.7.4.3 Uncertainty Associated with Evaluation of Arsenic

Arsenic is a primary risk driver for exposure to groundwater at Site 4. There is uncertainty associated the evaluation of arsenic as a carcinogen. Although the more restrictive basis for evaluating risk associated with exposure to arsenic is to assume it is a carcinogen, carcinogenic effects are not the primary health effects expected to be manifested on exposure to arsenic. Scientific information indicates that humans are capable of metabolizing arsenic to expedite its elimination from the body (ATSDR, 1997). Its elimination from the body obviously mitigates the possibility for arsenic to manifest carcinogenic effects. Therefore, evaluating arsenic as a noncarcinogen would be more appropriate. However, arsenic was conservatively evaluated as a carcinogen in this risk assessment. Consequently, risks for this chemical are probably overestimated to some degree.

Specifically, the body methylates the arsenic to form monomethyl arsenic and dimethyl arsenic. A limited capacity exists for the body to methylate arsenic, but this limit is generally reached when the body's

intake of arsenic exceeds approximately 500 µg/day. The maximum estimated concentration of arsenic in groundwater at the site was 11.4 ug/L. Assuming that a receptor ingests 2 liters of water per day, exposure to this concentration corresponds to an approximate intake of 22.8 µg-arsenic/day. This intake is well within the body's ability to metabolize arsenic. Although some humans may be more sensitive to arsenic, in that they are "poor methylators," the average exposure concentration for the site is usually orders of magnitude less than the normal limit of metabolic saturation and is most likely less than levels that would trigger responses in sensitive individuals.

In addition to the uncertainty associated with the metabolism of arsenic, there is also uncertainty associated with the bioavailability of arsenic. The risks estimates calculated for arsenic as based on the assumption that 100 percent of the arsenic that enters the body is bioavailable. However, the toxicity studies on which RfDs and CSFs for metals are based do not account for the characteristics of a metal in soil or the limitations that these characteristics place on the absorption of the metal. Several recent studies on the bioavailability of arsenic (Ruby, V. *et al*., 1999) indicate that the bioavailability of arsenic in various soil types ranges from 8 to 28 percent. Based on these studies, it is possible that the risks calculated for arsenic in soil could be overestimated by as much as one order of magnitude.

6.7.4.4 Uncertainty Associated with Toxicity Criteria for TCE

As noted in Section 7.4.1.4 toxicity criteria (i.e., RfDs, CSFs) for TCE are not currently published on the USEPA's IRIS database or in HEAST. The toxicity criteria developed by the Cal EPA (Cal EPA, 2002) were used for TCE in this risk assessment. However, USEPA has published draft toxicity values for TCE in a recent technical document (USEPA, 2001c). The draft toxicity criteria are currently undergoing peer review. A range of CSFs [0.02 – 0.4 $(mg/kg/day)^{-1}$], as opposed to a single recommended value, is presented in the recent guidance. The draft CSFs are 2 to 30 times higher than the Cal EPA CSF [0.013 $(mg/kg/day^{-1}$]. The draft oral RfD is 0.0004 mg/kg/day as compared to the Cal EPA RfD of 0.5 mg/kg/day. TCE was identified as a COPC for groundwater. Risks estimates for exposure to TCE in groundwater were within acceptable levels using the Cal EPA toxicity values and would be within acceptable levels if the draft USEPA criteria had been used in the calculations. Therefore, use of the Cal EPA CSFs and RfDs does not affect the results and conclusions of the risk assessment.

6.7.4.5 Use of Iron Toxicity Criteria

An NCEA provisional RfD was used to evaluate non-carcinogenic effects from exposure to iron. The provisional RfD is based on allowable intakes, rather than on adverse effect levels. Therefore, there is some degree of uncertainty associated with the use of the RfD. Note that some USEPA regions (e.g., Region 1) consider the use of the oral RfD for iron inappropriate and recommend that this metal not be evaluated quantitatively in risk assessments.

In addition, as previously discussed, there is uncertainty associated with the toxicity data for iron. The RfD for iron is based on the recommended daily allowance (RDA) for adult human nutrition. Children and adolescents require more iron in their diets than adults do; consequently, using an RfD based on the adult RDA for iron to evaluate exposures to children results in an overestimation of the risks for children. When the HI for exposures to iron by children exceed unity, USEPA Region 3 recommends recalculating the HI using an RfD of 1.1 mg/kg/day (instead of the 0.3 mg/kg/day provided in IRIS). If this value was used to estimate risks for children, the HQs calculated for iron would decrease by a factor of 1.1/0.3. Therefore, the risk estimates calculated for iron may be overestimated. The iron HQ for the child resident assumed to be exposed to groundwater was 3. If the alternate RfD was used, the HQ for iron in groundwater would be 0.8 and would less than the goal of unity (1.0) for the RME. The HQs for child exposure to iron in other media were less than unity and therefore the overestimation is not significant.

6.7.5 Uncertainty in the Risk Characterization

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

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. Therefore, the uncertainty regarding antagonistic or synergistic effects is ambiguous because potential human health risks may either be underestimated or overestimated.

6.8 SUMMARY AND CONCLUSIONS

Site 4, the Golf Course Landfill, is a former four acre landfill located northeast of the intersection of 7th Street and Colby Avenue. The site is adjacent to the driving range for Pine Bayou Golf Course and parts of the 1st, 9th and 18th holes of the golf course overlay the landfilled area. The landfill was operated from 1966 until 1972 and was the only operating landfill on the base at that time. Waste material was disposed of in trenches, burned daily, and then backfilled. Most, if not all, of the solid waste and some of the liquid and chemical waste generated at the installation were disposed of at Site 4 during the period of landfill operation. Access to the site is not restricted and children are known to play frequently at the site. The northern boundary of the landfill is adjacent to Canal No. 1.

Site workers, occupational workers, construction/excavation workers, trespassers/recreational users (adults and adolescents), and hypothetical future on-site residents were evaluated as potential receptors in the site-specific baseline HHRA. All receptors were evaluated for potential exposure to COPCs in subsurface soil, surface water, and sediment. Construction/excavation workers and future hypothetical future residents were also evaluated for exposure to COPCs in groundwater.

Inhalation of volatile emissions from soil and fugitive dust was evaluated qualitatively via a comparison of site data with USEPA Generic SSLs for transfers from soil to air (inhalation). Exposure was considered to be relatively insignificant because maximum subsurface soil concentrations for all detected chemicals were less than the inhalation SSLs and this pathway was not quantitatively evaluated in the HHRA.

The following chemicals were identified as COPCs for quantitative risk evaluation at Site 4:

- Subsurface soil – benzo(a)anthracene, dibenzo(a,h)anthracene, aluminum, arsenic, iron, and vanadium.

- Groundwater – 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, benzene, TCE, VC, dioxins/furans, dibenzofuran, aluminum, antimony, arsenic, barium, chromium, iron, manganese, and vanadium.

- Surface Water – PCE, dioxins/furans, arsenic, iron, and manganese.

- Sediment –benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(12,3-cd)pyrene, Aroclor-1260, dioxins/furans, aluminum, arsenic, iron, thallium, and vanadium.

No chemicals were excluded from the risk assessment on the basis of background concentrations because background data are not available for NCBC Gulfport.

Risk Assessment Results – Current Land Use

Under current land use, quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for site workers and trespassers/recreational users hypothetically exposed to COPCs in subsurface soil, surface water, and sediment. Total ILCRs for site workers and trespassers/recreational users were within the USEPA risk management range ($1x10^{-6}$ - $1x10^{-4}$) but slightly exceeded the MDEQ goal for cumulative site risk ($1x10^{-6}$). Total non-carcinogenic HIs for site workers and trespassers/recreational users were less than unity indicating that no adverse toxic effects are expected under the conditions established in the exposure assessment.

Risk Assessment Results – Future Land Use

Under future land use, quantitative estimates of non-carcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for site workers, occupational workers, construction/excavation workers, trespassers/recreational users, and hypothetical future on-site residents.

Risk assessment results for site workers and trespassers/recreational users are the same as those described above. Total ILCRs for future construction/excavation workers and occupational workers were within the USEPA's risk management range ($1x10^{-6}$ - $1x10^{-4}$) but exceeded the MDEQ goal for cumulative site risk ($1x10^{-6}$). Total HIs for occupational workers and construction/excavation workers were less than unity, indicating that no adverse toxic effects are expected for exposure to soil, groundwater (for construction/excavation workers), surface water, and sediment under the defined exposure conditions.

Cancer and non-cancer risk estimates developed for the hypothetical future resident exceeded USEPA and State of Mississippi cancer and non-cancer risk benchmarks. The ILCR for hypothetical future residents exceeded 1×10^{-4} and is primarily due to exposure to VC, dioxins/furans, and arsenic in groundwater. The cumulative non-carcinogenic HI for future on-site residents exceeded the USEPA goal of unity and is mainly the result of exposure to cis-1,2-DCE, VC, and iron in groundwater. In addition, maximum detected concentrations of cis-and trans-1,2-DCE, TCE, VC, and arsenic exceeded USEPA and MDEQ primary MCLs. However, as discussed in Section 6.6.2, there are significant uncertainties associated with the risk estimates developed for COPCs in groundwater. Among these are the facts that the residential groundwater scenario assumes that groundwater on the site is used as a source of domestic drinking water, turbidity readings greater than 10 NTU were reported for some of the groundwater samples used to quantify risk, and background could not be used to eliminate metals as COPCs. ILCRs and HIs for residential exposure to soil, surface water, and sediment were less than or within USEPA, but slightly exceeded the MDEQ risk benchmark for carcinogenic health effects.

In summary, a HHRA was performed to evaluate exposure to COPCs in subsurface soil, groundwater, surface water, and sediment at Site 4, the Golf Course Landfill at NCBC Gulfport. Estimated risks for site workers, occupational workers, construction/excavation workers, and trespassers/recreational users assumed to be exposed to COPCs in site media were less than or within USEPA but exceeded the MDEQ risk benchmark for carcinogenic health effects. The quantitative risk evaluation indicated that potential adverse health effects may be associated with the hypothetical future residential use of groundwater. The maximum detected concentrations of several VOCs and arsenic in groundwater also exceeded USEPA and MDEQ primary MCLs. However, there is considerable uncertainty in the risk estimates calculated for exposure to COPCs in groundwater and the numerical risk results are likely overestimated. In addition, the residential groundwater use scenario is evaluated to be conservative and

to provide information to risk managers for Site 4. The groundwater underlying and downgradient of Site 4 is not currently used as a source of drinking water and there are no plans to develop this resource in the future. Residential risks estimated for other site media (subsurface soil, surface water, and sediment) were within USEPA but exceeded the MDEQ benchmark for carcinogenic health effects.

7.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

The goal of the SLERA is to evaluate potential risks to ecological receptors in aquatic habitats located at or influenced by Site 4. The NCBC Gulfport Tier 1 Partnering Team decided to streamline the Ecological Risk evaluation for Site 4 by eliminating the evaluation of terrestrial receptors based on the USEPA Presumed Remedy Process (USEPA 1991, 1996), Conceptual Site Models, and previous risk information. The team decided that aquatic receptors would be the most sensitive to the contaminants of concern found in the impacted media. In addition, the aquatic pathway was considered the primary concern for the potential receptors both on and off the base (NCBC, 2005).

Because the presumptive remedy strategy will include removal of the existing sediment and lining of the canal with concrete and covering the site with a low permeability soil cap, it is anticipated that ecological risks identified in this section will be actively remediated. Therefore, the USEPA Region IV ESVs will be treated as remedial goals for this site. Surface soil samples were analyzed as part of the evaluation of the suitability of the existing soil cover for use in the low permeability cap. The surface soil results were screened by comparison to the ESVs, but not further evaluated.

This SLERA was conducted in accordance with USEPA Ecological RAGS (USEPA, 1997a), USEPA Amended Guidance on ERA at Military Bases (USEPA, 2000b), and the Navy Policy for Conducting ERAs [Department of the Navy (DON), 1999]. The risk assessment for Site 4, the Golf Course Landfill, consists of Steps 1 through 3A of USEPA's 8-step ERA 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

7.1 SCREENING-LEVEL PROBLEM FORMULATION

The Problem Formulation presents the site history, describes physical and ecological characteristics of the site, identifies ecological receptors of concern, and provides the basis for selecting assessment and measurement endpoints. These items provide the information that will be used to develop the conceptual exposure model for the site.

7.1.1 Environmental Setting

NCBC Gulfport is located in the western part of the city of Gulfport (Figure 1-1). The base occupies 1,100 acres and has an average elevation of approximately 30 feet above mean sea level (msl). Site 4 is an approximately 13 acre former landfill located in the western section of NCBC Gulfport (Figure 1-2). Topography at Site 4 is relatively flat and the ground surface is primarily fill dirt and native sand with sparse vegetative cover. The west-northwestern boundary of the landfill is adjacent to Canal No. 1.

Canal No. 1 at Site 4 is approximately 12 to 14 feet wide and approximately 2 feet deep at its deeper portions. Storm water runoff at Site 4 and in the areas surrounding Site 4 flows into various tributary ditches that feed into Canal No. 1, which collects the runoff from Drainage Area 5 (Figure 3-3). Water levels in the canal fluctuate with rainfall with upper reaches (southwestern sections) periodically being dry. Surface water in Canal No. 1 is typically slow flowing and flows to the north and eventually leaves NCBC Gulfport at Outfall 1, located at 28th Street, and ultimately into Turkey Creek. Turkey Creek empties into Bernard Bayou approximately 4 miles northeast of the base. Aquatic plants grow in stable sand and gravel banks near and below water levels in Canal No. 1. Vegetation along the canal banks is periodically cut to prevent tree growth. No wetlands exist adjacent to the canal in the vicinity of Site 4.

Ecological habitat at Site 4 consists of mowed grass associated with the golf course. Few trees are present on the eastern side of Canal No. 1. Scattered trees are present on the golf course west of Site 4 on the opposite side of Canal No.1, while shrubs and trees are present adjacent to Canal No. 1 downstream (northeast) of the site. Aquatic habitat at Site 4 is limited to that associated with Canal No. 1 including aquatic weeds/grasses along its banks and in the water, benthic invertebrates, and fish. Previous studies (HLA, 1999a) identified Gizzard Shad (*Dorosoma cepedianum*), Redear Sunfish (*Lepomis microlophus*), Largemouth Bass (*Micropterus salmoides*), and Brown Bullhead (*Ameiurus nebulosus*) in Canal No. 1 downstream of Site 4. The grassy areas adjacent to Canal No. 1 are regularly mowed and provide little if any riparian habitat. Because of this, and since NCBC Gulfport is mostly developed land, the site provides little habitat suitable for upper trophic level aquatic receptors. Areas to the west and downstream of Site 4 that contain more trees and shrubs would provide more cover and food sources than the mowed grass at the site, and are potentially utilized by more species.

Contamination was first detected at Site 4 during dioxin delineation activities for on- and off-site surface water drainage features conducted in 1995 (ABB-ES, 1995). Analytical results from the groundwater samples collected from shallow monitoring wells installed at Site 4 for this investigation reported dioxins and VC. Dioxins were also reported in a seep sample collected from the bank of Canal No. 1. While initial suspicions were that HO had been disposed of at Site 4 based on its time of operation, subsequent investigations have indicated that HO was not disposed of at Site 4 (HLA, 1998). A detailed discussion of previous investigations performed at Site 4 is included in Section 1.0 of this RI.

7.1.2 Contaminant Fate and Transport

Previous investigations have identified the following potential sources of contamination at Site 4 as including:

- Liquid and solid wastes disposed of in the landfill, and
- Backfilled incineration byproduct.

Potential contaminant release mechanisms at Site 4 include the mobilization of contaminants from wastes buried in subsurface soil to local groundwater by infiltration of precipitation and dissolution of soluble contaminants. Soluble constituents can be transported to the water table by rainwater infiltration, and may continue to migrate downgradient discharging as seeps into Canal No. 1. Seeps have been observed discharging from the east (landfill) side of Canal No.1 that runs along the west-northwest side of the site. The groundwater at Site 4 is somewhat deeper than in the surrounding area due to several feet of landfill cover. The cover material is a fine to medium sand with little silt, allowing infiltration or seepage into the landfill. The top of the local confining clay layer was encountered at depths of approximately 30 feet bls.

Transport is affected by the chemical and physical properties of both the soil and the contaminants. Currently erosion and overland transport of particulate matter from site surface soil do not appear to be important transport mechanisms at Site 4 due to the presence of several feet of clean fill covering the site. Past erosion and overland transport of surface soil via storm water runoff as well as airborne dispersion by wind may have resulted in contaminant deposition in Canal No. 1. Sources outside of Site 4 may also be responsible for contamination found in Canal No. 1. As Canal No. 1 is tied into other storm water ditches at NCBC Gulfport, it is very likely that contaminants from other parts of the facility have been transported via storm water into Canal No. 1.

The following discussions address classes of contaminants detected in sediment and surface water in Canal No. 1 that might be associated with Site 4.

7.1.2.1 Dioxins

Between 1968 and 1977, NCBC Gulfport was used by the United States Air Force (USAF) as a storage area for drums containing HO (Site 8). Occasional spills and drum ruptures occurred during storage and handling of the HO. In 1977, remaining drums were drained, rinsed with diesel fuel, drained again, crushed, and then disposed. This is believed to be the primary source of dioxins at NCBC Gulfport. HO is an equal mixture of two agricultural herbicides (2,4-D and 2,4,5-T) in diesel fuel or jet fuel.

Contamination of Site 4 surface and subsurface soils by liquid wastes and/or incineration byproducts with 2,4,5-T and 2,4-D, as well as byproduct contaminants (dioxins and furans) may have occurred.

There are 75 polychlorinated dibenzo-p-dioxin (PCDD) congeners (collectively referred to as dioxins) and each congener differs in the number and positions of chlorine atoms. The toxicological properties of individual congeners vary greatly. The most toxic of the PCDDs is 2,3,7,8-TCDD (Eisler, 2000). All dioxin and furan data in this report are expressed as total TCDD TEQ concentrations. TEQs are used to address the problem of evaluating the toxicity of mixtures of dioxin congeners. The TEQ method assigns a TEF to each compound. This factor denotes a given dioxin compound's toxicity relative to 2,3,7,8-TCDD, which is assigned the maximum toxicity designation of 1.0. Other dioxin compounds are given equal or lower numbers, with each number proportional to its toxicity relative to that of 2,3,7,8-TCDD. The Total TCDD TEQ concentration is the sum of individual TEF multiplied by the concentration of the individual dioxin compounds.

Dioxin has a high octanol-water partition coefficient (log K_{ow}) and a very low solubility in water. The K_{ow} is a measure of the lipophilicity; lipophilic chemicals are more readily absorbed into the blood, while water-soluble chemicals are less rapidly absorbed. For 2,3,7,8-TCDD, the log K_{ow} ranges from 6.4 to 6.95, and the water solubility ranges from 12 to 20 ng/L (USEPA, 1993g). This combination of characteristics means that in soil, sediment, and water, dioxin is primarily associated with particulate and organic matter. Dioxin exhibits little potential for significant leaching or volatilization once sorbed to particulate matter. In general, dioxins become more environmentally and chemically stable with increasing halogen content and exhibit a relative inertness to acids, bases, oxidation, reduction, and heat (Eisler, 2000). Due to the lipophilicity of dioxins, they can accumulate in fat.

7.1.2.2 VOCs

VOCs are poorly adsorbed to soil and sediment particles. Also, because they are very volatile, they typically are detected in surface water, surface soil, and sediment only at low concentrations. VOCs in soil will dissolve in rain water to varying degrees and can be transported overland with runoff or into groundwater. Photolysis and hydrolysis are not significant mechanisms for VOC degradation. Aerobic biodegradation in soil and groundwater is significant, however, and anaerobic degradation can also occur in these media. VOCs do not bioaccumulate in ecological receptors, and therefore, biomagnification through the food chain is not significant. VOCs are typically toxic to ecological receptors only at relatively high concentrations.

7.1.2.3 SVOCs

Most SVOCs detected in Canal No. 1 sediment were PAHs. PAHs are a diverse group of compounds consisting of two or more substituted and unsubstituted polynuclear aromatic rings formed by the incomplete combustion of carbonaceous materials. PAHs are ubiquitous in the modern environment and are common constituents of coal tar, soot, vehicle exhaust, cigarette smoke, certain petroleum products, road tar, mineral oils, creosote, and many cooked foods. PAHs can also be released to the environment through natural sources such as forest fires.

PAHs are transferred from surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photooxidation, chemical oxidation, and microbial metabolism. In soil and sediments, microbial metabolism is the major process for degradation of PAHs (ATSDR, 1989a). Low molecular weight PAHs are relatively soluble and volatile; they may volatilize and photolyze from soil and surface water, and they also may be biodegraded. High molecular weight PAHs tend to be immobile and insoluble, binding strongly to organic matter (reducing the potential for leaching to groundwater), and they are resistant to volatilization, photolysis, and biodegradation (Eisler, 2000).

PAHs vary substantially in their toxicity to aquatic organisms. In general, toxicity increases as molecular weight increases. Uptake of PAHs by aquatic species is highly species-specific, and uptake is higher in algae, mollusks, and other species that are incapable of metabolizing PAHs (Eisler, 2000). The ability of fish to metabolize PAHs may explain why benzo(a)pyrene is frequently not detected or is found at only very low levels in fish from environments heavily contaminated with PAHs. Upper tropic level organisms are primarily exposed to PAHs through diet, but most wildlife can metabolize and excrete PAHs. Vertebrates can readily metabolize PAHs, but lower forms (insects and worms) cannot metabolize PAHs as quickly. Food chain uptake does not appear to be a major exposure source to PAHs for aquatic animals, and food-chain biomagnification of PAHs is typically minimal (ATSDR, 1989a). PAHs may be absorbed by plants but are expected to be translocated, metabolized, and potentially photodegraded. Accumulation within plants is likely to occur only in heavily polluted locations where uptake exceeds metabolism and degradation (Edwards, 1983).

One phthalate (bis[2-ethylhexyl]phthalate) was detected in sediment. Plastic wastes are the major source of phthalates, which are relatively persistent in the environment. Although numerous studies have demonstrated that phthalates undergo biodegradation, this is a slow process. Some microorganisms have been shown to excrete products that increase the solubility of phthalates and enhance their biodegradation (Gibbons and Alexander, 1989). Adsorption onto soils and sediments appears to be a significant sink for phthalates. If released to water, phthalates tend to adsorb strongly to suspended particulate matter within the water column and sediment. Bis(2-ethylhexyl)phthalate is not expected to

significantly volatilize or appreciably leach from soil into groundwater (Spectrum, 2003). Biomagnification of phthalates does not occur.

7.1.2.4 Pesticides

Chlorinated pesticides are highly persistent in the environment, and tend to tightly sorb to organic matter and be immobile in most soils. Degradation of chlorinated pesticides in soil would eventually occur through volatilization, photolysis, and aerobic and anaerobic degradation. Due to the lipophilicity of organochlorine pesticides, they can bioaccumulate in animals. These compounds generally bioconcentrate in lower trophic level organisms and can be transferred and magnified in higher trophic level organisms. Several chlorinated pesticides were detected in sediment in Canal No. 1.

7.1.2.5 PCBs

PCBs include a variety of mixtures of individual biphenyl isomers, each consisting of two joined benzene rings and up to 10 chlorine atoms. Mixtures of these isomers are known by their commercial designation of Aroclor. Only one PCB compound (Aroclor-1260) was detected in sediment in Canal No. 1.

PCBs adsorb strongly to soil particles with adsorption generally increasing with the degree of chlorination. PCBs generally do not significantly leach in aqueous soil systems. PCBs released into water adsorb to sediments and other organic matter. Typically, PCB concentrations are greater in sediment and suspended material than in the water column. Aquatic sediments can act as an environmental reservoir from which PCBs may be released slowly over a long period of time (ATSDR, 1989b). For PCBs that exist in the dissolved state in water, volatilization becomes the primary fate process (USEPA, 1985). Degradation of PCBs in the environment is dependent upon the degree of chlorination. Generally, the more chlorinated the PCB molecule, the more persistent it will be in the environment. Factors that determine biodegradability include the amount of chlorination, concentration, microbial population type, available nutrients, and the temperature (ATSDR, 1989b). Biodegradation of higher chlorinated PCBs (such as Aroclor-1260) occurs very slowly [Hazardous Substance Data Bank (HSDB), 2005]. PCBs can significantly bioconcentrate in aquatic organisms.

7.1.2.6 Metals

Many metals occur naturally in soil, surface water, and sediment due primarily to chemical weathering of rocks. Most metals are toxic to aquatic receptors above certain concentrations, with some metals being more toxic at lower concentrations than others. In addition, different chemical forms of metals are more toxic than others. For example, hexavalent chromium is typically more toxic than trivalent chromium, and methylmercury is more toxic than inorganic mercury. Furthermore, the toxicity of several metals

(aluminum, cadmium, chromium, copper, lead, nickel, silver, and zinc) to aquatic receptors in freshwater systems decreases with increasing water hardness. Factors such as pH, clay content, and organic matter content influence the bioavailability of metals to invertebrates in sediment. In water, most metals tend to adsorb to sediment or to suspended particles in the water column. However, because of dissolution, complexation, and sediment resuspension, metals are often detected in surface water. Arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc have the potential to significantly accumulate in biota (USEPA, 2000c).

7.1.3 Ecotoxicity

Pesticides, PCBs, dioxins, VOCs, SVOCs, and metals were detected in either sediment or surface water samples collected from Canal No.1. The following abstracts from the literature provide general discussions of each group's ecotoxicity.

7.1.3.1 Dioxins

Toxic effects of dioxins in animals appear to be mediated by its binding to a cytoplasmic protein known as the aryl hydrocarbon (Ah) receptor (Eisler, 2000; USEPA, 1993g). The binding of xenobiotic compounds to the Ah receptor is known to disrupt an organism's normal development and functioning. Following binding of dioxin to the receptor protein, the complex is translocated to the cell nucleus where it becomes associated with deoxyribonucleic acid (DNA). The interaction between the protein complex and DNA results in the transcription of one or more target genes. The toxicological effects associated with dioxins result from physiological responses to the presence of these gene products following exposure (USEPA, 1993g).

Demonstrated toxic effects of dioxins in fish, birds, and mammals include mortality, immunotoxicity, weight loss ("wasting syndrome"), reproductive effects (e.g., fetotoxicity, teratogenesis), carcinogenesis, adverse effects on endocrine functions, alterations in lipid metabolism and gluconeogenesis, thymic atrophy, and induction of certain enzyme systems (USEPA, 1993g). Dioxin modulates the activities of a vast array of biochemical pathways including receptors (estrogen, glucocorticoid, epidermal growth factor), hormones, components of intermediary metabolism, transforming growth factor, tumor necrosis factor, metabolic activation/deactivation mechanisms (cytochrome P450 and uridine diphosphate glucuronyltransferase isozymes), inflammation factors, interleukins, and protooncogene expression (Lucier, et al., 1993).

Research indicates the Ah receptor mediates most if not all biological and toxic effects induced by dioxin-like chemicals, and dioxins must bind to the Ah receptor to cause toxicity (Birnbaum, 1994). Amphibians and reptiles are relatively insensitive to dioxins. Although Ah receptor homologs have been identified in

amphibians and primitive fish, their toxicological significance is uncertain. A wide variety of invertebrates including amphipods, daphnids, midges, mosquito larvae, sandworms, oligochaete worms, snails, clams, and grass shrimp are insensitive to dioxin-induced toxicity in long-term exposures (USEPA, 1993g). The insensitivity of invertebrates to dioxin toxicity is consistent with data showing that several invertebrate Ah receptor homologs lack the ability to bind with dioxins (Butler, et al., 2001). Data indicate plants are also relatively insensitive to dioxins (USEPA, 1993g), and the uptake of dioxins by vegetation is considered to be negligible (Eisler, 2000).

7.1.3.2 VOCs

VOCs readily volatilize, are poorly adsorbed to soil and sediment particles, and are typically detected in surface water, surface soil, and sediment only at low concentrations. VOCs do not bioaccumulate in ecological receptors, and their toxicity to ecological receptors is relatively low.

7.1.3.3 SVOCs

Few generalizations can be made about the ecotoxicity of PAHs because of the extreme variability in toxicity and physiochemical properties of PAHs. Adverse impacts to plants from PAHs, however, are rare (Eisler, 2000). In most animal species, PAHs 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 invertebrates, 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). USEPA Region IV considers the potential toxicity of PAHs via the terrestrial food web to be generally negligible unless PAHs are present at extremely high concentrations (i.e., percent levels: 10,000 mg/kg) in soil. Microbial metabolism is the major process for degradation of PAHs in soil (ATSDR, 1997).

Chronic oral exposure to phthalates can 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 may, 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.

7.1.3.4 Pesticides

Organochlorine pesticides are reproductive and nervous system toxins. Although these compounds were used as insecticides, they are toxic to other animals as well. The target organ for acute exposures is 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 fat tissue of organisms such as birds and mammals. They can cause reproductive failure in birds of prey through eggshell thinning and disruption of egg-laying and nesting cycles (Amdur et al., 1991). These pesticides were developed to control insects on crops, and as a result, they are practically non-toxic to plants.

7.1.3.5 PCBs

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 piscivorous birds and mammals that feed on contaminated prey items (Eisler, 2000). Toxicity to aquatic organisms can occur through chronic exposures to PCBs at the ppb level. 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. Mink, for example, are highly sensitive to PCBs. Impacts to mink include anorexia, weight loss, lethargy, reproductive effects, and death (Eisler, 2000). Among sensitive avian species, PCBs disrupt the normal pattern of growth, reproduction, metabolism, and behavior. 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, 1999c).

7.1.3.6 Metals

It is difficult to make generalizations about the toxic actions of metals because of diverse affinities for organic molecules in biological 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). At the molecular level, metal toxicity typically affects enzyme systems, leading to disruption of cellular transport, cellular respiration, cell division, and other physiological processes. Metal toxicity to aquatic organisms is marked by a broad spectrum of effects that can range from reduced growth to death. Aquatic organisms are most sensitive to metal toxicity in the embryonic and larval stages of the life cycle.

7.1.4 Complete Exposure Pathways

Sediment invertebrates and fish are exposed to sediment and surface water contaminants through ingestion and direct contact. Higher trophic level animals such as birds and mammals may be exposed to site-related contamination through ingestion of contaminated food items and water. These animals may also incidentally ingest contaminants in sediment while preening feathers or feeding on items to which sediment has adhered. Absorption of contaminants from the gastrointestinal tract is the primary pathway of intake for upper trophic level receptors. Exposure to contaminants in sediment and surface water through dermal contact could occur but is unlikely to represent a major exposure pathway because feathers and chitinous exoskeletons minimize transfer of contaminants across dermal tissue. Airborne transport is a negligible pathway for aquatic receptors, consequently the inhalation pathway is not significant.

Actual or potential exposures of ecological receptors are determined by identifying the most likely pathways of contaminant release and transport. 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 an ecological receptor. As explained in Step 1 of USEPA's ERA guidance (USEPA, 1997a), if an exposure pathway is not complete, that exposure pathway does not need to be evaluated. Amphibians have a potentially complete pathway, but toxicological data regarding oral doses are not sufficient for their inclusion in the analyses. In summary, complete exposure pathways and routes of entry into aquatic biota at Site 4 consist of:

- Direct contact with sediment
- Ingestion of sediment
- Direct contact with surface water
- Ingestion of surface water
- Ingestion of contaminated food items

Because surface soil from Site 4 will not be incorporated into the low permeability cap that will be used to cover the site, further ecological screening was not conducted.

7.1.5 Preliminary Assessment and Measurement Endpoints

USEPA Region IV has specified that assessment endpoints for the screening-level assessment should be broad and generic. For the screening level assessment, the preliminary assessment endpoint is the protection of aquatic biota from adverse effects of chemicals on their growth, survival, and reproduction. Measurement endpoints represent the assessment endpoints chosen for a site, and are measures of biological effects (USEPA, 1997a). The preliminary measurement endpoints were chemical

concentrations in sediment and surface water that are associated with no adverse effects on growth, survival, and reproduction of aquatic organisms. The measurement endpoints are represented by USEPA Region IV ESVs for sediment and surface water.

The USEPA Region IV ESVs for sediment and surface water 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 IV considers their ESVs to be protective of aquatic invertebrates, fish, and plants as well as upper level receptors such as birds and mammals. In the SLERA, therefore, a distinction is not made between measurement endpoints associated with direct toxicity to invertebrates, fish, and plants versus measurement endpoints associated with food chain effects.

7.2 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

For the SLERA, maximum concentrations of chemicals detected in sediment and surface water were compared to USEPA Region IV ESVs (USEPA, 2001a). If the maximum concentration was less than the ESV, the chemical was eliminated from further consideration. If the maximum concentration equaled or exceeded the ESV, or if an ESV was not available, the chemical was then considered to be an ecological COPC and was retained for further study in the ERA.

The surface water ESVs for lead and zinc were derived using equations provided by USEPA (2004a) for hardness-dependent metals. The surface water hardness (56.8 mg/L) was calculated using the average calcium and magnesium concentrations from all three surface water samples.

7.3 SCREENING-LEVEL EXPOSURE ESTIMATE

Exposure point chemical concentrations were obtained from sediment and surface water samples collected from Canal No. 1 in August 2004 and from surface soil samples collected from the landfill in June 2007. The full data sets are presented in Tables 7-1, 7-2, and 7-3.

The sediment data base consisted of eight samples (and one duplicate sample) collected from Canal No. 1. Figure 2-3 illustrates where sediment samples were collected. It should be noted that dioxin analyses were performed only on the most upstream (04SD0801) and downstream (04SD0101) sample locations.

The surface water data base consisted of three samples (and one duplicate sample) collected from Canal No. 1. Figure 2-3 illustrates the locations of the surface water samples.

The surface soil data base consisted of six samples collected from across the landfill area. Figure 2-3 illustrates the locations of the surface soil samples.

All analytes (except calcium, magnesium, potassium, and sodium) detected in sediment and surface water samples were assessed in this investigation. Calcium, magnesium, potassium, and sodium were excluded because they are essential nutrients that are toxic only at extremely high concentrations. Due to the scarcity of data for these essential nutrients, it was not possible to develop ranges of toxicity for them, even at high concentrations.

7.4 SCREENING-LEVEL RISK CALCULATION

The preliminary risk calculation step compared maximum concentrations of chemicals in sediment and surface water to USEPA Region IV ESVs. The ratio of the maximum concentration to the ESV is called the screening HQ. Analytes whose maximum concentrations did not exceed ESVs (i.e., HQ < 1.0) were dropped from further consideration, and those that equaled or exceeded ESVs (i.e., HQ $\geq$ 1.0), or did not have ESVs, were retained as ecological COPCs.

7.4.1 Sediment

In sediment, four pesticides (4,4'-DDD, 4,4'-DDT and alpha and gamma chlordane) were retained as COPCs because their maximum concentrations exceeded screening values (Table 7-4). The PCB Aroclor-1260 was also retained as a COPC because its maximum concentration exceeded its screening value. Thirteen VOCs were retained as COPCs because ESVs were not available. Seven PAHs (benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, phenanthrene, pyrene) were retained as COPCs because their maximum concentrations exceeded ESVs, while four other PAHs were retained as COPCs because ESVs were not available. One phthalate (bis[2-ethylhexyl]phthalate) was retained as a COPC because the maximum concentration exceeded its screening value. The remaining semivolatile compounds including carbazole and dibenzofuran were retained as COPCs because ESVs were not available.

2,3,7,8-TCDD was retained as a COPC because its maximum concentration (expressed as the TEQ) exceeded its screening value. Nine metals (aluminum, barium, beryllium, cobalt, iron, manganese, selenium, thallium, vanadium) and cyanide were included as COPCs because ESVs were not available. Lead was the only metal retained as a COPC in sediment because its maximum concentration exceeded its ESV.

7.4.2 Surface Water

In surface water, one VOC (acetone) was retained as a COPC because its maximum concentration exceeded its screening value (Table 7-5). Two VOCs were retained as COPCs because ESVs were not available. Iron, lead, and cyanide were retained as COPCs because their maximum concentrations exceeded screening values. Barium and manganese were included as COPCs because ESVs were not available.

7.4.3 Surface Soil

In surface soil, two PAHs (fluoranthene and pyrene) were reported to exceed screening values. Two pesticides [dieldrin and delta benzene hexachloride (BHC)] also exceeded screening values. Copper, lead, vanadium, and zinc had maximum reported concentrations that exceeded screening values. Concentrations of the analytes in surface soil were less than human health screening criteria. Because exposure to the existing surface soil will be prevented by the installation of the low permeability cap, further evaluation of ecological risk from exposure to surface soil was not conducted.

7.5 REFINEMENT OF PRELIMINARY COPC

At this point, the first two steps of the ERA have been completed. The ERA process includes a series of scientific/management decision points (SMDPs) (USEPA, 1997c). The first SMDP occurs at the end of Step 2, 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, USEPA Region IV recognizes that most ERAs will proceed into Step 3, and facilities are encouraged to submit the results of Steps 1-3 as a single deliverable document (USEPA, 2000b). With this in mind, and since the SLERA indicates a potential for adverse effects, a more thorough assessment is warranted. Therefore, the risk assessment process for Site 4 will proceed into Step 3 (Baseline Risk Assessment Problem Formulation).

7.6 PROBLEM FORMULATION

The baseline ERA begins with a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process (USEPA, 1997a and DON, 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 (i.e., plants, invertebrates, fish, and wildlife receptors). Examples of factors considered during Step 3A include toxicological evaluation of COPCs, spatial distribution of contaminants, food-chain modeling, and habitat quality (USEPA, 1997a and DON, 1999).

Food-chain modeling was conducted to investigate potential risks to representative aquatic receptors from ingested doses of sediment and surface water COPCs that are known to bioaccumulate or biomagnify (USEPA, 2000c) *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. USEPA Region IV does not consider PAHs to bioaccumulate unless they are present in percent levels in sediment. The 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 E.

The assessment endpoints associated with the food-chain modeling were the protection of piscivorous birds and mammals from adverse effects of COPCs on 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 aquatic and sediment dwelling organisms (e.g., crayfish, frogs). Piscivorous birds at and near NCBC Gulfport include wading birds such as herons and egrets. Piscivorous mammals include the river otter and mink. 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 can be exposed to and accumulate site-related contaminants that have accumulated in prey items. This would be especially applicable for contaminants such as dioxins, organochlorine pesticides, and certain metals. The associated measurement endpoints were doses of COPCs associated with adverse effects on growth, survival, and reproduction of these receptor groups.

As previously discussed, Site 4 and its surroundings provide limited habitat suitable for upper trophic level aquatic receptors. For this analysis, representative semi-aquatic wildlife species were identified for evaluation based on potential presence in the Gulfport area, and piscivorous dietary preferences. Receptor species were also selected on the basis of their small body size, their ecological importance, and the availability of life history data. Smaller body size typically results in a relatively higher contaminant dose, making the modeling more conservative and protective of other species. The mink was selected to represent piscivorous mammals and the kingfisher and green heron were selected to represent piscivorous birds. A discussion of the representative receptors selected for food chain modeling is included in Appendix E.

A site conceptual exposure model is designed to diagram 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 Site 4 are shown schematically in Figure 2-1. These pathways describe the movement from sources of contamination to potential ecological receptors; the linkage of these items is the conceptual site model. The groundwater pathway is probably minimal due to the introduction of the activated carbon traps that intercept the contamination present in

groundwater before it enters Canal No. 1, but is conservatively assumed to be complete as shown in Figure 2-1.

The sources of waste material shown in Figure 2-1 consist of liquid and solid wastes disposed of and backfilled incineration byproduct at Site 4, and contaminants from other sources at NCBC Gulfport. The major contaminant transport pathway is believed to have historically been associated with storm water runoff from Site 4 and other aspects of NCBC. After being introduced into surface water or sediment, contaminants are taken up by aquatic and benthic organisms. Mammals and birds consume these organisms.

7.6.1 Results of Food-Chain Modeling

Based on maximum concentrations and conservative assumptions, food chain HQs exceeded 1.0 for two pesticides: 4,4'-DDT, and 4,4'-DDD (hereafter referred to as DDT and DDD respectively) and the PCB Aroclor-1260. Additionally, food chain HQs exceeded 1.0 for dioxin (expressed as 2,3,7,8-TCDD TEQ) and lead (Table 7-6).

Based on the average concentration scenario, food chain HQs exceeded 1.0 for DDT and dioxin (Table 7-7).

7.6.2 Step 3a Discussion

The results of the screening level assessment and Step 3a considerations are discussed on a COPC-specific basis.

7.6.2.1 VOCs

Thirteen VOCs were retained as COPCs in sediment because ESVs were not available. None of these chemicals are expected to be toxic via the food chain. The majority of VOCs were detected in 1 of 8 or 2 of 8 samples except for 2-butanone (7 of 8), acetone (8 of 8), carbon disulfide (7 of 8), and trichlorofluromethane (7 of 8). Acetone and 2-butanone are known common laboratory contaminants. The toxicity of acetone to animals is in the parts-per-thousand range (Opresko, 1995). Carbon disulfide occurs naturally in sediments since it is a natural product of anaerobic biodegradation. Worldwide, at least 40 percent and possibly as much as 80 percent of releases are a result of natural or biogenic activity (IPCS, 2002). Carbon disulfide is also a laboratory contaminant associated with extraction methods used for sample preparation prior to analysis. There is uncertainty regarding the results for trichlorofluoromethane. Non-detected values ranged from 0.006 to 0.11 mg/kg which is greater than the

reported maximum detected value. All other reported concentrations were less than the reported detection limits.

The presence of a chlorinated solvent plume at Site 4 raises concerns regarding potential impacts to Canal No.1 through groundwater seeps. Few sediment screening benchmarks were identified for chlorinated solvents. An apparent effects level (AET) of 0.041 mg/kg in marine sediment was identified for TCE (Buchman, 1999). TCE was detected in 1 of 8 samples at a concentration of 0.001, below the AET. AETs for freshwater sediment were not available. AETs are equivalent to the concentration in the highest non-toxic sample in a dataset, and represent the concentration above which adverse biological effects would be expected to occur (Buchman, 1999). VOCs are typically toxic to ecological receptors only at relatively high concentrations, and the data from Site 4 do not appear to be excessively elevated. Although toxicity data are sparse regarding their effects to invertebrates, the presence of these chemicals at relatively low concentrations in Canal No. 1 sediment probably poses negligible or minor risk.

Acetone was the only VOC COPC identified in surface water because an ESV was not available. As discussed regarding sediment, acetone in surface water is not anticipated to represent a significant risk to aquatic receptors.

7.6.2.2 SVOCs

Seven SVOCs (benzaldehyde, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, dibenzofuran, and ideno(1,2,3-cd)pyrene) were retained as COPCs in sediment because ESVs were not available. Benzaldehyde, benzo(b)fluoranthene, carbazole, dibenzofuran, and ideno(1,2,3-cd)pyrene were each detected in only 1 of 8 samples. There is uncertainty in the results for benzaldehyde, carbazole, dibenzofuran, and ideno(1,2,3-cd)pyrene as they were reported at concentrations well below the lowest reported detection limit. Benzo(g,h,i)perylene and benzo(k)fluoranthene were detected in 2 of 8 samples; however, one of the two samples for each compound were reported at concentrations much lower than the reported detection limit. While toxicity guidelines are sparse for these sediment COPCs, they are not thought to be associated with highly elevated levels of potential risk.

Maximum screening HQs of seven PAHs (benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, phenanthrene, and pyrene) exceeded 1.0, but were relatively low (2.4 to 6.0). Because of this, and since the toxicity of PAHs via the aquatic food web is negligible at the concentrations measured at Site 4, PAHs appear to pose negligible risk at the site.

Bis(2-ethylhexyl)phthalate was retained as a COPC because the maximum detected concentration exceeded its screening value. Bis(2-ethylhexyl)phthalate was only detected in 1 of 8 samples

(04SD0401). Phthalates are common environmental contaminants due to their use in plastics. Phthalates can also be an artifact of the sampling and/or analytical methods. Ecotoxicity data for plants and invertebrates could not be located, but phthalates have a low acute toxicity to animals and would pose negligible risk to animals via the food chain at the concentrations measured in Canal No. 1 sediment.

7.6.2.3 Pesticides

All pesticide COPCs at Site 4 are organochlorine insecticides that are no longer used but are known to be extremely persistent in the environment. Maximum screening HQs in sediment ranged from 1.67 for DDT to 218 for gamma-chlordane (Table 7-4). DDT and its breakdown product DDD were detected in 2 of 8 samples while gamma-chlordane was detected in 1 of 8 samples. This indicates that potential risk to benthic invertebrates may be spatially limited. To characterize potential risk to benthic organisms, detected concentrations were compared to additional screening guidelines. Numerous sediment guidelines are available for pesticides, encompassing a wide range of values. MacDonald et al (2003) reviewed and evaluated eight separate approaches to support the establishment of guidelines protective of sediment dwelling organisms in Florida inland waters. Based on the results of that evaluation, threshold effect concentrations (TECs) and probable effect concentrations (PECs) were developed and are used by the State of Florida Department of Environmental Protection (FDEP) to evaluate risk to sediment dwelling organisms in inland (fresh water) systems. Although developed for Florida fresh water sediments, the MacDonald et al (2003) values are often used to evaluate fresh water sediments in other states, especially when those states have not developed their own TECs and PECs. The TECs identify sediment concentrations below which adverse effects on sediment-dwelling organisms are unlikely to occur, while the PEC values indicate sediment concentrations above which adverse effects on sediment-dwelling organisms are likely to occur (MacDonald et al., 2003). Sediment samples with concentrations between the TEC and PEC are neither predicted to be toxic nor nontoxic. However, sediments which have concentrations of one of more COPCs between the TECs and PECs should be considered to be of moderate priority, while sediments with COPC concentrations in excess of one or more PECs should be considered to be of relatively high concern (MacDonald et al, 2003). Furthermore, the magnitude and frequency of exceedances of the PECs provide a basis for assigning relative priority to areas of concern with respect to contaminated sediments (MacDonald et al, 2003).

The following discussion of pesticide COPCs at Site 4 refers to the TECs and PECs, which are summarized in Table 7-8. The TECs and PECs were derived based on adverse effects to sediment dwelling organisms, and are not meant to be used to evaluate risk to upper level receptors such as birds and mammals.

As can be seen in Table 7-8 the maximum concentration of DDD and DDT are between the TEC and PEC. The mean concentrations of both DDD and DDT are below the TEC. The maximum concentration of gamma-chlordane exceeds the PEC for chlordane in one sample (04SD0801) which is the most upstream sample. This indicates potential isolated adverse impacts to benthic invertebrates. There is uncertainty associated with samples where concentrations were between the TEC and the PEC; as occurred for DDD and DDT.

All pesticide food chain HQs were less than 1.0 for piscivorous mammals represented by the mink. Thus, based on maximum concentrations and conservative assumptions, and assuming that mink forage exclusively at Canal No 1 at Site 4, the sediment data indicate that pesticides pose no potential risk to piscivorous mammals represented by the mink.

For avian receptors, food chain HQs exceeded 1.0 for DDD and DDT in both the conservative scenario and the average scenario (Tables 7-6 and 7-7). All other pesticides had food chain HQs less than 1.0 for avian receptors under both conservative and average scenarios. The food chain HQs shown in Table 7-6 are based on maximum detected concentrations. Birds actually forage over large areas, so average concentrations more closely approximate the concentrations to which these receptors would be exposed. In the average scenario (Table 7-7), only the no-observed-adverse-effects level (NOAEL)-based HQs for DDT was greater than or equal to 1.0 (1.1 for kingfisher and 1.2 for the green heron). All lowest-observed-adverse-effects level (LOAEL)-based HQs were less than 1.0 (Table 7-7). There is uncertainty inherent in the NOAEL-based HQs for DDT and its metabolites. A NOAEL was not derived in the toxicity test in which the avian LOAEL was derived (Appendix E), so the LOAEL was divided by 10 to derive an estimated NOAEL. Therefore, the actual toxicity threshold concentration might be greater or less than the estimated NOAEL.

As previously discussed, DDD and DDT were detected in only 2 of 8 and 1 of 8 samples respectively. DDD and DDT were detected in sample 04SD0401, while only DDD was detected in 04SD0501. These two samples are located in a central reach of Canal No. 1 near a green and between two golf bridges, and were only about 30 feet apart. The habitat in this area is considered marginal for the kingfisher and heron. Activities associated with the golf course may additionally discourage feeding in this area. Foraging by birds and mammals would be more likely to occur at locations downstream of the site than in more developed areas. The conservative food chain models presume that all representative species forage exclusively at Canal No.1 (i.e. Area Use Factor equals 1). Based on the size and quality of the habitat previously discussed, it is highly unlikely that these receptors receive the majority of their diet from this location. Area Use Factors (AUFs) are derived in Appendix E and provide an estimate of the time the selected receptors may spend at the site based on their home ranges. Application of the AUFs to risk estimates for exposure to pesticides results in HQs less than 1.0. In the kingfisher: for DDT (0.13 x 2.8 =

0.36) and for DDD (0.13 x 1.2 = 0.16). In the green heron: for DDT (0.05 x 2.8 = 0.14), and for DDD (0.05 x 1.2 = 0.06). Because of this, available data indicate that pesticides will pose negligible risk to piscivorous birds represented by the kingfisher and green heron.

7.6.2.4 PCBs

Potential risks to benthic invertebrates from exposure to PCBs (Aroclor-1260) were identified in sediment. The maximum screening HQ was 7.3. The highest PCB concentrations were found at upstream sampling locations on the southwest portion of the site (04SD0401, 04SD0501, 04SD0601, and 04SD0801). Concentrations at these locations all exceeded the ESV of 33 µg/kg with a range of 46 – 160 µg/kg. To further evaluate potential risks to benthic organisms, the detected concentrations were compared to the TEC and PEC guidelines for Aroclor-1260. The concentration in one sample (04SD0401) was below the TEC. All other detected concentrations were between the TEC and PEC. There is uncertainty associated with samples where concentrations are between the TEC and the PEC as they are neither predicted to be toxic nor nontoxic. All concentrations were well below the PEC of 680 µg/kg.

Based on the maximum detected PCB concentration in sediment (0.24 mg/kg) and conservative exposure assumptions, the NOAEL-based HQ for piscivorous mammals represented by the mink was greater than 1.0 (HQ = 2.38, Table 7-6). The LOAEL-based HQ was less than 1.0 (0.5) under the conservative scenario. In the average scenario, the NOAEL-based and LOAEL-based HQs were both less than 1.0 (0.2 and 0.04 respectively, Table 7-7). The food chain HQs are based on the receptors foraging exclusively at the site (AUF = 1.0). Assuming an AUF of 0.17 for the mink (Appendix E) in the conservative scenario, the NOAEL-based HQ would be 2.38 × 0.17 = 0.4. Because of this, available data indicate that PCBs will pose negligible risk to piscivorous mammals represented by the mink.

Based on the maximum detected dioxin concentration in sediment (0.24 mg/kg) and conservative exposure assumptions, the NOAEL-based HQ for piscivorous birds was 2.3 for both the kingfisher and the green heron (Table 7-6). The LOAEL-based HQ was 0.2 for both the kingfisher and green heron. All piscivorous bird HQs were less than 1.0 for PCBs in the average scenario (Table 7-7). When AUFs are incorporated into the conservative analysis, the HQ for the kingfisher is 0.13 x 2.3 = 0.3 and for the green heron is 0.05 x 2.3 = 0.12. Thus, available data indicate that PCBs will pose negligible risk to piscivorous birds represented by the kingfisher and green heron.

7.6.2.5 Dioxins

Potential risks to benthic invertebrates from exposure to dioxin were identified in sediment. The maximum screening HQ was 12.2. The highest 2,3,7,8-TEQ concentration (30.5 ng/kg) and number of dioxin congeners was detected in the most upstream sample (04SD0801). There is uncertainty regarding

the extent of potential risk due to the distance between the two samples collected (approximately 725 feet). It should be noted that the 2,3,7,8-TEQ concentration (3.4 ng/kg) in the downstream sample (04SD0101) is approximately nine times lower than the upstream sample. Although USEPA Region IV uses 2.5 ng/kg as a sediment screening value (USEPA, 2001a) and considers the value to be protective of benthic invertebrates, the number was actually derived using a conservative approach to estimate risks to mammals whose diets consists solely of dioxin-contaminated aquatic organisms (USEPA, 1993g). Thus, sediment concentrations greater than 2.5 ng/kg do not necessarily indicate risk to sediment invertebrates. As discussed in Section 2.1.4.1, many invertebrate species are insensitive to dioxins in long-term exposures.

Dioxin was detected in 1 of 3 surface water samples and was found at a concentration below the USEPA Region IV ESV.

Based on the maximum detected dioxin concentration in sediment (30.5 ng/kg) and in surface water (4.9 pg/L) and conservative exposure assumptions, the NOAEL-based HQ for piscivorous mammals represented by the mink was greater than 1.0 (HQ = 14.5, Table 7-6). The LOAEL-based HQ was also greater than 1.0 (1.4) under the conservative scenario. In the average scenario, the NOAEL-based HQ for piscivorous mammals represented by the mink was 2.2, and the LOAEL-based HQ was 0.2 (Table 7-7). The food chain HQs are based on the receptors foraging exclusively at the site (AUF = 1.0). Assuming an AUF of 0.17 for the mink (Appendix E) in the average scenario, the NOAEL-based HQ would be 2.2 × 0.17 = 0.37, and the LOAEL-based HQ would be 0.2 × 0.17 = 0.034. Because of this, available data indicate that dioxins will pose negligible risk to piscivorous mammals represented by the mink.

Based on the maximum detected dioxin concentration in sediment (30.5 ng/kg) and in surface water (4.9 pg/L) and conservative exposure assumptions, the NOAEL-based HQ for piscivorous birds was 1.3 for both the kingfisher and the green heron (Table 7-6). The LOAEL-based HQ was 0.1 for both the kingfisher and green heron. All piscivorous bird HQs were less than 1.0 for dioxin in the average scenario (Table 7-7). When AUFs are incorporated into the conservative analysis, the HQ for the kingfisher is 0.13 x 1.3 = 0.17 and for the green heron is 0.05 x 1.3 = 0.07. Thus, available data indicate that dioxins will pose negligible risk to piscivorous birds represented by the kingfisher and green heron.

7.6.2.6 Metals

Lead was the only metal retained as a COPC in sediment because its maximum concentration exceeded its ESV, but the maximum lead HQ (1.4) was relatively low. A review of Table 7-8 indicates that the maximum concentration of lead falls between the TEC and PEC but the mean concentration is less than the TEC. There is uncertainty associated with samples when concentrations are between the TEC and

the PEC; however, adverse impacts from lead to benthic invertebrates would not be expected based on the mean concentration. Only 2 of 8 sediment samples had lead concentrations in excess of the Region IV ESV and the TEC. This indicates that any potential risks to benthic organisms would appear to be spatially limited.

No USEPA Region IV ESV is available for barium; however, a TEC and PEC are available (Table 7-8). The maximum and mean concentrations of barium fall between the TEC and PEC. A review of the data indicates 6 of 8 samples had concentrations between the TEC and PEC. No samples exceeded the PEC.

No USEPA Region IV ESV is available for cobalt however a TEC is available (Table 7-8). The maximum and mean concentrations of cobalt were less than this TEC. This would indicate that adverse effects associated with exposure to cobalt are unlikely to occur.

There were no Region 4 ESVs, TECs, or PECs for aluminum, beryllium, iron, manganese, selenium, thallium, and vanadium, precluding an evaluation of risk from these metals to benthic receptors AETs expressed as percentages were identified for aluminum and iron. The AET for aluminum (1.8 percent) corresponds to 18,000 mg/kg, while the AET for iron (22 percent) corresponds to 220,000 mg/kg. Only 1 of 8 samples (04SD0401) had an aluminum concentration (16,800 mg/kg) that exceeded the AET. None of the samples had iron concentrations in excess of the AET. As previously discussed, even though AETs for freshwater sediment are not available, they provide an estimate of concentrations above which adverse biological effects would be expected to occur (Buchman, 1999). Aluminum and iron are typically toxic at only very high or very low pH. Based on the near neutral average pH measured in Canal No. 1 surface water (6.6) these metals should not be bioavailable and adverse effects are not anticipated.

There is uncertainty associated with those chemicals for which no screening guidelines could be identified (beryllium, manganese, selenium, thallium, and vanadium). These chemicals were found at relatively low concentrations including beryllium (0.07 to 0.21 mg/kg), manganese (7.2 to 38 mg/kg), selenium (0.6 to 0.78 mg/kg), thallium (0.73 to 0.76 mg/kg), and vanadium (5.6 to 27.5 mg/kg). Beryllium, manganese, and vanadium were detected in the majority of samples while selenium was detected in only 3 of 8 samples and thallium in 2 of 8 samples.

Iron, lead, and cyanide were retained as COPCs in surface water because their maximum concentrations exceeded screening values. Lead was detected in only 1 of 3 samples in excess of its ESV. The other two samples were non-detected for lead. The screening value for iron of 1,000 mg/L is based primarily on field observation of cold water species. The criteria rationale notes that variations in ambient surface water conditions including alkalinity, hardness, pH, temperature, and the presence of ligands may affect the solubility and ultimately the toxicity of the metal (USEPA, 1976). As previously discussed, the

potential for adverse effects from iron is considered low at the average pH measured in Canal No. 1. Cyanide was detected in one sample (04SW0301) at a concentration (3.9 mg/L) that is less than the ESV (5.2 mg/L). The sample with the maximum reported concentration (6.4 mg/L) used in the screening was a duplicate (04SW0101D). The original sample (04SW0101) was non-detected for cyanide at a higher concentration (10 mg/L) adding uncertainty to the duplicate result. Using one-half the detection limit for the non-detected sample (5 mg/L) and averaging this value with the duplicate concentration yields an average concentration of 5.7, only slightly above the ESV.

Barium and manganese were included as surface water COPCs because ESVs were not available. The absence of background data precludes an evaluation of the extent that these concentrations are related to NCBC Gulfport versus natural conditions.

Based on maximum concentrations and conservative assumptions, and assuming that mink forage exclusively at Canal No 1 at Site 4, food chain HQs were less than 1.0 for all metals (Table 7-6). Thus, the sediment and surface water data indicate that metals pose no potential risk to piscivorous mammals represented by the mink.

Based on maximum concentrations and conservative assumptions, and assuming that avian receptors forage exclusively at Canal No. 1 at Site 4, food chain HQs associated with exposure to lead were greater than 1.0 for the kingfisher and green heron (Table 7-6). No LOAEL-based HQs were greater than 1.0 under the conservative scenario. An evaluation of the average scenario (Table 7-7) indicates that no risks were predicted for either the kingfisher or green heron. As previously discussed, based on the foraging habits of birds average concentrations may provide a better estimate of potential concentrations to which they may be exposed. Incorporation of AUFs in the conservative scenario reduce the HQs for the kingfisher to 0.13 x 3.9 = 0.50, and for the green heron to 0.05 x 3.9 = 0.2. Consequently, potential risk to avian receptors from metals is considered minimal.

7.7 UNCERTAINTY

Uncertainty is associated with all aspects of the ecological assessment methodology presented in the preceding sections. This section provides a summary of the uncertainties.

7.7.1 Uncertainty in the Problem Formulation

Probably the primary uncertainty in this risk assessment is the extent that wildlife receptors forage at Site 4. The site provides poor habitat, and as a result, significant foraging probably does not occur at the site. Risk to piscivorous receptors was evaluated as a conservative measure, but under current habitat

conditions, the food chain HQs are believed to grossly overestimate risk at the site. The precise extent of overestimation is uncertain.

Another uncertainty associated with Site 4 is the choice of representative receptors. The mink was selected to represent small mammals that consume fish, but the site provides very little cover in which these timid animals can hide. Under current habitat conditions, the food chain HQs for mammals represented by the mink are believed to grossly overestimate risk to piscivourous mammals. Kingfishers and herons have been identified at downstream creeks and bayous including Turkey Creek (HLA, 2001) but these species and other piscivorous birds probably do not forage at Site 4 to any significant extent. Therefore, the food chain HQs for birds represented by the kingfisher and green heron are believed to overestimate risk to piscivorous birds.

7.7.2 Uncertainty in the Ecological Effects Characterization

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

Data for investigating toxicity to reptiles and amphibians from oral ingestion of contaminants are sparse. Thus, potential risks via the food chain were not evaluated for reptiles and amphibians.

7.7.3 Uncertainty in the Exposure Assessment

Detection limits for some non-detected pesticides and PAHs in sediment exceeded ESVs in all samples (Table 7-2). While the high detection limits prevents a complete evaluation of the presence of pesticides and PAHs in these samples, the overall impact of this uncertainty is not considered significant. The use of one-half the detection limit for non-detected chemicals when calculating totals and averages may lead to overestimates of potential risk.

The dermal exposure for upper-level receptors was not evaluated, potentially underestimating risks. However, this exposure route is usually miniscule.

Literature-based bioaccumulation factors used in food-chain modeling often vary between species and sites. This can overestimate or underestimate potential risks.

The assumption that the selected receptors are present at Site 4 and that they receive 100 percent of their food from the site is considered to grossly overestimate potential risk. Application of AUFs helps to reduce this uncertainty.

7.7.4 Uncertainty in the Risk Characterization

This uncertainty results from the combination of the above uncertainties. For example, the assessment of risks to upper-level receptors via the food chain is hindered by uncertainties such as the derivation of the toxicity reference values, the process used to derive bioaccumulation factors, and the choice of the best species to represent mammal and bird receptors. A weight of evidence approach to assess risks was used to reduce the overall uncertainty in these situations.

Uncertainty in risk characterization also results from the lack of data regarding the toxicity of multiple chemicals. For example, detectable concentrations of multiple pesticides were identified at several locations. The extent to which these concentrations might contribute to cumulative toxicity is uncertain.

7.8 SUMMARY AND CONCLUSIONS

Concentrations of a number of contaminants in Canal No.1 sediment and surface water were elevated above conservative screening levels and associated with potential risk to ecological receptors. The detected contaminants, while possibly associated with Site 4, may also have been transported from other areas of NCBC Gulfport via storm water runoff through ditches that connect to Canal No.1. When conservative assumptions used in the ERA are re-evaluated and factors that affect potential exposures such as quality and size of the habitat, and actual use of the site by modeled receptors are considered, the overall level of ecological risk associated with the cited contamination in Canal No. 1 is considered to be minimal. The following conclusions are discussed by the groups of chemical contaminants identified at Site 4.

There is uncertainty associated with risk estimates to aquatic receptors from VOCs due to an absence of screening values. VOCs are typically toxic at relatively high concentrations so the low concentrations of VOCs appear to pose negligible risks to benthic invertebrates, fish, and aquatic plants.

SVOCs appear to pose negligible to minor risk to benthic invertebrates and fish at Site 4.

Organochlorine pesticides including DDT, DDD, and gamma chlordane are present in a limited number of sediment samples at levels associated with potential risk to benthic invertebrates and fish. Any risk is considered to be spatially limited based on the frequency of detection. Comparison of the detected concentrations to TEC and PEC guidelines showed that all DDD and DDT results were between the TEC

and PEC; however, the maximum concentration of gamma-chlordane exceeded the PEC indicating potential concern for adverse effects. These pesticides are no longer used but are known to be extremely persistent.

Organochlorine pesticides can bioaccumulate and biomagnify in the food chain. A food chain model using the mink to represent piscivorous mammals found no potential risk from pesticides at Site 4. Food chain models for piscivorous birds represented by the kingfisher and green heron indicated HQs greater than 1.0 from DDD and DDT in both conservative and average analyses. When AUFs are used in the risk equations to represent the proportion of time receptors are exposed to contamination at the site, no risk is estimated. Site 4 does not provide quality habitat for these receptors and is located between a golf course and a developed portion of NCBC Gulfport. Based on these conclusions, potential risk to piscivorous birds from pesticides at Site 4 is considered negligible.

Four of eight sediment samples had PCB concentrations in excess of the USEPA Region IV ESV and three of these samples had concentrations between the TEC and PEC. No concentrations above the PEC were found. PCBs appear to pose minor risk to benthic invertebrates and fish at Site 4.

Based on maximum concentrations and conservative scenarios, food chain HQs were greater than 1.0 for PCBs for piscivorous mammals and birds. Analysis of the average scenario indicated no potential risk. All food chain HQs were less than 1.0 when AUFs are incorporated into the conservative scenarios. Based on this information, negligible risk to piscivorous mammals and birds from PCBs is expected.

The maximum concentration of dioxin (expressed as the 2,3,7,8-TEQ) exceeded the USEPA Region IV ESV. The NCBC Navy Partnering Team and the MDEQ previously identified a RBC for dioxin remediation at the Off-base Area of Concern (TtNUS, 2005) and concluded that “dioxin contamination remaining after remediation based on a sediment remediation goal of 38 ng/kg will pose minimal risk to sediment/soil-associated organisms.” The highest detected concentration at Site 4 (30.4 ng/kg expressed as the 2,3,7,8-TEQ) is less than this MDEQ Tier 1 TRG. Based on this information, minimal risk to benthic invertebrates and fish from exposure to dioxin is expected in Canal No. 1 sediment.

No risks to fish or aquatic plants associated with exposure to dioxin in surface water were identified.

Based on maximum concentrations and conservative scenarios, dioxin food chain HQs were greater than 1.0 for piscivorous mammals and birds. Risk was estimated for piscivorous mammals represented by the mink using the average scenario but, no risk was estimated for piscivorous birds. All HQs were less than 1.0 when AUFs are incorporated into the conservative scenarios. Based on this information, negligible risk to piscivorous mammals and birds from dioxin is expected.

Concentrations of lead in sediment exceeded its ESV in 2 of 8 samples indicating any potential risk is spatially limited. The maximum concentration of lead fell between the TEC and PEC; however, the mean concentration was less than the TEC. There is uncertainty associated with metals for which no screening guidelines could be identified. Considerations of site-specific factors such as pH indicate potential low bioavailability and consequently low potential risks for aluminum and iron. Several metals such as beryllium, manganese, and vanadium were detected in the majority of the sediment samples collected. In the absence of background data, it is difficult to conclude whether these concentrations are site-related or reflective of natural conditions. None of the metals were detected at exceedingly high concentrations; consequently they are not anticipated to be associated with elevated levels of potential risk to benthic invertebrates.

Several metals exceeded their respective USEPA Region IV ESVs for surface water. However, based on the low concentrations detected as well as the measured pH, potential risks to fish and aquatic plants are considered to be negligible.

Food chain models for piscivorous birds represented by the kingfisher and green heron indicated NOAEL HQs greater than 1.0 (but LOAEL HQs less than 1.0) from exposure to lead in the conservative analysis. All HQs were less than 1.0 in the average scenario analysis. All HQs were less than 1.0 when AUFs are incorporated into the conservative scenarios. Based on this information, minimal risk to piscivorous birds from lead is expected.

8.0 SUMMARY AND CONCLUSIONS

The primary objective of the RI is to provide data to evaluate the current environmental conditions and guide the selection of a remedy that is protective of human health and the environment for any contamination present at Site 4. In order to achieve this primary objective, samples from various media were collected and analyzed to fill data gaps from previous investigations.

The following sections summarize the findings of the RI, the HHRA, and the ERA. The nature and extent of contamination at Site 4 was determined by comparison to the MDEQ Tier 1 TRGs. The potential impacts of these contaminants to human and ecological receptors were evaluated in the HHRA (USEPA and State of Mississippi human health benchmarks) and the SLERA (USEPA ESVs).

8.1 SITE HYDROLOGY

The depth to groundwater at Site 4 ranges from less than 1 to 8 feet in the shallow monitoring wells and from 4 to 8 feet in the deep monitoring wells and is controlled primarily by surface topography and proximity to Canal No. 1. Groundwater flow direction in the shallow groundwater interval is to the northwest. The estimated average groundwater velocity for the shallow zone at the site was calculated at 1.7 feet/day and the estimated average groundwater velocity for the deep zone at the site was calculated at 0.06 feet/day. Vertical gradients were observed in adjacent pairs of shallow and deep monitoring wells, with downward gradients observed in most of the well pairs.

8.2 SOIL ASSESSMENT

The release of contaminants at Site 4 most likely resulted from landfill operations. The detections of CVOCs and metals at Site 4 support the reported disposal of these materials at the site.

Arsenic was detected in 9 of the 10 subsurface soil samples at concentrations greater than the Tier 1 unrestricted TRG. Two of these locations had arsenic concentrations greater than the restricted TRG. The detected concentrations of arsenic at Site 4 are typical for coastal plain soils in Mississippi. Other metals and cyanide were detected at concentrations less than the Tier 1 unrestricted TRGs.

Detected VOC concentrations in the subsurface soil samples were less than the Tier 1 unrestricted TRGs.

Dibenzo(a,h)anthracene was detected in one subsurface soil sample at a concentration greater than the unrestricted TRG, but less than the restricted TRG. Concentrations of other SVOCs in the soil samples were less than the Tier 1 unrestricted TRGs.

Several pesticides were detected in Site 4 subsurface soil samples at concentrations less than the Tier 1 unrestricted TRGs. Concentrations of PCBs and organophosphorus pesticides were less than standard laboratory detection limits.

Herbicide concentrations in the subsurface soil samples were less than standard laboratory detection limits.

Dioxins were detected in both of the subsurface soil samples submitted for dioxin analysis. The OCDD and HpCDD congeners were at concentrations one or two orders of magnitude greater than the TCDD concentration. The dioxin TEQs calculated from the Site 4 soil samples were less than the unrestricted Tier 1 TRG for TCDD.

8.3 GROUNDWATER ASSESSMENT

Groundwater characterization samples collected at Site 4 were analyzed for the full suite of TCL, TAL, and Appendix IX analytes. Additional delineation samples were collected using DPT and from monitoring wells and analyzed for CVOCs.

A dissolved CVOC plume was delineated in the southern part of Site 4. Concentrations of VC, cis-1,2-DCE, trans-1,2-DCE, and TCE in groundwater exceeded the Tier 1 TRGs. The plume appears to have an area of approximately 48,000 square feet. Comparison of analytical data from shallow and deep well pairs indicate that the CVOC plume is limited to the uppermost sand zone of the shallow surficial aquifer, to a depth of approximately 24 feet, and has not migrated vertically. The CVOC plume has migrated to the northwest side of Canal No. 1, indicating that the canal is not a hydraulic barrier. Decreasing CVOC concentrations, up to 50 percent, were noted in two monitoring wells that were sampled in 2004 and 2006; however, DPT samples and some new monitoring wells installed in 2006 had higher CVOC concentrations than previously seen at the site. Data collected to this point suggest that the phenomena known as DCE stall has occurred in the dissolved CVOC plume at Site 4. DCE stall in groundwater systems results when insufficient electron acceptors or substrates or adverse environmental conditions prevent further biologically mediated reductive dechlorination of VOCs.

Iron was detected in four DPT groundwater samples and three monitoring well groundwater samples at concentrations greater than the TRG. Comparison of unfiltered iron sample results to filtered iron results suggest that a significant percentage of total iron concentrations may result from transported particulates, rather than dissolved iron concentrations.

Antimony was detected in one monitoring well sample at a concentration greater than the TRG. Other metals were detected in the groundwater samples at concentrations less than the Tier 1 TRGs.

Detected SVOC concentrations in the monitoring well samples were less than the Tier 1 TRGs. Concentrations of SVOCs in the DPT groundwater samples were less than standard laboratory detection limits. Pesticide and PCB concentrations in the groundwater samples were less than standard laboratory detection limits. Herbicide concentrations in the groundwater samples were less than standard laboratory detection limits. The dioxin TEQs calculated from the Site 4 groundwater samples were less than the Tier 1 TRG for TCDD. Detected cyanide concentrations in the groundwater samples were less than the Tier 1 TRG.

8.4 SURFACE WATER AND SEDIMENT ASSESSMENT

Detected concentrations of VOCs, dioxins, cyanide, and metals in the surface water samples were less than the Tier 1 TRGs for groundwater. Concentrations of SVOCs, pesticides, PCBs, and herbicides in the surface water samples were less than standard laboratory detection limits. Detected concentrations of VOCs, pesticides, PCBs, and cyanide in the sediment samples were less than the Tier 1 unrestricted TRGs. Concentrations of herbicides were less than standard laboratory detection limits.

Benzo(a)pyrene was detected in one sediment sample at a concentration greater than the restricted TRG and in two sediment samples at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-CD)pyrene were also detected in one sediment sample at concentrations greater than the unrestricted TRG, but less than the restricted TRG. Concentrations of other SVOCs detected in sediment samples from Site 4 were less than screening criteria.

OCDD, OCDF, and HPDD were detected in one surface water sample. TCDD was not detected in this sample and the TEQ was less than the Tier 1 TRG for TCDD. Most of the 2,3,7,8 chlorinated dioxin and furan congeners were detected in one or more of the sediment samples analyzed for dioxins at Site 4. TCDD was detected in all three of the sediment samples. The dioxin TEQ for two sediment samples were greater than the unrestricted TRG and less than the restricted TRG. TCDD contributes less than 1 percent of the total concentration of 2,3,7,8 chlorinated congeners, which suggests that HO is not the major contributor of dioxins and furans in the Site 4 sediment.

Arsenic was detected in the eight sediment samples at concentrations greater than the Tier 1 unrestricted TRG. Five of these locations had arsenic concentrations greater than the restricted TRG. The detected concentrations of arsenic at Site 4 are typical for coastal plain soils in Mississippi. Other metals and cyanide were detected at concentrations less than the Tier 1 unrestricted TRGs.

8.5 HUMAN HEALTH RISK ASSESSMENT

A HHRA was performed to evaluate exposure to contaminants in subsurface soil, groundwater, surface water, and sediment at Site 4. Estimated risks for site workers, occupational workers, construction/excavation workers, and trespassers/recreational users assumed to be exposed to site media were less than or within USEPA and MDEQ risk benchmarks. The quantitative risk evaluation indicated that potential adverse health effects may be associated with the hypothetical future residential use of groundwater. The maximum detected concentrations of several VOCs and arsenic in groundwater also exceeded USEPA and MDEQ primary MCLs. However, there is considerable uncertainty in the risk estimates calculated for exposure to contaminants in groundwater and the numerical risk results are likely overestimated. In addition, the residential groundwater use scenario is evaluated to be conservative and to provide information to risk managers for Site 4. The groundwater underlying and downgradient of Site 4 is not currently used as a source of drinking water and there are no plans to develop this resource in the future. Residential risks estimated for other site media (subsurface soil, surface water, and sediment) were within USEPA and MDEQ benchmarks.

8.6 ECOLOGICAL RISK ASSESSMENT

Concentrations of a number of contaminants in Canal No.1 sediment and surface water were elevated above conservative screening levels and associated with potential risk to ecological receptors. The detected contaminants, while possibly associated with Site 4 the Golf Course Landfill, may also have been transported from other areas of NCBC Gulfport via storm water runoff through ditches that connect to Canal No.1. When conservative assumptions used in the ERA are re-evaluated and factors that affect potential exposures such as quality and size of the habitat, and actual use of the site by modeled receptors are considered, the overall level of ecological risk associated with the cited contamination in Canal No. 1 is considered to be minimal.

8.7 CONCLUSIONS

CVOCs and iron were detected in Site 4 groundwater at concentrations exceeding MDEQ risk-based screening criteria. The CVOC plume is limited to the southern part of the site. PAHs and arsenic were detected in site subsurface soil exceeding MDEQ risk-based screening criteria for unrestricted site use. PAHs, dioxins, and arsenic were detected in sediments from Canal No. 1 exceeding MDEQ risk-based screening criteria for unrestricted site use. Concentrations of analytes detected in surface water samples collected from Canal No. 1 were less than the MDEQ risk-based screening criteria.

The HHRA identified risk to human receptors (site residents only) exposed to site groundwater exceeding USEPA and MDEQ benchmarks. Estimated risks for site workers, occupational workers,

construction/excavation workers, and trespassers/recreational users assumed to be exposed to site media were less than or within USEPA and MDEQ risk benchmarks. The SLERA indicated that risk to ecological receptors did not exceed USEPA and MDEQ benchmarks.

The CVOC plume in Site 4 groundwater will require measures to eliminate or minimize exposure by active cleanup, engineering controls, and/or institutional controls. A treatability study was conducted to evaluate the effectiveness of bioaugmentation to remediate the CVOC plume.

Based on the results of the RI, an FS using CERCLA guidelines is recommended for Site 4. As discussed throughout this report, Site 4 meets the requirements of the presumptive remedy framework for municipal and military landfills. Therefore, the primary remedial strategy for Site 4 will be containment of the disposal area with an impermeable cap meeting state and USEPA requirements to prevent exposure to site soil and leaching of contaminants to groundwater and active remediation of the existing sediment in Canal No. 1 and lining of the canal to prevent groundwater to surface water migration.

The containment strategy should focus on three areas: 1) Low permeability cover (to prevent infiltration via surface soil - as required by MDEQ). 2) Elimination of the potential for mechanical disturbance of the cover during golf course operations. 3) Minimize erosion of surface soils and transportation into Canal No.1.

Active remediation will be required to remove the impacted sediment along the northwestern boundary of the site. Placement of the permanent concrete lining in the canal (in conjunction with the low-permeability cover) will prevent future contamination of the surface water and sediment.

Based on the location and types of chemicals/compounds discovered during this investigation, interim removal or time-critical actions will not be required. After the above actions are taken, there will be a low likelihood for the migration of contaminated media, and the local population will not be exposed to the contaminants in the subsurface soil and groundwater at the site if current base operations and restrictions are maintained.

The FS will incorporate the presumptive remedy strategy including a low permeability cover in conjunction with sediment removal and a permanent lining of the canal to prevent recontamination in the future. The current soil cover is not adequate for permanent site closure under either Mississippi Department of Environmental Quality (MDEQ) or USEPA regulations. Long-term monitoring and maintenance of the soil cover will be required.

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FIGURES

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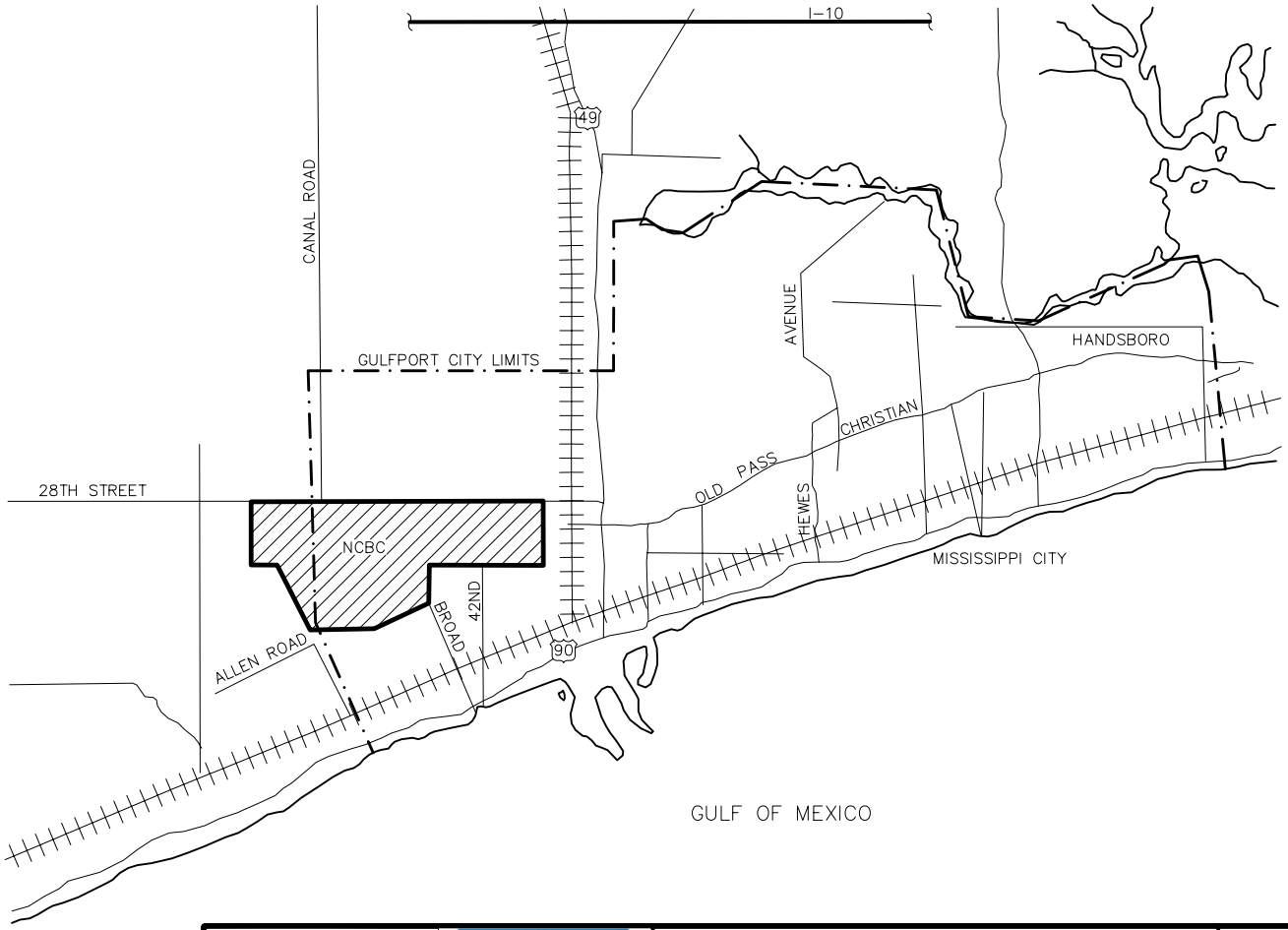

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SCALE AS NOTED			DRAWING NO. FIGURE 1-1 / REV. 0

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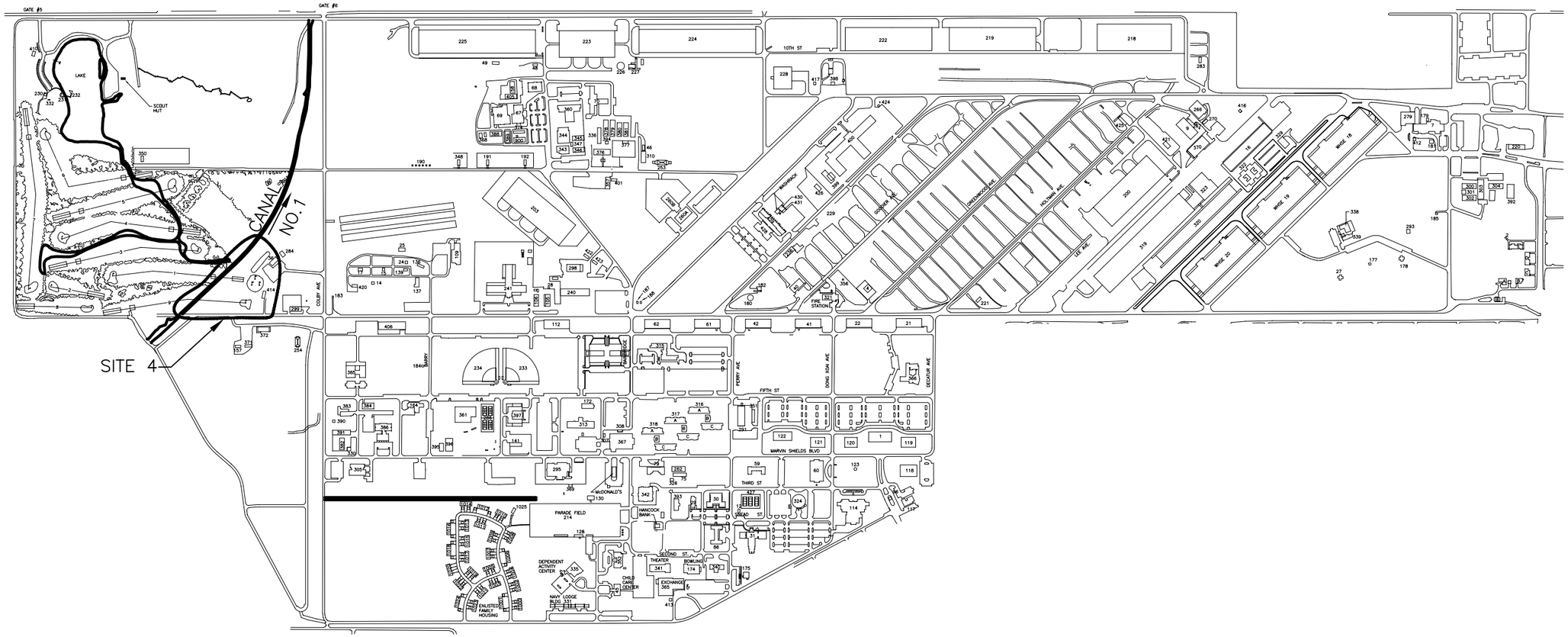

DRAWN BY MF	DATE 10/24/06	NAVFAC	SITE LOCATION SITE 4 RI REPORT NCBC GULFPORT, MISSISSIPPI	CONTRACT NO. 9666
CHECKED BY	DATE			OWNER NO.
REVISED BY	DATE			APPROVED BY / DATE
SCALE AS NOTED				DRAWING NO. FIGURE 1-2 / REV. 0

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

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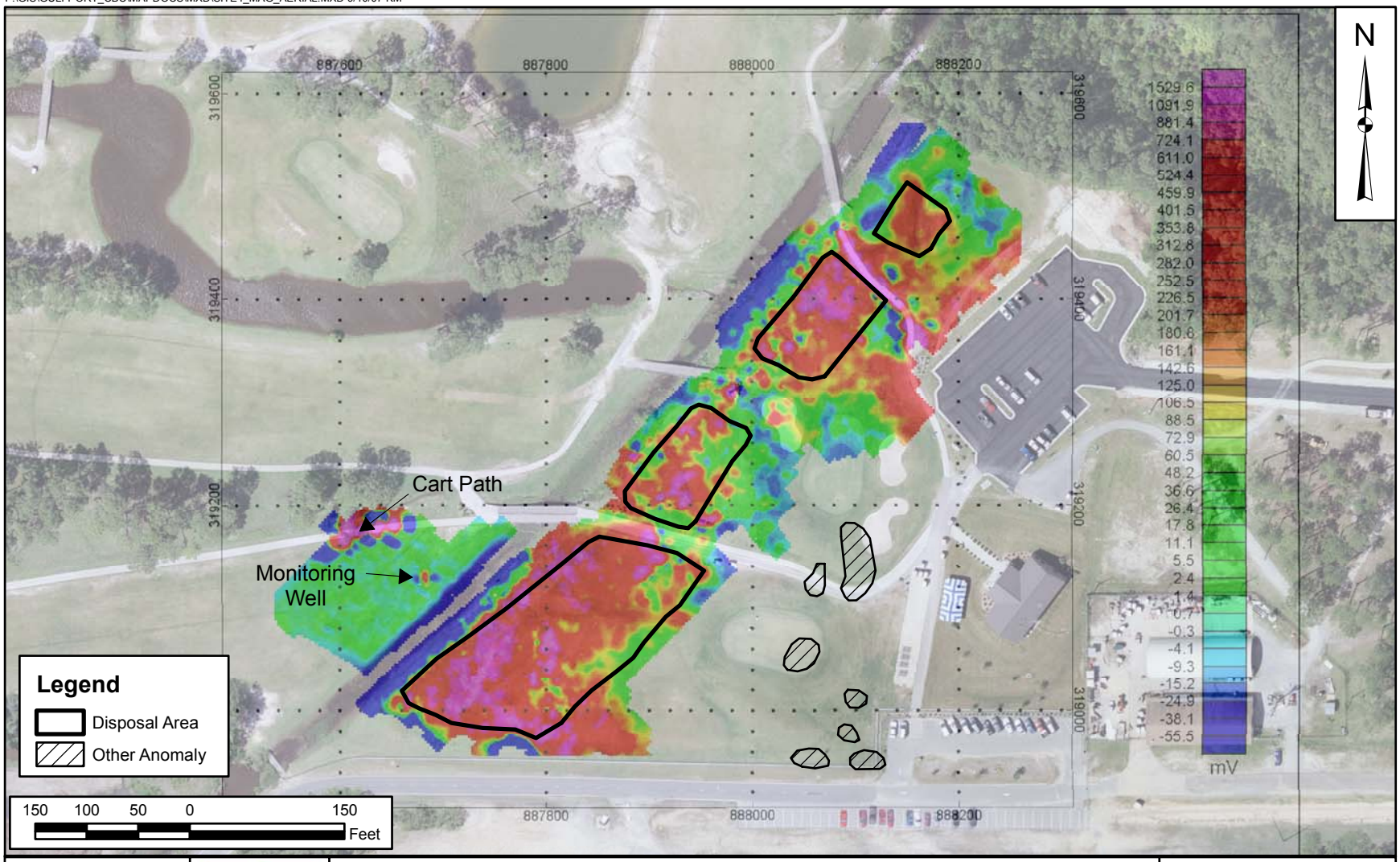
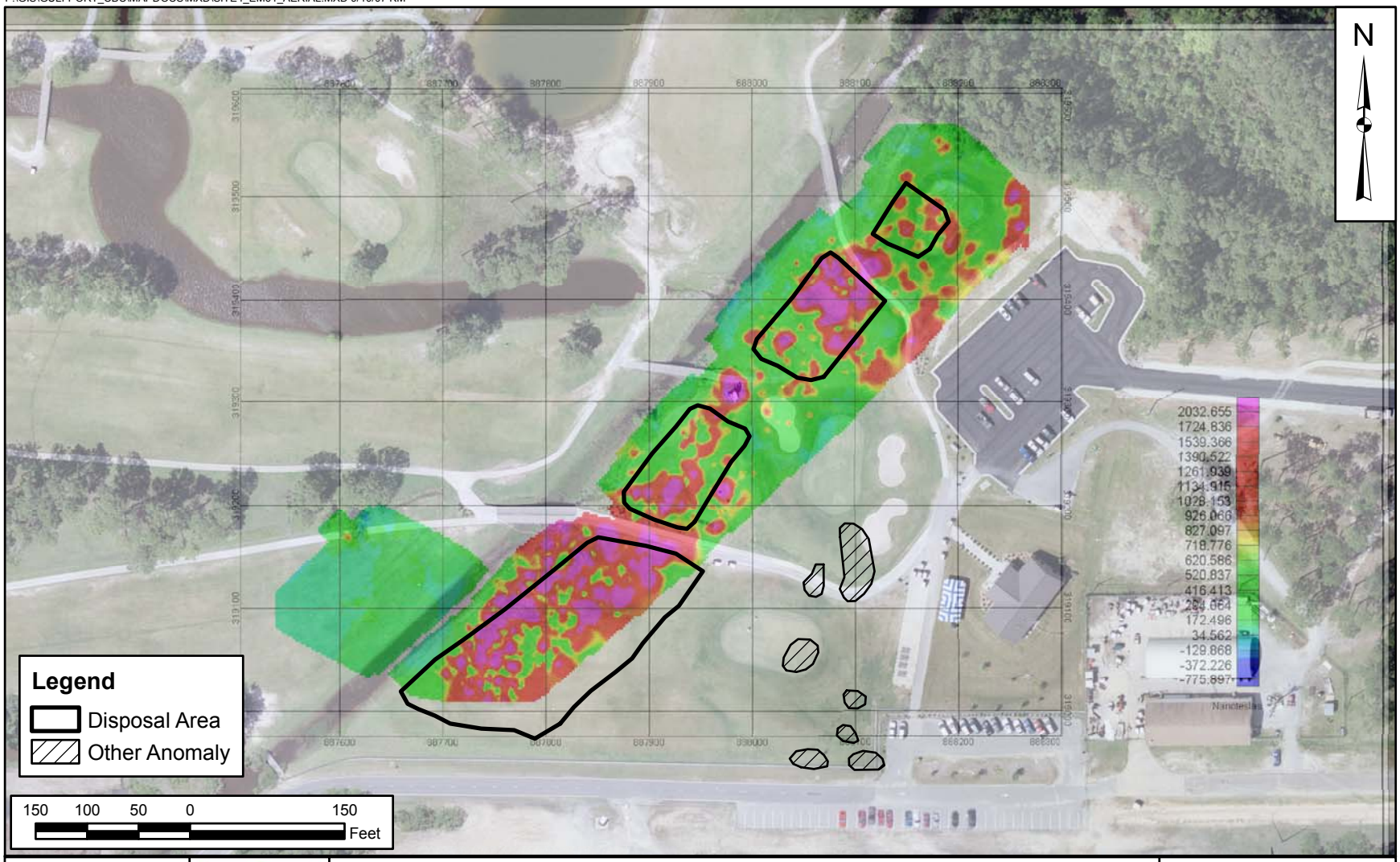


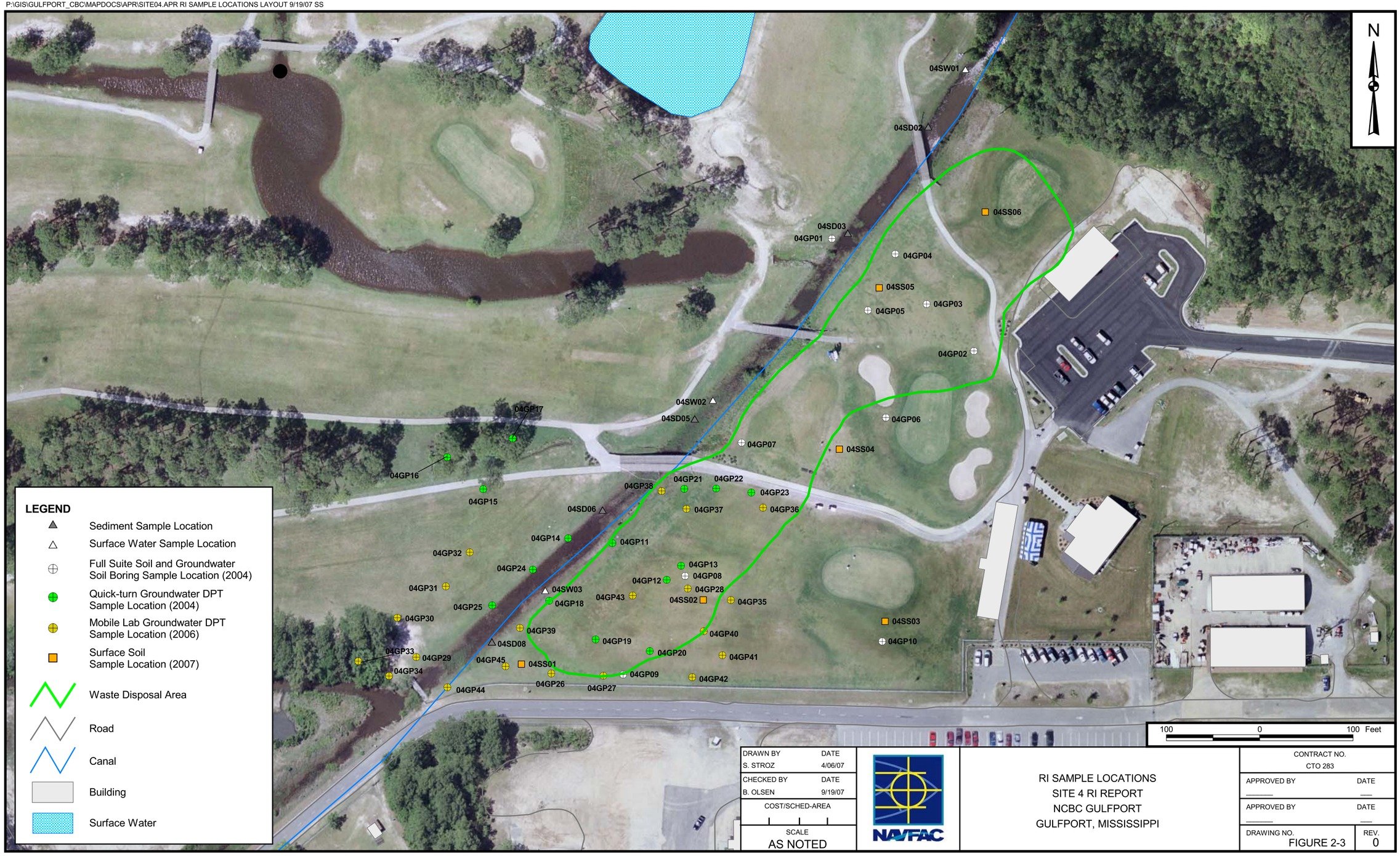
DRAWN BY K. MOORE	DATE 9/10/07	MAGNETOMETER RESULTS SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NUMBER CTO 0283
CHECKED BY B. OLSEN	DATE 9/11/07		APPROVED BY ___ DATE ___
COST/SCHED AREA			APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. 2-1 REV 0

P:\GIS\GULFPORT_CBC\MAPDOCS\MXD\SITE4_EM61_AERIAL.MXD 9/10/07 KM



DRAWN BY K. MOORE	DATE 9/10/07	EM 61 RESULTS SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NUMBER CTO 0283
CHECKED BY B. OLSEN	DATE 9/11/07		APPROVED BY ___ DATE ___
COST/SCHED AREA			APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. 2-2 REV 0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR RI SAMPLE LOCATIONS LAYOUT 9/19/07 SS



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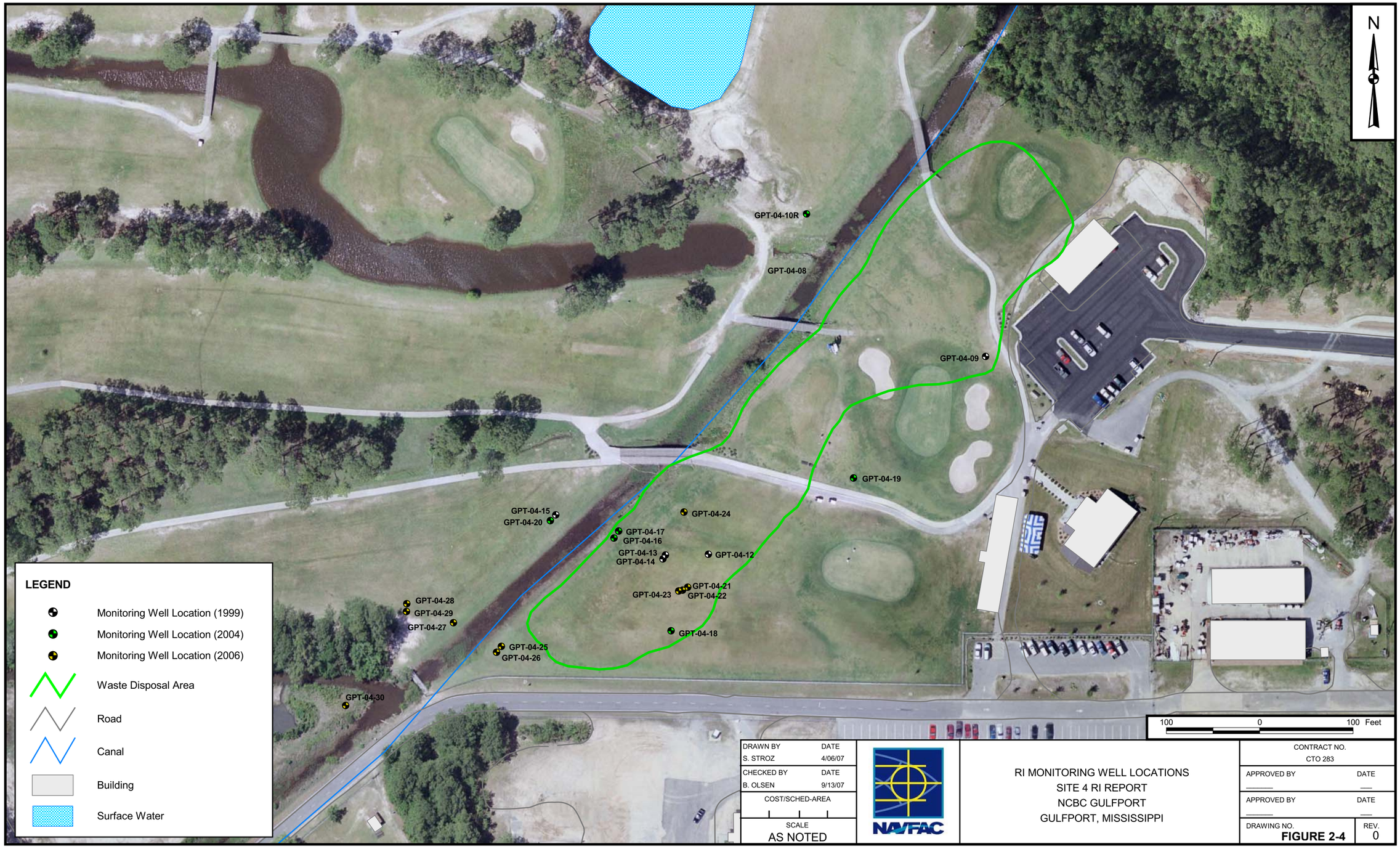
S. STROZ	4/06/07
CHECKED BY	DATE
B. OLSEN	9/19/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

RI SAMPLE LOCATIONS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-3	REV. 0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR RI MW LOCATION LAYOUT 7/13/07 KM



DRAWN BY	DATE
S. STROZ	4/06/07
CHECKED BY	DATE
B. OLSEN	9/13/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

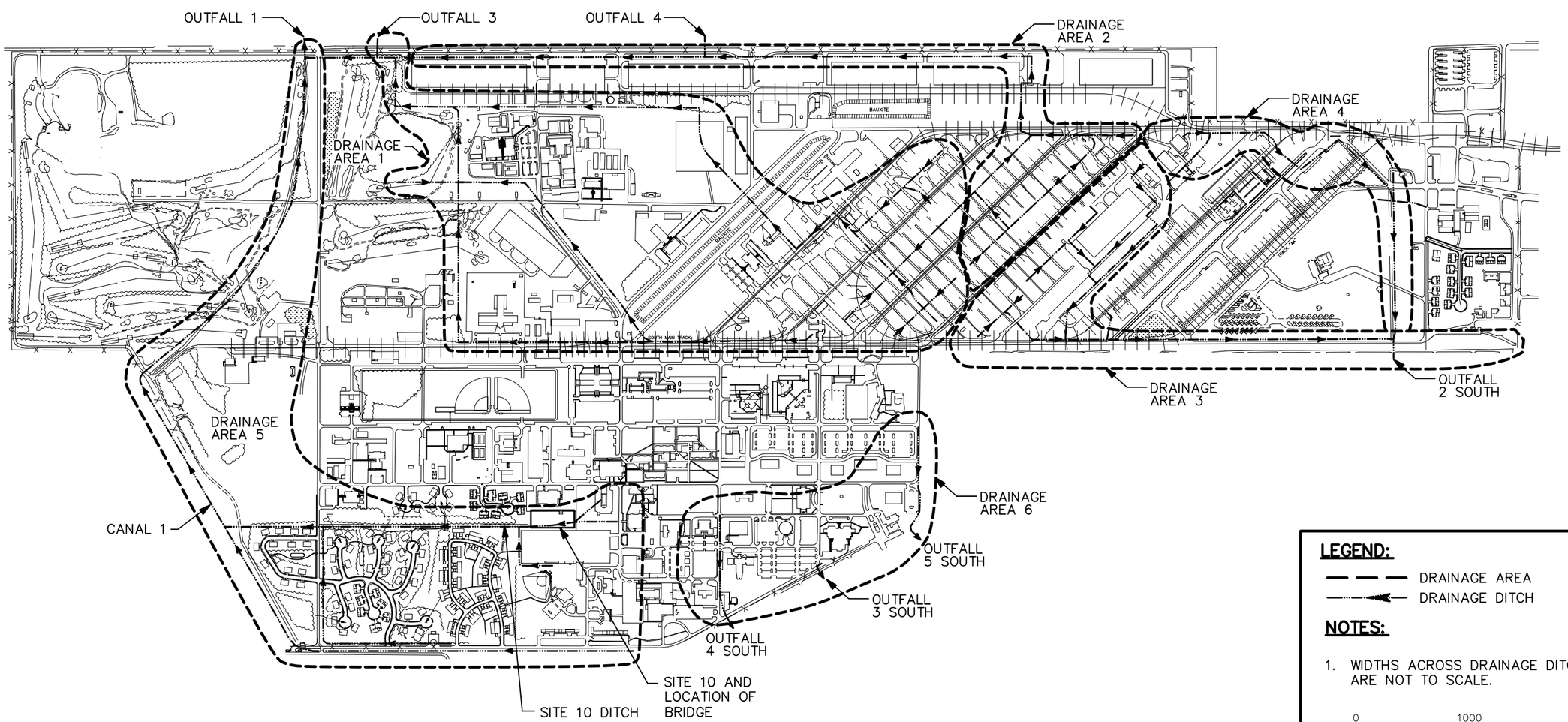
RI MONITORING WELL LOCATIONS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2-4	REV. 0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR SITE04_SURFACE FLOW LINE LAYOUT 9/18/07 SS

DRAWN BY S. PAXTON	DATE 10/24/06	SURFACE FEATURES SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NO. CTO 068
CHECKED BY B. OLSON	DATE 9/18/07		APPROVED BY ____ DATE ____
COST/SCHED-AREA			APPROVED BY ____ DATE ____
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 / REV. 0

ACAD: 9666CP13.dwg 09/13/07 MF PIT



LEGEND:

DRAINAGE AREA

DRAINAGE DITCH

NOTES:

1. WIDTHS ACROSS DRAINAGE DITCHES ARE NOT TO SCALE.

0 1000 2000

GRAPHIC SCALE IN FEET

SOURCE: NAVAL CONSTRUCTION BATTALION CENTER, GULFPORT MS., JUNE 2001

DRAWN BY MF	DATE 9/13/07	SURFACE WATER FEATURES SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NO. 9666
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-2 / REV. 0

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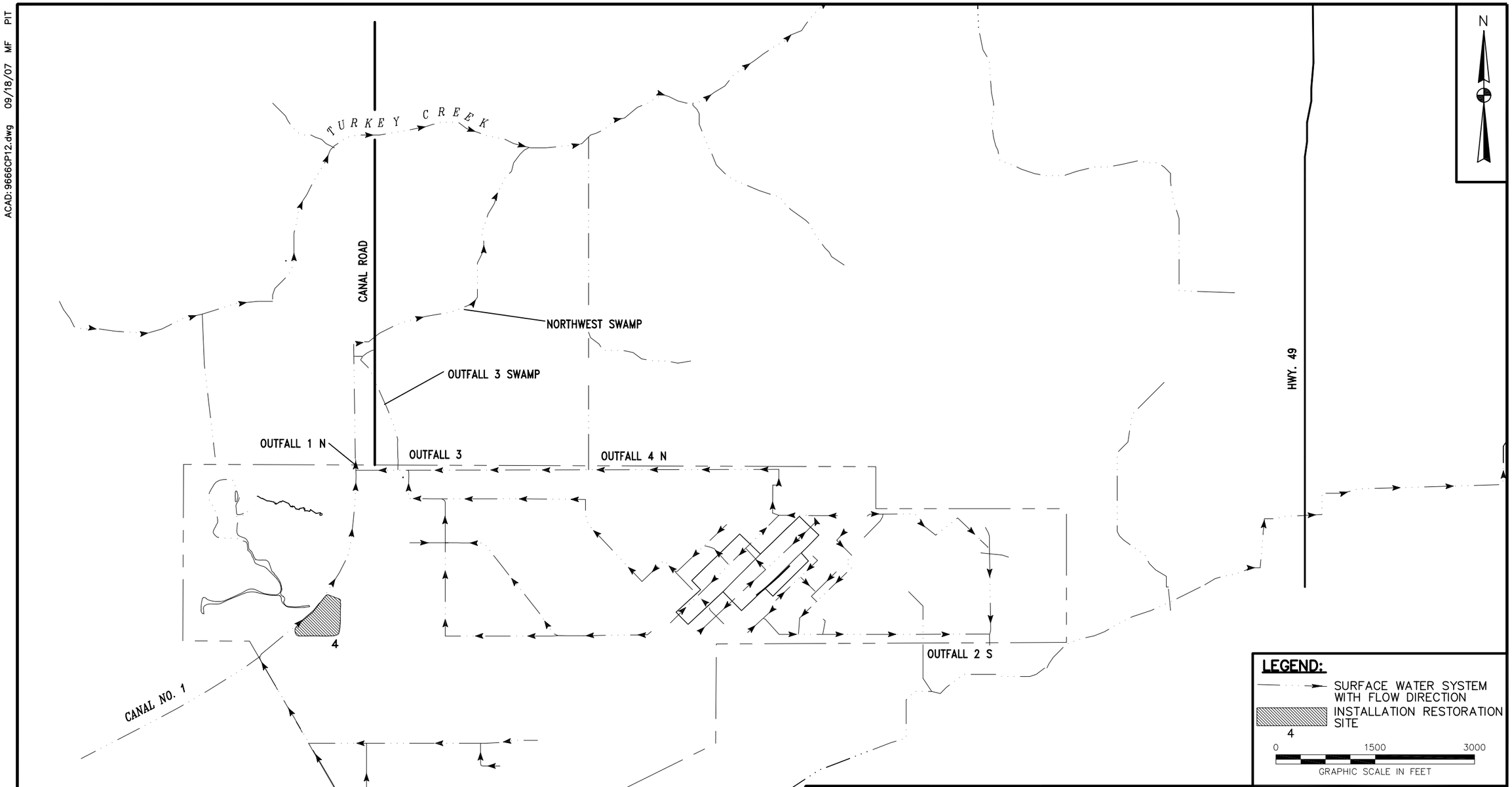
FORM CADD NO. SDIV-BH.DWG - REV 1 - 9/10/98

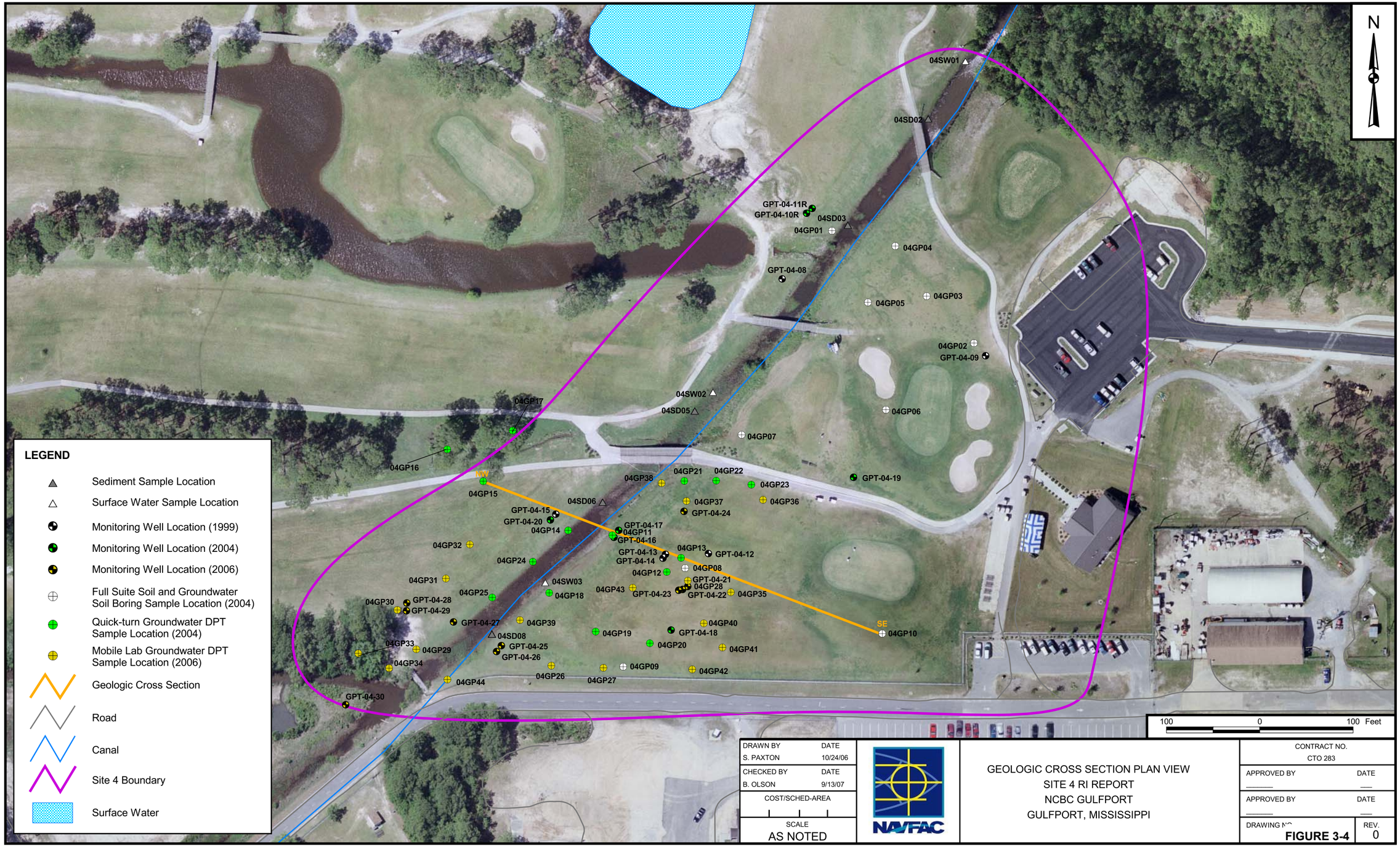
ACAD: 9666CP12.dwg 09/18/07 MF PIT



DRAWN BY MF	DATE 9/13/07	SURFACE WATER SYSTEM SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NO. 9666
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-3 / REV. 0

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

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR SITE04_GEOLOGIC CROSS SECTION LAYOUT 9/13/07 JEE



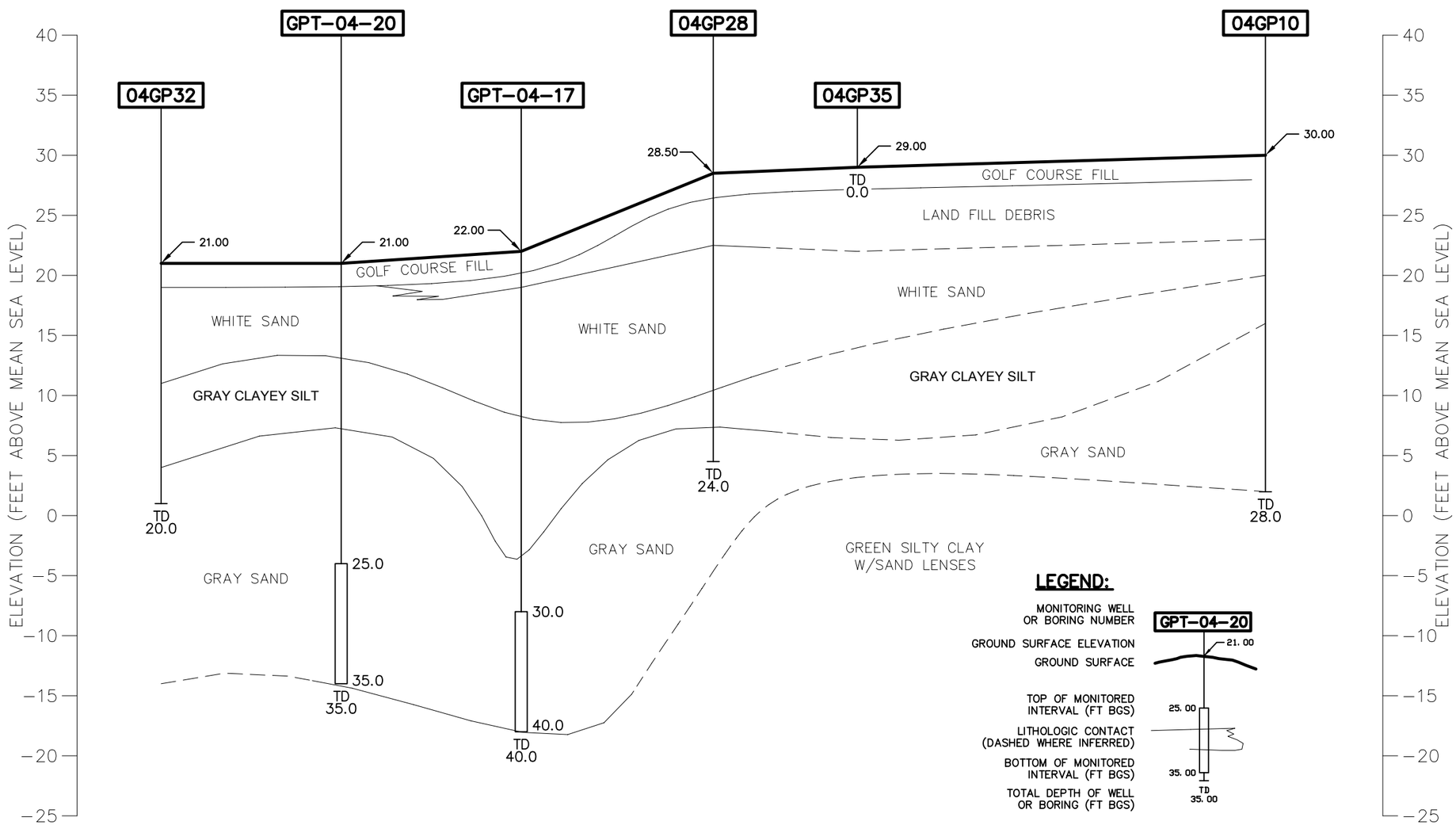
DRAWN BY	DATE
S. PAXTON	10/24/06
CHECKED BY	DATE
B. OLSON	9/13/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

GEOLOGIC CROSS SECTION PLAN VIEW
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3-4	REV. 0

ACAD: 9666GX02.dwg 09/13/07 MF PIT



0 50 100
HORIZONTAL SCALE IN FEET

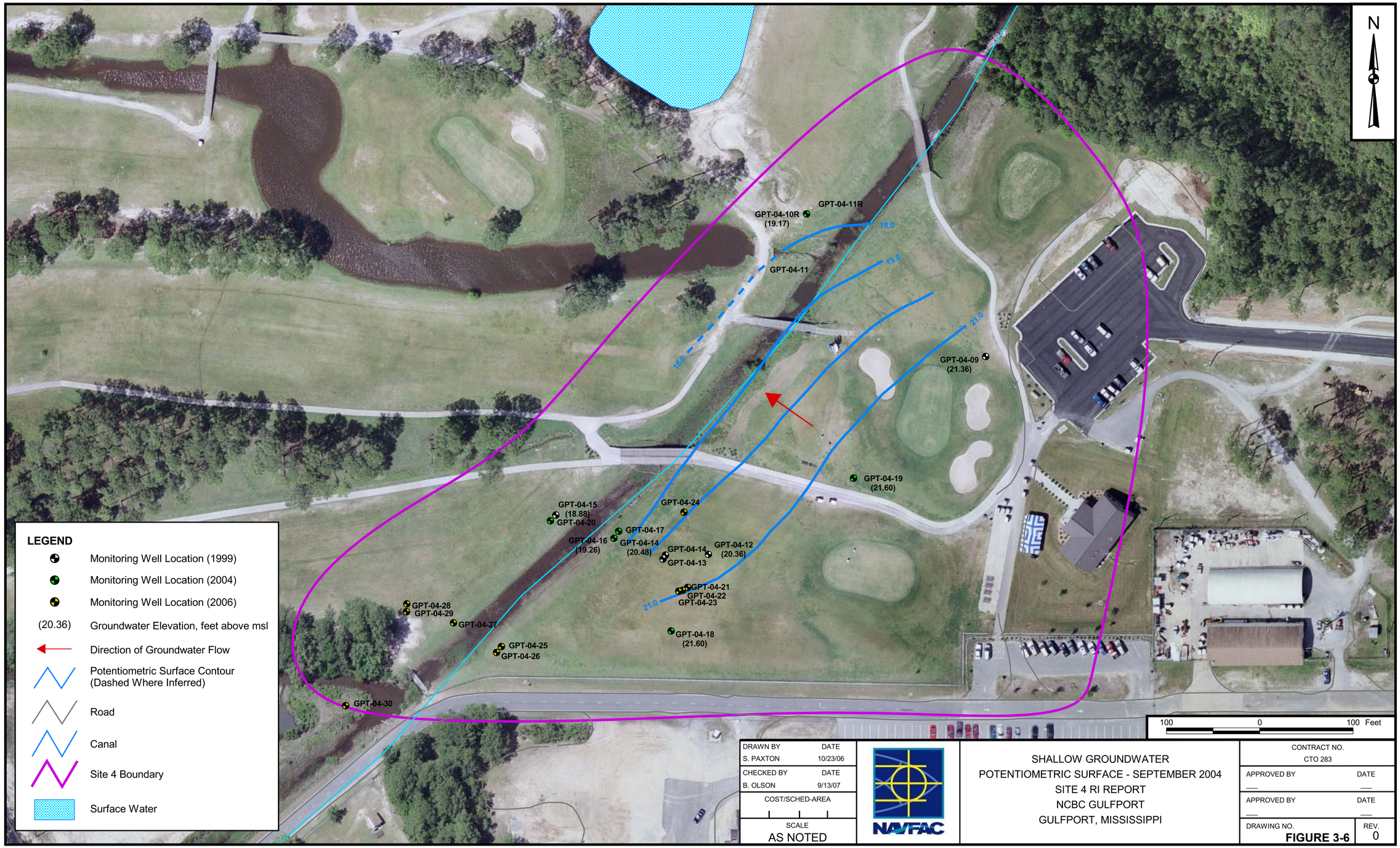
0 10 20
VERTICAL SCALE IN FEET

DRAWN BY MF	DATE 9/13/07	GEOLOGICAL CROSS SECTION SITE 4 RI REPORT NCBC GULFPORT GULFPORT, MISSISSIPPI	CONTRACT NO. 9666
CHECKED BY	DATE		OWNER NO.
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-5 / REV. 0

NAVFAC

FORM CADD NO. SDIV-BH.DWG - REV 2 - 6/19/06

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR SITE04_POTENTIOMETRIC SURFACE SEPTEMBER 2004 LAYOUT 9/13/07 JEE



DRAWN BY	DATE
S. PAXTON	10/23/06
CHECKED BY	DATE
B. OLSON	9/13/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

SHALLOW GROUNDWATER
POTENTIOMETRIC SURFACE - SEPTEMBER 2004
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
APPROVED BY	DATE
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APPROVED BY	DATE
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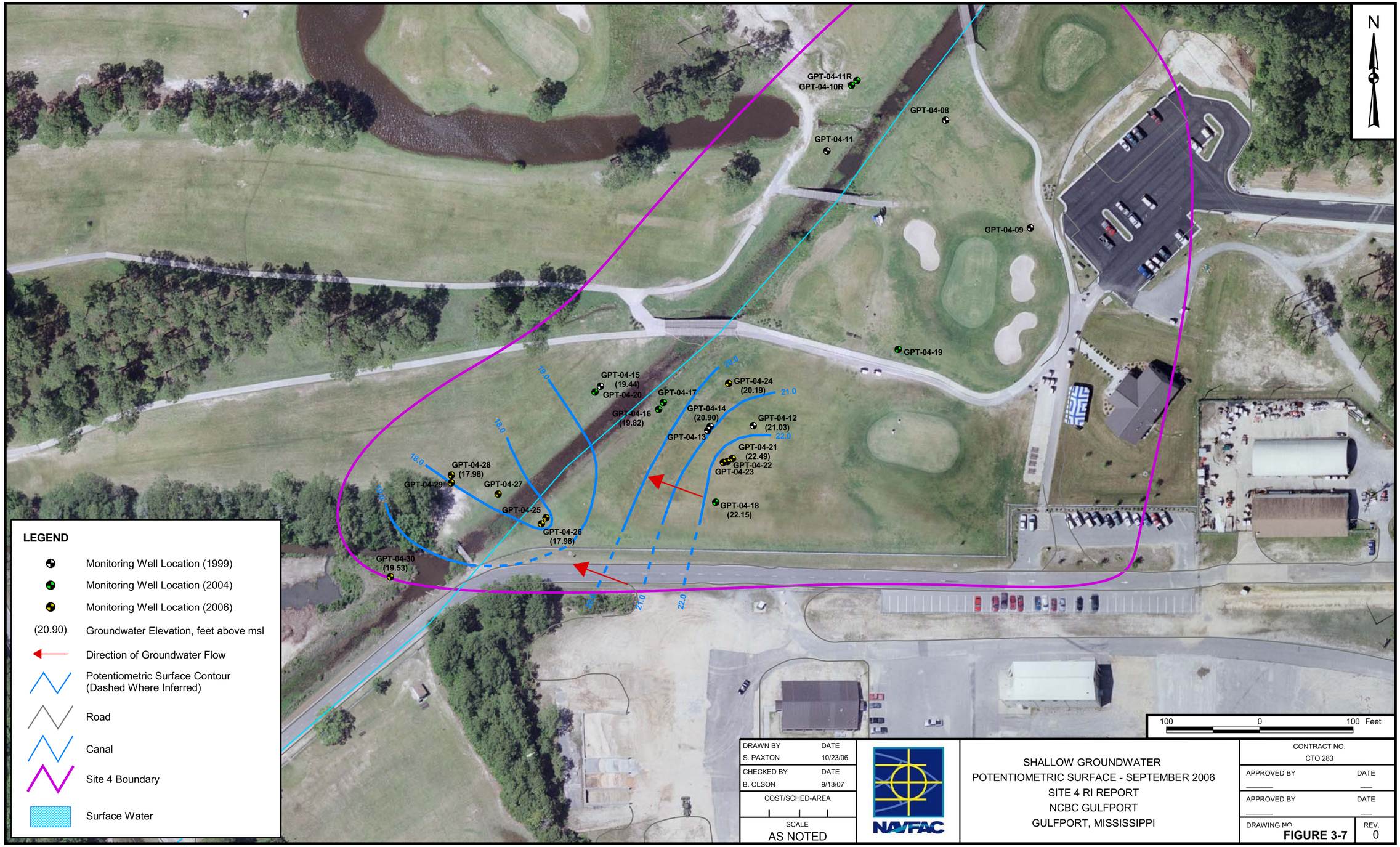
DRAWING NO.	REV.
FIGURE 3-6	0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR SITE04_POTENTIOMETRIC SURFACE SEPTEMBER 2006 LAYOUT 9/13/07 JEE



DRAWN BY	DATE
S. PAXTON	10/23/06
CHECKED BY	DATE
B. OLSON	9/13/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

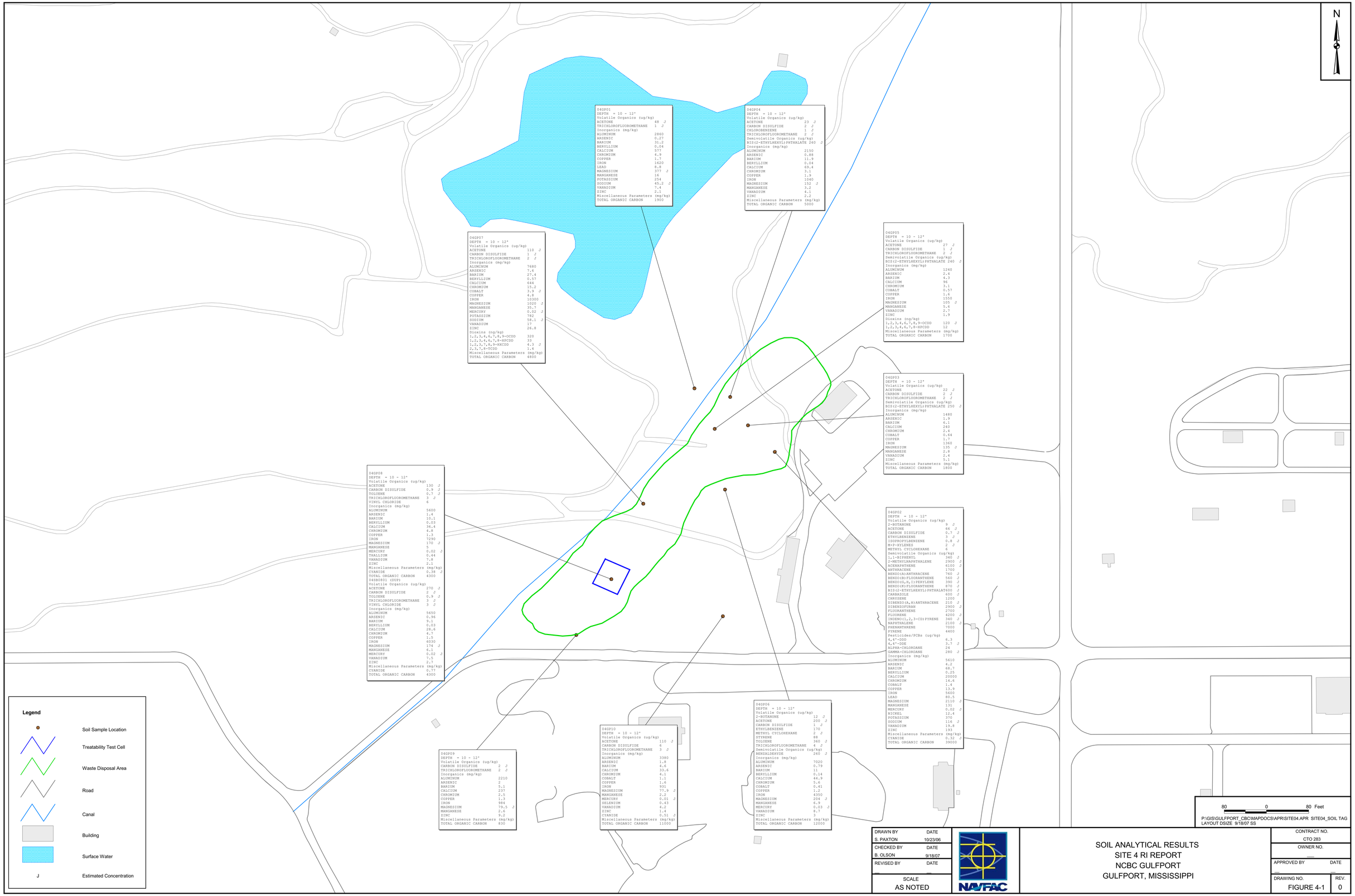
SHALLOW GROUNDWATER
POTENTIOMETRIC SURFACE - SEPTEMBER 2006
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

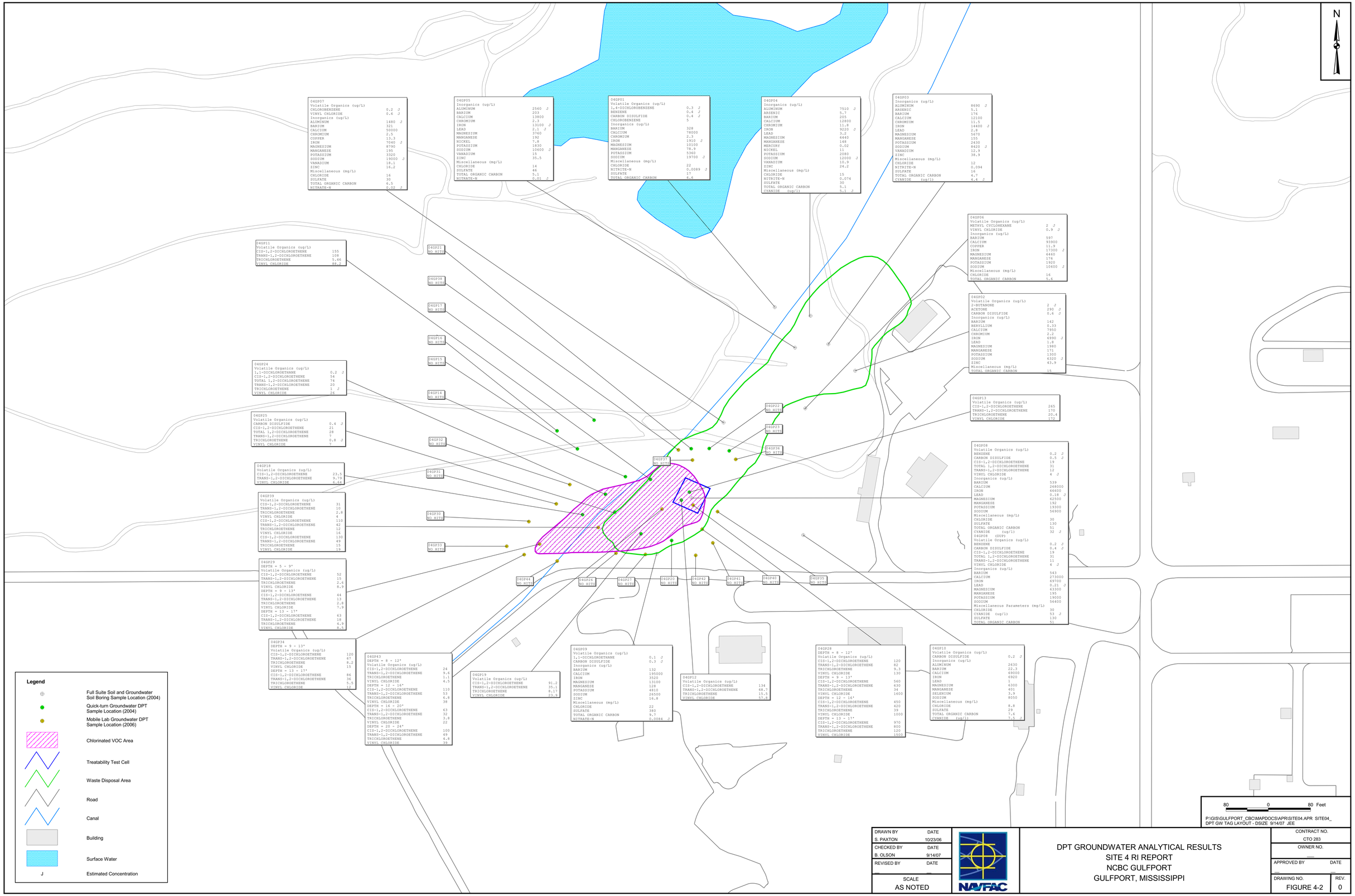
CONTRACT NO.
CTO 283

APPROVED BY ____ DATE ____

APPROVED BY ____ DATE ____

DRAWING NO. **FIGURE 3-7** REV. 0


N
04GP01
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 48 J
TRICHLOROFLUOROMETHANE 1 J
Inorganics (mg/kg)
ALUMINUM 2860
ARSENIC 0.27
BARIUM 31.2
BERYLLIUM 0.04
CALCIUM 577
CHROMIUM 4.9
COPPER 1.7
IRON 1620
LEAD 8.8
MAGNESIUM 377 J
MANGANESE 16
POTASSIUM 254
SODIUM 45.2 J
VANADIUM 7.4
ZINC 2.1
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 1900
04GP04
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 23 J
CARBON DISULFIDE 2 J
CHLOROBENZENE 1 J
TRICHLOROFLUOROMETHANE 2 J
Semivolatile Organics (ug/kg)
BIS(2-ETHYLHEXYL)PHTHALATE 260 J
Inorganics (mg/kg)
ALUMINUM 2150
ARSENIC 0.88
BARIUM 11.9
BERYLLIUM 0.04
CALCIUM 69.4
CHROMIUM 3.1
COPPER 1.9
IRON 1040
MAGNESIUM 152 J
MANGANESE 3.2
VANADIUM 4.1
ZINC 2.2
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 5000
04GP07
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 110 J
CARBON DISULFIDE 1 J
TRICHLOROFLUOROMETHANE 2 J
Inorganics (mg/kg)
ALUMINUM 7680
ARSENIC 7.6
BARIUM 27.4
BERYLLIUM 0.57
CALCIUM 644
CHROMIUM 15.2
COBALT 3.9 J
COPPER 4.8
IRON 10300
MAGNESIUM 1020 J
MANGANESE 35.7
MERCURY 0.02 J
POTASSIUM 782
SODIUM 58.1 J
VANADIUM 17
ZINC 26.8
Dioxins (ng/kg)
1,2,3,4,6,7,8,9-OCDD 320
1,2,3,4,6,7,8-HPCDD 33
1,2,3,7,8,9-HXCDD 4.3 J
2,3,7,8-TCDD 1.4
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 4800
04GP05
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 27 J
CARBON DISULFIDE 1 J
TRICHLOROFLUOROMETHANE 2 J
Semivolatile Organics (ug/kg)
BIS(2-ETHYLHEXYL)PHTHALATE 240 J
Inorganics (mg/kg)
ALUMINUM 1240
ARSENIC 2.4
BARIUM 4.3
CALCIUM 96
CHROMIUM 3.1
COBALT 0.57
COPPER 1.6
IRON 1550
MAGNESIUM 105 J
MANGANESE 5.6
VANADIUM 2.7
ZINC 1.9
Dioxins (ng/kg)
1,2,3,4,6,7,8,9-OCDD 120 J
1,2,3,4,6,7,8-HPCDD 12
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 1700
04GP03
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 22 J
CARBON DISULFIDE 2 J
TRICHLOROFLUOROMETHANE 2 J
Semivolatile Organics (ug/kg)
BIS(2-ETHYLHEXYL)PHTHALATE 250 J
Inorganics (mg/kg)
ALUMINUM 1480
ARSENIC 1.9
BARIUM 6.1
CALCIUM 240
CHROMIUM 2.4
COBALT 0.64
COPPER 1.7
IRON 1360
MAGNESIUM 135 J
MANGANESE 2.8
VANADIUM 2.4
ZINC 5.1
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 1800
04GP08
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 130 J
CARBON DISULFIDE 0.9 J
TOLUENE 0.7 J
TRICHLOROFLUOROMETHANE 3 J
VINYL CHLORIDE 6
Inorganics (mg/kg)
ALUMINUM 5600
ARSENIC 1.4
BARIUM 10.1
BERYLLIUM 0.03
CALCIUM 36.4
CHROMIUM 4.8
COPPER 1.3
IRON 7290
MAGNESIUM 170 J
MANGANESE 5
MERCURY 0.02 J
THALLIUM 0.44
VANADIUM 7.8
ZINC 2.1
Miscellaneous Parameters (mg/kg)
CYANIDE 0.38 J
TOTAL ORGANIC CARBON 4300
04SB0801 (DUP)
Volatile Organics (ug/kg)
ACETONE 270 J
CARBON DISULFIDE 2 J
TOLUENE 0.9 J
TRICHLOROFLUOROMETHANE 3 J
VINYL CHLORIDE 3 J
Inorganics (mg/kg)
ALUMINUM 5650
ARSENIC 0.96
BARIUM 9.1
BERYLLIUM 0.03
CALCIUM 28.6
CHROMIUM 4.7
COPPER 1.5
IRON 6030
MAGNESIUM 174 J
MANGANESE 6.1
MERCURY 0.02 J
VANADIUM 7.5
ZINC 2.7
Miscellaneous Parameters (mg/kg)
CYANIDE 0.77
TOTAL ORGANIC CARBON 4300
04GP02
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
2-BUTANONE 9 J
ACETONE 66 J
CARBON DISULFIDE 0.7 J
ETHYLBENZENE 3 J
ISOPROPYLBENZENE 0.8 J
M+P-XYLENES 2 J
METHYL CYCLOHEXANE 6
Semivolatile Organics (ug/kg)
1,1-BIPHENYL 340 J
2-METHYLNAPHTHALENE 2900 J
ACENAPHTHENE 6100 J
ANTHRACENE 1700
BENZO(A)ANTHRACENE 760 J
BENZO(B)FLUORANTHENE 560 J
BENZO(G,H,I)PERYLENE 390 J
BENZO(K)FLUORANTHENE 870 J
BIS(2-ETHYLHEXYL)PHTHALAT 600 J
CARBAZOLE 600 J
CHRYSENE 1200
DIBENZO(A,H)ANTHRACENE 210 J
DIBENZOFURAN 2900 J
FLUORANTHENE 2700
FLUORENE 4200 J
INDENO(1,2,3-CD)PYRENE 340 J
NAPHTHALENE 2100 J
PHENANTHRENE 7000
PYRENE 4400
Pesticides/PCBs (ug/kg)
4,4'-DDD 6.3
4,4'-DDE 3.7 J
ALPHA-CHLORDANE 24
GAMMA-CHLORDANE 280 J
Inorganics (mg/kg)
ALUMINUM 5610
ARSENIC 4.2
BARIUM 68.7
BERYLLIUM 0.25
CALCIUM 20000
CHROMIUM 14.6
COBALT 1.4
COPPER 13.9
IRON 5600
LEAD 80.5
MAGNESIUM 2110 J
MANGANESE 131
MERCURY 0.02 J
NICKEL 12.4
POTASSIUM 370
SODIUM 116 J
VANADIUM 19.8
ZINC 193
Miscellaneous Parameters (mg/kg)
CYANIDE 0.32 J
TOTAL ORGANIC CARBON 39000
04GP09
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
CARBON DISULFIDE 2 J
TRICHLOROFLUOROMETHANE 2 J
Inorganics (mg/kg)
ALUMINUM 2210
ARSENIC 2
BARIUM 5.1
CALCIUM 237
CHROMIUM 2.5
COPPER 1.3
IRON 984
MAGNESIUM 79.5 J
MANGANESE 2.6
ZINC 9.2
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 830
04GP10
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
ACETONE 110 J
CARBON DISULFIDE 6
TRICHLOROFLUOROMETHANE 3 J
Inorganics (mg/kg)
ALUMINUM 3380
ARSENIC 1.8
BARIUM 4.6
CALCIUM 33.6
CHROMIUM 4.1
COBALT 1.1
COPPER 1.6
IRON 931
MAGNESIUM 77.9 J
MANGANESE 2.2
MERCURY 0.01 J
SELENIUM 0.43
VANADIUM 4.2
ZINC 1.4
CYANIDE 0.51 J
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 11000
04GP06
DEPTH = 10 - 12'
Volatile Organics (ug/kg)
2-BUTANONE 12 J
ACETONE 200 J
CARBON DISULFIDE 1 J
ETHYLBENZENE 170
METHYL CYCLOHEXANE 2 J
STYRENE 88
TOLUENE 360 J
TRICHLOROFLUOROMETHANE 4 J
Semivolatile Organics (ug/kg)
BENZALDEHYDE 260 J
Inorganics (mg/kg)
ALUMINUM 7020
ARSENIC 0.79
BARIUM 11
BERYLLIUM 0.14
CALCIUM 44.9
CHROMIUM 5.6
COBALT 0.41
COPPER 1.2
IRON 4350
MAGNESIUM 204 J
MANGANESE 6.9
MERCURY 0.03 J
VANADIUM 8.7
ZINC 3
Miscellaneous Parameters (mg/kg)
TOTAL ORGANIC CARBON 12000
Legend
Soil Sample Location
Treatability Test Cell
Waste Disposal Area
Road
Canal
Building
Surface Water
J Estimated Concentration
80 0 80 Feet
P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR SITE04_SOIL TAG
LAYOUT DSIZE 9/18/07 SS
DRAWN BY DATE
S. PAXTON 10/23/06
CHECKED BY DATE
B. OLSON 9/18/07
REVISED BY DATE
SCALE
AS NOTED
NAVFAC
SOIL ANALYTICAL RESULTS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI
CONTRACT NO.
CTO 283
OWNER NO.
APPROVED BY DATE
DRAWING NO.
FIGURE 4-1
REV.
0



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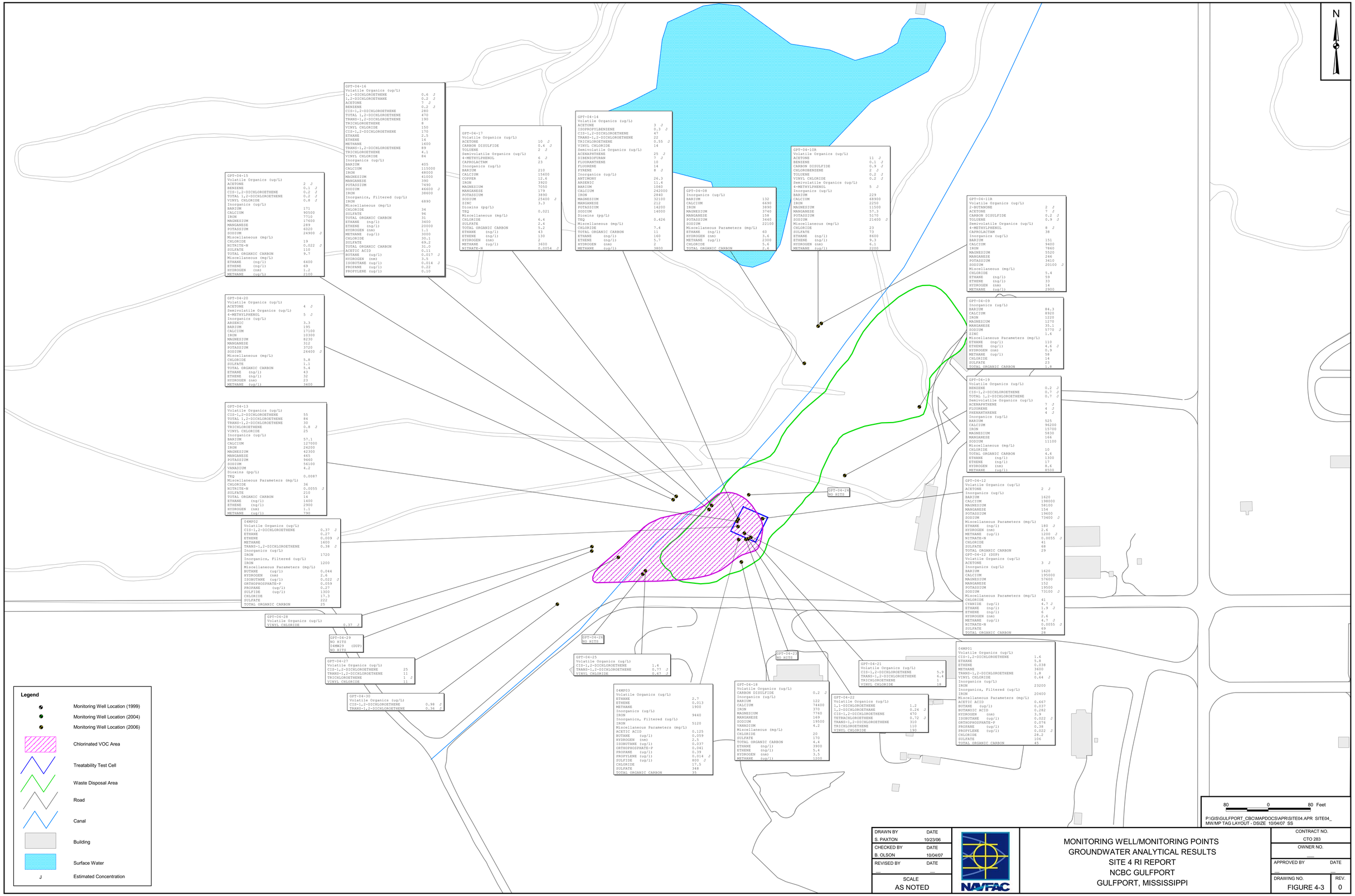
S. PAXTON	10/23/06
CHECKED BY	DATE
B. OLSON	9/14/07
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

DPT GROUNDWATER ANALYTICAL RESULTS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
OWNER NO.	
—	
APPROVED BY	DATE
—	—
DRAWING NO.	REV.
FIGURE 4-2	0



DRAWN BY	DATE
S. PAXTON	10/23/06
CHECKED BY	DATE
B. OLSON	10/04/07
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

MONITORING WELL/MONITORING POINTS
GROUNDWATER ANALYTICAL RESULTS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
OWNER NO.	
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APPROVED BY	DATE
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DRAWING NO.	REV.
FIGURE 4-3	0

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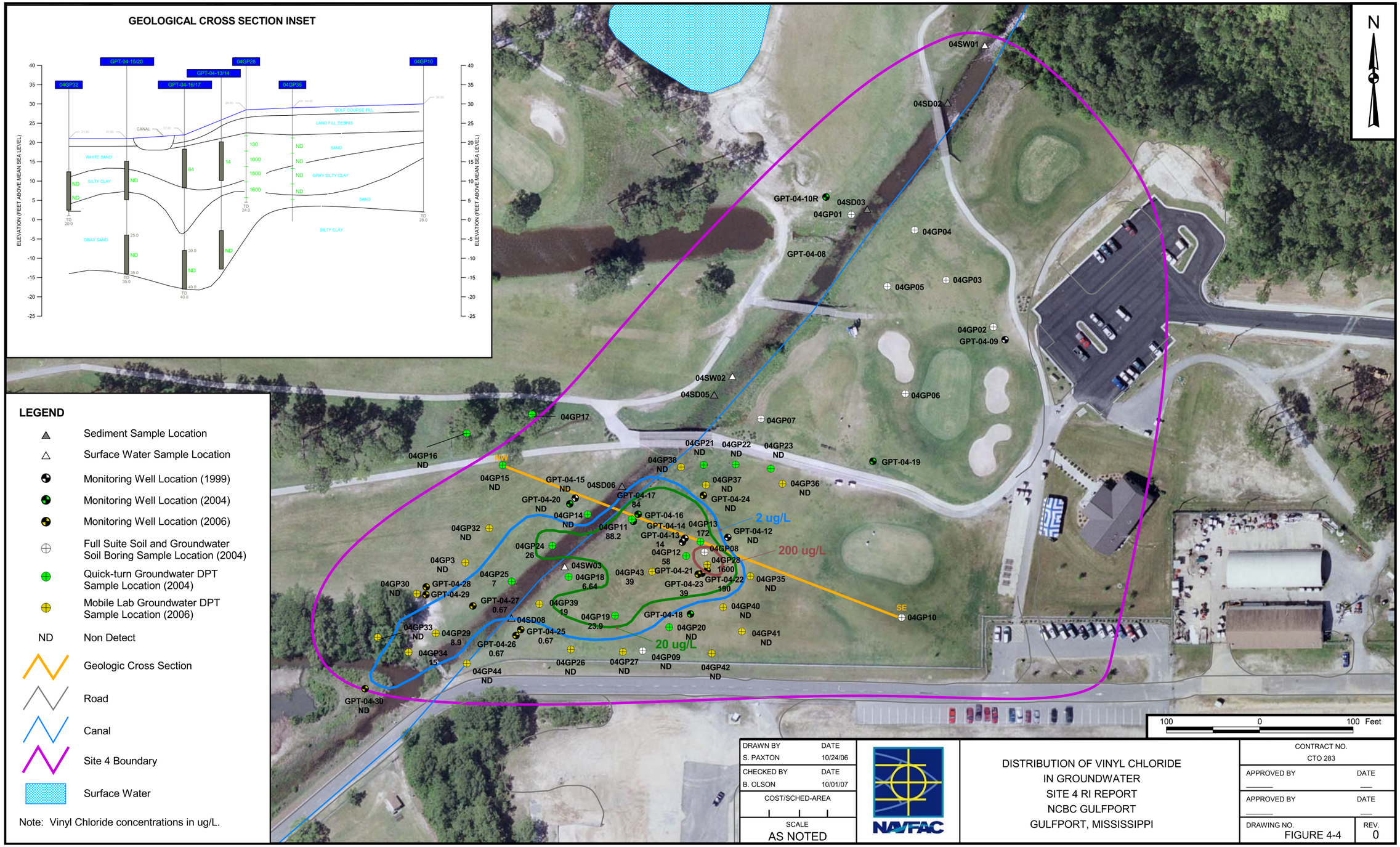
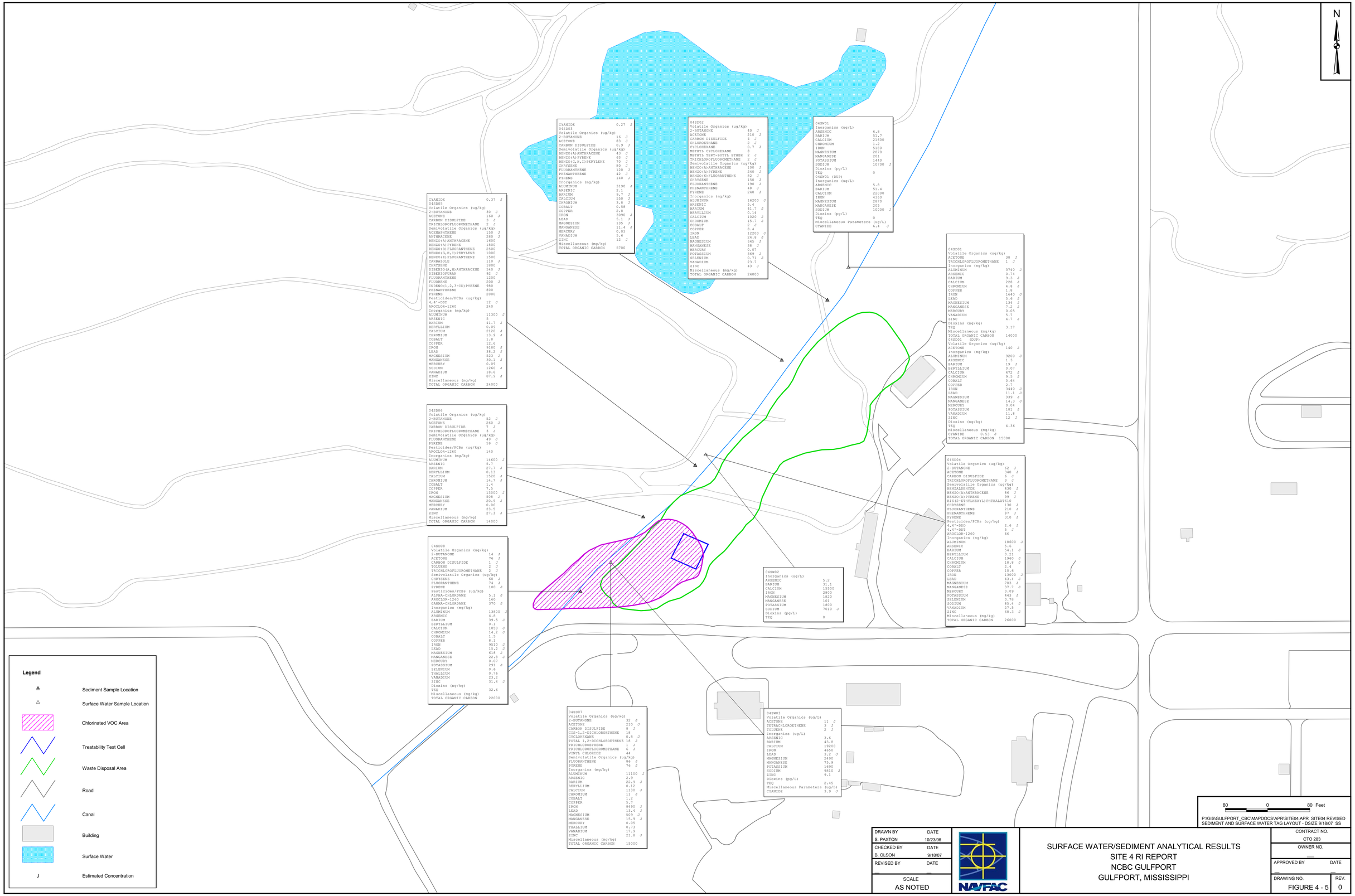




DRAWN BY	DATE
S. PAXTON	10/23/06
CHECKED BY	DATE
B. OLSON	9/18/07
REVISED BY	DATE
SCALE	
AS NOTED	

NAVFAC

SURFACE WATER/SEDIMENT ANALYTICAL RESULTS
SITE 4 RI REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
CTO 283	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 4 - 5	0

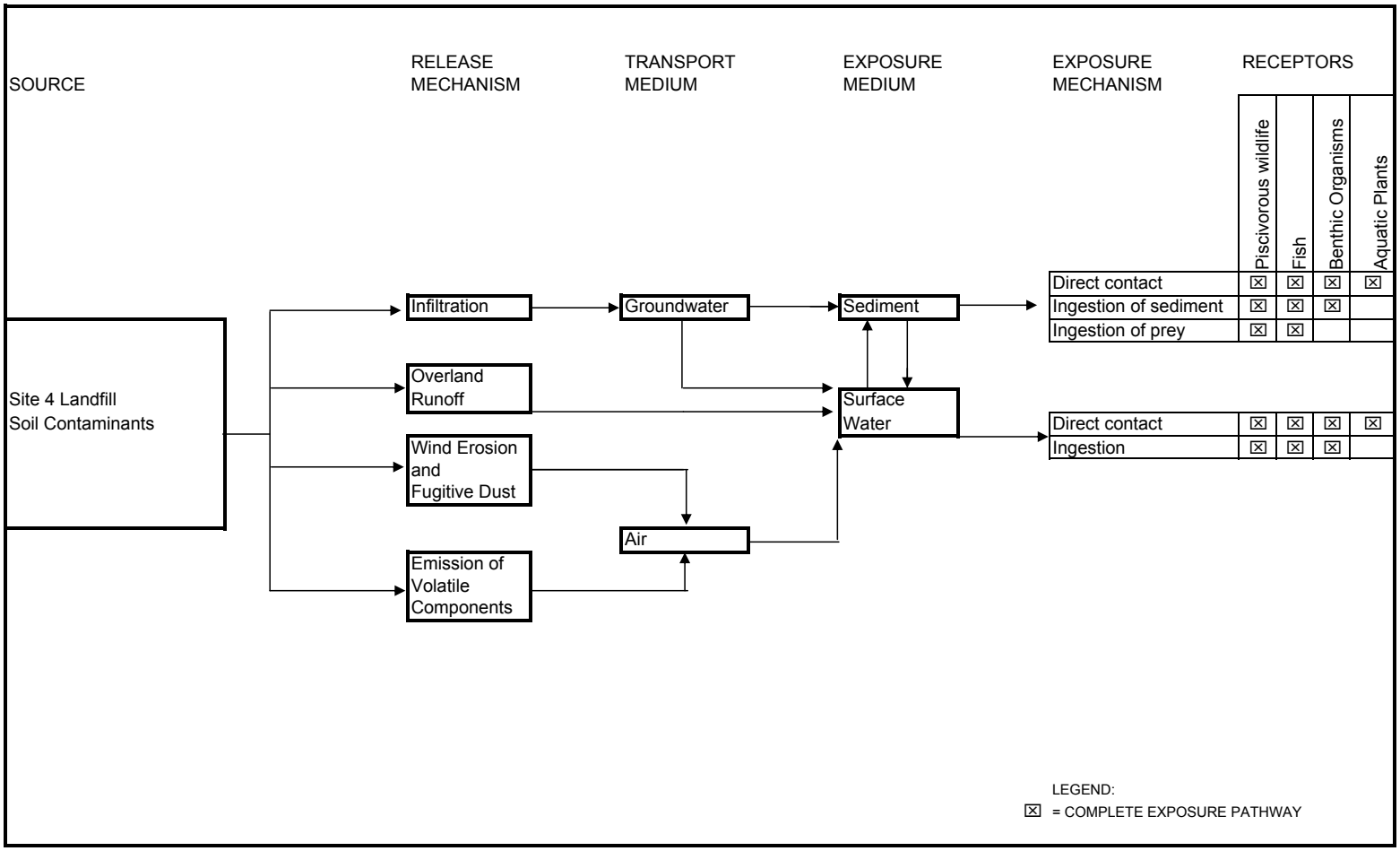


FIGURE 6-1. CONCEPTUAL SITE MODEL
SITE 4 GOLF COURSE LANDFILL
NCBC GULFPORT, MISSISSIPPI

TABLES

TABLE 2-1
REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS SUMMARY
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

	NATURE AND EXTENT ANALYSES								FATE AND TRANSPORT ANALYSES						
SAMPLE MATRIX	**TCL VOCs**	**TCL SVOCs**	**TCL Pest/PCBs**	**Appx IX OP Pest**	**Appx IX Herbicide**	**TAL Metals + CN**	**Dioxins and Furans**	**CVOC**	**TOC**	**Anions**	**Dissolved Gases**	**Hydrogen**	**Volatile Fatty Acids**	**Iron + Filtered iron**	**Microbial Census**
Soil	10	10	10		10	10	2		10						
Sediment	8	8	8	8	8	8	2		8						
Surface Water	3	3	3	3	3	3	3								
Groundwater															
DPT Groundwater	25	10	10	10	10	10			10	10	10				
Monitoring Wells	13	13	13	13	13	13	13		13	13	13	13			
DPT - Mobile Lab								20							
Baseline								3			4	4	4	4	3

Notes:

TCL VOCs	target compound list volatile organic compounds - Method 8260B
TCL SVOCs	target compound list semivolatile organic compounds - Method 8270C
TCL Pest/PCBs	target compound list pesticides and PCBs - Methods 8081A/8082
Appx IX OP pest	Appendix IX organophosphorus pesticides - Method
Appx IX Herbicide	Appendix IX chlorinated herbicides - Method 8151B
TAL Metals + CN	target analyte list metals + cyanide - Method 6061B/7000A
Dioxins/Furans	Method 8290
CVOC	chlorinated volatile organic compounds - Method 8260B
TOC	total organic carbon - Method 9060
Anions	various methods
Dissolved Gases	Method RSK 147
Hydrogen	Method AM20GAX
Volatile fatty acids	Method AM23G
Iron + filtered iron	Method 6061B (unfiltered and filtered aliquots for each sample)
Microbial census	Biodechlor census

TABLE 2-2
WELL CONSTRUCTION DETAILS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

	INSTALLATION DATE	TOTAL DEPTH (feet bls)	SCREENED INTERVAL (feet bls)	TOP OF CASING ELEVATION
GPT-04-10R	8/16/2004	14	4-14	22.66
GPT-04-11R	8/17/2004	35	30-35	22.35
GPT-04-16	8/14/2004	14	4-14	21.39
GPT-04-17	8/15/2004	40	35-40	21.25
GPT-04-18	8/14/2004	21	11-21	28.76
GPT-04-19	8/15/2004	19	9-19	29.15
GPT-04-20	8/17/2004	35	30-35	20.93
GPT-04-21	4/11/2006	16	6-16	28.51
GPT-04-22	4/11/2006	24	19-24	28.60
GPT-04-23	5/16/2006	50	45-50	28.58
GPT-04-24	4/11/2006	16	6-16	26.40
GPT-04-25	4/11/2006	16	6-16	21.10
GPT-04-26	4/11/2006	38	28-38	21.00
GPT-04-27	4/12/2006	15	5-15	20.06
GPT-04-28	4/12/2006	16	6-16	21.33
GPT-04-29	4/12/2006	35	25-35	21.27
GPT-04-30	4/12/2006	15	5-15	21.88
EXISTING WELLS				
GPT-04-08	2/18/1999			24.13
GPT-04-09	2/18/1999	26	16-26	28.44
GPT-04-10	2/18/1999	15	5-15	21.86
GPT-04-11	2/18/1999	45	35-45	21.96
GPT-04-12	2/18/1999	16	6-16	28.13
GPT-04-13	2/18/1999	15	5-15	27.39
GPT-04-14	2/18/1999	34	24-34	27.26
GPT-04-15	2/18/1999	15	5-15	20.99

Notes:
bls - below land surface
Top of casing elevations in feet above mean sea level

TABLE 3-1

WATER LEVEL MEASUREMENT SUMMARY
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

MONITORING WELL ID	AQUIFER ZONE	TOP-OF-CASING ELEVATION	9/24/2004		9/27/2006	
			DEPTH TO WATER	GROUNDWATER ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION
GPT-04-09	Intermediate	28.44	7.08	21.36		
GPT-04-11	Deep	21.96	3.58	18.38		
GPT-04-10R	Shallow	22.66	3.49	19.17		
GPT-04-11R	Deep	22.35	4.95	17.40		
GPT-04-12	Shallow	28.13	7.77	20.36	7.10	21.03
GPT-04-13	Shallow	27.39	8.08	19.31	6.45	20.94
GPT-04-14	Deep	27.43	6.95	20.48	6.53	20.90
GPT-04-15	Shallow	20.99	2.11	18.88	1.55	19.44
GPT-04-16	Shallow	21.42	2.16	19.26	1.60	19.82
GPT-04-17	Deep	21.27	2.68	18.59	3.11	18.16
GPT-04-18	Shallow	28.81	7.21	21.60	6.66	22.15
GPT-04-19	Shallow	29.15	7.55	21.60		
GPT-04-20	Deep	21.04	2.27	18.77	2.89	18.15
GPT-04-21	Shallow	28.51			6.02	22.49
GPT-04-22	Intermediate	28.60			7.58	21.02
GPT-04-23	Deep	28.58			8.57	20.01
GPT-04-24	Shallow	26.40			6.21	20.19
GPT-04-25	Shallow	21.10			1.55	19.55
GPT-04-26	Deep	21.00			3.02	17.98
GPT-04-27	Shallow	20.06			0.48	19.58
GPT-04-28	Shallow	21.33			3.35	17.98
GPT-04-29	Deep	21.27			1.83	19.44
GPT-04-30	Shallow	21.88			2.35	19.53

Notes:
Elevations referenced to feet above mean sea level
Depths in feet below top-of-casing

TABLE 3-2

HORIZONTAL HYDRAULIC GRADIENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

SHALLOW WELLS							
		WELL PAIRS	**TOTAL DEPTH (fbls)**	**SCREENED INTERVAL (fbls)**	**TOP OF CASING ELEVATION (fams)**	**DEPTH TO WATER (fbtoc)**	**GROUNDWATER ELEVATION (fams)**
9/24/2004	Highest	GPT-04-09	26	11-26	28.44	7.08	21.36
(Northeast)	Lowest	GPT-04-10R	14	4-14	22.66	3.49	19.17
		HORIZONTAL DISTANCE (feet)		240	**HORIZONTAL GRADIENT (feet/foot)**		**0.009**
9/24/2004	Highest	GPT-04-12	16	6-16	28.13	7.77	20.36
(Southwest)	Lowest	GPT-04-15	15	5-15	20.99	2.11	18.88
		HORIZONTAL DISTANCE (feet)		175	**HORIZONTAL GRADIENT (feet/foot)**		**0.008**
9/27/2006	Highest	GPT-04-21	13	3-13	28.51	6.02	22.49
	Lowest	GPT-04-15	15	5-15	20.99	1.55	19.44
		HORIZONTAL DISTANCE (feet)		165	**HORIZONTAL GRADIENT (feet/foot)**		**0.018**
DEEP WELLS							
9/24/2004	Highest	GPT-04-13	34	24-34	27.39	8.08	19.31
	Lowest	GPT-04-20	35	25-35	21.04	2.27	18.77
		HORIZONTAL DISTANCE (feet)		125	**HORIZONTAL GRADIENT (feet/foot)**		**0.004**
9/27/2006	Highest	GPT-04-23	50	40-50	28.58	8.57	20.01
	Lowest	GPT-04-20	35	25-35	21.04	2.27	18.77
		HORIZONTAL DISTANCE (feet)		125	**HORIZONTAL GRADIENT (feet/foot)**		**0.010**

Notes:
fbls - feet below land surface
fams - feet above mean sea level
fbtoc - feet below top of casing
Horizontal distance measure parallel to direction of groundwater flow

TABLE 3-3
VERTICAL HYDRAULIC GRADIENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

				9/24/2004		9/27/2006	
WELL PAIRS	**TOTAL WELL DEPTH**	**SCREENED INTERVAL (fbls)**	**TOP OF CASING ELEVATION (fams)**	**DEPTH TO WATER (fbtoc)**	**GROUNDWATER ELEVATION (fams)**	**DEPTH TO WATER (fbtoc)**	**GROUNDWATER ELEVATION (fams)**
GPT-04-10R	14	4-14	22.66	3.49	19.17		
GPT-04-11R	35	35-45	22.35	4.95	17.40		
SCREEN SEPARATION (feet)		21	**VERTICAL GRADIENT**		**-0.084**		
GPT-04-14	15	5-15	27.43	6.95	20.48	6.53	20.90
GPT-04-13	34	24-34	27.39	8.08	19.31	6.45	20.94
SCREEN SEPARATION (feet)		9	**VERTICAL GRADIENT**		**-0.130**		**0.004**
GPT-04-15	15	5-15	20.99	2.11	18.88	1.55	19.44
GPT-04-20	35	25-35	21.04	2.27	18.77	2.89	18.15
SCREEN SEPARATION (feet)		10	**VERTICAL GRADIENT**		**-0.011**		**-0.129**
GPT-04-16	14	4-14	21.42	2.16	19.26	1.60	19.82
GPT-04-17	40	30-40	21.27	2.68	18.59	3.11	18.16
SCREEN SEPARATION (feet)		16	**VERTICAL GRADIENT**		**-0.042**		**-0.104**
GPT-04-21	13	3-13	28.51			6.02	22.49
GPT-04-23	50	40-50	28.58			8.57	20.01
SCREEN SEPARATION (feet)		27	**VERTICAL GRADIENT**				**-0.092**
GPT-04-26	13	3-13	21.00			3.02	17.98
GPT-04-25	44	34-44	21.10			1.55	19.55
SCREEN SEPARATION (feet)		21	**VERTICAL GRADIENT**				**0.075**
GPT-04-28	13	3-13	21.33			3.35	17.98
GPT-04-29	49	39-49	21.27			1.83	19.44
SCREEN SEPARATION (feet)		27	**VERTICAL GRADIENT**				**0.054**

Notes:
fbls - feet below land surface
fams - feet above mean sea level
fbtoc - feet below top of casing
Negative gradients are downward, positive gradients are upward

TABLE 4-1

FIELD HEADSPACE SCREENING RESULTS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

SOIL BORING	TOTAL DEPTH (feet)	SAMPLE DEPTH (feet)	HEADSPACE RESPONSE (ppm)	SATURATED	LAB SAMPLE ID	COMMENTS
04GP01	44	34-36	239	Yes	04SB0101	
04GP02	40	4-6	5.8	No	04SB0201	
04GP03	40	16-18	4.9	Yes	04SB0301	
04GP04	24	12-14	5.6	Yes	04SB0401	
04GP05	28	14-16	4.5	Yes	04SB0501	Dioxin sample, geotechnical sample
04GP06	32	12-14	44.5	Yes	04SB0601	
04GP07	24	20-22	235	Yes	04SB0701	Dioxin sample, geotechnical sample
04GP08	24	10-12	5,694	Yes	04SB0801	Geotechnical sample
04GP09	24	16-18	50.1	Yes	04SB0901	
04GP10	28	10-12	> 9,999	Yes	04SB1001	

Notes:
ppm = parts per million

TABLE 4-2
POSITIVE DETECTIONS IN SUBSURFACE SOIL SAMPLES - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location			04GP01	04GP02	04GP03	04GP04	04GP05	04GP06
sample ID	Mississippi	Mississippi	04SB0101	04SB0201	04SB0301	04SB0401	04SB0501	04SB0601
sample depth (feet below surface)	Tier 1 TRG	Tier 1 TRG	34-36	4-6	16-18	12-14	14-16	12-14
sample date	Restricted	Unrestricted	08/11/04	08/12/04	08/12/04	08/12/04	08/13/04	08/18/04
Volatile Organics (ug/kg)								
2-BUTANONE	84,500	84,500	26 U	**9 J**	26 UJ	37 UJ	27 U	**12 J**
ACETONE	104,000,000	7,820,000	**48 J**	**66 J**	**22 J**	**23 J**	**27 J**	**200 J**
CARBON DISULFIDE	7,970	7,970	5 U	**0.7 J**	**2 J**	**2 J**	**1 J**	**1 J**
CHLOROBENZENE	1,190	1,190	5 U	5 U	5 U	**1 J**	5 U	6 U
ETHYLBENZENE	39,500	395,000	5 U	**3 J**	5 U	7 U	5 U	**170**
ISOPROPYLBENZENE	9,430	9,430	5 U	**0.8 J**	5 U	7 U	5 U	6 UJ
M+P-XYLENES	3,180	3,180	10 U	**2 J**	11 U	15 U	11 U	12 U
METHYL CYCLOHEXANE			5 U	**6**	5 U	7 U	5 U	**2 J**
STYRENE	384,000	384,000	5 U	5 U	5 U	7 U	5 U	**88**
TOLUENE	38,000	38,000	5 U	5 U	5 U	7 U	5 U	**360 J**
TRICHLOROFLUOROMETHANE	143,000,000	23,500,000	**1 J**	5 U	**2 J**	**2 J**	**2 J**	**4 J**
VINYL CHLORIDE	939	426	5 U	5 U	5 U	7 U	5 U	6 U
Semivolatile Organics (ug/kg)								
1,1-BIPHENYL	10,200,000	3,910,000	400 U	**340 J**	400 U	420 U	410 U	400 U
2-METHYLNAPHTHALENE	40,900,000	1,560,000	400 U	**2900 J**	400 U	420 U	410 U	400 U
ACENAPHTHENE	123,000,000	4,690,000	400 U	**6100 J**	400 U	420 U	410 U	400 U
ANTHRACENE	613,000,000	23,500,000	400 U	**1700**	400 U	420 U	410 U	400 U
BENZALDEHYDE	204,000,000	7,820,000	400 UJ	760 UJ	400 UJ	420 UJ	410 UJ	**260 J**
BENZO(A)ANTHRACENE	7,840	875	400 U	**760 J**	400 U	420 U	410 U	400 U
BENZO(B)FLUORANTHENE	7,840	875	400 U	**560 J**	400 U	420 U	410 U	400 U
BENZO(G,H,I)PERYLENE	61,300,000	2,350,000	400 U	**390 J**	400 U	420 U	410 U	400 U
BENZO(K)FLUORANTHENE	78,400	8,750	400 U	**870 J**	400 U	420 U	410 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	409,000	45,600	400 U	**600 J**	**250 J**	**260 J**	**240 J**	400 U
CARBAZOLE	286,000	31,900	400 U	**600 J**	400 U	420 U	410 U	400 U
CHRYSENE	784,000	87,500	400 U	**1200**	400 U	420 U	410 U	400 U
DIBENZO(A,H)ANTHRACENE	784	87.5	400 U	**210 J**	400 U	420 U	410 U	400 U
DIBENZOFURAN	8,180,000	313,000	400 U	**2900 J**	400 U	420 U	410 U	400 U
FLUORANTHENE	81,700,000	3,130,000	400 U	**2700**	400 U	420 U	410 U	400 U
FLUORENE	81,700,000	3,130,000	400 U	**4200 J**	400 U	420 U	410 U	400 U
INDENO(1,2,3-CD)PYRENE	7,840	875	400 U	**340 J**	400 U	420 U	410 U	400 U
NAPHTHALENE	247,000	194,000	400 U	**2100 J**	400 U	420 U	410 U	400 U
PHENANTHRENE	61,300,000	2,350,000	400 U	**7000**	400 U	420 U	410 U	400 U
PYRENE	61,300,000	2,350,000	400 U	**4400**	400 U	420 U	410 U	400 U
Pesticides/PCBs (ug/kg)								
4,4'-DDD	23,800	2,660	4 UJ	**6.3**	4 U	4.2 U	4.1 U	4 UJ
4,4'-DDE	16,800	1,880	4 UJ	**3.7 J**	4 U	4.2 U	4.1 U	4 U
ALPHA-CHLORDANE	12,300	1,820	2 UJ	**24**	2.1 U	2.1 U	2.1 U	2 U
GAMMA-CHLORDANE	12,300	1,820	2 UJ	**280 J**	2.1 U	2.1 U	2.1 U	2 U
Dioxins (ng/kg)								
1,2,3,4,6,7,8,9-OCDD							**120 J**	
1,2,3,4,6,7,8-HPCDD							**12**	
1,2,3,7,8,9-HXCDD							2 U	
2,3,7,8-TCDD	38.2	4.26					0.2 U	
DIOXIN TEQ	38.2	4.26					**0.24**	

Notes:
TRG = Target Remediation Goal
TRG values converted from mg/kg to units shown
ug/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
TEQ = Toxic Equivalents
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-2
POSITIVE DETECTIONS IN SUBSURFACE SOIL SAMPLES - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location			04GP07	04GP08	04GP08	04GP09	04GP10
sample ID	Mississippi	Mississippi	04SB0701	04SB0801	04SB0801D	04SB0901	04SB1001
sample depth (feet below surface)	Tier 1 TRG	Tier 1 TRG	20-22	10-12	10-12	16-18	10-12
sample date	Restricted	Unrestricted	08/18/04	08/19/04	08/19/04	08/18/04	08/19/04
Volatile Organics (ug/kg)							
2-BUTANONE	84,500	84,500	29 UJ	25 U	30 U	25 UJ	25 UJ
ACETONE	104,000,000	7,820,000	**110 J**	**130 J**	**270 J**	25 UR	**110 J**
CARBON DISULFIDE	7,970	7,970	**1 J**	**0.9 J**	**2 J**	**2 J**	**6**
CHLOROBENZENE	1,190	1,190	6 U	5 U	6 U	5 U	5 U
ETHYLBENZENE	39,500	395,000	6 U	5 U	6 U	5 U	5 U
ISOPROPYLBENZENE	9,430	9,430	6 U	5 U	6 U	5 U	5 U
M+P-XYLENES	3,180	3,180	12 U	10 U	12 U	10 U	10 U
METHYL CYCLOHEXANE			6 U	5 U	6 U	5 U	5 U
STYRENE	384,000	384,000	6 U	5 U	6 U	5 U	5 U
TOLUENE	38,000	38,000	6 U	**0.7 J**	**0.9 J**	5 U	5 U
TRICHLOROFLUOROMETHANE	143,000,000	23,500,000	**2 J**	**3 J**	**3 J**	**2 J**	**3 J**
VINYL CHLORIDE	939	426	6 U	**6**	**3 J**	5 U	5 U
Semivolatile Organics (ug/kg)							
1,1-BIPHENYL	10,200,000	3,910,000	440 U	390 U	390 U	400 U	400 U
2-METHYLNAPHTHALENE	40,900,000	1,560,000	440 U	390 U	390 U	400 U	400 U
ACENAPHTHENE	123,000,000	4,690,000	440 U	390 U	390 U	400 U	400 U
ANTHRACENE	613,000,000	23,500,000	440 U	390 U	390 U	400 U	400 U
BENZALDEHYDE	204,000,000	7,820,000	440 UJ	390 UJ	390 UJ	400 UJ	400 UJ
BENZO(A)ANTHRACENE	7,840	875	440 U	390 U	390 U	400 U	400 U
BENZO(B)FLUORANTHENE	7,840	875	440 U	390 U	390 U	400 U	400 U
BENZO(G,H,I)PERYLENE	61,300,000	2,350,000	440 U	390 U	390 U	400 U	400 U
BENZO(K)FLUORANTHENE	78,400	8,750	440 U	390 U	390 U	400 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	409,000	45,600	440 U	390 U	390 U	400 U	400 U
CARBAZOLE	286,000	31,900	440 U	390 U	390 U	400 U	400 U
CHRYSENE	784,000	87,500	440 U	390 U	390 U	400 U	400 U
DIBENZO(A,H)ANTHRACENE	784	87.5	440 U	390 U	390 U	400 U	400 U
DIBENZOFURAN	8,180,000	313,000	440 U	390 U	390 U	400 U	400 U
FLUORANTHENE	81,700,000	3,130,000	440 U	390 U	390 U	400 U	400 U
FLUORENE	81,700,000	3,130,000	440 U	390 U	390 U	400 U	400 U
INDENO(1,2,3-CD)PYRENE	7,840	875	440 U	390 U	390 U	400 U	400 U
NAPHTHALENE	247,000	194,000	440 U	390 U	390 U	400 U	400 U
PHENANTHRENE	61,300,000	2,350,000	440 U	390 U	390 U	400 U	400 U
PYRENE	61,300,000	2,350,000	440 U	390 U	390 U	400 U	400 U
Pesticides/PCBs (ug/kg)							
4,4'-DDD	23,800	2,660	4.4 UJ	3.9 U	3.9 U	4 UJ	4 U
4,4'-DDE	16,800	1,880	4.4 U	3.9 U	3.9 U	4 U	4 U
ALPHA-CHLORDANE	12,300	1,820	2.3 U	2 U	2 U	2 U	2.1 U
GAMMA-CHLORDANE	12,300	1,820	2.3 U	2 U	2 U	2 U	2.1 U
Dioxins (ng/kg)							
1,2,3,4,6,7,8,9-OCDD			**320**				
1,2,3,4,6,7,8-HPCDD			**33**				
1,2,3,7,8,9-HXCDD			**4.3 J**				
2,3,7,8-TCDD	38.2	4.26	**1.4**				
DIOXIN TEQ	38.2	4.26	**2.48**				

Notes:
TRG = Target Remediation Goal
TRG values converted from mg/kg to units shown
ug/kg = micrograms per kilogram
ng/kg = nanograms per kilogram
TEQ = Toxic Equivalents
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-3
POSTIVE DETECTIONS IN SUBSURFACE SOIL SAMPLES - INORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location			04GP01	04GP02	04GP03	04GP04	04GP05	04GP06	04GP07	04GP08	04GP08	04GP09	04GP10
sample ID	Mississippi	Mississippi	04SB0101	04SB0201	04SB0301	04SB0401	04SB0501	04SB0601	04SB0701	04SB0801	04SB0801D	04SB0901	04SB1001
sample depth (feet below surface)	Tier 1 TRG	Tier 1 TRG	34-36	4-6	16-18	12-14	14-16	12-14	20-22	10-12	10-12	16-18	10-12
sample date	Restricted	Unrestricted	08/11/04	08/12/04	08/12/04	08/12/04	08/13/04	08/18/04	08/18/04	08/19/04	08/19/04	08/18/04	08/19/04
Inorganics (mg/kg)													
ALUMINUM	2,040,000	78,200	**2860**	**5610**	**1480**	**2150**	**1240**	**7020**	**7680**	**5600**	**5650**	**2210**	**3380**
ARSENIC	3.82	0.426	**0.27**	**4.2**	**1.9**	**0.88**	**2.4**	**0.79**	**7.6**	**1.4**	**0.96**	**2**	**1.8**
BARIUM	14,300	5,480	**31.2**	**68.7**	**6.1**	**11.9**	**4.3**	**11**	**27.4**	**10.1**	**9.1**	**5.1**	**4.6**
BERYLLIUM	1,020	156	**0.04**	**0.25**	0.02 U	**0.04**	0.02 U	**0.14**	**0.57**	**0.03**	**0.03**	0.02 U	0.02 U
CALCIUM			**577**	**20000**	**240**	**69.4**	**96**	**44.9**	**644**	**36.4**	**28.6**	**237**	**33.6**
CHROMIUM	381	227	**4.9**	**14.6**	**2.4**	**3.1**	**3.1**	**5.6**	**15.2**	**4.8**	**4.7**	**2.5**	**4.1**
COBALT	12,300	4,690	0.33 U	**1.4**	**0.64**	0.42 U	**0.57**	**0.41**	**3.9 J**	0.39 U	0.46 U	0.4 U	**1.1**
COPPER	8,170	3,130	**1.7**	**13.9**	**1.7**	**1.9**	**1.6**	**1.2**	**4.8**	**1.3**	**1.5**	**1.3**	**1.6**
IRON	613,000	23,500	**1620**	**5600**	**1360**	**1040**	**1550**	**4350**	**10300**	**7290**	**6030**	**984**	**931**
LEAD	1,700	400	**8.8**	**80.5**	2.7 U	3.8 U	2.1 U	5.4 U	8.2 U	4.2 U	4.7 U	1.1 U	2.6 U
MAGNESIUM			**377 J**	**2110 J**	**135 J**	**152 J**	**105 J**	**204 J**	**1020 J**	**170 J**	**174 J**	**79.5 J**	**77.9 J**
MANGANESE	4,080	1,560	**16**	**131**	**2.8**	**3.2**	**5.6**	**6.9**	**35.7**	**5**	**6.1**	**2.6**	**2.2**
MERCURY	61.3	10	0.01 U	**0.02 J**	0.01 U	0.01 U	0.01 U	**0.03 J**	**0.02 J**	**0.02 J**	**0.02 J**	0.01 U	**0.01 J**
NICKEL	4,080	1,560	1.3 U	**12.4**	1.5 U	1.5 U	2 U	1.7 U	7.3 U	1.7 U	1.5 U	1.7 U	2.8 U
POTASSIUM			**254**	**370**	136 U	132 U	88.1 U	156 U	**782**	144 U	163 U	106 U	88.7 U
SELENIUM	1,020	391	0.28 U	0.38 U	0.34 U	0.35 U	0.32 U	0.32 U	0.35 U	0.33 U	0.39 U	0.34 U	**0.43**
SODIUM			**45.2 J**	**116 J**	15.8 U	29.5 U	40.4 U	27.4 U	**58.1 J**	34.1 U	34.9 U	17.2 U	9.6 U
THALLIUM	143	5.48	0.31 U	0.42 U	0.38 U	0.39 U	0.36 U	0.36 U	0.38 U	**0.44**	0.43 U	0.37 U	0.32 U
VANADIUM	1,430	548	**7.4**	**19.8**	**2.4**	**4.1**	**2.7**	**8.7**	**17**	**7.8**	**7.5**	2 U	**4.2**
ZINC	61,300	23,500	**2.1**	**193**	**5.1**	**2.2**	**1.9**	**3**	**26.8**	**2.1**	**2.7**	**9.2**	**1.4**
CYANIDE	4,080	1,560	0.5 UJ	**0.32 J**	0.5 UJ	0.5 UJ	0.5 UJ	0.58 UJ	0.63 UJ	**0.38 J**	**0.77 J**	0.55 UJ	**0.51 J**
Other Parameters (mg/kg)													
TOTAL ORGANIC CARBON			1900	39000	1800	5000	1700	12000	4800	4300	4300	830	11000
TOTAL SOLIDS			84%	86%	82%	79%	81%	82%	75%	84%	84%	82%	82%

Notes:
TRG = Target Remediation Goal
mg/kg = milligrams per kilogram
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG
Chromium TRG for hexavalent chromium

TABLE 4-4
POSITIVE DETECTIONS IN SURFACE SOIL SAMPLES
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location				04SS01	04SS02	04SS03	04SS04	04SS05	04SS06
sample ID	Mississippi	Mississippi	USEPA	04SS0101	04SS0201	04SS0301	04SS0401	04SS0501	04SS0601
sample depth	Tier 1 TRG	Tier 1 TRG	Region IV	0-2	0-1	0-1.5	0-1.5	0-1.5	0-1.5
sample date	Restricted	Unrestricted	ESV	05/17/07	05/17/07	05/17/07	05/17/07	05/17/07	05/17/07
Volatile Organics (ug/kg)									
2-BUTANONE	84,500	84,500		2 U	1.9 U	1.6 U	1.4 U	1.3 U	**4 J**
BENZENE	1,360	887	50	0.19 U	**0.24 J**	0.16 U	0.48 U	0.43 U	0.46 U
Semivolatile Organics (ug/kg)									
BENZALDEHYDE	204,000,000	7,820,000		62 U	60 U	61 U	**67 J**	59 U	58 U
BENZO(A)ANTHRACENE	7,840	875		**80 J**	39 U	**40 J**	410 U	38 U	380 U
BENZO(A)PYRENE	784	88	100	**80 J**	24 U	25 U	260 U	24 U	240 U
BENZO(B)FLUORANTHENE	7,840	875		**100 J**	34 U	35 U	360 U	33 U	330 U
BENZO(K)FLUORANTHENE	78,400	8,750		**79 J**	42 U	43 U	440 U	42 U	410 U
CHRYSENE	784,000	87,500		**100 J**	33 U	**44 J**	350 U	33 U	320 U
FLUORANTHENE	81,700,000	3,130,000	100	**120 J**	57 U	59 U	61 U	57 U	56 U
PHENANTHRENE	61,300,000	2,350,000	100	**52 J**	24 U	**25 J**	26 U	24 U	24 U
PYRENE	61,300,000	2,350,000	100	**140 J**	43 U	**49 J**	450 U	42 U	420 U
Pesticides/PCBs (ug/kg)									
4,4'-DDD	23,800	2,660	2.5	**7.7 J**	**3.5 J**	**6.1 J**	**2.7 J**	**1.3 R**	**2.1 J**
4,4'-DDE	16,800	1,880	2.5	**7.7**	**1.4**	**1.9**	**0.6 J**	**0.45 J**	**0.66 J**
4,4'-DDT	16,800	1,880	2.5	**200 J**	**2.7 J**	**0.84 J**	0.15 U	**0.97 J**	0.28 R
ALPHA-CHLORDANE	12,300	1,820	100	**39 J**	**9.9**	**6.6 J**	**1.8 J**	**1.5 J**	**1.7 J**
BETA-BHC	3,180	355	1	0.097 U	**1**	0.096 U	0.1 U	0.094 U	0.093 U
DELTA-BHC	3,180	355	0.05	0.097 U	**0.32 J**	0.096 U	0.1 U	0.094 U	0.093 U
DIELDRIN	358	40	0.5	**3.1 J**	0.14 U	**1.6 J**	**0.49 J**	**0.32 J**	0.14 U
ENDOSULFAN II	1,230,000	469,000	100	0.15 U	**0.59 J**	0.14 U	0.15 U	0.14 U	0.14 U
ENDOSULFAN SULFATE	1,230,000	469,000	100	0.15 U	**0.47 J**	**0.78 J**	**0.37 J**	0.14 U	0.14 U
ENDRIN	61,300	23,500	1	**1.7**	0.14 U	0.14 U	0.15 U	0.14 U	0.14 U
GAMMA-BHC (LINDANE)	4,400	491	0.05	0.097 U	0.094 U	0.096 U	0.1 U	0.094 U	**0.15 J**
GAMMA-CHLORDANE	12,300	1,820	100	**20**	**10**	**4.9**	**1.9**	**1.4**	**1.8 J**
HEPTACHLOR	195	127	100	0.097 U	**0.98 J**	0.096 U	0.1 U	0.094 U	0.093 U
Inorganics (mg/kg)									
ALUMINUM	2,040,000	78,200		**5270**	**5490**	**6420**	**5240**	**4150**	**5030**
ARSENIC	4	0	18	**3.4**	**2.5**	**5.6**	**1.5**	0.65 U	**1.5**
BARIUM	14,300	5,480	330	**19.7**	**15.5**	**15.1**	**13.6**	**9.7**	**10**
CALCIUM				**1490**	**911**	**1250**	**713**	**3230**	**410**
CHROMIUM	381	227	26	**6.4**	**5.5**	**7.6**	**4**	**3.7**	**4.1**
COPPER	8,170	3,130	28	**8.6**	**3.3**	**35.8**	1.2 U	**1.4**	**1.1**
IRON	613,000	23,500		**5540**	**6350**	**5260**	**4940**	**2270**	**2880**
LEAD	1,700	400	11	**32.1**	**7.5**	**91.5**	**5.8**	**4.8**	3.6 U
MAGNESIUM				227 U	**246**	**258**	235 U	217 U	217 U
MANGANESE	4,080	1,560	220	**24.5**	**8.5**	**17.1**	**5**	**4**	**4.2**
MERCURY	61	10	0.1	0.044	0.014 U	**0.032**	0.015 U	0.014 U	0.015 U
NICKEL	4,080	1,560	38	**3**	**1.4**	**1.9**	**1.4**	**1.2**	**1.1**
VANADIUM	1,430	548	7.8	**9**	**9**	**11.1**	**7.5**	**5.6**	**6.9**
ZINC	61,300	23,500	50	**54**	**10.7**	**194**	**9.4**	**6.8**	**5.7**
CYANIDE	4,080	1,560	0.9	**0.34**	**0.14**	0.14 U	0.15 U	0.14 U	**0.37**

Notes:
TRG = Target Remediation Goal
TRG values converted from mg/kg to units shown
ESV = Ecological Screening Value
mg/kg = milligram per kilogram
ug/kg = micrograms per kilogram
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-5
GROUNDWATER CHARACTERIZATION RESULTS - VOCS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP01	04GP02	04GP03	04GP04	04GP05	04GP06	04GP07	04GP08	04GP08	04GP09
sample ID	Mississippi	04GP0101	04GP0201	04GP0301	04GP0401	04GP0501	04GP0601	04GP0701	04GP0801	04GP0801D	04GP0901
sample date	Tier 1	08/17/04	08/12/04	08/13/04	08/13/04	08/18/04	08/18/04	08/18/04	08/19/04	08/19/04	08/19/04
sample type	TRG	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.1 J**
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	**0.3 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 U	**2 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	608	5 U	**290 J**	5 U	5 U	5 U	6 U	5 U	13 U	11 U	5 U
BENZENE	5	**0.4 J**	5 U	5 U	5 U	5 U	5 U	5 U	**0.2 J**	**0.2 J**	5 U
CARBON DISULFIDE	1040	**0.4 J**	**0.6 J**	5 UJ	5 UJ	5 U	5 U	5 U	**0.5 J**	**0.4 J**	**0.3 J**
CHLOROBENZENE	100	**5**	5 U	5 U	5 U	5 U	5 U	**0.2 J**	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**19**	**19**	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U	5 U	5 UJ	5 UJ	5 U	**2 J**	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**12**	**11**	5 U
TRICHLOROETHENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	2	5 U	5 U	5 U	5 U	5 U	**0.9 J**	**0.6 J**	**4 J**	**4 J**	5 U

location		04GP10	04GP11	04GP12	04GP13	04GP14	04GP15	04GP16	04GP17	04GP18	04GP19
sample ID	Mississippi	04GP1001	04GP1101	04GP1201	04GP1301	04GP1401	04GP1501	04GP1601	04GP1701	04GP1801	04GP1901
sample date	Tier 1	08/19/04	08/10/04	08/10/04	08/10/04	08/11/04	08/11/04	08/11/04	08/11/04	08/16/04	08/16/04
sample type	TRG	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
ACETONE	608	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
BENZENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	1040	**0.2 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	**155**	**134**	**265**	5 U	5 U	5 U	5 U	**23.5**	**91.2**
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U									
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	**108**	**68.7**	**170**	5 U	5 U	5 U	5 U	**9.79**	**35.1**
TRICHLOROETHENE	5	5 U	**5.46**	**15.5**	**20.4**	5 U	5 U	5 U	5 U	5 U	**8.17**
VINYL CHLORIDE	2	5 U	**88.2**	**57.8**	**172**	5 U	5 U	5 U	5 U	**6.64**	**23.9**

TABLE 4-5
GROUNDWATER CHARACTERIZATION RESULTS - VOCS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP20	04GP21	04GP22	04GP23	04GP24	04GP25	GPT-04-08	GPT-04-09	GPT-04-10	GPT-04-11
sample ID	Mississippi	04GP2001	04GP2101	04GP2201	04GP2301	04GP2401	04GP2501	04GW0801	04GW0901	04GW1001	04GW1101
sample date	Tier 1	08/16/04	08/16/04	08/16/04	08/16/04	08/20/04	08/20/04	09/23/04	09/08/04	09/09/04	09/09/04
sample type	TRG	DPT	DPT	DPT	DPT	DPT	DPT	MW	MW	MW	MW
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	**0.2 J**	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	20 U	20 U	20 U	20 U	5 U	5 U	5 UR	5 U	5 U	**2 J**
ACETONE	608	50 U	50 U	50 U	50 U	8 U	5 U	5 UR	5 UR	**11 J**	**7 J**
BENZENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.1 J**	5 U
CARBON DISULFIDE	1040	5 U	5 U	5 U	5 U	5 U	**0.4 J**	5 UJ	5 U	**0.9 J**	**0.2 J**
CHLOROBENZENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**2 J**	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	5 U	5 U	5 U	**54**	**21**	5 U	5 U	5 U	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE						5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.2 J**	**0.9 J**
TRANS-1,2-DICHLOROETHENE	100	5 U	5 U	5 U	5 U	**20**	**7**	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5	5 U	5 U	5 U	5 U	**1 J**	**0.8 J**	5 U	5 U	5 U	5 U
VINYL CHLORIDE	2	5 U	5 U	5 U	5 U	**26**	**7**	5 U	5 U	**0.2 J**	5 U

location		GPT-04-12	GPT-04-12	GPT-04-13	GPT-04-14	GPT-04-15	GPT-04-16	GPT-04-17	GPT-04-18	GPT-04-19	GPT-04-20
sample ID	Mississippi	04GW1201	04GW1201D	04GW1301	04GW1401	04GW1501	04GW1601	04GW1701	04GW1801	04GW1901	04GW2001
sample date	Tier 1	09/14/04	09/14/04	09/22/04	09/22/04	09/10/04	09/13/04	09/13/04	09/21/04	09/21/04	09/10/04
sample type	TRG	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	**0.6 J**	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	**0.2 J**	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 U	5 U	5 UR	5 UR	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	608	**2 J**	3 J	5 UR	**3 J**	**2 J**	**7 J**	**10 J**	5 UR	5 UR	**4 J**
BENZENE	5	5 U	5 U	5 U	5 U	**0.1 J**	**0.2 J**	5 U	5 U	**0.2 J**	5 U
CARBON DISULFIDE	1040	5 U	5 U	5 UJ	5 UJ	5 U	5 U	**0.4 J**	**0.2 J**	5 U	5 U
CHLOROBENZENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	5 U	**55**	5 U	**0.2 J**	**280**	5 U	5 U	**0.7 J**	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	**0.3 J**	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	5 U	5 U	5 U	5 U	**2 J**	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	5 U	**30**	5 U	5 U	**190**	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5	5 U	5 U	**0.8 J**	5 U	5 U	**8**	5 U	5 U	5 U	5 U
VINYL CHLORIDE	2	5 U	5 U	**25**	5 U	**0.8 J**	**150**	5 U	5 U	5 U	5 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-6
GROUNDWATER DELINEATION RESULTS - MOBILE LAB CVOC
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP45	04GP45	04GP45	04GP26	04GP26	04GP26	04GP26	04GP27	04GP27	04GP27
sample ID	Mississippi	04GP4501	04GP4502	04GP4503	04GP2601	04GP2602	04GP2603	04GP2604	04GP2701	04GP2702	04GP2703
sample depth	Tier 1	6 - 10	10 - 14	14 - 18	4 - 8	8 - 12	12 - 16	16 - 20	5 - 9	9 - 13	13 - 17
sample date	TRG	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

location		04GP27	04GP28	04GP28	04GP28	04GP28	04GP29	04GP29	04GP29	04GP30	04GP30
sample ID	Mississippi	04GP2704	04GP2801	04GP2802	04GP2803	04GP2804	04GP2901	04GP2902	04GP2903	04GP3001	04GP3002
sample depth	Tier 1	17 - 21	8 - 12	12 - 16	16 - 20	20 - 24	5 - 9	9 - 13	13 - 17	4 - 8	8 - 12
sample date	TRG	03/28/06	03/28/06	03/28/06	03/28/06	03/28/06	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	**120**	**450**	**970**	**560**	**52**	**44**	**63**	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	82	**420**	**800**	**630**	**15**	**13**	**18**	1 U	1 U
TRICHLOROETHENE	5	1 U	**9.3**	**39**	**120**	**34**	**2.6**	**2.8**	**4.9**	1 U	1 U
VINYL CHLORIDE	2	1 U	**130**	**1000**	**1500**	**1600**	**8.9**	**7.9**	**8.5**	1 U	1 U

location		04GP30	04GP31	04GP31	04GP32	04GP32	04GP33	04GP33	04GP34	04GP34	04GP35
sample ID	Mississippi	04GP3003	04GP3101	04GP3102	04GP3201	04GP3202	04GP3301	04GP3302	04GP3401	04GP3402	04GP3501
sample depth	Tier 1	12 - 16	9 - 13	13 - 17	9 - 13	13 - 17	8 - 12	12 - 16	9 - 13	13 - 17	8 - 12
sample date	TRG	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06	03/29/06	03/30/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**120**	**86**	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**67**	**36**	1 U
TRICHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**8.2**	**5.5**	1 U
VINYL CHLORIDE	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**15**	**12**	1 U

location		04GP35	04GP35	04GP35	04GP36	04GP36	04GP36	04GP36	04GP37	04GP37	04GP37
sample ID	Mississippi	04GP3502	04GP3503	04GP3504	04GP3601	04GP3602	04GP3603	04GP3604	04GP3701	04GP3702	04GP3703
sample depth	Tier 1	12 - 16	16 - 20	20 - 24	7 - 11	11 - 15	15 - 19	19 - 23	8 - 12	12 - 16	16 - 20
sample date	TRG	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

TABLE 4-6
GROUNDWATER DELINEATION RESULTS - MOBILE LAB CVOC
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP38	04GP38	04GP38	04GP39	04GP39	04GP39	04GP40	04GP40	04GP40	04GP40
sample ID	Mississippi	04GP3801	04GP3802	04GP3803	04GP3901	04GP3902	04GP3903	04GP4001	04GP4002	04GP4003	04GP4004
sample depth	Tier 1	8 - 12	12 - 16	16 - 20	8 - 12	12 - 16	16 - 20	9 - 13	13 - 17	17 - 21	21 - 25
sample date	TRG	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/30/06	03/31/06	03/31/06	03/31/06	03/31/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	**31**	**110**	**130**	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	**10**	**42**	**49**	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	1 U	1 U	1 U	**2.8**	**12**	**15**	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	1 U	1 U	1 U	**4**	**16**	**19**	1 U	1 U	1 U	1 U

location		04GP41	04GP41	04GP41	04GP41	04GP42	04GP42	04GP42	04GP43	04GP43	04GP43
sample ID	Mississippi	04GP4101	04GP4102	04GP4103	04GP4104	04GP4201	04GP4202	04GP4203	04GP4301	04GP4302	04GP4303
sample depth	Tier 1	8 - 12	12 - 16	16 - 20	20 - 24	8 - 12	12 - 16	16 - 20	8 - 12	12 - 16	16 - 20
sample date	TRG	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06	03/31/06
Volatile Organics (ug/L)											
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**24**	**110**	**63**
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**9.6**	**53**	**32**
TRICHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**1.1**	**6.8**	**3.8**
VINYL CHLORIDE	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**4.5**	**38**	**22**

location		04GP43	04GP44	04GP44	04GP44
sample ID	Mississippi	04GP4304	04GP4401	04GP4402	04GP4403
sample depth	Tier 1	20 - 24	6 - 10	10 - 14	14 - 18
sample date	TRG	03/31/06	03/31/06	03/31/06	03/31/06
Volatile Organics (ug/L)					
CIS-1,2-DICHLOROETHENE	70	**100**	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	49	1 U	1 U	1 U
TRICHLOROETHENE	5	4.8	1 U	1 U	1 U
VINYL CHLORIDE	2	**39**	1 U	1 U	1 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-7
CHLORINATED VOC CHARACTERIZATION DATA
DIRECT PUSH GROUNDWATER SAMPLES
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Sample ID	Sample Depth	Chlorinated Compounds (TRG)			
		VC (2 μg/L)	**cis-DCE** (70 μg/L)	**trans-DCE** (100 μg/L)	**TCE** (5 μg/L)
DPT Samples					
04GP11	12	88.2	155	108	5.5
04GP12	13	58	134	68.7	15.5
04GP13	12	172	265	170	20.4
04GP18	10	6.64	23.5	9.8	ND
04GP19	12	23.9	91.2	35.1	8.17
04GP24	10	26	54	20	1
04GP25	14	7	21	7	0.8
04GP28	8	130	120	82	9.3
	13	1000	450	420	39
	16	1500	970	800	130
	22	1600	560	630	34
04GP29	9	8.9	52	15	2.6
	13	7.9	44	13	2.8
	17	8.5	63	18	4.9
04GP34	13	15	120	67	8.2
	17	12	86	36	5.5
04GP39	6	4	31	10	2.8
	8	16	110	42	15
	13	19	130	49	15
04GP43	12	4.5	24	9.6	1.1
	16	38	110	53	6.8
	20	22	63	32	3.8
	24	39	100	49	4.8

TABLE 4-8
BASELINE GROUNDWATER SAMPLES - CVOCS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location	Mississippi	GPT-04-12	GPT-04-13	GPT-04-14	GPT-04-15	GPT-04-16	GPT-04-17	GPT-04-20	GPT-04-21	GPT-04-22
sample ID	Tier 1	04MW1202	04MW1302	04MW1402	04MW1502	04GW1602	04MW1702	04MW2002	04MW2101	04MW2201
sample date	TRG	04/11/06	04/11/06	04/13/06	04/11/06	03/30/06	04/13/06	04/11/06	04/21/06	04/21/06
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	7	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	**1.2**
1,2-DICHLOROETHANE	5	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	**0.24 J**
CIS-1,2-DICHLOROETHENE	70	1 U	**47**	1 U	1 U	**170**	1 U	1 U	**5.9**	**470**
TETRACHLOROETHENE	5	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	**0.72 J**
TRANS-1,2-DICHLOROETHENE	100	1 U	**22**	1 U	1 U	**89**	1 U	1 U	**6.4**	**310**
TRICHLOROETHENE	5	1 U	**0.55 J**	1 U	1 U	**4.1**	1 U	1 U	**1**	**110**
VINYL CHLORIDE	2	1 U	**14**	1 U	1 U	**84**	1 U	1 U	**18**	**190**

location	Mississippi	GPT-04-23	GPT-04-24	GPT-04-25	GPT-04-26	GPT-04-27	GPT-04-28	GPT-04-29	GPT-04-29	GPT-04-30
sample ID	Tier 1	04MW2301	04MW2401	04MW2501	04MW2601	04MW2701	04MW2801	04MW2901	04MW2901D	04MW3001
sample date	TRG	07/28/06	04/20/06	04/21/06	04/21/06	04/21/06	04/20/06	04/20/06	04/20/06	04/20/06
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	1 U	1 U	**1.4**	1 U	**25**	1 U	1 U	1 U	**0.98 J**
TETRACHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1 U	1 U	**0.77 J**	1 U	**11**	1 U	1 U	1 U	**0.36 J**
TRICHLOROETHENE	5	1 U	1 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	1 U	1 U	**0.67 J**	1 U	**11**	**0.37 J**	1 U	1 U	1 U

location	Mississippi	04MP01	04MP02	04MP03
sample ID	Tier 1	04MP0101	04MP0201	04MP0301
sample date	TRG	04/20/06	04/20/06	04/20/06
Volatile Organics (ug/L)				
1,1-DICHLOROETHENE	7	1 U	1 U	1 U
1,2-DICHLOROETHANE	5	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	**1.6**	**0.37 J**	1 U
TETRACHLOROETHENE	5	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	**1.8**	**0.38 J**	1 U
TRICHLOROETHENE	5	1 U	1 U	1 U
VINYL CHLORIDE	2	**0.64 J**	1 U	1 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-9
POSITIVE DETECTIONS IN DPT GROUNDWATER - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP01	04GP02	04GP03	04GP04	04GP05	04GP06	04GP07	04GP08	04GP08	04GP09	04GP10
sample ID	Mississippi	04GP0101	04GP0201	04GP0301	04GP0401	04GP0501	04GP0601	04GP0701	04GP0801	04GP0801D	04GP0901	04GP1001
sample depth	Tier 1	11-15	24-28	16-20	16-20	12-16	14-18	16-20	16-20	16-20	16-20	12-16
sample date	TRG	08/17/04	08/12/04	08/13/04	08/13/04	08/18/04	08/18/04	08/18/04	08/19/04	08/19/04	08/19/04	08/19/04
Volatile Organics (ug/L)												
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.1 J**	5 U
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	**0.3 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 U	**2 J**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	608	5 U	**290 J**	5 U	5 U	5 U	6 U	5 U	13 U	11 U	5 U	5 U
BENZENE	5	**0.4 J**	5 U	5 U	5 U	5 U	5 U	5 U	**0.2 J**	**0.2 J**	5 U	5 U
CARBON DISULFIDE	1040	**0.4 J**	**0.6 J**	5 UJ	5 UJ	5 U	5 U	5 U	**0.5 J**	**0.4 J**	**0.3 J**	**0.2 J**
CHLOROBENZENE	100	**5**	5 U	5 U	5 U	5 U	5 U	**0.2 J**	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**19**	**19**	5 U	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U	5 U	5 UJ	5 UJ	5 U	**2 J**	5 U	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**12**	**11**	5 U	5 U
TRICHLOROETHENE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
VINYL CHLORIDE	2	5 U	5 U	5 U	5 U	5 U	**0.9 J**	**0.6 J**	**4 J**	**4 J**	5 U	5 U
Semivolatile Organics (ug/L)												
4-METHYLPHENOL	183	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHENE	365	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CAPROLACTAM	18300	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
DIBENZOFURAN	24.3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	1460	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	243	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PHENANTHRENE	1100	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	183	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-10
POSITIVE DETECTIONS IN MONITORING WELLS - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date sample depth	Mississippi Tier 1 TRG	GPT-04-08 04GW0801 09/23/04 16-26	GPT-04-09 04GW0901 09/08/04 16-26	GPT-04-10 04GW1001 09/09/04 5-15	GPT-04-11 04GW1101 09/09/04 35-45	GPT-04-12 04GW1201 09/14/04 6-16	GPT-04-12 04GW1201D 09/14/04 6-16	GPT-04-13 04GW1301 09/22/04 5-15	GPT-04-14 04GW1401 09/22/04 24-34
Volatile Organics (ug/L)									
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	7	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 UR	5 U	5 U	**2 J**	5 U	5 U	5 UR	5 UR
ACETONE	608	5 UR	5 UR	**11 J**	**7 J**	**2 J**	3 J	5 UR	**3 J**
BENZENE	5	5 U	5 U	**0.1 J**	5 U	5 U	5 U	5 U	5 U
CARBON DISULFIDE	1040	5 UJ	5 U	**0.9 J**	**0.2 J**	5 U	5 U	5 UJ	5 UJ
CHLOROBENZENE	100	5 U	5 U	**2 J**	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	5 U	5 U	5 U	5 U	5 U	5 U	**55**	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.3 J**
METHYL CYCLOHEXANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	**0.2 J**	**0.9 J**	5 U	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	5 U	5 U	5 U	5 U	5 U	**30**	5 U
TRICHLOROETHENE	5	5 U	5 U	5 U	5 U	5 U	5 U	**0.8 J**	5 U
VINYL CHLORIDE	2	5 U	5 U	**0.2 J**	5 U	5 U	5 U	**25**	5 U
Semivolatile Organics (ug/L)									
4-METHYLPHENOL	183	10 U	10 U	**5 J**	**8 J**	10 U	10 U	10 U	10 U
ACENAPHTHENE	365	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**25 J**
CAPROLACTAM	18300	10 U	10 U	10 U	**38**	10 U	10 U	10 U	10 U
DIBENZOFURAN	24.3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**7 J**
FLUORANTHENE	1460	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**10**
FLUORENE	243	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**14**
PHENANTHRENE	1100	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	183	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**8 J**
Dioxins (pg/L)									
1,2,3,4,6,7,8,9-OCDD		3.1 U	4 U	8.8 U	23 U	21 U	13 U	**87 J**	**160**
1,2,3,4,6,7,8-HPCDD		2.5 U	0.89 U	3.1 U	3.6 U	2.1 U	1.7 U	8 U	**31 J**
DIOXIN TEQ	30	0	0	0	0	0	0	0.0087	0.426

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Dioxin TRG values converted from ug/L to pg/L

pg/L = picograms per liter
TEQ = Toxic Equivalents
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-10
POSITIVE DETECTIONS IN MONITORING WELLS - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date sample depth	Mississippi Tier 1 TRG	GPT-04-15 04GW1501 09/10/04 5-15	GPT-04-16 04GW1601 09/13/04 4-14	GPT-04-17 04GW1701 09/13/04 35-40	GPT-04-18 04GW1801 09/21/04 11-21	GPT-04-19 04GW1901 09/21/04 9-19	GPT-04-20 04GW2001 09/10/04 30-35
Volatile Organics (ug/L)							
1,1-DICHLOROETHANE	798	5 U	5 U	5 U	5 U	5 U	5 U
1,1-DICHLOROETHENE	7	5 U	**0.6 J**	5 U	5 U	5 U	5 U
1,2-DICHLOROETHANE	5	5 U	**0.2 J**	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE	75	5 U	5 U	5 U	5 U	5 U	5 U
2-BUTANONE	1910	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	608	**2 J**	**7 J**	**10 J**	5 UR	5 UR	**4 J**
BENZENE	5	**0.1 J**	**0.2 J**	5 U	5 U	**0.2 J**	5 U
CARBON DISULFIDE	1040	5 U	5 U	**0.4 J**	**0.2 J**	5 U	5 U
CHLOROBENZENE	100	5 U	5 U	5 U	5 U	5 U	5 U
CIS-1,2-DICHLOROETHENE	70	**0.2 J**	**280**	5 U	5 U	**0.7 J**	5 U
ETHYLBENZENE	700	5 U	5 U	5 U	5 U	5 U	5 U
ISOPROPYLBENZENE	679	5 U	5 U	5 U	5 U	5 U	5 U
METHYL CYCLOHEXANE		5 U	5 U	5 U	5 U	5 U	5 U
STYRENE	100	5 U	5 U	5 U	5 U	5 U	5 U
TOLUENE	1000	5 U	5 U	**2 J**	5 U	5 U	5 U
TRANS-1,2-DICHLOROETHENE	100	5 U	**190**	5 U	5 U	5 U	5 U
TRICHLOROETHENE	5	5 U	**8**	5 U	5 U	5 U	5 U
VINYL CHLORIDE	2	**0.8 J**	**150**	5 U	5 U	5 U	5 U
Semivolatile Organics (ug/L)							
4-METHYLPHENOL	183	10 U	10 U	**6 J**	10 U	10 U	**5 J**
ACENAPHTHENE	365	10 U	10 U	10 U	10 U	**7 J**	10 U
CAPROLACTAM	18300	10 U	10 U	**23**	10 U	10 U	10 U
DIBENZOFURAN	24.3	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	1460	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	243	10 U	10 U	10 U	10 U	**4 J**	10 U
PHENANTHRENE	1100	10 U	10 U	10 U	10 U	**4 J**	10 U
PYRENE	183	10 U	10 U	10 U	10 U	10 U	10 U
Dioxins (pg/L)							
1,2,3,4,6,7,8,9-OCDD		1.6 U	4.9 U	**210**	12 U	25 U	2 U
1,2,3,4,6,7,8-HPCDD		1.5 U	1 U	16 U	12 U	9.7 U	0.81 U
DIOXIN TEQ	30	0	0	0.021	0	0	0

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Dioxin TRG values converted from ug/L to pg/L
pg/L = picograms per liter
TEQ = Toxic Equivalents
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-11
POSITIVE DETECTIONS IN DPT GROUNDWATER - INORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		04GP01	04GP02	04GP03	04GP04	04GP05	04GP06	04GP07	04GP08	04GP08	04GP09	04GP10
sample ID	Mississippi	04GP0101	04GP0201	04GP0301	04GP0401	04GP0501	04GP0601	04GP0701	04GP0801	04GP0801D	04GP0901	04GP1001
sample depth	Tier 1	11-15	24-28	16-20	16-20	12-16	14-18	16-20	16-20	16-20	16-20	12-16
sample date	TRG	08/17/04	08/12/04	08/13/04	08/13/04	08/18/04	08/18/04	08/18/04	08/19/04	08/19/04	08/19/04	08/19/04
Inorganics (ug/L)												
ALUMINUM	36500	161 U	353 U	**8690 J**	**7510 J**	**2560 J**	418 U	**1480 J**	163 U	163 U	402 U	**2630**
ANTIMONY	6	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	0.19 U	0.19 U	0.22 U	0.25 U
ARSENIC	50	3.03 U	3.03 U	5.1	5.7	3.03 U	3.03 U	3.03 U	0.75 U	3.7 U	2.9 U	8.6 U
BARIUM	2000	**328**	**142**	**176**	**205**	**203**	**597**	**321**	**539**	**543**	**132**	**22.3**
BERYLLIUM	4	0.27 U	**0.33**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
CALCIUM		**78000**	**7950**	**12100**	**12800**	**13800**	**93900**	**50000**	**268000**	**273000**	**195000**	**69000**
CHROMIUM (as Cr VI)	100	**2.3**	**2.2**	**11.5**	**11.8**	**2.3**	0.8 U	**2.5**	1.8 U	3.4 U	5.4 U	10.1 U
COPPER	1300	1.91 U	1.9 U	5.3 U	6 U	1.91 U	**11.9**	**13.3**	1.91 UJ	1.91 UJ	1.91 U	12.6 U
IRON	11000	**1910 J**	**6990 J**	**14400 J**	**9220 J**	**13100 J**	**17300 J**	**7040 J**	**66600**	**69700**	**3520**	**6920**
LEAD	15	1.7 U	**1.8**	2.8	**3.2**	**2.1 J**	1.7 U	1.7 U	**0.18 J**	**0.21 J**	0.15 U	**1**
MAGNESIUM		**10100**	**1980**	5670	**6440**	**3760**	**6460**	**8790**	**62500**	**63300**	**13100**	**6300**
MANGANESE	730	**78.9**	**171**	155	**148**	**192**	**176**	**195**	**192**	**195**	**128**	**401**
MERCURY	2	0.01 U	0.01 U	0.01 U	**0.02**	0.01 U	0.01 U	0.01 U	0.07 U	0.06 U	0.07 U	0.08 U
NICKEL	730	2 U	10.8 U	10.8 U	**11**	**7.8**	1 U	3.3 U	10.8 U	10.8 U	10.8 U	10.8 U
POTASSIUM		**5360**	**1300**	**2430**	**2080**	**1830**	**1920**	**3320**	**19300**	**19000**	**4810**	722 U
SELENIUM	50	3.71 UJ	3.71 UJ	3.71 UJ	3.71 UJ	3.71 UJ	3.71 UJ	3.71 UJ	3.71 U	3.71 U	3.71 U	**3.9**
SODIUM		**19700 J**	**6320 J**	**8420 J**	**12000 J**	**10600 J**	**10600 J**	**19000 J**	**56900**	**56400**	**26500**	**8050**
VANADIUM	256	4.14 U	4.14 U	**12.9**	**10.9**	**15**	4.14 U	**18.1**	4.14 U	4.14 U	4.14 U	4.14 U
ZINC	11000	6.3 U	**43.9**	**38.9**	**24.2**	**35.5**	2.3 U	**16.2**	1.7 U	1.44 U	**16.8**	5.3 U
CYANIDE as free cyanide	200	10 U	10 U	**4.4 J**	**5.1 J**	10 U	10 U	10 U	**32 J**	**53 J**	10 UJ	**7.5 J**

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
TEQ = Toxic Equivalents
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-12
POSITIVE DETECTIONS IN MONITORING WELLS - INORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location		GPT-04-08	GPT-04-09	GPT-04-10	GPT-04-11	GPT-04-12	GPT-04-12	GPT-04-13	GPT-04-14
sample ID		04GW0801	04GW0901	04GW1001	04GW1101	04GW1201	04GW1201D	04GW1301	04GW1401
sample date	Mississippi	09/23/04	09/08/04	09/09/04	09/09/04	09/14/04	09/14/04	09/22/04	09/22/04
sample depth	Tier 1 TRG	16-26	16-26	5-15	35-45	6-16	6-16	5-15	24-34
Inorganics (ug/L)									
ALUMINUM	36500	185 U	382 U	17.9 U	105 U	17.9 U	17.9 U	90.8 U	110 U
ANTIMONY	6	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	**26.3**
ARSENIC	50	3.03 U	3.03 U	3.03 U	3.03 U	3.03 U	3.03 U	3.03 U	**11.4**
BARIUM	2000	**132**	**84.3**	**229**	**151**	**1620**	1620	**57.1**	**1060**
BERYLLIUM	4	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
CALCIUM		**6690**	**8920**	**68900**	**9400**	**198000**	195000	**127000**	**242000**
CHROMIUM (as Cr VI)	100	0.82 U	0.8 U	0.8 U	0.8 U	1.5 U	2.1 U	0.80 U	1.4 U
COPPER	1300	1.91 U	1.91 U	1.91 U	1.91 U	1.91 U	1.91 U	1.91 U	1.91 U
IRON	11000	**3890**	**1220**	2250	**7860**	146 U	126 U	**24200**	**2840**
LEAD	15	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
MAGNESIUM		**3740**	**1270**	11500	**5520**	**58100**	57600	**42300**	**32100**
MANGANESE	730	**158**	**35.1**	57.3	**246**	**154**	152	**465**	**212**
MERCURY	2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
NICKEL	730	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U
POTASSIUM		**3440**	2120 U	5170	**3410**	**19600**	19500	**9460**	**14200**
SELENIUM	50	3.71 U	3.71 U	4.2 U	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U
SODIUM		**22100**	**5770 J**	21400 J	**20100 J**	**73400 J**	73100 J	**56100**	**14000**
VANADIUM	256	4.14 U	4.14 U	4.14 U	4.14 U	4.14 U	4.14 U	**4.2**	4.14 U
ZINC	11000	1.44 U	**1.6**	1.44 U	1.44 U	1.44 U	1.44 U	2.0 U	5.0 U
CYANIDE as free cyanide	200	10 U	10 U	10 U	10 U	10 U	4.7 J	10 U	10 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-12
POSITIVE DETECTIONS IN MONITORING WELLS - INORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date sample depth	Mississippi Tier 1 TRG	GPT-04-15 04GW1501 09/10/04 5-15	GPT-04-16 04GW1601 09/13/04 4-14	GPT-04-17 04GW1701 09/13/04 35-40	GPT-04-18 04GW1801 09/21/04 11-21	GPT-04-19 04GW1901 09/21/04 9-19	GPT-04-20 04GW2001 09/10/04 30-35
Inorganics (ug/L)							
ALUMINUM	36500	36.2 U	197 U	757 U	281 U	49.7 U	93.7 U
ANTIMONY	6	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U
ARSENIC	50	3.03 U	3.03 U	3.03 U	3.03 U	3.03 U	**3.3**
BARIUM	2000	**171**	**405**	**210**	**122**	**525**	**195**
BERYLLIUM	4	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
CALCIUM		**90500**	**115000**	**15600**	**74400**	**96200**	**17100**
CHROMIUM (as Cr VI)	100	0.8 U	0.8 U	2.3 U	0.80 U	0.80 U	0.8 U
COPPER	1300	1.91 U	1.91 U	**12.6**	1.91 U	1.91 U	1.91 U
IRON	11000	**7710**	**48000**	**3920**	**370**	**15700**	**10300**
LEAD	15	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U
MAGNESIUM		**17600**	**41000**	**7050**	**7760**	**5830**	**8230**
MANGANESE	730	**289**	**390**	**179**	**169**	**166**	**312**
MERCURY	2	0.01 U	0.01 U	0.01 U	0.08 U	0.08 U	0.01 U
NICKEL	730	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U	10.8 U
POTASSIUM		**6020**	**7490**	**3890**	2960 U	2040 U	**3720**
SELENIUM	50	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U	3.71 U
SODIUM		**24900 J**	**46600 J**	**25400 J**	**19500**	**11100**	**26400 J**
VANADIUM	256	4.14 U	4.14 U	4.14 U	**4.2**	4.14 U	4.14 U
ZINC	11000	1.44 U	1.44 U	**3.3**	2.4 U	3.8 U	1.44 U
CYANIDE as free cyanide	200	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
TRG = Target Remediation Goal
ug/L = micrograms per liter
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-13
POSITIVE DETECTIONS IN SURFACE WATER
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Location sample ID sample date	Mississippi Tier 1 TRG	USEPA Region IV ESV	04SW01 04SW0101 08/05/04	04SW01 04SW0101D 08/05/04	04SW02 04SW0201 08/12/04	04SW03 04SW0301 08/17/04
Volatile Organics (ug/L)						
ACETONE	608	1500	5 U	7 U	10 U	**11 J**
TETRACHLOROETHENE	5	84	5 U	5 U	5 U	**3 J**
TOLUENE	1000	175	5 U	5 U	5 U	**2 J**
Dioxins (pg/L)						
1,2,3,4,6,7,8,9-OCDD			18 U	16 U	19 U	**1200**
1,2,3,4,6,7,8,9-OCDF			4.5 U	3.5 U	1.9 U	**51 J**
1,2,3,4,6,7,8-HPCDD			4 U	3.7 U	2.8 U	**120**
DIOXIN TEQ	30	10	0	0	0	**2.45**
Inorganics (ug/L)						
ARSENIC	50	190	**6.8**	**5.8**	**5.2**	**3.6**
BARIUM	2000	3.9	**51.7**	**51.4**	**31.1**	**43.8**
CALCIUM		116000	**21600**	**22000**	**15500**	**19200**
CHROMIUM (as Cr VI)	100	11	**1.2**	0.8 U	0.8 U	0.8 U
IRON	11000	1000	**5180**	**4360**	**2800**	**4650**
LEAD	15	1.32	1.7 U	1.7 U	1.7 U	**3.2 J**
MAGNESIUM		82000	**2870**	**2870**	**1820**	**2490**
MANGANESE	730	80	**201**	**205**	**101**	**75.9**
POTASSIUM		53000	**1440**	1180 U	**1800**	**1690**
SODIUM		680000	**10700 J**	**10000 J**	**7010 J**	**9810 J**
ZINC	11000	58.91	1.7 U	3.8 U	2 U	**9.1**
CYANIDE	200	5.2	10 U	**6.4 J**	10 U	**3.9 J**

Notes:
TRG = Target Remediation Goal
Dioxin TRG values converted from ug/L to pg/L
ug/L = micrograms per liter
pg/L = picograms per liter
TEQ = Toxic Equivalents
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG
ESV = Ecological Screening Value

TABLE 4-14
POSITIVE DETECTIONS IN SEDIMENT SAMPLES - ORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date	Mississippi Tier 1 TRG Restricted	Mississippi Tier 1 TRG Unrestricted	USEPA Region IV ESV	04SD01 04SD0101 08/05/04	04SD01 04SD0101D 08/05/04	04SD02 04SD0201 08/06/04	04SD03 04SD0301 08/12/04	04SD04 04SD0401 08/12/04	04SD05 04SD0501 08/13/04	04SD06 04SD0601 08/18/04	04SD07 04SD0701 08/17/04	04SD08 04SD0801 08/18/04
Volatile Organics (ug/kg)												
2-BUTANONE	84,500	84,500		29 UJ	57 UJ	**40 J**	**16 J**	**62 J**	**30 J**	**52 J**	**32 J**	**14 J**
ACETONE	104,000,000	7,820,000		**38 J**	140 J	**210 J**	**83 J**	**340 J**	**160 J**	**260 J**	**210 J**	**76 J**
CARBON DISULFIDE	7,970	7,970		6 U	11 UJ	**4 J**	**0.9 J**	**6 J**	**3 J**	**7 J**	**8 J**	**1 J**
CHLOROETHANE	1,970,000	220,000		6 U	11 UJ	**2 J**	6 U	10 U	9 U	9 U	9 U	8 U
CIS-1,2-DICHLOROETHENE	1,210,000	782,000		6 U	11 UJ	8 U	6 U	10 U	9 U	9 U	**18**	8 U
CYCLOHEXANE				6 U	11 UJ	**0.7 J**	6 U	10 U	9 U	9 U	**0.8 J**	8 U
METHYL CYCLOHEXANE				6 U	11 UJ	**8**	6 U	10 U	9 U	9 U	9 U	8 U
METHYL TERT-BUTYL ETHER	8,740,000	3,910,000		12 U	23 UJ	**2 J**	11 U	20 U	18 U	18 U	18 U	16 U
TOLUENE	38,000	38,000		6 U	11 UJ	8 U	6 U	10 U	9 U	9 U	9 U	**2 J**
TRICHLOROETHENE	7,920	5,170		6 U	11 UJ	8 U	6 U	10 U	9 U	9 U	**1 J**	8 U
TRICHLOROFLUOROMETHANE	143,000,000	23,500,000		**1 J**	11 UJ	**2 J**	6 U	**3 J**	**2 J**	**3 J**	**6 J**	**2 J**
VINYL CHLORIDE	939	426		6 U	11 UJ	8 U	6 U	10 U	9 U	9 U	**44**	8 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	123,000,000	4,690,000	330	460 U	440 U	540 U	440 U	580 U	**150 J**	480 U	500 U	500 U
ANTHRACENE	613,000,000	23,500,000	330	460 U	440 U	540 U	440 U	580 U	**280 J**	480 U	500 U	500 U
BENZALDEHYDE	204,000,000	7,820,000		460 UJ	440 UJ	540 UJ	440 UJ	**430 J**	580 UJ	480 UJ	500 UJ	500 UJ
BENZO(A)ANTHRACENE	7,840	875	330	460 U	440 U	**100 J**	**43 J**	**86 J**	**1600**	480 U	500 U	500 U
BENZO(A)PYRENE	784	87.5	330	460 U	440 U	**240 J**	**63 J**	**99 J**	**1800**	480 U	500 U	500 U
BENZO(B)FLUORANTHENE	7,840	875		460 U	440 U	540 U	440 U	580 U	**2500**	480 U	500 U	500 U
BENZO(G,H,I)PERYLENE	61,300,000	2,350,000		460 U	440 U	540 U	**70 J**	580 U	**1000**	480 U	500 U	500 U
BENZO(K)FLUORANTHENE	78,400	8,750		460 U	440 U	**82 J**	440 U	580 U	**1500**	480 U	500 U	500 U
BIS(2-ETHYLHEXYL)PHTHALATE	409,000	45,600		460 U	440 U	540 U	440 U	**610**	580 U	480 U	500 U	500 U
CARBAZOLE	286,000	31,900		460 U	440 U	540 U	440 U	580 U	**110 J**	480 U	500 U	500 U
CHRYSENE	784,000	87,500	330	460 U	440 U	**150 J**	**80 J**	**130 J**	**1800**	480 U	500 U	**60 J**
DIBENZO(A,H)ANTHRACENE	784	87.5	330	460 U	440 U	540 U	440 U	580 U	**540 J**	480 U	500 U	500 U
DIBENZOFURAN	8,180,000	313,000		460 U	440 U	540 U	440 U	580 U	**92 J**	480 U	500 U	500 U
FLUORANTHENE	81,700,000	3,130,000	330	460 U	440 U	**190 J**	**120 J**	**210 J**	**1200**	**49 J**	**86 J**	**74 J**
FLUORENE	81,700,000	3,130,000	330	460 U	440 U	540 U	440 U	580 U	**200 J**	480 U	500 U	500 U
INDENO(1,2,3-CD)PYRENE	7,840	875		460 U	440 U	540 U	440 U	580 U	**980**	480 U	500 U	500 U
PHENANTHRENE	61,300,000	2,350,000	330	460 U	440 U	**48 J**	**42 J**	**87 J**	**800**	480 U	500 U	500 U
PYRENE	61,300,000	2,350,000	330	460 U	440 U	**240 J**	**140 J**	**310 J**	**2000**	**59 J**	**76 J**	**100 J**
Pesticides/PCBs (ug/kg)												
4,4'-DDD	23,800	2,660	3.3	4.6 UJ	4.4 UJ	5.4 UJ	4.4 U	**2.6 J**	**12 J**	4.8 U	5 UJ	5 U
4,4'-DDT	16,800	1,880	3.3	4.6 UJ	4.4 UJ	5.4 UJ	4.4 UJ	**5 J**	5.8 UJ	4.8 UJ	5 UJ	5 UJ
ALPHA-CHLORDANE	12,300	1,820	1.7	2.4 UJ	2.2 UJ	2.8 UJ	2.2 U	3 U	3 UJ	2.5 UJ	2.6 UJ	**5.1 J**
AROCLOR-1260	10,000	1,000	33	24 UJ	22 U	28 UJ	22 U	**46**	**240**	**140**	26 UJ	**160**
GAMMA-CHLORDANE	12,300	1,820	1.7	2.4 UJ	2.2 UJ	2.8 UJ	2.2 U	3 U	3 U	2.5 UJ	2.6 UJ	**370 J**

Notes:
TRG = Target Remediation Goal
TRG values converted from mg/kg to units shown
ug/kg = micrograms per kilogram

ESV = Ecological Screening Value
J = Estimated concentration
U = Sample concentration less than the value shown

Results in bold are positive detections
Shaded results exceed TRG

TABLE 4-15
POSITIVE DETECTIONS IN SEDIMENT SAMPLES - DIOXINS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date	Mississippi Tier 1 TRG Restricted	Mississippi Tier 1 TRG Unrestricted	USEPA Region IV ESV	04SD01 04SD0101 08/05/04	04SD01 04SD0101D 08/05/04	04SD08 04SD0801 08/18/04
Dioxins (ng/kg)						
1,2,3,4,6,7,8,9-OCDD				**500**	**650**	**6000**
1,2,3,4,6,7,8,9-OCDF				**18 J**	**24**	**250**
1,2,3,4,6,7,8-HPCDD				**63**	**86**	**670**
1,2,3,4,6,7,8-HPCDF				**7.5 J**	**8.6**	**98**
1,2,3,4,7,8,9-HPCDF				0.95 U	1.2 U	**9.2**
1,2,3,4,7,8-HXCDD				0.59 U	0.63 U	**8.7**
1,2,3,4,7,8-HXCDF				0.95 U	1.3 U	**7.1 J**
1,2,3,6,7,8-HXCDD				2.8 U	**4.1**	**25**
1,2,3,6,7,8-HXCDF				1.1 U	1.2 U	**8.3 J**
1,2,3,7,8,9-HXCDD				**6.5 J**	**9.3**	**19**
1,2,3,7,8-PECDD				0.47 U	0.6 U	**6 J**
2,3,4,6,7,8-HXCDF				0.55 U	0.73 U	**5.9 J**
2,3,7,8-TCDD	38.2	4.26	2.5	**1.3 J**	**1.4 J**	**8**
2,3,7,8-TCDF				0.59 U	0.65 U	**1.6**
TEQ	38.2	4.26	2.5	**3.17**	**4.36**	**32.6**

Notes:
TRG = Target Remediation Goal
ng/kg = nanograms per kilogram
TEQ = Toxic Equivalents
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG
ESV = Ecological Screening Value

TABLE 4-16
POSITIVE DETECTIONS IN SEDIMENT SAMPLES - INORGANICS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

location sample ID sample date	Mississippi Tier 1 TRG Restricted	Mississippi Tier 1 TRG Unrestricted	USEPA Region IV ESV	04SD01 04SD0101 08/05/04	04SD01 04SD0101D 08/05/04	04SD02 04SD0201 08/06/04	04SD03 04SD0301 08/12/04	04SD04 04SD0401 08/12/04	04SD05 04SD0501 08/13/04	04SD06 04SD0601 08/18/04	04SD07 04SD0701 08/17/04	04SD08 04SD0801 08/18/04
Inorganics (mg/kg)												
ALUMINUM	2,040,000	78,200		**3740 J**	**9200 J**	**16200 J**	**3190 J**	**18600 J**	**11300 J**	**14600 J**	**11100 J**	**13800 J**
ARSENIC	3.82	0.426	7.24	**0.74**	**1.3**	**5.4**	**2.1**	**5.6**	**5**	**5.7**	**2.9**	**4.8**
BARIUM	14,300	5,480		**9.3 J**	**19 J**	**41.7 J**	**9.7 J**	**54.1 J**	**41.7 J**	**27.7 J**	**22.9 J**	**39.5 J**
BERYLLIUM	1,020	156		0.03 U	**0.07**	**0.14**	0.02 U	**0.21**	**0.09**	**0.13**	**0.12**	**0.1**
CALCIUM				**228 J**	**472 J**	**1020 J**	**550 J**	**1960 J**	**2120 J**	**1520 J**	**1130 J**	**1050 J**
CHROMIUM	381	227	52.3	**4.8 J**	**9.5 J**	**15.7 J**	**3.8 J**	**18.8 J**	**13.9 J**	**14.7 J**	**11 J**	**14.2 J**
COBALT	12,300	4,690		0.47 U	**0.64**	**2 J**	**0.58**	**2.4**	**1.8**	**1.4**	**1.2**	**1.5**
COPPER	8,170	3,130	18.7	**1.8**	**2.7**	**8.4**	**2.8**	**10.6**	**12.6**	**7.5**	**5.7**	**8.1**
IRON	613,000	23,500		**1640 J**	**3440 J**	**12200 J**	**3090 J**	**13000 J**	**9180 J**	**13000 J**	**8490 J**	**9510 J**
LEAD	1,700	400	30.2	**5.6 J**	**11.1 J**	**24.8 J**	**5.1 J**	**43.4 J**	**38.2 J**	14.2 U	**13.4 J**	**15.2 J**
MAGNESIUM				**134 J**	**339 J**	**645 J**	**135 J**	**703 J**	**523 J**	**508 J**	**509 J**	**618 J**
MANGANESE	4,080	1,560		**7.2 J**	**14.3 J**	**38 J**	**11.4 J**	**37.7 J**	**30.1 J**	**20.9 J**	**15.9 J**	**22.8 J**
MERCURY	61.3	10	0.13	**0.05**	**0.04**	**0.07**	**0.03**	**0.09**	**0.09**	**0.06**	**0.05**	**0.07**
POTASSIUM				77.5 U	**181 J**	**369 J**	79.2 U	**443 J**	238 U	274 U	251 U	**291 J**
SELENIUM	1,020	391		0.4 U	0.26 U	**0.71 J**	0.33 U	**0.78**	0.55 U	0.48 U	0.43 U	**0.6**
SODIUM				16.9 U	32.8 U	52.4 U	17.5 U	**85.4 J**	**1260 J**	52.9 U	58.7 U	54.7 U
THALLIUM	143	5.48		0.44 U	0.28 U	0.48 U	0.36 U	0.61 U	0.61 U	0.53 U	**0.73**	**0.76**
VANADIUM	1,430	548		**5.7**	**11.8**	**23.7**	**5.6**	**27.5**	**18.6**	**23.5**	**17.9**	**23.2**
ZINC	61,300	23,500	124	**4.7 J**	**12 J**	**43 J**	**12 J**	**68.3 J**	**87.9 J**	**27.3 J**	**21.8 J**	**31.4 J**
CYANIDE	4,080	1,560		0.5 UJ	**0.35 J**	0.5 UJ	**0.27 J**	0.5 UJ	**0.37 J**	0.63 UJ	0.63 UJ	0.69 UJ

Notes:
TRG = Target Remediation Goal
mg/kg = milligrams per kilogram
U = Sample concentration less than the value shown
J = Estimated concentration
Results in bold are positive detections
Shaded results exceed TRG
Chromium TRG for hexavalent chromium
ESV = Ecological Screening Value

TABLE 5-1
ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Chemical	Specific Gravity (@ 20/4°C)	Vapor Pressure (mm Hg @ 20°C)	Solubility (mg/L @ 20°C)	Octanol/Water Partition Coefficient	Organic Carbon Partition Coefficient	Henry's Law Constant (atm-m3/mole)	Bioconcentration Factor (mg/L/mg/kg)	Mobility Index log((solubility*VP)/ Koc)
HALOGENATED ALIPHATICS								
cis-1,2-Dichloroethene	1.2837	2.02E+2 (25°C)	8.00E+02	1.58E+02	3.55E+01	4.08E-3 (24.8°C)	1.40E+01	3.66E+00
1,1-Dichloroethene	1.218	5.91E+2 (25°C)	2.1E+2 (25°C)	3.02E+01	5.89E+01	2.286E-2 (25°C)	5.30E+01	3.32E+00
Trichloroethene	1.47	5.78E+01	1.10E+3 (25°C)	2.00E+02	1.10E+02	1.03E-02	8.10E+01	4.57
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)								
Benzo(a)anthracene	1.274	5.00E-09	1E-2 (24°C)	4.07E+05	3.98E+05	6.60E-07	5.30E+04	-1.59E+01
Benzo(b)fluoranthene	NA	5.00E-07	1.2E-3 (25°C)	3.72E+06	1.23E+06	1.20E-05	1.40E+05	-1.53E+01
Benzo(a)pyrene	1.351	5.00E-09	3.8E-3 (25°C)	9.55E+05	1.02E+06	4.9E-7 (25°C)	1.40E+05	-1.67E+01
Dibenzo(a,h)anthracene	1.282	1.00E-10	5E-4 (25°C)	9.33E+05	3.80E+06	7.3E-8 (25°C)	6.90E+05	-1.99E+01
Indeno(1,2,3-cd)pyrene		1E-10 (25°C)	6.20E-02	4.57E+07	3.47E+06	6.95E-8 (25°C)	3.50E+05	-1.77E+01
DIOXINS/FURANS								
2,3,7,8-TCDD	1.827	7.40E-10	3.20E-04	6.31E+06	3.98E+06	5.40E-23	7.94E+03	-1.92E+01

Data Sources:

USEPA, September 1992, Handbook of RCRA Groundwater Monitoring Constituents: Chemical and Physical Properties.

USEPA, December 1982, Aquatic Fate Process Data for Organic Priority Pollutants.

USEPA, July 1996, Soil Screening Guidance.

TABLE 5-2
RELATIVE MOBILITIES OF METALS AS A FUNCTION OF ENVIRONMENTAL CONDITIONS (Eh,pH)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

	Environmental Conditions			
Relative Mobility	**Oxidizing**	**Acidic**	**Neutral/ Alkaline**	**Reducing**
Very High			Selenium	
High	Selenium Zinc	Selenium Zinc Copper Nickel Mercury Silver		
Medium	Copper Nickel Mercury Silver Arsenic Cadmium	Arsenic Cadmium	Arsenic Cadmium	
Low	Lead Barium Beryllium	Lead Barium Beryllium	Lead Barium Beryllium	
Very Low	Iron Chromium	Chromium	Chromium Zinc Copper Nickel Mercury Silver	Chromium Selenium Zinc Copper Nickel Mercury Lead Barium Beryllium Silver

TABLE 5-3
BIODEGRADATION INDICATORS
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

sample ID	04GW0801	04GW0901	04GW1001	04GW1101	04GW1201	04GW1301	04GW1401	04GW1501	04GW1601	04GW1701	04GW1801	04GW1901	04GW2001
sample date	09/23/04	09/08/04	09/09/04	09/09/04	09/14/04	09/22/04	09/22/04	09/10/04	09/13/04	09/13/04	09/21/04	09/21/04	09/10/04
Miscellaneous Parameters (mg/L)													
CHLORIDE	5.6	14	23	5.4	41	36	7.4	19	34	6.4	20	10	5.8
HYDROGEN (NM)	3.6	0.9	6.1	14	2.6	1.1	2	1.2	1.1	2	3.5	8.6	23
NITRATE-N	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.0055 J	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.0054 J	0.05 U	0.05 U	0.05 UJ
NITRITE-N	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.0055 J	0.05 U	0.022 J	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 UJ
SULFATE	1.0 U	23	73	2 U	68	210	1.0 U	110	96	2.4	170	1.0 U	1.1
TOTAL ORGANIC CARBON	2.6	1.8			29	14	11	9.7	31	5.2	4.4	4.6	5.4
Volatile Gases													
ETHANE (ng/L)	60	110	8600	59	180 J	1400	160	6400	3400	43	3900	1300	43
ETHENE (ng/L)	5 U	4.6 J	9.3	33	5 U	2900	5.7	69	20000	130	5.4	17	32
METHANE (ug/L)	2300	58	2200	2900	1200 J	790	3800	2100	3000	3600	1200	8500	3400

sample ID	04GP0101	04GP0201	04GP0301	04GP0401	04GP0501	04GP0601	04GP0701	04GP0801	04GP0901	04GP1001
sample date	08/17/04	08/12/04	08/13/04	08/13/04	08/18/04	08/18/04	08/18/04	08/19/04	08/19/04	08/19/04
Miscellaneous Parameters (mg/L)										
CHLORIDE	22		12	15	14	16	16	30	22	8.8
NITRATE-N	0.05 UJ		0.05 UJ	0.05 UJ	0.01 J	0.05 UJ	0.02 J	0.05 U	0.0084 J	0.05 U
NITRITE-N	0.0089 J		0.094	0.074	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SULFATE	17		16	30	46	1 U	30	130	380	29
TOTAL ORGANIC CARBON	6.6	15	4.7	5.1	5.1	5.6	6.5	51	9.7	7.6

location	GPT-04-16	04MP01	04MP02	04MP03
sample date	03/30/06	04/20/06	04/20/06	04/20/06
Miscellaneous Parameters (mg/L)				
CHLORIDE	30.1	28.2	17.3	17.5
ORTHOPHOSPHATE-P	0.01 U	0.076	0.059	0.041
SULFATE	69.2	106	222	348
SULFIDE	0.75 U	750 U	1300	800 J
TOTAL ORGANIC CARBON	31	45	25	35
Volatile Fatty Acids (mg/L)				
ACETIC ACID	0.11	0.667		0.125
BUTANOIC ACID	0.07 U	0.282		0.07 U
Light Gases (ug/L)				
BUTANE	0.017 J	0.037	0.044	0.059
ETHANE	2.5	5.8	0.27	2.7
ETHENE	14	0.038	0.009 J	0.013
ISOBUTANE	0.014 J	0.022 J	0.022 J	0.037
METHANE	1600	3600	1600	1900
PROPANE	0.22	0.38	0.27	0.39
PROPYLENE	0.1	0.022 J	0.025 U	0.014 J
HYDROGEN (NM)	3.5 NM	3.9 NM	2.6 NM	2.5 NM

Notes:
mg/L = milligrams per liter
ug/L = micrograms per liter
ng/L = nanograms per liter
NM = nanomoles
U = Sample concentration less than the value shown
J = Estimated concentration

TABLE 6-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)																		
78-93-3	2-Butanone	0.009	J	0.012	J	mg/kg	04SB0601	2/10	0.025 - 0.037	0.012	NA	2200	N	84.5	84.5	MDEQ	No	BSL
67-64-1	Acetone	0.022	J	0.27	J	mg/kg	04SB0801-D	9/9	---	0.27	NA	1400	N	7820	104000	MDEQ	No	BSL
75-15-0	Carbon Disulfide	0.0007	J	0.006		mg/kg	04SB1001	9/10	0.005	0.006	NA	36	N	7.97	7.97	MDEQ	No	BSL
108-90-7	Chlorobenzene	0.001	J	0.001	J	mg/kg	04SB0401	1/10	0.005 - 0.006	0.001	NA	15	N	1.19	1.19	MDEQ	No	BSL
100-41-4	Ethylbenzene	0.003	J	0.17		mg/kg	04SB0601	2/10	0.005 - 0.007	0.17	NA	400	sat	395	395	MDEQ	No	BSL
98-82-8	Isopropylbenzene	0.0008	J	0.0008	J	mg/kg	04SB0201	1/10	0.005 - 0.007	0.0008	NA	57	N	9.43	9.43	MDEQ	No	BSL
TTNUS054	M+P-Xylenes	0.002	J	0.002	J	mg/kg	04SB0201	1/10	0.010 - 0.015	0.002	NA	27	N	NA	NA	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	0.002	J	0.006		mg/kg	04SB0201	2/10	0.005 - 0.007	0.006	NA	260	N	NA	NA	MDEQ	No	BSL
100-42-5	Styrene	0.088		0.088		mg/kg	04SB0601	1/10	0.005 - 0.007	0.088	NA	1700	sat	384	384	MDEQ	No	BSL
108-88-3	Toluene	0.0007	J	0.36	J	mg/kg	04SB0601	2/10	0.005 - 0.007	0.36	NA	520	sat	38	38	MDEQ	No	BSL
75-69-4	Trichlorofluoromethane	0.001	J	0.004	J	mg/kg	04SB0601	9/10	0.005	0.004	NA	39	N	23500	143000	MDEQ	No	BSL
75-01-4	Vinyl Chloride	0.003	J	0.006		mg/kg	04SB0801	1/10	0.005 - 0.007	0.006	NA	0.079	C	0.426	0.939	MDEQ	No	BSL
Semivolatile Organics (mg/kg)																		
92-52-4	1,1-Biphenyl	0.34	J	0.34	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	300	N	3910	10200	MDEQ	No	BSL
91-57-6	2-Methylnaphthalene	2.9	J	2.9	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	5.6	N(7)	1560	40900	MDEQ	No	BSL
83-32-9	Acenaphthene	6.1	J	6.1	J	mg/kg	04SB0201	1/10	0.39 - 0.44	6.1	NA	370	N	4690	123000	MDEQ	No	BSL
120-12-7	Anthracene	1.7		1.7		mg/kg	04SB0201	1/10	0.39 - 0.44	1.7	NA	2200	N	23500	613000	MDEQ	No	BSL
100-52-7	Benzaldehyde	0.26	J	0.26	J	mg/kg	04SB0601	1/10	0.39 - 0.44	0.26	NA	610	N	7820	204000	MDEQ	No	BSL
56-55-3	**Benzo(a)anthracene**	0.76	J	0.76	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.76	NA	**0.62**	C	0.875	7.84	MDEQ	**Yes**	**ASL**
205-99-2	Benzo(b)fluoranthene	0.56	J	0.56	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.56	NA	0.62	C	0.875	7.84	MDEQ	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.39	J	0.39	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.39	NA	230	N(8)	2350	61300	MDEQ	No	BSL
207-08-9	Benzo(k)fluoranthene	0.87	J	0.87	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.87	NA	6.2	C	8.75	78.4	MDEQ	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	0.24	J	0.6	J	mg/kg	04SB0201	4/10	0.39 - 0.44	0.6	NA	35	C	45.6	409	MDEQ	No	BSL
86-74-8	Carbazole	0.6	J	0.6	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.6	NA	24	C	31.9	286	MDEQ	No	BSL
218-01-9	Chrysene	1.2		1.2		mg/kg	04SB0201	1/10	0.39 - 0.44	1.2	NA	62	C	87.5	784	MDEQ	No	BSL
53-70-3	**Dibenzo(a,h)anthracene**	0.21	J	0.21	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.21	NA	**0.062**	C	**0.0875**	0.784	MDEQ	**Yes**	**ASL**
132-64-9	Dibenzofuran	2.9	J	2.9	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	15	N	313	8180	MDEQ	No	BSL
206-44-0	Fluoranthene	2.7		2.7		mg/kg	04SB0201	1/10	0.39 - 0.44	2.7	NA	230	N	3130	81700	MDEQ	No	BSL
86-73-7	Fluorene	4.2	J	4.2	J	mg/kg	04SB0201	1/10	0.39 - 0.44	4.2	NA	270	N	3130	81700	MDEQ	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.34	J	0.34	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	0.62	C	0.875	7.84	MDEQ	No	BSL
91-20-3	Naphthalene	2.1	J	2.1	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.1	NA	5.6	N	194	247	MDEQ	No	BSL
85-01-8	Phenanthrene	7		7		mg/kg	04SB0201	1/10	0.39 - 0.44	7	NA	230	N(8)	2350	61300	MDEQ	No	BSL
129-00-0	Pyrene	4.4		4.4		mg/kg	04SB0201	1/10	0.39 - 0.44	4.4	NA	230	N	2350	61300	MDEQ	No	BSL
Pesticides/PCBs (mg/kg)																		
72-54-8	4,4'-DDD	0.0063		0.0063		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0063	NA	2.4	C	2.66	23.8	MDEQ	No	BSL
72-55-9	4,4'-DDE	0.0037	J	0.0037	J	mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0037	NA	1.7	C	1.88	16.8	MDEQ	No	BSL
5103-71-9	alpha-Chlordane	0.024		0.024		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.024	NA	1.6	C(9)	NA	NA	MDEQ	No	BSL
12789-03-06	gamma-Chlordane	0.28	J	0.28	J	mg/kg	04SB0201	1/10	0.002 - 0.0023	0.28	NA	1.6	C(9)	NA	NA	MDEQ	No	BSL
Dioxins/Furans(ng/kg)																		
3268-87-9	OCDD	120	J	320		ng/kg	04SB0701	2/2	---	320	NA	39000	C	4260	38200	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	12		33		ng/kg	04SB0701	2/2	---	33	NA	390	C	426	3820	MDEQ	No	BSL
19408-74-3	1,2,3,7,8,9-HxCDD	4.3	J	4.3	J	ng/kg	04SB0701	1/2	2	4.3	NA	39	C	103	923	MDEQ	No	BSL
1746-01-6	2,3,7,8-TCDD	1.4		1.4		ng/kg	04SB0701	1/2	0.2	1.4	NA	3.9	C	4.26	38.2	MDEQ	No	BSL
37871-00-4	TOTAL HpCDD	27		180		ng/kg	04SB0701	2/2	---	180	NA	NA		NA	NA	NA	NA	NA
34465-46-8	TOTAL HxCDD	15		200		ng/kg	04SB0701	2/2	---	200	NA	NA		NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	86		86		ng/kg	04SB0701	1/2	1.7	86	NA	NA		NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	1.6		95		ng/kg	04SB0701	2/2	---	95	NA	NA		NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	0.672		2.6		ng/kg	04SB0701	2/2	---	2.6	NA	3.9	C	4.26	38.2	MDEQ	No	BSL

TABLE 6-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Inorganics (mg/kg)																		
7429-90-5	**Aluminum**	1240		7680		mg/kg	04SB0701	10/10	---	7680	NA	**7600**	N	78200	2040000	MDEQ	**Yes**	**ASL**
7440-38-2	**Arsenic**	0.27		7.6		mg/kg	04SB0701	10/10	---	7.6	NA	**0.39**	C	**0.426**	**3.82**	MDEQ	**Yes**	**ASL**
7440-39-3	Barium	4.3		68.7		mg/kg	04SB0201	10/10	---	68.7	NA	540	N	5480	14300	MDEQ	No	BSL
7440-41-7	Beryllium	0.03		0.57		mg/kg	04SB0701	6/10	0.02	0.57	NA	15	N	156	1020	MDEQ	No	BSL
7440-70-2	Calcium	28.6		20000		mg/kg	04SB0201	10/10	---	20000	NA	NA	N	NA	NA	MDEQ	No	NUT
7440-47-3	Chromium	2.4		15.2		mg/kg	04SB0701	10/10	---	15.2	NA	30	C(10)	NA	NA	MDEQ	No	BSL
7440-48-4	Cobalt	0.41		3.9	J	mg/kg	04SB0701	6/10	0.33 - 0.46	3.9	NA	140	N	4690	12300	MDEQ	No	BSL
7440-50-8	Copper	1.2		13.9		mg/kg	04SB0201	10/10	---	13.9	NA	310	N	3130	8170	MDEQ	No	BSL
7439-89-6	**Iron**	931		10300		mg/kg	04SB0701	10/10	---	10300	NA	**2300**	N	23500	613000	MDEQ	**Yes**	**ASL**
7439-92-1	Lead	8.8		80.5		mg/kg	04SB0201	2/10	1.1 - 8.2	80.5	NA	400	N(11)	400	1700	MDEQ	No	BSL
7439-95-4	Magnesium	77.9	J	2110	J	mg/kg	04SB0201	10/10	---	2110	NA	NA	N	NA	NA	MDEQ	No	NUT
7439-96-5	Manganese	2.2		131		mg/kg	04SB0201	10/10	---	131	NA	180	N	1560	4080	MDEQ	No	BSL
7439-97-6	Mercury	0.01	J	0.03	J	mg/kg	04SB0601	5/10	0.01	0.03	NA	2.3	N	10	61.3	MDEQ	No	BSL
7440-02-0	Nickel	12.4		12.4		mg/kg	04SB0201	1/10	1.3 - 7.3	12.4	NA	160	N	1560	4080	MDEQ	No	BSL
7440-09-7	Potassium	254		782		mg/kg	04SB0701	3/10	88.1 - 163	782	NA	NA	N	NA	NA	MDEQ	No	NUT
7782-49-2	Selenium	0.43		0.43		mg/kg	04SB1001	1/10	0.28 - 0.39	0.43	NA	39	N	391	1020	MDEQ	No	BSL
7440-23-5	Sodium	45.2	J	116	J	mg/kg	04SB0201	3/10	9.6 - 40.4	116	NA	NA		NA	NA	MDEQ	No	NUT
7440-28-0	Thallium	0.44		0.44		mg/kg	04SB0801	1/10	0.31 - 0.43	0.44	NA	0.52	N	5.48	143	MDEQ	No	BSL
7440-62-2	**Vanadium**	2.4		19.8		mg/kg	04SB0201	9/10	2	19.8	NA	**7.8**	N	548	1430	MDEQ	**Yes**	**ASL**
7440-66-6	Zinc	1.4		193		mg/kg	04SB0201	10/10	---	193	NA	2300	N	23500	61300	MDEQ	No	BSL
Miscellaneous Parameters (mg/kg)																		
57-12-5	Cyanide	0.32	J	0.77	J	mg/kg	04SB0801-D	3/10	0.5 - 0.63	0.77	NA	120	N	1560	4080	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994).

Associated Samples:

04SB0101	04SB0501	04SB0801-DUP
04SB0201	04SB0601	04SB0901
04SB0301	04SB0701	04SB1001
04SB0401	04SB0801	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002 for Unrestricted and Restricted Land Use.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

TABLE 6-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS - SUBSURFACE SOII
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)															
78-93-3	2-Butanone	0.009		0.012		mg/kg	04SB0601	2/10	0.025 - 0.037	0.012	NA	4.4	24000	No	BSL
67-64-1	Acetone	0.022		0.27		mg/kg	04SB0801-D	9/9	---	0.27	NA	6.6	NA	No	BSL
75-15-0	Carbon Disulfide	0.0007		0.006		mg/kg	04SB1001	9/10	0.005	0.006	NA	1.5	720	No	BSL
108-90-7	Chlorobenzene	0.001		0.001		mg/kg	04SB0401	1/10	0.005 - 0.006	0.001	NA	0.065	13	No	BSL
100-41-4	Ethylbenzene	0.003		0.17		mg/kg	04SB0601	2/10	0.005 - 0.007	0.17	NA	0.67	400	No	BSL
98-82-8	Isopropylbenzene	0.0008		0.0008		mg/kg	04SB0201	1/10	0.005 - 0.007	0.0008	NA	18	850	No	BSL
TTNUS054	M+P-Xylenes	0.002		0.002		mg/kg	04SB0201	1/10	0.010 - 0.015	0.002	NA	7.1	420	No	BSL
108-87-2	Methyl Cyclohexane	0.002		0.006		mg/kg	04SB0201	2/10	0.005 - 0.007	0.006	NA	NA	490	No	BSL
100-42-5	Styrene	0.088		0.088		mg/kg	04SB0601	1/10	0.005 - 0.007	0.088	NA	0.18	1500	No	BSL
108-88-3	Toluene	0.0007		0.36		mg/kg	04SB0601	2/10	0.005 - 0.007	0.36	NA	0.59	650	No	BSL
75-69-4	Trichlorofluoromethane	0.001		0.004		mg/kg	04SB0601	9/10	0.005	0.004	NA	8	110	No	BSL
75-01-4	**Vinyl Chloride**	0.003		0.006		mg/kg	04SB0801	1/10	0.005 - 0.007	0.006	NA	**0.00067**	0.28	**Yes**	**ASL**
Semivolatile Organics (mg/kg)															
92-52-4	1,1-Biphenyl	0.34		0.34		mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	57	NA	No	BSL
91-57-6	2-Methylnaphthalene	2.9		2.9		mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	NA	NA	No	NTX
83-32-9	Acenaphthene	6.1		6.1		mg/kg	04SB0201	1/10	0.39 - 0.44	6.1	NA	31	NA	No	BSL
120-12-7	Anthracene	1.7		1.7		mg/kg	04SB0201	1/10	0.39 - 0.44	1.7	NA	650	NA	No	BSL
100-52-7	Benzaldehyde	0.26		0.26		mg/kg	04SB0601	1/10	0.39 - 0.44	0.26	NA	0.86	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	0.76		0.76		mg/kg	04SB0201	1/10	0.39 - 0.44	0.76	NA	**0.16**	NA	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	0.56		0.56		mg/kg	04SB0201	1/10	0.39 - 0.44	0.56	NA	**0.49**	NA	**Yes**	**ASL**
191-24-2	Benzo(g,h,i)perylene	0.39		0.39		mg/kg	04SB0201	1/10	0.39 - 0.44	0.39	NA	NA	NA	No	NTX
207-08-9	**Benzo(k)fluoranthene**	0.87		0.87		mg/kg	04SB0201	1/10	0.39 - 0.44	0.87	NA	**0.49**	NA	**Yes**	**ASL**
117-81-7	Bis(2-ethylhexyl)phthalate	0.24		0.6		mg/kg	04SB0201	4/10	0.39 - 0.44	0.6	NA	180	NA	No	BSL
86-74-8	**Carbazole**	0.6		0.6		mg/kg	04SB0201	1/10	0.39 - 0.44	0.6	NA	**0.03**	NA	**Yes**	**ASL**
218-01-9	**Chrysene**	1.2		1.2		mg/kg	04SB0201	1/10	0.39 - 0.44	1.2	NA	**0.16**	NA	**Yes**	**ASL**
53-70-3	Dibenzo(a,h)anthracene	0.21		0.21		mg/kg	04SB0201	1/10	0.39 - 0.44	0.21	NA	1.5	NA	No	BSL
132-64-9	**Dibenzofuran**	2.9		2.9		mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	**2.4**	NA	**Yes**	**ASL**
206-44-0	Fluoranthene	2.7		2.7		mg/kg	04SB0201	1/10	0.39 - 0.44	2.7	NA	310	NA	No	BSL
86-73-7	Fluorene	4.2		4.2		mg/kg	04SB0201	1/10	0.39 - 0.44	4.2	NA	41	NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.34		0.34		mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	1.4	NA	No	BSL
91-20-3	Naphthalene	2.1		2.1		mg/kg	04SB0201	1/10	0.39 - 0.44	2.1	NA	3.1	17	No	BSL
85-01-8	Phenanthrene	7		7		mg/kg	04SB0201	1/10	0.39 - 0.44	7	NA	NA	NA	No	NTX
129-00-0	Pyrene	4.4		4.4		mg/kg	04SB0201	1/10	0.39 - 0.44	4.4	NA	230	NA	No	BSL
Pesticides/PCBs (mg/kg)															
72-54-8	4,4'-DDD	0.0063		0.0063		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0063	NA	0.71	NA	No	BSL
72-55-9	4,4'-DDE	0.0037		0.0037		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0037	NA	2.2	NA	No	BSL
5103-71-9	alpha-Chlordane (7)	0.024		0.024		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.024	NA	0.48	72	No	BSL
12789-03-06	gamma-Chlordane (7)	0.28		0.28		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.28	NA	0.48	72	No	BSL
Dioxins/Furans(ng/kg)															
3268-87-9	OCDD	120		320		ng/kg	04SB0701	2/2	---	320	NA	2800	430000	No	BSL
35822-46-9	**1,2,3,4,6,7,8-HpCDD**	12		33		ng/kg	04SB0701	2/2	---	33	NA	**28**	4300	**Yes**	**ASL**
19408-74-3	1,2,3,7,8,9-HxCDD	4.3		4.3		ng/kg	04SB0701	1/2	2	4.3	NA	3200	2460000	No	BSL
1746-01-6	**2,3,7,8-TCDD**	1.4		1.4		ng/kg	04SB0701	1/2	0.2	1.4	NA	**0.28**	43	**Yes**	**ASL**
37871-00-4	TOTAL HpCDD	27		180		ng/kg	04SB0701	2/2	---	180	NA	NA	NA	NA	NA
34465-46-8	TOTAL HxCDD	15		200		ng/kg	04SB0701	2/2	---	200	NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	86		86		ng/kg	04SB0701	1/2	1.7	86	NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	1.6		95		ng/kg	04SB0701	2/2	---	95	NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	0.672		2.6		ng/kg	04SB0701	2/2	---	2.6	NA	**0.28**	43	**Yes**	**ASL**

TABLE 6-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS - SUBSURFACE SOII
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Inorganics (mg/kg)															
7429-90-5	**Aluminum**	1240		7680		mg/kg	04SB0701	10/10	---	7680	NA	**8.3**	686000	**Yes**	**ASL**
7440-38-2	**Arsenic**	0.27		7.6		mg/kg	04SB0701	10/10	---	7.6	NA	**0.29**	745	**Yes**	**ASL**
7440-39-3	Barium	4.3		68.7		mg/kg	04SB0201	10/10	---	68.7	NA	82	68600	No	BSL
7440-41-7	Beryllium	0.03		0.57		mg/kg	04SB0701	6/10	0.02	0.57	NA	3.2	133	No	BSL
7440-70-2	Calcium	28.6		20000		mg/kg	04SB0201	10/10	---	20000	NA	NA	NA	No	NUT
7440-47-3	**Chromium(8)**	2.4		15.2		mg/kg	04SB0701	10/10	---	15.2	NA	**2.1**	267	**Yes**	**ASL**
7440-48-4	**Cobalt**	0.41		3.9		mg/kg	04SB0701	6/10	0.33 - 0.46	3.9	NA	**0.17**	1140	**Yes**	**ASL**
7440-50-8	Copper	1.2		13.9		mg/kg	04SB0201	10/10	---	13.9	NA	560	NA	No	BSL
7439-89-6	Iron	931		10300		mg/kg	04SB0701	10/10	---	10300	NA	NA	NA	No	BSL
7439-92-1	Lead	8.8		80.5		mg/kg	04SB0201	2/10	1.1 - 8.2	80.5	NA	NA	NA	No	BSL
7439-95-4	Magnesium	77.9		2110		mg/kg	04SB0201	10/10	---	2110	NA	NA	NA	No	NUT
7439-96-5	**Manganese**	2.2		131		mg/kg	04SB0201	10/10	---	131	NA	**110**	6860	**Yes**	**ASL**
7439-97-6	Mercury	0.01		0.03		mg/kg	04SB0601	5/10	0.01	0.03	NA	NA	NA	No	BSL
7440-02-0	Nickel	12.4		12.4		mg/kg	04SB0201	1/10	1.3 - 7.3	12.4	NA	14	NA	No	BSL
7440-09-7	Potassium	254		782		mg/kg	04SB0701	3/10	88.1 - 163	782	NA	NA	NA	No	NUT
7782-49-2	**Selenium**	0.43		0.43		mg/kg	04SB1001	1/10	0.28 - 0.39	0.43	NA	**0.26**	NA	**Yes**	**ASL**
7440-23-5	Sodium	45.2		116		mg/kg	04SB0201	3/10	9.6 - 40.4	116	NA	NA	NA	No	NUT
7440-28-0	**Thallium**	0.44		0.44		mg/kg	04SB0801	1/10	0.31 - 0.43	0.44	NA	**0.056**	NA	**Yes**	**ASL**
7440-62-2	Vanadium	2.4		19.8		mg/kg	04SB0201	9/10	2	19.8	NA	260	NA	No	BSL
7440-66-6	Zinc	1.4		193		mg/kg	04SB0201	10/10	---	193	NA	680	NA	No	BSL
Miscellaneous Parameters (mg/kg)															
57-12-5	Cyanide	0.32		0.77		mg/kg	04SB0801-D	3/10	0.5 - 0.63	0.77	NA	2	NA	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 USEPA Soil Screening Levels. USEPA Internet Site at http://risk.lsd.ornl.gov/calc_start.shtml (Soil to air SSLs for noncarcinogens are divided by 10). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1. If the maximum concentration of a chemical exceeds the SSL for Migration to Air (i.e., inhalation), risks for that chemical are quantitatively evaluated in the risk assessment.
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
8 As Hexavalent Chromium.

Associated Samples:

04SB0101	04SB0501	04SB0801-DUP
04SB0201	04SB0601	04SB0901
04SB0301	04SB0701	04SB1001
04SB0401	04SB0801	

Definitions:
COPC = Chemical of Potential Concern
J = Estimated Value
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level

For Elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NTX = No toxicity information available

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (ug/L)																	
75-34-3	1,1-Dichloroethane	0.1	J	0.2	J	ug/L	04GP2401	2/38	5	0.2	NA	81	N	798	MDEQ	No	BSL
75-35-4	1,1-Dichloroethene	0.6	J	0.6	J	ug/L	04GW1601	1/38	5	0.6	NA	34	N	7	MDEQ	No	BSL
107-06-2	**1,2-Dichloroethane**	0.2	J	0.2	J	ug/L	04GW1601	1/38	5	0.2	NA	**0.12**	C	5	MDEQ	**Yes**	**ASL**
106-46-7	1,4-Dichlorobenzene	0.3	J	0.3	J	ug/L	04GP0101	1/38	5	0.3	NA	0.5	C	75	MDEQ	No	BSL
156-59-2	**cis-1,2-Dichloroethene**	0.2	J	280		ug/L	04GW1601	12/38	5	280	NA	**6.1**	N	**70**	MDEQ	**Yes**	**ASL**
156-60-5	**trans-1,2-Dichloroethene**	7		190		ug/L	04GW1601	10/38	5	190	NA	**12**	N	**100**	MDEQ	**Yes**	**ASL**
540-59-0	**Total 1,2-Dichloroethene**	0.2	J	470		ug/L	04GW1601	7/25	10	470	NA	**6.1**	N	NA	NA	**Yes**	**ASL**
78-93-3	2-Butanone	2	J	2	J	ug/L	04GP0201, 04GW11R01	2/35	5 - 20	2	NA	700	N	1910	MDEQ	No	BSL
67-64-1	Acetone	2	J	290	J	ug/L	04GP0201	9/33	5 - 50	290	NA	550	N	608	MDEQ	No	BSL
71-43-2	**Benzene**	0.1	J	0.4	J	ug/L	04GP0101	6/38	5	0.4	NA	**0.35**	C	5	MDEQ	**Yes**	**ASL**
75-15-0	Carbon Disulfide	0.2	J	0.9	J	ug/L	04GW10R01	10/38	5	0.9	NA	100	N	1040	MDEQ	No	BSL
108-90-7	Chlorobenzene	0.2	J	5		ug/L	04GP0101	3/38	5	5	NA	11	N	100	MDEQ	No	BSL
98-82-8	Isopropylbenzene	0.3	J	0.3	J	ug/L	04GW1401	1/38	5	0.3	NA	66	N	679	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	2	J	2	J	ug/L	04GP0601	1/25	5	2	NA	520	N	NA	NA	No	BSL
108-88-3	Toluene	0.2	J	2	J	ug/L	04GW1701	3/38	5	2	NA	72	N	1000	MDEQ	No	BSL
79-01-6	**Trichloroethene**	0.8	J	20.4		ug/L	04GP1301	8/38	5	20.4	NA	**0.028**	C	**5**	MDEQ	**Yes**	**ASL**
75-01-4	**Vinyl Chloride**	0.2	J	172		ug/L	04GP1301	14/38	5	172	NA	**0.02**	C	**2**	MDEQ	**Yes**	**ASL**
Semivolatile Organics (ug/L)																	
106-44-5	4-Methylphenol	5	J	8	J	ug/L	04GW11R01	4/23	10	8	NA	18	N	183	MDEQ	No	BSL
83-32-9	Acenaphthene	7	J	25	J	ug/L	04GW1401	2/23	10	25	NA	37	N	365	MDEQ	No	BSL
105-60-2	Caprolactam	23		38		ug/L	04GW11R01	2/23	10	38	NA	1800	N	18300	MDEQ	No	BSL
132-64-9	**Dibenzofuran**	7	J	7	J	ug/L	04GW1401	1/23	10	7	NA	**1.2**	N	24.3	MDEQ	**Yes**	**ASL**
206-44-0	Fluoranthene	10		10		ug/L	04GW1401	1/23	10	10	NA	150	N	1460	MDEQ	No	BSL
86-73-7	Fluorene	4	J	14		ug/L	04GW1401	2/23	10	14	NA	24	N	243	MDEQ	No	BSL
85-01-8	Phenanthrene	4	J	4	J	ug/L	04GW1901	1/23	10	4	NA	18	N(7)	1100	MDEQ	No	BSL
129-00-0	Pyrene	8	J	8	J	ug/L	04GW1401	1/23	10	8	NA	18	N	183	MDEQ	No	BSL
Dioxins/Furans (pg/L)																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	87	J	210		pg/L	04GW1701	3/13	1.6 - 25	210	NA	4500	C	446	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	31	J	31	J	pg/L	04GW1401	1/13	0.81 - 16	31	NA	45	C	44.6	MDEQ	No	BSL
37871-00-4	Total HpCDD	40		62		pg/L	04GW1401	2/13	0.81 - 12	62	NA	NA		NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	2.1		10		pg/L	04GW1401	3/13	---	10	NA	**0.45**	C	**0.446**	MDEQ	**Yes**	**ASL**
Inorganics (ug/L)																	
7429-90-5	**Aluminum**	1480	J	8690	J	ug/L	04GP0301	5/23	17.9 - 757	8690	NA	**3600**	N	36500	MDEQ	**Yes**	**ASL**
7440-36-0	**Antimony**	26.3		26.3		ug/L	04GW1401	1/23	0.19 - 2.34	26.3	NA	**1.5**	N	**6**	MDEQ	**Yes**	**ASL**
7440-38-2	**Arsenic**	3.3		11.4		ug/L	04GW1401	4/23	0.75 - 8.6	11.4	NA	**0.045**	C	50	USEPA	**Yes**	**ASL**
7440-39-3	**Barium**	22.3		1620		ug/L	04GW1201, 04GW1201-D	23/23	---	1620	NA	**260**	N	2000	MDEQ	**Yes**	**ASL**
7440-41-7	Beryllium	0.33		0.33		ug/L	04GP0201	1/23	0.27	0.33	NA	7.3	N	4	MDEQ	No	BSL
7440-70-2	Calcium	6690		273000		ug/L	04GP0801-D	23/23	---	273000	NA	NA		NA	NA	No	NUT
7440-47-3	**Chromium**	2.2		11.8		ug/L	04GP0401	6/23	0.8 - 10.1	11.8	NA	**11**	N(8)	100	MDEQ	**Yes**	**ASL**
7440-50-8	Copper	11.9		13.3		ug/L	04GP0701	3/23	1.9 - 12.6	13.3	NA	150	N	1300	MDEQ	No	BSL
7439-89-6	**Iron**	370		69700		ug/L	04GP0801-D	22/23	126 - 146	69700	NA	**1100**	N	**11000**	MDEQ	**Yes**	**ASL**
7439-92-1	Lead	0.18	J	3.2		ug/L	04GP0401	6/23	0.15 - 1.7	3.2	NA	15	(9)	15	MDEQ	No	BSL

TABLE 6-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
7439-95-4	Magnesium	1270		63300		ug/L	04GP0801-D	23/23	---	63300	NA	NA		NA	NA	No	NUT
7439-96-5	**Manganese**	35.1		465		ug/L	04GW1301	23/23	---	465	NA	**88**	N	730	MDEQ	**Yes**	**ASL**
7439-97-6	Mercury	0.02		0.02		ug/L	04GP0401	1/23	0.01 - 0.08	0.02	NA	1.1	N	2	MDEQ	No	BSL
7440-02-0	Nickel	7.8		11		ug/L	04GP0401	2/23	1 - 10.8	11	NA	73	N	730	MDEQ	No	BSL
7440-09-7	Potassium	1300		19600		ug/L	04GW1201	19/23	722 - 2960	19600	NA	NA		NA	NA	No	NUT
7782-49-2	Selenium	3.9		3.9		ug/L	04GP1001	1/23	3.71 - 4.2	3.9	NA	18	N	50	MDEQ	No	BSL
7440-23-5	Sodium	5770	J	73400	J	ug/L	04GW1201	23/23	---	73400	NA	NA		NA	NA	No	NUT
7440-62-2	**Vanadium**	4.2		18.1		ug/L	04GP0701	6/23	4.14	18.1	NA	**3.6**	N	256	MDEQ	**Yes**	**ASL**
7440-66-6	Zinc	1.6		43.9		ug/L	04GP0201	8/23	1.44 - 6.3	43.9	NA	1100	N	11000	MDEQ	No	BSL
Miscellanous Parameters (ug/L)																	
16887-00-6	Chloride	5400		41000		ug/L	04GW1201	22/22	---	41000	NA	NA		NA	MDEQ	No	NTX
57-12-5	Cyanide	4.4	J	53	J	ug/L	04GP0801-D	5/23	10	53	NA	73	N	200	MDEQ	No	BSL
74-84-0	Ethane	0.0019	J	8.6		ug/L	04GW10R01	13/13	---	8.6	NA	NA		NA	NA	No	NTX
74-85-1	Ethene	0.0046	J	20		ug/L	04GW1601	12/13	0.005	20	NA	NA		NA	NA	No	NTX
1333-74-0	Hydrogen	0.9		23		ug/L	04GW1601	12/13	---	23	NA	NA		NA	NA	No	NTX
74-82-8	Methane	4.7	J	8500		ug/L	04GW1901	13/13	---	8500	NA	NA		NA	NA	No	NTX
TTNUS495	Nitrate-N	5.4	J	20	J	ug/L	04GP0701	5/22	50	20	NA	10000		10000	MDEQ	No	BSL
TTNUS496	Nitrite-N	5.5	J	94		ug/L	04GP0301	5/22	50	94	NA	1000		1000	MDEQ	No	BSL
14808-79-8	Sulfate	1100		380000		ug/L	04GP0901	17/22	1000 - 2000	380000	NA	NA		NA	NA	No	NTX

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for phenanthrene.
8 Hexavalent Chromium.
9 Action Level at the tap (Winter 2004).

Associated Samples:

04GP0101	04GP0601	04GP1201	04GP1901	04GW0901	04GW1401
04GP0201	04GP0701	04GP1301	04GP2001	04GW10R01	04GW1501
04GP0301	04GP0801	04GP1401	04GP2101	04GW1101	04GW1601
04GP0301_STL	04GP0801-D	04GP1501	04GP2201	04GW11R01	04GW1701
04GP0401	04GP0901	04GP1601	04GP2301	04GW1201	04GW1801
04GP0401_STL	04GP1001	04GP1701	04GP2401	04GW1201-D	04GW1901
04GP0501	04GP1101	04GP1801	04GP2501	04GW1301	04GW2001

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No toxicity information available

TABLE 6-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (ug/L)																	
67-64-1	Acetone	11	J	11	J	ug/L	04SW0301	1/3	5 - 10	11	NA	550	N	608	MDEQ	No	BSL
127-18-4	**Tetrachloroethene**	3	J	3	J	ug/L	04SW0301	1/3	5	3	NA	**0.1**	C	5	MDEQ	**Yes**	**ASL**
108-88-3	Toluene	2	J	2	J	ug/L	04SW0301	1/3	5	2	NA	72	N	1000	MDEQ	No	BSL
Dioxins/Furans (pg/L)																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	1200		1200		pg/L	04SW0301	1/3	16 - 19	1200	NA	4500	C	**446**	MDEQ	No	BSL
39001-02-0	1,2,3,4,6,7,8,9-OCDF	51	J	51	J	pg/L	04SW0301	1/3	1.9 - 4.5	51	NA	4500	C	446	MDEQ	No	BSL
35822-46-9	**1,2,3,4,6,7,8-HpCDD**	120		120		pg/L	04SW0301	1/3	2.8 - 4	120	NA	**45**	C	**44.6**	MDEQ	**Yes**	**ASL**
37871-00-4	Total HpCDD	260		260		pg/L	04SW0301	1/3	3.4 - 4	260	NA	NA		NA	NA	NA	NA
38998-75-3	Total HpCDF	37		37		pg/L	04SW0301	1/3	1.7 - 3.5	37	NA	NA		NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	4.9		4.9		pg/L	04SW0301	1/3		4.9	NA	**0.45**	C	**0.446**	MDEQ	**Yes**	**ASL**
Inorganics (ug/L)																	
7440-38-2	**Arsenic**	3.6		6.8		ug/L	04SW0101	3/3	0	6.8	NA	**0.045**	C	10	USEPA	**Yes**	**ASL**
7440-39-3	Barium	31.1		51.7		ug/L	04SW0101	3/3	0	51.7	NA	260	N	2000	MDEQ	No	BSL
7440-70-2	Calcium	15500		22000		ug/L	04SW0101-D	3/3	0	22000	NA	NA		NA	MDEQ	No	NUT
7440-47-3	Chromium	1.2		1.2		ug/L	04SW0101	1/3	0.8	1.2	NA	11	N	100	MDEQ	No	BSL
7439-89-6	**Iron**	2800		5180		ug/L	04SW0101	3/3	0	5180	NA	**1100**	N	11000	MDEQ	**Yes**	**ASL**
7439-92-1	Lead	3.2	J	3.2	J	ug/L	04SW0301	1/3	1.7	3.2	NA	15	(8)	15	MDEQ	No	BSL
7439-95-4	Magnesium	1820		2870		ug/L	04SW0101, 04SW0101-D	3/3	0	2870	NA	NA		NA	MDEQ	No	NUT
7439-96-5	**Manganese**	75.9		205		ug/L	04SW0101-D	3/3	0	205	NA	**88**	N	730	MDEQ	**Yes**	**ASL**
7440-09-7	Potassium	1440		1800		ug/L	04SW0201	3/3	1180	1800	NA	NA		NA	MDEQ	No	NUT
7440-23-5	Sodium	7010	J	10700	J	ug/L	04SW0101	3/3	0	10700	NA	NA		NA	MDEQ	No	NUT
7440-66-6	Zinc	9.1		9.1		ug/L	04SW0301	1/3	1.7 - 3.8	9.1	NA	1100	N	11000	MDEQ	No	BSL
Miscellanous Parameters (ug/L)																	
57-12-5	Cyanide	3.9	J	6.4	J	ug/L	04SW0101-D	2/3	10	6.4	NA	73	N	200	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Hexavalent Chromium.
8 Action Level at the tap (Winter 2004).

Associated Samples:
04SW0101 04SW0201
04SW0101-D 04SW0301

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)																		
78-93-3	2-Butanone	0.014	J	0.062	J	mg/kg	04SD0401	7/8	0.029 -0.0 57	0.062	NA	2200	N	84.5	84.5	MDEQ	No	BSL
67-64-1	Acetone	0.038	J	0.34	J	mg/kg	04SD0401	8/8	---	0.34	NA	1400	N	7820	104000	MDEQ	No	BSL
75-15-0	Carbon Disulfide	0.0009	J	0.008	J	mg/kg	04SD0701	7/8	0.006 -0.011	0.008	NA	36	N	7.97	7.97	MDEQ	No	BSL
75-00-3	Chloroethane	0.002	J	0.002	J	mg/kg	04SD0201	1/8	0.006 -0.011	0.002	NA	3	C	220	1970	MDEQ	No	BSL
110-82-7	Cyclohexane	0.0007	J	0.0008	J	mg/kg	04SD0701	2/8	0.006 -0.011	0.0008	NA	140	sat	NA	NA	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	0.008		0.008		mg/kg	04SD0201	1/8	0.006 -0.011	0.008	NA	260	N	NA	NA	MDEQ	No	BSL
1634-04-4	Methyl Tert-butyl Ether	0.018	J	0.018	J	mg/kg	04SD0701	1/8	0.006 -0.011	0.018	NA	32	C	782	1210	MDEQ	No	BSL
108-88-3	cis-1,2-Dichloroethene	0.018	J	0.018	J	mg/kg	04SD0701	1/8	0.011 - 0.023	0.018	NA	4.3	N	NA	NA	MDEQ	No	BSL
TTNUS054	Total-1,2-Dichloroethene	0.002	J	0.002	J	mg/kg	04SD0201	1/8	0.011 - 0.023	0.002	NA	4.3	N	3910	8740	MDEQ	No	BSL
108-88-3	Toluene	0.002	J	0.002	J	mg/kg	04SD0801	1/8	0.006 -0.011	0.002	NA	520	sat	38	38	MDEQ	No	BSL
100-42-5	Trichloroethene	0.001	J	0.001	J	mg/kg	04SD0701	1/8	0.006 -0.011	0.001	NA	0.053	C	5.17	7.92	MDEQ	No	BSL
75-69-4	Trichlorofluoromethane	0.001		0.006		mg/kg	04SD0701	7/8	0.006 -0.011	0.006	NA	39	N	23500	143000	MDEQ	No	BSL
75-01-4	Vinyl Chloride	0.044		0.044		mg/kg	04SD0701	1/8	0.006 -0.011	0.044	NA	0.079	C	0.426	0.939	MDEQ	No	BSL
Semivolatile Organics (mg/kg)																		
83-32-9	Acenaphthene	0.15	J	0.15	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.15	NA	370	N	4690	123000	MDEQ	No	BSL
120-12-7	Anthracene	0.28	J	0.28	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.28	NA	2200	N	23500	613000	MDEQ	No	BSL
100-52-7	Benzaldehyde	0.43	J	0.43	J	mg/kg	04SD0401	1/8	0.440 - 0.580	0.43	NA	610	N	7820	204000	MDEQ	No	BSL
56-55-3	**Benzo(a)anthracene**	0.043	J	1.6		mg/kg	04SD0501	4/8	0.440 - 0.580	1.6	NA	**0.62**	C	**0.875**	7.84	MDEQ	**Yes**	**ASL**
50-32-8	**Benzo)a)pyrene**	0.063	J	1.8		mg/kg	04SD0501	4/8	0.440 - 0.580	1.8	NA	**0.062**	C	**0.0875**	**0.784**	MDEQ	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	2.5		2.5		mg/kg	04SD0501	1/8	0.440 - 0.580	2.5	NA	**0.62**	C	**0.875**	7.84	MDEQ	**Yes**	**ASL**
191-24-2	Benzo(g,h,i)perylene	0.07	J	1		mg/kg	04SD0501	2/8	0.440 - 0.580	1	NA	230	N(7)	2350	61300	MDEQ	No	BSL
207-08-9	Benzo(k)fluoranthene	0.082	J	1.5		mg/kg	04SD0501	2/8	0.440 - 0.580	1.5	NA	6.2	C	8.75	78.4	MDEQ	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	0.61		0.61		mg/kg	04SD0401	1/8	0.440 - 0.580	0.61	NA	35	C	45.6	409	MDEQ	No	BSL
86-74-8	Carbazole	0.11	J	0.11	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.11	NA	24	C	31.9	286	MDEQ	No	BSL
218-01-9	Chrysene	0.06	J	1.8		mg/kg	04SD0501	5/8	0.440 - 0.580	1.8	NA	62	C	87.5	784	MDEQ	No	BSL
53-70-3	**Dibenzo(a,h)anthracene**	0.54	J	0.54	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.54	NA	**0.062**	C	**0.0875**	0.784	MDEQ	**Yes**	**ASL**
	Dibenzofuran	0.092	J	0.092	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.092	NA	15	N	313	8180	MDEQ	No	BSL
206-44-0	Fluoranthene	0.049	J	1.2		mg/kg	04SD0501	7/8	0.440 - 0.580	1.2	NA	230	N	3130	81700	MDEQ	No	BSL
86-73-7	Fluorene	0.2	J	0.2	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.2	NA	270	N	3130	81700	MDEQ	No	BSL
193-39-5	**Indeno(1,2,3-cd)pyrene**	0.98		0.98		mg/kg	04SD0501	1/8	0.440 - 0.580	0.98	NA	**0.62**	C	**0.875**	7.84	MDEQ	**Yes**	**ASL**
85-01-8	Phenanthrene	0.042	J	0.8		mg/kg	04SD0501	4/8	0.440 - 0.580	0.8	NA	230	N(7)	2350	61300	MDEQ	No	BSL
129-00-0	Pyrene	0.059	J	2		mg/kg	04SD0501	7/8	0.440 - 0.580	2	NA	230	N	2350	61300	MDEQ	No	BSL
Pesticides/PCBs (mg/kg)																		
72-54-8	4,4'-DDD	0.0026	J	0.012	J	mg/kg	04SD0501	2/8	0.0044 - 0.0054	0.012	NA	2.4	C	2.66	23.8	MDEQ	No	BSL
50-29-3	4,4'-DDT	0.005	J	0.005	J	mg/kg	04SD0401	1/8	0.0044 - 0.0058	0.005	NA	1.7	C	1.88	16.8	MDEQ	No	BSL
5103-71-9	alpha-Chlordane	0.0051	J	0.0051	J	mg/kg	04SD0801	1/8	0.0022 -0.003	0.0051	NA	1.6	C(8)	NA	NA	MDEQ	No	BSL
12789-03-06	gamma-Chlordane	0.37		0.37		mg/kg	04SD0801	1/8	0.0022 -0.003	0.37	NA	1.6	C(8)	NA	NA	MDEQ	No	BSL
11096-82-5	**Aroclor-1260**	0.046	J	0.24	J	mg/kg	04SD0501	4/8	0.022 - 0.028	0.24	NA	**0.22**	C	1	10	MDEQ	**Yes**	**ASL**
Dioxins/Furans(ng/kg)																		
3268-87-9	**OCDD**	500		6000		ng/kg	04SD0801	2/2	---	6000	NA	39000	C	**4260**	38200	MDEQ	**Yes**	**ASL**
39001-02-0	OCDF	18	J	250		ng/kg	04SD0801	2/2	---	250	NA	39000	C	4260	38200	MDEQ	No	BSL
35822-46-9	**1,2,3,4,6,7,8-HpCDD**	63		670		ng/kg	04SD0801	2/2	---	670	NA	**390**	C	**426**	3820	MDEQ	**Yes**	**ASL**
67562-39-4	1,2,3,4,6,7,8-HpCDF	7.5	J	98		ng/kg	04SD0801	2/2	---	98	NA	390	C	426	3820	MDEQ	No	BSL
55673-89-7	1,2,3,4,7,8,9-HpCDF	9.2		9.2		ng/kg	04SD0801	1/2	0.95 - 1.2	9.2	NA	390	C	426	3820	MDEQ	No	BSL
39227-28-6	1,2,3,4,7,8-HxCDD	8.7		8.7		ng/kg	04SD0801	1/2	0.59 - 0.63	8.7	NA	39	C	42.6	382	MDEQ	No	BSL
70648-26-9	1,2,3,4,7,8-HxCDF	7.1	J	7.1	J	ng/kg	04SD0801	1/2	0.95 - 1.3	7.1	NA	39	C	42.6	382	MDEQ	No	BSL
57653-85-7	1,2,3,6,7,8-HxCDD	4.1		25		ng/kg	04SD0801	2/2	2.8	25	NA	39	C	103	923	MDEQ	No	BSL
57117-44-9	1,2,3,6,7,8-HxCDF	8.3	J	8.3	J	ng/kg	04SD0801	1/2	1.1 - 1.2	8.3	NA	39	C	42.6	382	MDEQ	No	BSL
19408-74-3	1,2,3,7,8,9-HxCDD	6.5	J	19		ng/kg	04SD0801	2/2	---	19	NA	39	C	103	923	MDEQ	No	BSL
40321-76-4	**1,2,3,7,8-PeCDD**	6	J	6	J	ng/kg	04SD0801	1/2	0.47 - 0.6	6	NA	**3.9**	C	8.52	76.3	MDEQ	**Yes**	**ASL**
60851-34-5	2,3,4,6,7,8-HxCDF	5.9	J	5.9	J	ng/kg	04SD0801	1/2	0.55 - 0.73	5.9	NA	39	C	42.6	382	MDEQ	No	BSL
1746-01-6	**2,3,7,8-TCDD**	1.3	J	8		ng/kg	04SD0801	2/2	---	8	NA	**3.9**	C	**4.26**	38.2	MDEQ	**Yes**	**ASL**
51207-31-9	2,3,7,8-TCDF	1.6		1.6		ng/kg	04SD0801	1/2	0.59 - 0.65	1.6	NA	39	C	42.6	382	MDEQ	No	BSL

TABLE 6-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
37871-00-4	TOTAL HpCDD	120		1400		ng/kg	04SD0801	2/2	---	1400	NA	NA		NA	NA	NA	NA	NA
34465-46-8	TOTAL HxCDD	40		170		ng/kg	04SD0801	2/2	---	170	NA	NA		NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	5.2		6		ng/kg	04SD0801	2/2	3.7	6	NA	NA		NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	10		33		ng/kg	04SD0101	2/2	---	33	NA	NA		NA	NA	NA	NA	NA
38998-75-3	TOTAL HpCDF	23		330		ng/kg	04SD0801	2/2	---	330	NA	NA		NA	NA	NA	NA	NA
55684-94-1	TOTAL HxCDF	10		150		ng/kg	04SD0801	2/2	---	150	NA	NA		NA	NA	NA	NA	NA
30402-15-4	TOTAL PeCDF	22		22		ng/kg	04SD0801	1/2	2.1 - 2.2	22	NA	NA		NA	NA	NA	NA	NA
55722-27-5	TOTAL TCDF	11		100		ng/kg	04SD0101	2/2	---	100	NA	NA		NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	3.9		30.5		ng/kg	04SD0801	2/2	---	30.5	NA	**3.9**	C	**4.26**	38.2	MDEQ	**Yes**	**ASL**
Inorganics (mg/kg)																		
7429-90-5	**Aluminum**	3190	J	18600	J	mg/kg	04SD0401	8/8	---	18600	NA	**7600**	N	78200	2040000	MDEQ	**Yes**	**ASL**
7440-38-2	**Arsenic**	0.74		5.7		mg/kg	04SD0601	8/8	---	5.7	NA	**0.39**	C	**0.426**	**3.82**	MDEQ	**Yes**	**ASL**
7440-39-3	Barium	9.3	J	54.1	J	mg/kg	04SD0401	8/8	---	54.1	NA	540	N	5480	14300	MDEQ	No	BSL
7440-41-7	Beryllium	0.07		0.21		mg/kg	04SD0401	7/8	0.02 - 0.03	0.21	NA	15	N	156	1020	MDEQ	No	BSL
7440-70-2	Calcium	228	J	2120	J	mg/kg	04SD0501	8/8	---	2120	NA	NA		NA	NA	MDEQ	No	NUT
7440-47-3	Chromium	3.8	J	18.8	J	mg/kg	04SD0401	8/8	---	18.8	NA	30	C(9)	NA	NA	MDEQ	No	BSL
7440-48-4	Cobalt	0.58		2.4		mg/kg	04SD0401	8/8	0.47	2.4	NA	140	N	4690	12300	MDEQ	No	BSL
7440-50-8	Copper	1.8		12.6		mg/kg	04SD0501	8/8	---	12.6	NA	310	N	3130	8170	MDEQ	No	BSL
7439-89-6	**Iron**	1640	J	13000	J	mg/kg	04SD0401, 04SD0601	8/8	---	13000	NA	**2300**	N	23500	613000	MDEQ	**Yes**	**ASL**
7439-92-1	Lead	5.1	J	43.4	J	mg/kg	04SD0401	7/8	14.2	43.4	NA	400	(10)	400	1700	MDEQ	No	BSL
7439-95-4	Magnesium	134	J	703	J	mg/kg	04SD0401	8/8	---	703	NA	NA		NA	NA	MDEQ	No	NUT
7439-96-5	Manganese	7.2	J	38	J	mg/kg	04SD0201	8/8	---	38	NA	180	N	1560	4080	MDEQ	No	BSL
7439-97-6	Mercury	0.03		0.09		mg/kg	04SD0401, 04SD0501	8/8	---	0.09	NA	2.3	N	10	61.3	MDEQ	No	BSL
7440-09-7	Potassium	181	J	443	J	mg/kg	04SD0401	4/8	77.5 - 274	443	NA	NA		NA	NA	MDEQ	No	NUT
7782-49-2	Selenium	0.6		0.78		mg/kg	04SD0401	3/8	0.26 - 0.55	0.78	NA	39	N	391	1020	MDEQ	No	BSL
7440-23-5	Sodium	85.4	J	1260	J	mg/kg	04SD0501	2/8	16.9 - 58.7	1260	NA	NA		NA	NA	MDEQ	No	NUT
7440-28-0	**Thallium**	0.73		0.76		mg/kg	04SD0801	2/8	0.28 - 0.61	0.76	NA	**0.52**	N	5.48	143	MDEQ	**Yes**	**ASL**
7440-62-2	**Vanadium**	5.6		27.5		mg/kg	04SD0401	8/8	---	27.5	NA	**7.8**	N	548	1430	MDEQ	**Yes**	**ASL**
7440-66-6	Zinc	4.7	J	87.9	J	mg/kg	04SD0501	8/8	---	87.9	NA	2300	N	23500	61300	MDEQ	No	BSL
Miscellaneous Parameters (mg/kg)																		
57-12-5	Cyanide	0.27	J	0.37	J	mg/kg	04SD0501	3/8	0.5 - 0.69	0.37	NA	120	N	1560	4080	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits. `
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
9 Hexavalent Chromium.
10 OSWER soil screening level for residential land use (USEPA, July 1994).

Associated Samples:

04SD0101	04SD0201	04SD0401	04SD0601	04SD0801
04SD0101-D	04SD0301	04SD0501	04SD070	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002 for Unrestricted and Restricted Land Use.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

TABLE 6-6
CHEMICALS RETAINED AS COPCs
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Chemical	Subsurface Soil			Groundwater	Surface Water	Sediment
	Direct Contact	Soil to Air	Soil to Groundwater			
Volatile Organic Compounds						
1,2-Dichloroethane				X		
Benzene				X		
cis-1,2-Dichloroethene				X		
Tetrachloroethene					X	
trans-1,2-Dichloroethene				X		
Trichloroethene				X		
Vinyl Chloride			X	X		
Semivolatile Organic Compounds						
Benzo(a)anthracene	X		X			X
Benzo(a)pyrene						X
Benzo(b)fluoranthene			X			X
Benzo(k)fluoranthene			X			
Carbazole			X			
Chrysene			X			
Dibenzo(a,h)anthracene	X					X
Indeno(1,2,3-cd)pyrene						X
Dibenzofuran			X	X		
Polychlorinated Biphenyls (PCBs)						
Aroclor-1260						X
Dioxins/Furans						
2,3,7,8-TCDD TEQ			X	X	X	X
Inorganics						
Aluminum	X		X	X		X
Antimony				X		
Arsenic	X		X	X	X	X
Barium				X		
Chromium			X	X		
Cobalt			X			
Iron	X			X	X	X
Manganese			X	X	X	
Selenium			X			
Thallium			X			X
Vanadium	X			X		X

Notes
X - Indicates chemical was retained as a COPC.

TABLE 6-7
EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptors	Exposure Routes
Trespassers (Adult and Adolescent)	• Soil dermal contact (subsurface)[1] • Soil ingestion (subsurface) • Inhalation of air/dust/emissions • Surface water/sediment dermal contact • Surface water/sediment ingestion
Site/Occupational Workers	• Soil dermal contact (subsurface) • Soil ingestion (subsurface) • Inhalation of air/dust/emissions • Surface water/sediment dermal contact • Surface water/sediment ingestion
Construction/Excavation Workers	• Soil dermal contact (subsurface) • Soil ingestion (subsurface) • Inhalation of air/dust/emissions • Groundwater dermal contact (during excavation) • Inhalation of volatiles in groundwater(in a trench during excavation)
Residents (Adult/Children) (On site and Off-site)	• Soil dermal contact (subsurface) • Soil ingestion (surface and subsurface) • Inhalation of air/dust/emissions • Direct ingestion of groundwater • Groundwater dermal contact (showering/bathing) • Inhalation of volatiles in groundwater (showering/bathing and via vapor intrusion) • Surface water/sediment dermal contact • Surface water/sediment ingestion

1. Surface soil was not evaluated in the risk assessment because contamination at the site was disposed of in trenches and covered with clean soil.

TABLE 6-8
EXPOSURE POINT CONCENTRATIONS (EPCs) FOR COPCs
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Chemical of Potential Concern	Subsurface Soil[1]	Surface Water[2]	Sediment[2]	Groundwater[3]
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)
1,2-Dichloroethane				0.001
Benzene				0.001
cis-1,2-Dichloroethene				0.17
trans-1,2-Dichloroethene				0.11
Tetrachloroethylene		0.003		
Trichloroethylene				0.004
Vinyl chloride				0.088
Benzo(a)anthracene	0.76[4]		1.6	
Benzo(a)pyrene			1.8	
Benzo(b)fluoranthene			2.5	
Dibenzo(a,h)anthracene	0.21[4]		0.54	
Indeno(1,2,3-cd)pyrene			0.98	
Dibenzofuran				0.006
Aroclor-1260			0.24	
2,3,7,8-TCDD TEF		4.9E-09	3.05E-05	6.00E-09
Aluminum	5290		18600	
Antimony				0.0048
Arsenic	4.1	0.0068	5.7	0.0032
Barium				0.317
Chromium				
Iron	6130	5.18	13000	13.9
Manganese		0.205		0.288
Thallium			0.76	
Vanadium	11.1		27.5	0.0027

1. UCLs calculated according to the USEPA's ProUCL guidance, unless otherwise noted. See RAGS Part D Table 3s in Appendix D-1.
2. Because of the limited number of samples (i.e., less than 10 samples), the exposure concentration is the maximum detected concentration.
3. For groundwater, EPCs are the averages of permanent monitoring wells in the most contaminated areas of the plume. See Section 6.4.4. Note that aluminum and chromium were detected only in temporary well samples but were not detected in any permanent monitoring well samples.
4. Less than 50 percent positive detections. Maximum concentration is used as the EPC.

Blank spaces indicate that the chemical was not identified as a COPC or was not detected in the specified medium.

TABLE 6-9
SUMMARY OF EXPOSURE FACTORS - REASONABLE MAXIMUM EXPOSURE
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Exposure Route	Site Worker	Construction/ Excavation Worker	Occupational Worker	Adult Trespasser	Adolescent Trespasser	Future Adult Resident	Future Child Resident
ASSUMPTIONS FOR EXPOSURE TO SOIL AND SEDIMENT							
Exposure Concentration - C_{soil}, C_{sed} (mg/kg)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
Ingestion Rate (IR) (mg/day)	100[1]	330[2]	50[1]	50[1]	100[1]	100[1]	200[1]
Fraction Ingested (FI) (unitless)	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]
Skin Surface Area (SA) (cm^2/day)	3,300[4]	3,300[4]	3,300[4]	5,700[4]	3,250[5]	5,700[4]	2,800[4]
Soil-to-Skin Adherence Factor (AF) (mg/cm^2)	0.2[4]	0.3[4]	0.2[4]	0.07[4]	0.4[4]	0.07[4]	0.2[4]
Absorption Factor (ABS) (unitless)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
Conversion Factor (CF) (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Exposure Frequency (EF) - Soil (days/year)	24[6]	30[6]	250[1]	24[6]	100[6]	350[1]	350[1]
Exposure Frequency (EF) - Sediment (days/year)	24[6]	30[6]	30[6]	24[6]	30[6]	30[6]	30[6]
Exposure Duration (ED) (years)	25[1]	1[6]	25[1]	19[7]	11[7]	24[1]	6[1]
Body Weight (BW) (kg)	70[1]	70[1]	70[1]	70[1]	45[8]	70[1]	15[1]
Noncarcinogenic Averaging Time (AT_n) (days)	9,125[3]	365[3]	9,125[3]	6,935[3]	4,015[3]	8,760[3]	2,190[3]
Carcinogenic Averaging Time (AT_c) (days)	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]
ASSUMPTIONS FOR EXPOSURE TO SURFACE WATER							
Ingestion Rate (IR) (L/hour)	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.05[8]
SA (cm^2/day)	4,500[5]	4,500[5]	4,500[5]	4,500[5]	3,250[5]	4,500[5]	1,650[5]
EV (events/day)	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]
ET (hours/day) and t_{event} (hours/event)	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]
EF (days/year)	24[6]	30[6]	30[6]	24[6]	30[6]	30[6]	30[6]
K_p (cm/hour)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
t* (hour/event), τ (hour), and B (unitless)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
Exposure Duration (ED) (years)	25[1]	1[6]	25[1]	19[7]	11[7]	24[1]	6[1]
BW (kg)	70[1]	70[1]	70[1]	70[1]	45[8]	70[1]	15[1]
AT_n (days)	9,125[3]	365[3]	9,125[3]	6,935[3]	4,015[3]	8,760[3]	2,190[3]
AT_c (days)	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]

TABLE 6-9
SUMMARY OF EXPOSURE FACTORS - REASONABLE MAXIMUM EXPOSURE
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

ASSUMPTIONS FOR EXPOSURE TO GROUNDWATER							
Ingestion Rate (IR) (L/day)	NA	NA	NA	NA	NA	2[1]	1.5[9]
Skin Surface Area (SA) (cm^2/day)	NA	4,500[5]	NA	NA	NA	18,000[4]	6,600[4]
Exposure Time (ET) (hour/event)	NA	4[6]	NA	NA	NA	0.33[6]	0.33[6]
Event Frequency (EV) (events/day)	NA	1[6]	NA	NA	NA	1[6]	1[6]
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	NA	chemical-specific[4]	NA	NA	NA	chemical-specific[4]	chemical-specific[4]
Bunge Dermal Model variables - t* (hour/event), T (hour), and B (unitless)	NA	chemical-specific[4]	NA	NA	NA	chemical-specific[4]	chemical-specific[4]
Conversion Factor (CF) (L/cm^3)	NA	1E-03	NA	NA	NA	1E-03	1E-03
Exposure Frequency (EF) (days/year)	NA	30[6]	NA	NA	NA	350[1]	350[1]
Exposure Duration (ED) (years)	NA	1[6]	NA	NA	NA	24[1]	6[1]
Body Weight (BW) (kg)	NA	70[1]	NA	NA	NA	70[1]	15[1]
Noncarcinogenic Averaging Time (AT_n) (days)	NA	365[3]	NA	NA	NA	8,760[3]	2,190[3]
Carcinogenic Averaging Time (AT_c) (days)	NA	25,550[3]	NA	NA	NA	25,550[3]	25,550[3]
ASSUMPTIONS FOR EXPOSURE VIA INHALATION OF VOCS FROM GROUNDWATER							
Inhalation Rate (IR_n) (m^3/hour)	NA	2.5[2]	NA	NA	NA	0.6[3]	0.6[3]
Exposure Time (hours/day)	NA	4[6]	NA	NA	NA	0.33[6]	0.33[6]

1. USEPA, May 1993
2. USEPA, December 2002
3. USEPA, December 1989
4. USEPA, July 2004
5. Assumed 25 percent of total body surface area is exposed.
6. Professional Judgment
7. Assumes a total 30 year exposure, 11 years for an adolescent (6 to 16 years old) and the remaining 19 years for an adult.
8. USEPA Region 4, May 2000
9. USEPA, August 1997

TABLE 6-10
SUMMARY OF EXPOSURE FACTORS - CENTRAL TENDENCY EXPOSURE
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Exposure Route	Site Worker	Construction/ Excavation Worker	Occupational Worker	Adult Trespasser	Adolescent Trespasser	Future Adult Resident	Future Child Resident
ASSUMPTIONS FOR EXPOSURE TO SOIL AND SEDIMENT							
Exposure Concentration - C_{soil}, C_{sed} (mg/kg)	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]	Maximum or 95% UCL[1]
Ingestion Rate (IR) (mg/day)	50[1]	330[2]	50[1]	50[1]	50[1]	50[1]	100[1]
Fraction Ingested (FI) (unitless)	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]	1.0[3]
Skin Surface Area (SA) (cm^2/day)	3,300[4]	3,300[4]	3,300[4]	5,700[4]	3,250[5]	5,700[4]	2,800[4]
Soil-to-Skin Adherence Factor (AF) (mg/cm^2)	0.02[4]	0.1[4]	0.02[4]	0.01[4]	0.04[4]	0.01[4]	0.04[4]
Absorption Factor (ABS) (unitless)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
Conversion Factor (CF) (kg/mg)	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06	1E-06
Exposure Frequency (EF) - Soil (days/year)	12[6]	30[6]	219[1]	12[6]	50[6]	234[1]	234[1]
Exposure Frequency (EF) - Sediment (days/year)	12[6]	30[6]	30[6]	12[6]	15[6]	30[6]	30[6]
Exposure Duration (ED) (years)	9[1]	1[6]	9[1]	19[7]	11[7]	7[1]	2[1]
Body Weight (BW) (kg)	70[1]	70[1]	70[1]	70[1]	45[8]	70[1]	15[1]
Noncarcinogenic Averaging Time (AT_n) (days)	9,125[3]	365[3]	9,125[3]	6,935[3]	4,015[3]	2,555[3]	730[3]
Carcinogenic Averaging Time (AT_c) (days)	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]
ASSUMPTIONS FOR EXPOSURE TO SURFACE WATER							
Ingestion Rate (IR) (L/hour)	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.01[8]	0.05[8]
SA (cm^2/day)	4,500[5]	4,500[5]	4,500[5]	4,500[5]	3,250[5]	4,500[5]	1,650[5]
EV (events/day)	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]
ET (hours/day) and t_{event} (hours/event)	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]	1[6]
EF (days/year)	12[6]	30[6]	30[6]	12[6]	15[6]	30[6]	30[6]
K_p (cm/hour)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
t* (hour/event), τ (hour), and B (unitless)	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]	chemical-specific[4]
Exposure Duration (ED) (years)	9[1]	1[6]	9[1]	19[6]	11[6]	7[1]	2[1]
BW (kg)	70[1]	70[1]	70[1]	70[1]	45[8]	70[1]	15[1]
AT_n (days)	9,125[3]	365[3]	9,125[3]	6,935[3]	4,015[3]	2,555[3]	730[3]
AT_c (days)	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]	25,550[3]

TABLE 6-10
SUMMARY OF EXPOSURE FACTORS - CENTRAL TENDENCY EXPOSURE
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

ASSUMPTIONS FOR EXPOSURE TO GROUNDWATER							
Ingestion Rate (IR) (L/day)	NA	NA	NA	NA	NA	1.4[1]	0.66[9]
Skin Surface Area (SA) (cm^2/day)	NA	4,500[5]	NA	NA	NA	18,000[4]	6,600[4]
Exposure Time (ET) (hour/event)	NA	2[6]	NA	NA	NA	0.25[6]	0.25[6]
Event Frequency (EV) (events/day)	NA	1[6]	NA	NA	NA	1[6]	1[6]
Permeability Coefficient from Water through Skin (K_p)(cm/hour)	NA	chemical-specific[4]	NA	NA	NA	chemical-specific[4]	chemical-specific[4]
Bunge Dermal Model variables - t* (hour/event), T (hour), and B (unitless)	NA	chemical-specific[4]	NA	NA	NA	chemical-specific[4]	chemical-specific[4]
Conversion Factor (CF) (L/cm^3)	1E-03	1E-03	NA	NA	NA	1E-03	1E-03
Exposure Frequency (EF) (days/year)	NA	30[6]	NA	NA	NA	234[1]	234[1]
Exposure Duration (ED) (years)	NA	1[6]	NA	NA	NA	7[1]	2[1]
Body Weight (BW) (kg)	NA	70[1]	NA	NA	NA	70[1]	15[1]
Noncarcinogenic Averaging Time (AT_n) (days)	NA	365[3]	NA	NA	NA	2,555[3]	730[3]
Carcinogenic Averaging Time (AT_c) (days)	NA	25,550[3]	NA	NA	NA	25,550[3]	25,550[3]
ASSUMPTIONS FOR EXPOSURE VIA INHALATION OF VOCS FROM GROUNDWATER							
Inhalation Rate (IR_h) (m^3/hour)	NA	2.5[2]	NA	NA	NA	0.6[3]	0.6[3]
Exposure Time (hours/day)	NA	2[6]	NA	NA	NA	0.25[6]	0.25[6]

1. USEPA, May 1993
2. USEPA, December 2002
3. USEPA, December 1989
4. USEPA, July 2004
5. Assumed 25 percent of total body surface area is exposed.
6. Professional Judgment
7. Assumes a total 30 year exposure, 11 years for an adolescent (6 to 16 years old) and the remaining 19 years for an adult.
8. USEPA Region 4, May 2000
9. USEPA, August 1997

TABLE 6-11
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA PPRV	10/19/2004
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	5/5/2006
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA 9	10/2004
trans-1,2-Dichloroethene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Blood	1000/1	IRIS	5/5/2006
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver, Body Weight	1000/1	IRIS	5/5/2006
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	5/5/2006
Semivolatile Organic Compounds										
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
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)										
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans										
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Immunological, Nails	100	EPA 9	10/2004
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	5/5/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	5/5/2006
Barium	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300/1	IRIS	5/5/2006
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	5/5/2006
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	4/7/2006
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	5/5/2006
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	5/5/2006
Thallium	Chronic	7.0E-05	mg/kg/day	0.04	2.8E-06	mg/kg/day	Liver	3000	EPA 3	4/7/2006
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	4/7/2006

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 dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.

Definitions:

CNS = Central Nervous System
CVS = Cardiovascular system
EPA 3 = USEPA Region 3 Risk-Based Concentration Table, April 7, 2005.
EPA 9 = USEPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.
EPA PPRV - USEPA provisional peer reviewed value, value from USEPA Region 3 RBC Table, April 7, 2006.
GS = Gastrointestinal System
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = National Center for Environmental Assessment, value from USEPA Region 3 RBC Table, April 7, 2006.
CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6-12
NON-CANCER TOXICITY DATA -- INHALATION
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds									
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)	NA	NA	ATSDR MRL	4/7/2006
Benzene	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	Chronic	6.0E-02	mg/m^3	1.7E-02	(mg/kg/day)	Blood	NA	EPA PPRV	10/25/2005
Tetrachloroethene	Chronic	2.8E-01	mg/m^3	8.0E-02	(mg/kg/day)	Liver	NA	ATSDR MRL	4/7/2006
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	5/5/2006
Semivolatile Organic Compounds									
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
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)									
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans									
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	5/5/2006
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	5/5/2006
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 MRL = Agency for Toxic Substances and Disease Registry Minimal Risk Levels, value from USEPA Region 3 RBC Table, October 25, 2005.

CNS = Central Nervous System

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Applicable

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6-13
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds								
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	5.4E-01	$(mg/kg/day)^{-1}$	1	5.4E-01	$(mg/kg/day)^{-1}$	NA	EPA 3	4/7/2006
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1	1.3E-02	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Vinyl Chloride (Lifetime)	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Semivolatile Organic Compounds								
Benzo(a)anthracene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzo(b)fluoranthene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Indeno(1,2,3-cd)pyrene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)								
Aroclor-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Dioxins/Furans								
2,3,7,8-TCDD TEQ	1.5E+05	$(mg/kg/day)^{-1}$	1	1.5E+05	$(mg/kg/day)^{-1}$	B2	HEAST	7/1997
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	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	IRIS	5/5/2006
Barium	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Chromium VI	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
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.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

Definitions:

EPA 3 = USEPA Region 3 RBC Table, April 7, 2006.

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

IRIS = Integrated Risk Information System.

NA = Not Available.

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6-14
CANCER TOXICITY DATA -- INHALATION
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds							
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	5/5/2006
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	4/7/2006
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Vinyl Chloride (Lifetime)	8.8E-03	$(mg/m^3)^{-1}$	3.1E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Semivolatile Organic Compounds							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	4/7/2006
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)							
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans							
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Barium	NA	NA	NA	NA	D	IRIS	5/5/2006
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	D	IRIS	5/5/2006
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA

Notes:
1 - Inhalation CSF = Unit Risk * 70 kg / $20m^3$/day.

EPA Group:
A - Human carcinogen.
B1 - Probable human carcinogen - indicates that limited human data are available.
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .
C - Possible human carcinogen.
D - Not classifiable as a human carcinogen.
E - Evidence of noncarcinogenicity.

Definitions:
IRIS = Integrated Risk Information System.
NA = Not Available.
EPA 3 = USEPA Region 3 RBC Table, April 7, 2006.
EPA 9 = USEPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.
NCEA = National Center for Environmental Assessment, value from USEPA Region 3 RBC Table, April 7, 2006.
CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6-15
SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Construction Worker	Subsurface Soil	Ingestion	5.E-08	- -	- -	- -	0.02	- -
		Dermal Contact	8.E-09	- -	- -	- -	0.0005	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-08	- -	- -	- -	0.02	- -
	Surface Water	Ingestion	2.E-09	- -	- -	- -	0.0006	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.002	- -
	Sediment	Ingestion	2.E-07	- -	- -	- -	0.05	- -
		Dermal Contact	5.E-08	- -	- -	- -	0.0007	- -
		Total	2.E-07	- -	- -	- -	0.05	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	5.E-07	- -	- -	- -	0.02	- -
		Inhalation - In a Trench	1.E-08	- -	- -	- -	0.01	- -
			5.E-07	- -	- -	- -	0.04	- -
		Total Across All Exposure Pathways	**1.E-06**	- -	- -	- -	**0.1**	- -
Site Worker	Subsurface Soil	Ingestion	1.E-07	- -	- -	- -	0.002	- -
		Dermal Contact	1.E-07	- -	- -	- -	0.0003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.003	- -
	Surface Water	Ingestion	4.E-08	- -	- -	- -	0.0005	- -
		Dermal Contact	3.E-06	- -	- -	Dioxins/furans	0.001	- -
		Total	4.E-06	- -	- -	Dioxins/furans	0.002	- -
	Sediment	Ingestion	6.E-07	- -	- -	- -	0.006	- -
		Dermal Contact	7.E-07	- -	- -	- -	0.0004	- -
		Total	1.E-06	- -	- -	- -	0.006	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**5.E-06**	- -	- -	- -	**0.01**	- -
Occupational Worker	Subsurface Soil	Ingestion	3.E-06	- -	- -	Arsenic	0.05	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-06	- -	- -	Arsenic	0.05	- -
	Surface Water	Ingestion	5.E-08	- -	- -	- -	0.0006	- -
		Dermal Contact	4.E-06	- -	- -	Dioxins/furans	0.001	- -
		Total	4.E-06	- -	- -	Dioxins/furans	0.002	- -
	Sediment	Ingestion	1.E-06	- -	- -	- -	0.01	- -
		Dermal Contact	9.E-07	- -	- -	- -	0.0004	- -
		Total	2.E-06	- -	- -	PAHs	0.01	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**1.E-05**	- -	- -	- -	**0.07**	- -

TABLE 6-15
SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Adolescent Trespasser	Subsurface Soil	Ingestion	8.E-07	- -	- -	- -	0.03	- -
		Dermal Contact	6.E-07	- -	- -	- -	0.003	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	- -	0.03	- -
	Surface Water	Ingestion	4.E-08	- -	- -	- -	0.0009	- -
		Dermal Contact	2.E-06	- -	- -	Dioxins/furans	0.002	- -
		Total	2.E-06	- -	- -	Dioxins/furans	0.003	- -
	Sediment	Ingestion	1.E-06	- -	- -	- -	0.02	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.001	- -
		Total	2.E-06	- -	- -	PAHs	0.02	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**6.E-06**	- -	- -	- -	**0.06**	- -
Adult Trespasser	Subsurface Soil	Ingestion	1.E-07	- -	- -	- -	0.002	- -
		Dermal Contact	5.E-08	- -	- -	- -	0.0002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.003	- -
	Surface Water	Ingestion	3.E-08	- -	- -	- -	0.0005	- -
		Dermal Contact	3.E-06	- -	- -	Dioxins/furans	0.001	- -
		Total	3.E-06	- -	- -	Dioxins/furans	0.002	- -
	Sediment	Ingestion	4.E-07	- -	- -	- -	0.006	- -
		Dermal Contact	3.E-07	- -	- -	- -	0.0002	- -
		Total	8.E-07	- -	- -	- -	0.006	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**4.E-06**	- -	- -	- -	**0.01**	- -
Total Trespasser Risks Adolescent + Adult	Subsurface Soil	Ingestion	9.E-07	- -	- -	- -	NA	- -
		Dermal Contact	6.E-07	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-06	- -	- -	- -	NA	- -
	Surface Water	Ingestion	7.E-08	- -	- -	- -	NA	- -
		Dermal Contact	5.E-06	- -	- -	Dioxins/furans	NA	- -
		Total	5.E-06	- -	- -	Dioxins/furans	NA	- -
	Sediment	Ingestion	1.E-06	- -	- -	- -	NA	- -
		Dermal Contact	2.E-06	- -	- -	- -	NA	- -
		Total	3.E-06	- -	- -	PAHs	NA	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**9.E-06**	- -	- -	- -	NA	- -

TABLE 6-15
SUMMARY OF CANCER RISKS AND HAZARD INDICES - REASONABLE MAXIMUM EXPOSURE (RME)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Child Resident	Subsurface Soil	Ingestion	9.E-06	- -	- -	PAHs, Arsenic	0.6	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.01	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-05	- -	- -	PAHs, Arsenic	0.7	- -
	Surface Water	Ingestion	3.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	2.E-06	- -	- -	Dioxins/furans	0.003	- -
		Total	2.E-06	- -	- -	Dioxins/furans	0.02	- -
	Sediment	Ingestion	3.E-06	- -	- -	PAHs	0.1	- -
		Dermal Contact	8.E-07	- -	- -	- -	0.002	- -
		Total	4.E-06	- -	- -	PAHs	0.1	- -
	Groundwater	Ingestion	4.E-04	Vinyl Chloride	Arsenic	Dioxins/furans	10	cis-1,2-DCE, trans-1,2-DCE,TCE, Vinyl Chloride, Iron, Manganese
		Dermal Contact	7.E-05	- -	Dioxins/furans	Vinyl Chloride	0.3	- -
		Inhalation - Showering	1.E-05	- -	- -	Vinyl Chloride	1	- -
		Total	5.E-04	Vinyl Chloride	Dioxins/furans, Arsenic	- -	11	cis-1,2-DCE, trans-1,2-DCE,TCE, Vinyl Chloride, Iron, Manganese
		Total Across All Exposure Pathways	**5.E-04**	- -	- -	- -		- -
Future Adult Resident	Subsurface Soil	Ingestion	4.E-06	- -	- -	Arsenic	0.07	- -
		Dermal Contact	9.E-07	- -	- -	- -	0.002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-06	- -	- -	Arsenic	0.07	- -
	Surface Water	Ingestion	5.E-08	- -	- -	- -	0.0006	- -
		Dermal Contact	4.E-06	- -	- -	Dioxins/furans	0.001	- -
		Total	4.E-06	- -	- -	Dioxins/furans	0.002	- -
	Sediment	Ingestion	1.E-06	- -	- -	PAHs, Dioxins/furans, Arsenic	0.01	- -
		Dermal Contact	5.E-07	- -	- -	PAHs	0.0003	- -
		Total	2.E-06	- -	- -	PAHs, Dioxins/furans, Arsenic	0.01	- -
	Groundwater	Ingestion	7.E-04	Vinyl Chloride	Arsenic	Dioxins/furans	4	cis-1,2-DCE, Vinyl Chloride, Iron
		Dermal Contact	2.E-04	- -	Vinyl Chloride, Dioxins/furans	- -	0.2	- -
		Inhalation - Showering	5.E-06	- -	- -	Vinyl Chloride	0.2	- -
		Total	8.E-04	Vinyl Chloride	Dioxins/furans, Arsenic	- -	5	cis-1,2-DCE, Vinyl Chloride, Iron
		Total Across All Exposure Pathways	**8.E-04**	- -	- -	- -		- -
Total Residential Risks Child + Adult	Subsurface Soil	Ingestion	1.E-05	- -	- -	PAHs, Arsenic	NA	- -
		Dermal Contact	2.E-06	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-05	- -	- -	PAHs, Arsenic	NA	- -
	Surface Water	Ingestion	3.E-07	- -	- -	- -	NA	- -
		Dermal Contact	6.E-06	- -	- -	Dioxins/furans	NA	- -
		Total	6.E-06	- -	- -	Dioxins/furans	NA	- -
	Sediment	Ingestion	5.E-06	- -	- -	PAHs, Dioxins/furans, Arsenic	NA	- -
		Dermal Contact	1.E-06	- -	- -	PAHs	NA	- -
		Total	6.E-06	- -	PAHs	Dioxins/furans, Arsenic	NA	- -
	Groundwater	Ingestion	1.E-03	Vinyl Chloride	Arsenic	Dioxins/furans	NA	- -
		Dermal Contact	2.E-04	- -	Vinyl Chloride, Dioxins/furans	- -	NA	- -
		Inhalation - Showering	1.E-05	- -	- -	Vinyl Chloride	NA	- -
		Total	1.E-03	Vinyl Chloride, Dioxins/furans	Arsenic	- -	NA	- -
		Total Across All Exposure Pathways	**1.E-03**	- -	- -	- -	NA	- -

TABLE 6-16
SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Construction Worker	Subsurface Soil	Ingestion	2.E-08	- -	- -	- -	0.01	- -
		Dermal Contact	3.E-09	- -	- -	- -	0.0002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-08	- -	- -	- -	0.01	- -
	Surface Water	Ingestion	2.E-09	- -	- -	- -	0.0006	- -
		Dermal Contact	2.E-07	- -	- -	- -	0.001	- -
		Total	2.E-07	- -	- -	- -	0.002	- -
	Sediment	Ingestion	2.E-07	- -	- -	- -	0.05	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.0002	- -
		Total	2.E-07	- -	- -	- -	0.05	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	3.E-07	- -	- -	- -	0.01	- -
		Inhalation - In a Trench	6.E-09	- -	- -	- -	0.006	- -
			4.E-07	- -	- -	- -	0.02	- -
		Total Across All Exposure Pathways	**8.E-07**	- -	- -	- -	**0.08**	- -
Site Worker	Subsurface Soil	Ingestion	2.E-08	- -	- -	- -	0.001	- -
		Dermal Contact	2.E-09	- -	- -	- -	0.00001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-08	- -	- -	- -	0.001	- -
	Surface Water	Ingestion	8.E-09	- -	- -	- -	0.0002	- -
		Dermal Contact	6.E-07	- -	- -	- -	0.0006	- -
		Total	6.E-07	- -	- -	- -	0.0008	- -
	Sediment	Ingestion	1.E-07	- -	- -	- -	0.003	- -
		Dermal Contact	1.E-08	- -	- -	- -	0.00002	- -
		Total	1.E-07	- -	- -	- -	0.003	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**8.E-07**	- -	- -	- -	**0.005**	- -
Occupational Worker	Subsurface Soil	Ingestion	5.E-07	- -	- -	Arsenic	0.02	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.0002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	5.E-07	- -	- -	Arsenic	0.02	- -
	Surface Water	Ingestion	2.E-08	- -	- -	- -	0.0006	- -
		Dermal Contact	2.E-06	- -	- -	- -	0.001	- -
		Total	2.E-06	- -	- -	- -	0.002	- -
	Sediment	Ingestion	3.E-07	- -	- -	- -	0.007	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.00004	- -
		Total	3.E-07	- -	- -	- -	0.007	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**2.E-06**	- -	- -	- -	**0.03**	- -

TABLE 6-16
SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Adolescent Trespasser	Subsurface Soil	Ingestion	2.E-07	- -	- -	- -	0.008	- -
		Dermal Contact	3.E-08	- -	- -	- -	0.0002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	2.E-07	- -	- -	- -	0.008	- -
	Surface Water	Ingestion	2.E-08	- -	- -	- -	0.0004	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.0008	- -
		Total	1.E-06	- -	- -	- -	0.001	- -
	Sediment	Ingestion	2.E-07	- -	- -	- -	0.005	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.00007	- -
		Total	3.E-07	- -	- -	- -	0.006	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**2.E-06**	- -	- -	- -	**0.01**	- -
Adult Trespasser	Subsurface Soil	Ingestion	5.E-08	- -	- -	- -	0.001	- -
		Dermal Contact	3.E-09	- -	- -	- -	0.00001	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	6.E-08	- -	- -	- -	0.001	- -
	Surface Water	Ingestion	3.E-08	- -	- -	- -	0.0005	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.0006	- -
		Total	1.E-06	- -	- -	- -	0.001	- -
	Sediment	Ingestion	2.E-07	- -	- -	- -	0.003	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.00002	- -
		Total	2.E-07	- -	- -	- -	0.003	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**2.E-06**	- -	- -	- -	**0.01**	- -
Total Trespasser Risks Adolescent + Adult	Subsurface Soil	Ingestion	2.E-07	- -	- -	- -	NA	- -
		Dermal Contact	3.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	3.E-07	- -	- -	- -	NA	- -
	Surface Water	Ingestion	5.E-08	- -	- -	- -	NA	- -
		Dermal Contact	2.E-06	- -	- -	Dioxins/furans	NA	- -
		Total	2.E-06	- -	- -	Dioxins/furans	NA	- -
	Sediment	Ingestion	5.E-07	- -	- -	- -	NA	- -
		Dermal Contact	8.E-08	- -	- -	- -	NA	- -
		Total	5.E-07	- -	- -	- -	NA	- -
	Groundwater	Ingestion	NA	- -	- -	- -	NA	- -
		Dermal Contact	NA	- -	- -	- -	NA	- -
		Inhalation - Showering	NA	- -	- -	- -	NA	- -
		Total	NA	- -	- -	- -	NA	- -
		Total Across All Exposure Pathways	**3.E-06**	- -	- -	- -	NA	- -

TABLE 6-16
SUMMARY OF CANCER RISKS AND HAZARD INDICES - CENTRAL TENDENCY EXPOSURE (CTE)
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and ≤ 1E-4	Chemicals with Cancer Risks > 1E-6 and ≤ 1E-5	Hazard Index	Chemicals with HI > 1
Future Child Resident	Subsurface Soil	Ingestion	1.E-06	- -	- -	PAHs, Arsenic	0.2	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	PAHs, Arsenic	0.2	- -
	Surface Water	Ingestion	1.E-07	- -	- -	- -	0.01	- -
		Dermal Contact	6.E-07	- -	- -	- -	0.003	- -
		Total	7.E-07	- -	- -	- -	0.02	- -
	Sediment	Ingestion	5.E-07	- -	- -	- -	0.07	- -
		Dermal Contact	6.E-08	- -	- -	- -	0.0003	- -
		Total	6.E-07	- -	- -	- -	0.07	- -
	Groundwater	Ingestion	9.E-05	- -	Vinyl Chloride	Arsenic	6	cis-1,2-DCE, trans-1,2-DCE,TCE, Vinyl Chloride, Iron, Manganese
		Dermal Contact	1.E-05	- -	- -	Vinyl Chloride, Dioxins/furans	0.2	- -
		Inhalation - Showering	6.E-06	- -	- -	Vinyl Chloride	0.6	- -
		Total	1.E-04	- -	Vinyl Chloride	Dioxins/furans, Arsenic	7	cis-1,2-DCE, trans-1,2-DCE,TCE, Vinyl Chloride, Iron, Manganese
		Total Across All Exposure Pathways	**1.E-04**	- -	- -	- -		- -
Future Adult Resident	Subsurface Soil	Ingestion	4.E-07	- -	- -	Arsenic	0.02	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.0002	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	4.E-07	- -	- -	Arsenic	0.02	- -
	Surface Water	Ingestion	1.E-08	- -	- -	- -	0.0006	- -
		Dermal Contact	1.E-06	- -	- -	- -	0.001	- -
		Total	1.E-06	- -	- -	- -	0.002	- -
	Sediment	Ingestion	2.E-07	- -	- -	- -	0.007	- -
		Dermal Contact	2.E-08	- -	- -	- -	0.00004	- -
		Total	2.E-07	- -	- -	- -	0.007	- -
	Groundwater	Ingestion	9.E-05	- -	Vinyl Chloride	Arsenic	2	- -
		Dermal Contact	3.E-05	- -	Dioxins/furans	Vinyl Chloride	0.09	- -
		Inhalation - Showering	3.E-06	- -	- -	Vinyl Chloride	0.1	- -
		Total	1.E-04	- -	Vinyl Chloride, Dioxins/furans	Arsenic	2	- -
		Total Across All Exposure Pathways	**1.E-04**	- -	- -	- -		- -
Total Residential Risks Child + Adult	Subsurface Soil	Ingestion	1.E-06	- -	- -	PAHs, Arsenic	NA	- -
		Dermal Contact	9.E-08	- -	- -	- -	NA	- -
		Inhalation	NA	- -	- -	- -	NA	- -
		Total	1.E-06	- -	- -	PAHs, Arsenic	NA	- -
	Surface Water	Ingestion	1.E-07	- -	- -	- -	NA	- -
		Dermal Contact	2.E-06	- -	- -	Dioxins/furans	NA	- -
		Total	2.E-06	- -	- -	Dioxins/furans	NA	- -
	Sediment	Ingestion	7.E-07	- -	- -	- -	NA	- -
		Dermal Contact	8.E-08	- -	- -	- -	NA	- -
		Total	8.E-07	- -	- -	- -	NA	- -
	Groundwater	Ingestion	2.E-04	Vinyl Chloride	- -	Dioxins/furans, Arsenic	NA	- -
		Dermal Contact	4.E-05	- -	Dioxins/furans	Vinyl Chloride	NA	- -
		Inhalation - Showering	8.E-06	- -	- -	Vinyl Chloride	NA	- -
		Total	2.E-04	Vinyl Chloride	Dioxins/furans	Arsenic	NA	- -
		Total Across All Exposure Pathways	**2.E-04**	- -	- -	- -	NA	- -

TABLE 7-1
SURFACE WATER ANALYTICAL DATA
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

sample ID sample date	**04SW0101** **08/05/04**	**04SW0101D** **08/05/04**	**04SW0201** **08/12/04**	**04SW0301** **08/17/04**
Volatile Organics (ug/L)				
ACETONE	5 U	7 U	10 U	**11 J**
TETRACHLOROETHENE	5 U	5 U	5 U	**3 J**
TOLUENE	5 U	5 U	5 U	**2 J**
Inorganics (ug/L)				
ARSENIC	**6.8**	**5.8**	**5.2**	**3.6**
BARIUM	**51.7**	**51.4**	**31.1**	**43.8**
CALCIUM	**21600**	**22000**	**15500**	**19200**
CHROMIUM (as Cr VI)	**1.2**	0.8 U	0.8 U	0.8 U
IRON	**5180**	**4360**	**2800**	**4650**
LEAD	1.7 U	1.7 U	1.7 U	**3.2 J**
MAGNESIUM	**2870**	**2870**	**1820**	**2490**
MANGANESE	**201**	**205**	**101**	**75.9**
POTASSIUM	**1440**	1180 U	**1800**	**1690**
SODIUM	**10700 J**	**10000 J**	**7010 J**	**9810 J**
ZINC	1.7 U	3.8 U	2 U	**9.1**
Dioxins (pg/L)				
1,2,3,4,6,7,8,9-OCDD	18 U	16 U	19 U	**1200**
1,2,3,4,6,7,8,9-OCDF	4.5 U	3.5 U	1.9 U	**51 J**
1,2,3,4,6,7,8-HPCDD	4 U	3.7 U	2.8 U	**120**
TOTAL HPCDD	4 U	3.7 U	3.4 U	**260**
TOTAL HPCDF	3.5 U	2.6 U	1.7 U	**37**
Miscellaneous Parameters (ug/L)				
CYANIDE	10 U	**6.4 J**	10 U	**3.9 J**
pH (Field measurement)	6.71	NA	6.46	NA

ug/L = milligrams per liter
pg/L = picograms per liter
NA = not available
Bolded values = positive detection

TABLE 7-2
SEDIMENT ANALYTICAL DATA
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

sample ID	**04SD0101**	**04SD0101-AVG**	**04SD0101D**	**04SD0201**	**04SD0301**	**04SD0401**	**04SD0501**	**04SD0601**	**04SD0701**	**04SD0801**
sample date	**08/05/04**	**08/05/04**	**08/05/04**	**08/06/04**	**08/12/04**	**08/12/04**	**08/13/04**	**08/18/04**	**08/17/04**	**08/18/04**
Volatile Organics (ug/kg)										
2-BUTANONE	29 UJ	43 UJ	57 UJ	**40 J**	**16 J**	**62 J**	**30 J**	**52 J**	**32 J**	**14 J**
ACETONE	**38 J**	89 J	140 J	**210 J**	**83 J**	**340 J**	**160 J**	**260 J**	**210 J**	**76 J**
CARBON DISULFIDE	6 U	8.5 UJ	11 UJ	**4 J**	**0.9 J**	**6 J**	**3 J**	**7 J**	**8 J**	**1 J**
CHLOROETHANE	6 U	8.5 UJ	11 UJ	**2 J**	6 U	10 U	9 U	9 U	9 U	8 U
CIS-1,2-DICHLOROETHENE	6 U	8.5 UJ	11 UJ	8 U	6 U	10 U	9 U	9 U	**18**	8 U
CYCLOHEXANE	6 U	8.5 UJ	11 UJ	**0.7 J**	6 U	10 U	9 U	9 U	**0.8 J**	8 U
METHYL CYCLOHEXANE	6 U	8.5 UJ	11 UJ	**8**	6 U	10 U	9 U	9 U	9 U	8 U
METHYL TERT-BUTYL ETHER	12 U	17.5 UJ	23 UJ	**2 J**	11 U	20 U	18 U	18 U	18 U	16 U
TOLUENE	6 U	8.5 UJ	11 UJ	8 U	6 U	10 U	9 U	9 U	9 U	**2 J**
TRICHLOROETHENE	6 U	8.5 UJ	11 UJ	8 U	6 U	10 U	9 U	9 U	**1 J**	8 U
TRICHLOROFLUOROMETHANE	**1 J**	1 J	11 UJ	**2 J**	6 U	**3 J**	**2 J**	**3 J**	**6 J**	**2 J**
VINYL CHLORIDE	6 U	8.5 UJ	11 UJ	8 U	6 U	10 U	9 U	9 U	**44**	8 U
Semivolatile Organics (ug/kg)										
ACENAPHTHENE	460 U	450 U	440 U	540 U	440 U	580 U	**150 J**	480 U	500 U	500 U
ANTHRACENE	460 U	450 U	440 U	540 U	440 U	580 U	**280 J**	480 U	500 U	500 U
BENZALDEHYDE	460 UJ	450 UJ	440 UJ	540 UJ	440 UJ	**430 J**	580 UJ	480 UJ	500 UJ	500 UJ
BENZO(A)ANTHRACENE	460 U	450 U	440 U	**100 J**	**43 J**	**86 J**	**1600**	480 U	500 U	500 U
BENZO(A)PYRENE	460 U	450 U	440 U	**240 J**	**63 J**	**99 J**	**1800**	480 U	500 U	500 U
BENZO(B)FLUORANTHENE	460 U	450 U	440 U	540 U	440 U	580 U	**2500**	480 U	500 U	500 U
BENZO(G,H,I)PERYLENE	460 U	450 U	440 U	540 U	**70 J**	580 U	**1000**	480 U	500 U	500 U
BENZO(K)FLUORANTHENE	460 U	450 U	440 U	**82 J**	440 U	580 U	**1500**	480 U	500 U	500 U
BIS(2-ETHYLHEXYL)PHTHALATE	460 U	450 U	440 U	540 U	440 U	**610**	580 U	480 U	500 U	500 U
CARBAZOLE	460 U	450 U	440 U	540 U	440 U	580 U	**110 J**	480 U	500 U	500 U
CHRYSENE	460 U	450 U	440 U	**150 J**	**80 J**	**130 J**	**1800**	480 U	500 U	**60 J**
DIBENZO(A,H)ANTHRACENE	460 U	450 U	440 U	540 U	440 U	580 U	**540 J**	480 U	500 U	500 U
DIBENZOFURAN	460 U	450 U	440 U	540 U	440 U	580 U	**92 J**	480 U	500 U	500 U
FLUORANTHENE	460 U	450 U	440 U	**190 J**	**120 J**	**210 J**	**1200**	**49 J**	**86 J**	**74 J**
FLUORENE	460 U	450 U	440 U	540 U	440 U	580 U	**200 J**	480 U	500 U	500 U
INDENO(1,2,3-CD)PYRENE	460 U	450 U	440 U	540 U	440 U	580 U	**980**	480 U	500 U	500 U
PHENANTHRENE	460 U	450 U	440 U	**48 J**	**42 J**	**87 J**	**800**	480 U	500 U	500 U
PYRENE	460 U	450 U	440 U	**240 J**	**140 J**	**310 J**	**2000**	**59 J**	**76 J**	**100 J**
Pesticides/PCBs (ug/kg)										
4,4'-DDD	4.6 UJ	4.5 UJ	4.4 UJ	5.4 UJ	4.4 U	**2.6 J**	**12 J**	4.8 U	5 UJ	5 U
4,4'-DDT	4.6 UJ	4.5 UJ	4.4 UJ	5.4 UJ	4.4 UJ	**5 J**	5.8 UJ	4.8 UJ	5 UJ	5 UJ
ALPHA-CHLORDANE	2.4 UJ	2.3 UJ	2.2 UJ	2.8 UJ	2.2 U	3 U	3 UJ	2.5 UJ	2.6 UJ	**5.1 J**
AROCLOR-1260	24 UJ	23 UJ	22 U	28 UJ	22 U	**46**	**240**	**140**	26 UJ	**160**
GAMMA-CHLORDANE	2.4 UJ	2.3 UJ	2.2 UJ	2.8 UJ	2.2 U	3 U	3 U	2.5 UJ	2.6 UJ	**370 J**

TABLE 7-2
SEDIMENT ANALYTICAL DATA
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

sample ID	**04SD0101**	**04SD0101-AVG**	**04SD0101D**	**04SD0201**	**04SD0301**	**04SD0401**	**04SD0501**	**04SD0601**	**04SD0701**	**04SD0801**
sample date	**08/05/04**	**08/05/04**	**08/05/04**	**08/06/04**	**08/12/04**	**08/12/04**	**08/13/04**	**08/18/04**	**08/17/04**	**08/18/04**
Inorganics (mg/kg)										
ALUMINUM	3740 J	6470 J	9200 J	16200 J	3190 J	18600 J	11300 J	14600 J	11100 J	13800 J
ARSENIC	**0.74**	1.02	1.3	**5.4**	**2.1**	**5.6**	**5**	**5.7**	**2.9**	**4.8**
BARIUM	9.3 J	14.15 J	19 J	41.7 J	9.7 J	54.1 J	41.7 J	27.7 J	22.9 J	39.5 J
BERYLLIUM	0.03 U	0.0425	0.07	0.14	0.02 U	0.21	0.09	0.13	0.12	0.1
CALCIUM	228 J	350 J	472 J	1020 J	550 J	1960 J	2120 J	1520 J	1130 J	1050 J
CHROMIUM	4.8 J	7.15 J	9.5 J	15.7 J	3.8 J	18.8 J	13.9 J	14.7 J	11 J	14.2 J
COBALT	0.47 U	0.4375	0.64	2 J	0.58	2.4	1.8	1.4	1.2	1.5
COPPER	1.8	2.25	2.7	8.4	2.8	10.6	12.6	7.5	5.7	8.1
IRON	1640 J	2540 J	3440 J	12200 J	3090 J	13000 J	9180 J	13000 J	8490 J	9510 J
LEAD	5.6 J	8.35 J	11.1 J	24.8 J	5.1 J	43.4 J	38.2 J	14.2 U	13.4 J	15.2 J
MAGNESIUM	134 J	236.5 J	339 J	645 J	135 J	703 J	523 J	508 J	509 J	618 J
MANGANESE	7.2 J	10.75 J	14.3 J	38 J	11.4 J	37.7 J	30.1 J	20.9 J	15.9 J	22.8 J
MERCURY	0.05	0.045	0.04	0.07	0.03	0.09	0.09	0.06	0.05	0.07
POTASSIUM	77.5 U	109.875 J	181 J	369 J	79.2 U	443 J	238 U	274 U	251 U	291 J
SELENIUM	0.4 U	0.33 U	0.26 U	0.71 J	0.33 U	0.78	0.55 U	0.48 U	0.43 U	0.6
SODIUM	16.9 U	24.85 U	32.8 U	52.4 U	17.5 U	85.4 J	1260 J	52.9 U	58.7 U	54.7 U
THALLIUM	0.44 U	0.36 U	0.28 U	0.48 U	0.36 U	0.61 U	0.61 U	0.53 U	0.73	0.76
VANADIUM	5.7	8.75	11.8	23.7	5.6	27.5	18.6	23.5	17.9	23.2
ZINC	4.7 J	8.35 J	12 J	43 J	12 J	68.3 J	87.9 J	27.3 J	21.8 J	31.4 J
Miscellaneous Parameters (mg/kg)										
CYANIDE	0.5 UJ	0.35 J	0.35 J	0.5 UJ	0.27 J	0.5 UJ	0.37 J	0.63 UJ	0.63 UJ	0.69 UJ
PERCENT MOISTURE	44.1 %	41.25 %	38.4 %							39.8 %
TOTAL ORGANIC CARBON	14000	14500	15000	24000	5700	26000	24000	14000	15000	22000
TOTAL SOLIDS	72 %	73.5 %	75 %	62 %	75 %	57 %	57 %	69 %	66 %	66 %
Dioxins (ng/kg)										
1,2,3,4,6,7,8,9-OCDD	500	575	650							**6000**
1,2,3,4,6,7,8,9-OCDF	18 J	21 J	24							250
1,2,3,4,6,7,8-HPCDD	63	74.5	86							**670**
1,2,3,4,6,7,8-HPCDF	7.5 J	8.05 J	8.6							98
1,2,3,4,7,8,9-HPCDF	0.95 U	1.075 U	1.2 U							9.2
1,2,3,4,7,8-HXCDD	0.59 U	0.61 U	0.63 U							8.7
1,2,3,4,7,8-HXCDF	0.95 U	1.125 U	1.3 U							7.1 J
1,2,3,6,7,8-HXCDD	2.8 U	2.75	4.1							25
1,2,3,6,7,8-HXCDF	1.1 U	1.15 U	1.2 U							8.3 J
1,2,3,7,8,9-HXCDD	6.5 J	7.9 J	9.3							19
1,2,3,7,8-PECDD	0.47 U	0.535 U	0.6 U							6 J
2,3,4,6,7,8-HXCDF	0.55 U	0.64 U	0.73 U							5.9 J
2,3,7,8-TCDD	1.3 J	1.35 J	1.4 J							**8**
2,3,7,8-TCDF	0.59 U	0.62 U	0.65 U							1.6

ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
A = Average
D = Duplicate
Bolded values = positive detection

TABLE 7-3
SURFACE SOIL ANALYTICAL DATA
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

sample id	04SS0101	04SS0201	04SS0301	04SS0401	04SS0501	04SS0601
sample date	**05/17/07**	**05/17/07**	**05/17/07**	**05/17/07**	**05/17/07**	**05/17/07**
Volatile Organics (ug/kg)						
2-BUTANONE	2 U	1.9 U	1.6 U	1.4 U	1.3 U	**4 J**
BENZENE	0.19 U	**0.24 J**	0.16 U	0.48 U	0.43 U	0.46 U
Semivolatile Organics (ug/kg)						
BENZALDEHYDE	62 U	60 U	61 U	**67 J**	59 U	58 U
BENZO(A)ANTHRACENE	**80 J**	39 U	**40 J**	410 U	38 U	380 U
BENZO(A)PYRENE	**80 J**	24 U	25 U	260 U	24 U	240 U
BENZO(B)FLUORANTHENE	**100 J**	34 U	35 U	360 U	33 U	330 U
BENZO(K)FLUORANTHENE	**79 J**	42 U	43 U	440 U	42 U	410 U
CHRYSENE	**100 J**	33 U	**44 J**	350 U	33 U	320 U
FLUORANTHENE	**120 J**	57 U	59 U	61 U	57 U	56 U
PHENANTHRENE	**52 J**	24 U	**25 J**	26 U	24 U	24 U
PYRENE	**140 J**	43 U	**49 J**	450 U	42 U	420 U
Pesticides/PCBs (ug/kg)						
4,4'-DDD	**7.7 J**	**3.5 J**	**6.1 J**	**2.7 J**	**1.3**	**2.1 J**
4,4'-DDE	**7.7**	**1.4**	**1.9**	**0.6 J**	**0.45 J**	**0.66 J**
4,4'-DDT	**200 J**	**2.7 J**	**0.84 J**	0.15 U	**0.97 J**	**0.28**
ALPHA-CHLORDANE	**39 J**	**9.9**	**6.6 J**	**1.8 J**	**1.5 J**	**1.7 J**
BETA-BHC	0.097 U	**1**	0.096 U	0.1 U	0.094 U	0.093 U
DELTA-BHC	0.097 U	**0.32 J**	0.096 U	0.1 U	0.094 U	0.093 U
DIELDRIN	**3.1 J**	0.14 U	**1.6 J**	**0.49 J**	**0.32 J**	0.14 U
ENDOSULFAN II	0.15 U	**0.59 J**	0.14 U	0.15 U	0.14 U	0.14 U
ENDOSULFAN SULFATE	0.15 U	**0.47 J**	**0.78 J**	**0.37 J**	0.14 U	0.14 U
ENDRIN	**1.7**	0.14 U	0.14 U	0.15 U	0.14 U	0.14 U
GAMMA-BHC (LINDANE)	0.097 U	0.094 U	0.096 U	0.1 U	0.094 U	0.15 J
GAMMA-CHLORDANE	**20**	**10**	**4.9**	**1.9**	**1.4**	**1.8 J**
HEPTACHLOR	0.097 U	**0.98 J**	0.096 U	0.1 U	0.094 U	0.093 U
Inorganics (mg/kg)						
ALUMINUM	**5270**	**5490**	**6420**	**5240**	**4150**	**5030**
ARSENIC	**3.4**	**2.5**	**5.6**	**1.5**	0.65 U	**1.5**
BARIUM	**19.7**	**15.5**	**15.1**	**13.6**	**9.7**	**10**
CALCIUM	**1490**	**911**	**1250**	**713**	**3230**	**410**
CHROMIUM	**6.4**	**5.5**	**7.6**	**4**	**3.7**	**4.1**
COPPER	**8.6**	**3.3**	**35.8**	1.2 U	**1.4**	**1.1**
IRON	**5540**	**6350**	**5260**	**4940**	**2270**	**2880**
LEAD	**32.1**	**7.5**	**91.5**	**5.8**	**4.8**	3.6 U
MAGNESIUM	227 U	**246**	**258**	235 U	217 U	217 U
MANGANESE	**24.5**	**8.5**	**17.1**	**5**	**4**	**4.2**
MERCURY	**0.044**	0.014 U	**0.032**	0.015 U	0.014 U	0.015 U
NICKEL	**3**	**1.4**	**1.9**	**1.4**	**1.2**	**1.1**
VANADIUM	**9**	**9**	**11.1**	**7.5**	**5.6**	**6.9**
ZINC	**54**	**10.7**	**194**	**9.4**	**6.8**	**5.7**
Miscellaneous Parameters (mg/kg)						
CYANIDE	**0.34**	**0.14**	0.14 U	0.15 U	0.14 U	**0.37**

TABLE 7-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Sediment Screening Values mg/kg (4)	Hazard Quotient (5)	COPC Yes/No	Notes
VOCs (mg/kg)												
2-Butanone	0.014	J	0.062	J	04SD0401	7/8	0.029 -0.0 57	0.062	NA	NA	**Yes**	
Acetone	0.038	J	0.34	J	04SD0401	8/8	---	0.34	NA	NA	**Yes**	
Carbon Disulfide	0.0009	J	0.008	J	04SD0701	7/8	0.006 -0.011	0.008	NA	NA	**Yes**	
Chloroethane	0.002	J	0.002	J	04SD0201	1/8	0.006 -0.011	0.002	NA	NA	**Yes**	
Cyclohexane	0.0007	J	0.0008	J	04SD0701	2/8	0.006 -0.011	0.0008	NA	NA	**Yes**	
Methyl Cyclohexane	0.008		0.008		04SD0201	1/8	0.006 -0.011	0.008	NA	NA	**Yes**	
Methyl Tert-butyl Ether	0.018	J	0.002	J	04SD0701	1/8	0.006 -0.011	0.002	NA	NA	**Yes**	
cis-1,2-Dichloroethene	0.018	J	0.018	J	04SD0701	1/8	0.011 - 0.023	0.018	NA	NA	**Yes**	
Total-1,2-Dichloroethene	0.002	J	0.002	J	04SD0201	1/8	0.011 - 0.023	0.002	NA	NA	**Yes**	
Toluene	0.002	J	0.002	J	04SD0801	1/8	0.006 -0.011	0.002	NA	NA	**Yes**	
Trichloroethene	0.001	J	0.001	J	04SD0701	1/8	0.006 -0.011	0.001	NA	NA	**Yes**	
Trichlorofluoromethane	0.001		0.006		04SD0701	7/8	0.006 -0.011	0.006	NA	NA	**Yes**	
Vinyl Chloride	0.044		0.044		04SD0701	1/8	0.006 -0.011	0.044	NA	NA	**Yes**	
SVOCs (mg/kg)												
Acenaphthene	0.15	J	0.15	J	04SD0501	1/8	0.440 - 0.580	0.15	0.33	0.45	No	
Anthracene	0.28	J	0.28	J	04SD0501	1/8	0.440 - 0.580	0.28	0.33	0.85	No	
Benzaldehyde	0.43	J	0.43	J	04SD0401	1/8	0.440 - 0.580	0.43	NA	NA	**Yes**	
Benzo(a)anthracene	0.043	J	1.6		04SD0501	4/8	0.440 - 0.580	1.6	0.33	4.85	**Yes**	
Benzo)a)pyrene	0.063	J	1.8		04SD0501	4/8	0.440 - 0.580	1.8	0.33	5.45	**Yes**	
Benzo(b)fluoranthene	2.5		2.5		04SD0501	1/8	0.440 - 0.580	2.5	NA	NA	**Yes**	
Benzo(g,h,i)perylene	0.07	J	1		04SD0501	2/8	0.440 - 0.580	1	NA	NA	**Yes**	
Benzo(k)fluoranthene	0.082	J	1.5		04SD0501	2/8	0.440 - 0.580	1.5	NA	NA	**Yes**	
Bis(2-ethylhexyl)phthalate	0.61		0.61		04SD0401	1/8	0.440 - 0.580	0.61	0.182	3.35	**Yes**	
Carbazole	0.11	J	0.11	J	04SD0501	1/8	0.440 - 0.580	0.11	NA	NA	**Yes**	
Chryene	0.06	J	1.8		04SD0501	5/8	0.440 - 0.580	1.8	0.33	5.45	**Yes**	
Dibenzo(a,h)anthracene	0.54	J	0.54	J	04SD0501	1/8	0.440 - 0.580	0.54	0.33	1.64	**Yes**	
Dibenzofuran	0.092	J	0.092	J	04SD0501	1/8	0.440 - 0.580	0.092	NA	NA	**Yes**	
Fluoranthene	0.049	J	1.2		04SD0501	7/8	0.440 - 0.580	1.2	0.33	3.64	**Yes**	
Fluorene	0.2	J	0.2	J	04SD0501	1/8	0.440 - 0.580	0.2	0.33	0.61	No	
Indeno(1,2,3-cd)pyrene	0.98		0.98		04SD0501	1/8	0.440 - 0.580	0.98	NA	NA	**Yes**	
Phenanthrene	0.042	J	0.8		04SD0501	4/8	0.440 - 0.580	0.8	0.33	2.42	**Yes**	
Pyrene	0.059	J	2		04SD0501	7/8	0.440 - 0.580	2	0.33	6.06	**Yes**	
Pesticides and PCBs (mg/kg)												
4,4'-DDD	0.0026	J	0.012	J	04SD0501	2/8	0.0044 - 0.0054	0.012	0.003	4.00	**Yes**	
4,4'-DDT	0.005	J	0.005	J	04SD0401	1/8	0.0044 - 0.0058	0.005	0.003	1.67	**Yes**	
alpha-Chlordane	0.0051	J	0.0051	J	04SD0801	1/8	0.0022 -0.003	0.0051	0.0017	3.00	**Yes**	
gamma-Chlordane	0.37		0.37		04SD0801	1/8	0.0022 -0.003	0.37	0.0017	217.65	**Yes**	
Aroclor-1260	0.046	J	0.24	J	04SD0501	4/8	0.022 - 0.028	0.24	0.033	7.27	**Yes**	Screening value for total PCB

TABLE 7-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Sediment Screening Values mg/kg (4)	Hazard Quotient (5)	COPC Yes/No	Notes
Dioxins (ng/kg)												
OCDD	500		6000		04SD0801	2/2	---	6000	NA	NA	NA	Included in TCDD TEQ
OCDF	18	J	250		04SD0801	2/2	---	250	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,6,7,8-HpCDD	63		670		04SD0801	2/2	---	670	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,6,7,8-HpCDF	7.5	J	98		04SD0801	2/2	---	98	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,7,8,9-HpCDF	9.2		9.2		04SD0801	1/2	0.95 - 1.2	9.2	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,7,8-HxCDD	8.7		8.7		04SD0801	1/2	0.59 - 0.63	8.7	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,7,8-HxCDF	7.1	J	7.1	J	04SD0801	1/2	0.95 - 1.3	7.1	NA	NA	NA	Included in TCDD TEQ
1,2,3,6,7,8-HxCDD	4.1		25		04SD0801	2/2	2.8	25	NA	NA	NA	Included in TCDD TEQ
1,2,3,6,7,8-HxCDF	8.3	J	8.3	J	04SD0801	1/2	1.1 - 1.2	8.3	NA	NA	NA	Included in TCDD TEQ
1,2,3,7,8,9-HxCDD	6.5	J	19		04SD0801	2/2	---	19	NA	NA	NA	Included in TCDD TEQ
1,2,3,7,8-PeCDD	6	J	6	J	04SD0801	1/2	0.47 - 0.6	6	NA	NA	NA	Included in TCDD TEQ
2,3,4,6,7,8-HxCDF	5.9	J	5.9	J	04SD0801	1/2	0.55 - 0.73	5.9	NA	NA	NA	Included in TCDD TEQ
2,3,7,8-TCDD	1.3	J	8		04SD0801	2/2	---	8	NA	NA	NA	Included in TCDD TEQ
2,3,7,8-TCDF	1.6		1.6		04SD0801	1/2	0.59 - 0.65	1.6	NA	NA	NA	Included in TCDD TEQ
TOTAL HpCDD	120		1400		04SD0801	2/2	---	1400	NA	NA	NA	Included in TCDD TEQ
TOTAL HxCDD	40		170		04SD0801	2/2	---	170	NA	NA	NA	Included in TCDD TEQ
TOTAL PeCDD	5.2		6		04SD0801	2/2	3.7	6	NA	NA	NA	Included in TCDD TEQ
TOTAL TCDD	10		33		04SD0101	2/2	---	33	NA	NA	NA	Included in TCDD TEQ
TOTAL HpCDF	23		330		04SD0801	2/2	---	330	NA	NA	NA	Included in TCDD TEQ
TOTAL HxCDF	10		150		04SD0801	2/2	---	150	NA	NA	NA	Included in TCDD TEQ
TOTAL PeCDF	22		22		04SD0801	1/2	2.1 - 2.2	22	NA	NA	NA	Included in TCDD TEQ
TOTAL TCDF	11		100		04SD0101	2/2	---	100	NA	NA	NA	Included in TCDD TEQ
2,3,7,8-TCDD TEQ	3.387		30.487		04SD0801	2/2	---	30.487	2.5	12.19	**Yes**	

TABLE 7-4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Sediment Screening Values mg/kg (4)	Hazard Quotient (5)	COPC Yes/No	Notes
Inorganics (mg/kg)												
Aluminum	3190	J	18600	J	04SD0401	8/8	---	18600	NA	NA	**Yes**	
Arsenic	0.74		5.7		04SD0601	8/8	---	5.7	7	0.81	No	
Barium	9.3	J	54.1	J	04SD0401	8/8	---	54.1	NA	NA	**Yes**	
Beryllium	0.07		0.21		04SD0401	7/8	0.02 - 0.03	0.21	NA	NA	**Yes**	
Calcium	228	J	2120	J	04SD0501	8/8	---	2120	NA	NA	No	NUT
Chromium	3.8	J	18.8	J	04SD0401	8/8	---	18.8	52.3	0.36	No	
Cobalt	0.58		2.4		04SD0401	8/8	0.47	2.4	NA	NA	**Yes**	
Copper	1.8		12.6		04SD0501	8/8	---	12.6	18.7	0.67	No	
Iron	1640	J	13000	J	04SD0401, 04SD0601	8/8	---	13000	NA	NA	**Yes**	
Lead	5.1	J	43.4	J	04SD0401	7/8	14.2	43.4	30.2	1.44	**Yes**	
Magnesium	134	J	703	J	04SD0401	8/8	---	703	NA	NA	No	NUT
Manganese	7.2	J	38	J	04SD0201	8/8	---	38	NA	NA	**Yes**	
Mercury	0.03		0.09		04SD0401, 04SD0501	8/8	---	0.09	0.13	0.69	No	
Potassium	181	J	443	J	04SD0401	4/8	77.5 - 274	443	NA	NA	No	NUT
Selenium	0.6		0.78		04SD0401	3/8	0.26 - 0.55	0.78	NA	NA	**Yes**	
Sodium	85.4	J	1260	J	04SD0501	2/8	16.9 - 58.7	1260	NA	NA	No	NUT
Thallium	0.73		0.76		04SD0801	2/8	0.28 - 0.61	0.76	NA	NA	**Yes**	
Vanadium	5.6		27.5		04SD0401	8/8	---	27.5	NA	NA	**Yes**	
Zinc	4.7	J	87.9	J	04SD0501	8/8	---	87.9	124	0.71	No	
Cyanide	0.27	J	0.37	J	04SD0501	3/8	0.5 - 0.69	0.37	NA	NA	**Yes**	

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 Region IV Waste Management Division Sediment Screening Values for Hazardous Waste Sites.
5 Hazard quotient = maximum detected concentration ÷ ecological screening value

Associated Samples:

04SD0101	04SD0201	04SD0401	04SD0601	04SD0801
04SD0101-D	04SD0301	04SD0501	04SD070	

Definitions:
COPC = Chemical of Potential Concern
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
J = Estimated Value
NA = Not Applicable/Not Available.
NUT = Essential Nutrient
TEQ = toxicity equivalency

TABLE 7-5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1

Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Surface Water Screening Values (4) ug/L	Hazard Quotient (5)	COPC Yes/No	Notes
VOCs (ug/ml)												
Acetone	11	J	11	J	04SW0301	1/3	5 - 10	11	NA	NA	**Yes**	
Tetrachloroethene	3	J	3	J	04SW0301	1/3	5	3	84	0.04	No	
Toluene	2	J	2	J	04SW0301	1/3	5	2	175	0.01	No	
Dioxins (pg/ml)												
1,2,3,4,6,7,8,9-OCDD	1200		1200		04SW0301	1/3	16 - 19	1200	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,6,7,8,9-OCDF	51	J	51	J	04SW0301	1/3	1.9 - 4.5	51	NA	NA	NA	Included in TCDD TEQ
1,2,3,4,6,7,8-HpCDD	120		120		04SW0301	1/3	2.8 - 4	120	NA	NA	NA	Included in TCDD TEQ
Total HpCDD	260		260		04SW0301	1/3	3.4 - 4	260	NA	NA	NA	Included in TCDD TEQ
Total HpCDF	37		37		04SW0301	1/3	1.7 - 3.5	37	NA	NA	NA	Included in TCDD TEQ
2,3,7,8-TCDD TEQ	2.13		4.9		04SW0301	1/3		4.9	10.0	0.5	No	
Inorganics (ug/L)												
Arsenic	3.6		6.8		04SW0101	3/3	0	6.8	190	0.04	No	
Barium	31.1		51.7		04SW0101	3/3	0	51.7	NA	NA	**Yes**	
Calcium	15500		22000		04SW0101-D	3/3	0	22000	NA	NA	No	NUT
Chromium	1.2		1.2		04SW0101	1/3	0.8	1.2	11	0.1	No	Hexavalent chromium
Iron	2800		5180		04SW0101	3/3	0	5180	1000	5.2	**Yes**	
Lead	3.2	J	3.2	J	04SW0301	1/3	1.7	3.2	1.55	2.1	**Yes**	Hardness dependent[7]
Magnesium	1820		2870		04SW0101, 04SW0101-D	3/3	0	2870	NA	NA	No	NUT
Manganese	75.9		205		04SW0101-D	3/3	0	205	NA	NA	**Yes**	
Potassium	1440		1800		04SW0201	3/3	1180	1800	NA	NA	No	NUT
Sodium	7010	J	10700	J	04SW0101	3/3	0	10700	NA	NA	No	NUT
Zinc	9.1		9.1		04SW0301	1/3	1.7 - 3.8	9.1	65.63	0.1	No	Hardness dependent[7]
Cyanide	3.9	J	6.4	J	04SW0101-D	2/3	10	6.4	5.2	1.2	**Yes**	

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 Based on Region IV Water Management Division, Water Quality Standards
5 Hazard quotient = maximum detected concentration ÷ ecological screening value
6 Dioxin concentration and screening values expressed as picograms per liter
7 Hardness Dependent. Screening value calculated based on hardness (mg/L as $CaCO_3$) = 66.8

Associated Samples:
04SW0101
04SW0101-D
04SW0201
04SW0301

Definitions:
COPC = Chemical of Potential Concern
ug/L = micrograms per liter
J = Estimated Value
NA = Not Applicable/Not Available.
NUT = Essential Nutrient

TABLE 7-6
SUMMARY OF FOOD CHAIN HAZARD QUOTIENTS
CONSERVATIVE SCENARIO
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Kingfisher HQ_{NOAEL}	Kingfisher HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
PESTICIDES/PCBs						
4,4'-DDD	0.003	0.0007	**1.2**	0.12	**1.2**	0.12
4,4'-DDT	0.01	0.002	**2.8**	0.3	**2.8**	0.3
Alpha-Chlordane	0.004	0.002	0.01	0.002	0.0	0.002
Gamma-Chlordane	0.1	0.07	0.4	0.1	0.4	0.1
Aroclor-1260	**2.38**	0.483	**2.3**	0.2	**2.3**	0.2
DIOXINS/FURANS						
2,3,7,8-TCDD TEQ	**14.5**	**1.4**	**1.3**	0.1	**1.3**	0.1
INORGANICS						
Lead	0.5	0.05	**3.9**	0.4	**3.9**	0.4
Selenium	0.5	0.3	0.3	0.2	0.3	0.2

Notes:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Concentration
LOAEL - Lowest Observed Adverse Effects Concentration
NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.
Bolded values indicate HQ is greater than 1.0.

TABLE 7-7
SUMMARY OF FOOD CHAIN HAZARD QUOTIENTS
AVERAGE SCENARIO
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULPORT, MISSISSIPPI

Chemical	Mink HQ_{NOAEL}	Mink HQ_{LOAEL}	Kingfisher HQ_{NOAEL}	Kingfisher HQ_{LOAEL}	Green Heron HQ_{NOAEL}	Green Heron HQ_{LOAEL}
PESTICIDES/PCBs						
4,4'-DDD	0.0003	0.00006	0.25	0.03	0.29	0.03
4,4'-DDT	0.001	0.0002	**1.1**	0.1	**1.2**	0.1
Alpha-Chlordane	0.0004	0.0002	0.003	0.001	0.003	0.001
Gamma-Chlordane	0.004	0.002	0.03	0.01	0.03	0.01
Aroclor-1260	0.206	0.0417	0.50	0.05	0.6	0.1
DIOXINS/FURANS						
2,3,7,8-TCDD TEQ	**2.2**	0.2	0.5	0.05	0.5	0.1
INORGANICS						
Lead	0.02	0.002	0.26	0.03	0.3	0.03
Selenium	0.09	0.052	0.1	0.06	0.1	0.07

Notes:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Concentration
LOAEL - Lowest Observed Adverse Effects Concentration
NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.
Bolded values indicate HQ is greater than 1.0.

TABLE 7-8
COMPARISON OF SEDIMENT COPC CONCENTRATIONS TO SEDIMENT QUALITY GUIDELINES
SITE 4 REMEDIAL INVESTIGATION REPORT
NCBC GULFPORT, MISSISSIPPI

Analyte	Frequency of Detection	Range of Detected Values	Mean Concentration[a]	Ecological Screening Value[b]	Sediment Quality Assessment Guideline[c]	
					TEC	PEC
Pesticides/PCBs (ug/kg)						
4,4'-DDD	2/8	2.6 - 12	3.6	3.3	4.9	28
4,4'-DDT	1/8	5	2.8	3.3	4.2	63
Alpha-Chlordane	1/8	5.1	1.8	1.7	3.2[d]	18[d]
Gamma-Chlordane	1/8	370	47.4	1.7	3.2[d]	18[d]
Aroclor-1260	4/8	46 - 240	79.4	33	60[e]	680[e]
Dioxins/Furans(ng/kg)						
2,3,7,8-TCDD TEQ	2/2	3.4 - 30.5	17.19	2.5	NG	NG
Inorganics (mg/kg)						
Aluminum	8/8	3190 - 18600	11908	NA	NG	NG
Barium	8/8	9.3 - 54.1	31.4	NA	20	60
Beryllium	7/8	0.07 - 0.21	0.1	NA	NG	NG
Cobalt	8/8	0.58 - 2.4	1.4	NA	50	NG
Iron	8/8	1640 - 13000	8876	NA	NG	NG
Lead	7/8	5.1 - 43.4	19.4	30.2	36	130
Manganese	8/8	7.2 - 38	23.4	NA	NG	NG
Selenium	3/8	0.6 - 0.78	0.4	NA	NG	NG
Thallium	2/8	0.73 - 0.76	0.4	NA	NG	NG
Vanadium	8/8	5.6 - 27.5	18.6	NA	NG	NG
Cyanide	3/8	0.27 - 0.37	0.3	NA	NG	NG

Footnotes
a Mean concentrations were calculated using one-half the detection limit in non-detect samples.
b USEPA Region IV ecological screening values (USEPA, 2001).
c Sediment quality assessment guidelines for the protection of sediment-dwelling organisms in Florida inland waters (MacDonald et al., 2003).
d TEC and PEC for chlordane
e TEC and PEC for Total PCBs
NA = Ecological screening value not available
NG = No guideline available
TEC = Threshold Effect Concentration
PEC = Probable Effect Concentration
mg/kg = milligram per kilogram
ng/kg = nanogram per kilogram

APPENDIX A
GEOPHYSICS DATA

Gridding Report

Thu Jul 15 17:23:23 2004
Elasped time for gridding: 0.02 seconds

Data Source

Source Data File Name: C:\Program Files\MagMap2000\dataset2.dat
X Column: A
Y Column: B
Z Column: E

Data Counts

Active Data: 960

Original Data: 960
Excluded Data: 0
Deleted Duplicates: 0
Retained Duplicates: 0
Artificial Data: 0
Superseded Data: 0

Univariate Statistics

	X	Y	Z
Minimum:	-89.1357362	30.374063125	-35547.939
25%-tile:	-89.135732625	30.3741014182	-47.334
Median:	-89.13572636	30.374145305	0
75%-tile:	-89.135652575	30.374230355	80.693
Maximum:	-89.135644455	30.374289275	53657.675
Midrange:	-89.1356903275	30.3741762	9054.868
Range:	9.1744999991761E-005		
	0.000226149999999589205.614		
Interquartile Range:	8.0050000008214E-005		
	0.000128936800003031 28.027		
Median Abs. Deviation:	8.3066999962966E-006		6.9159500000637E-005
	53.984		
Mean:	-89.135699176302	30.374160523229	1182.6329802083
Trim Mean (10%):	-89.135699994682	30.374158844537	483.78854166667

Standard Deviation:	3.8547267035799E-005		7.407120369035E-005
Variance:	1.4858917959292E-009		5.4865432161374E-009
	27457181.700506		
Coef. of Variation:			4.4307576175079
Coef. of Skewness:			6.7010958650538

Inter-Variable Correlation

	X	Y	Z
X:	1.000	0.232	-0.193
Y:		1.000	-0.277
Z:			1.000

Inter-Variable Covariance

	X	Y	Z	
X:	1.4858917959292E-009		6.6209315090142E-010	-0.038973319245
Y:		5.4865432161374E-009		-0.10747319193441
Z:			27457181.700506	

Planar Regression: Z = AX+BY+C

Fitted Parameters

	A	B	C
Parameter Value:	21.442434361883	-461.83011112032	17121.573402139
Standard Error:	1821.9228868155	953.67848494573	171397.13604672

Inter-Parameter Correlations

	A	B	C
A:	1.000	0.230	0.986
B:		1.000	0.387
C:			1.000

ANOVA Table

Source	df	Sum of Squares	Mean Square	F
Regression:	2	-7520.2400665283	-3760.1200332642	-0.00013652
Residual:	957	26358901952.726	27543262.228554	
Total:	959	26358894432.486		

Coefficient of Multiple Determination (R^2): -2.8530180151698E-007

Nearest Neighbor Statistics

	Separation	|Delta Z|	
Minimum:	9.9999937219764E-009		0
25%-tile:	2.0615527386711E-007		1.159
Median:	5.6302752967034E-007		3.819
75%-tile:	6.7475921570083E-007		12.556
Maximum:	1.1388590801543E-006		87671.86
Midrange:	5.7442953693816E-007		43835.93
Range:	1.1288590864324E-006		87671.86
Interquartile Range:	4.6860394183372E-007		11.397
Median Abs. Deviation:	1.5704191051527E-007		3.346
Mean:	4.5656100522976E-007		459.456271875
Trim Mean (10%):	4.5363877834308E-007		19.761842592593
Standard Deviation:	2.8167523712258E-007		4786.856900149
Variance:	7.9340939208063E-014		22913998.982504
Coef. of Variation:	0.61694983561032	10.418525533702	
Coef. of Skewness:	-0.28356229243227	12.872045694072	
Root Mean Square:	5.3645958906936E-007		4808.8563139555
Mean Square:	2.8778889070447E-013		23125099.04827

Complete Spatial Randomness

Lambda:	46269226147.937
Clark and Evans:	0.19641512577051
Skellam:	80.31882797893

Exclusion Filtering

Exclusion Filter String: Not In Use

Duplicate Filtering

Duplicate Points to Keep:	First
X Duplicate Tolerance:	1E-011
Y Duplicate Tolerance:	2.6E-011

No duplicate data were found.

Breakline Filtering

Breakline Filtering:	Not In Use

Gridding Rules

Gridding Method:	Polynomial Regression
Maximum X Order:	1
Maximum Y Order:	1
Maximum Total Order:	1
Surface Definition:	Simple planar surface
Regression Coefficients:	$Z(X,Y) = A_{00} + A_{01} Y + A_{10} X$
A_{00}	-1121695593.0029
A_{01}	-17356082.297704
A_{10}	-18498460.444444

Output Grid

Grid File Name:	C:\Program Files\MagMap2000\dataset2.grd
Grid Size:	100 rows x 41 columns
Total Nodes:	4100
Filled Nodes:	4100
Blanked Nodes:	0

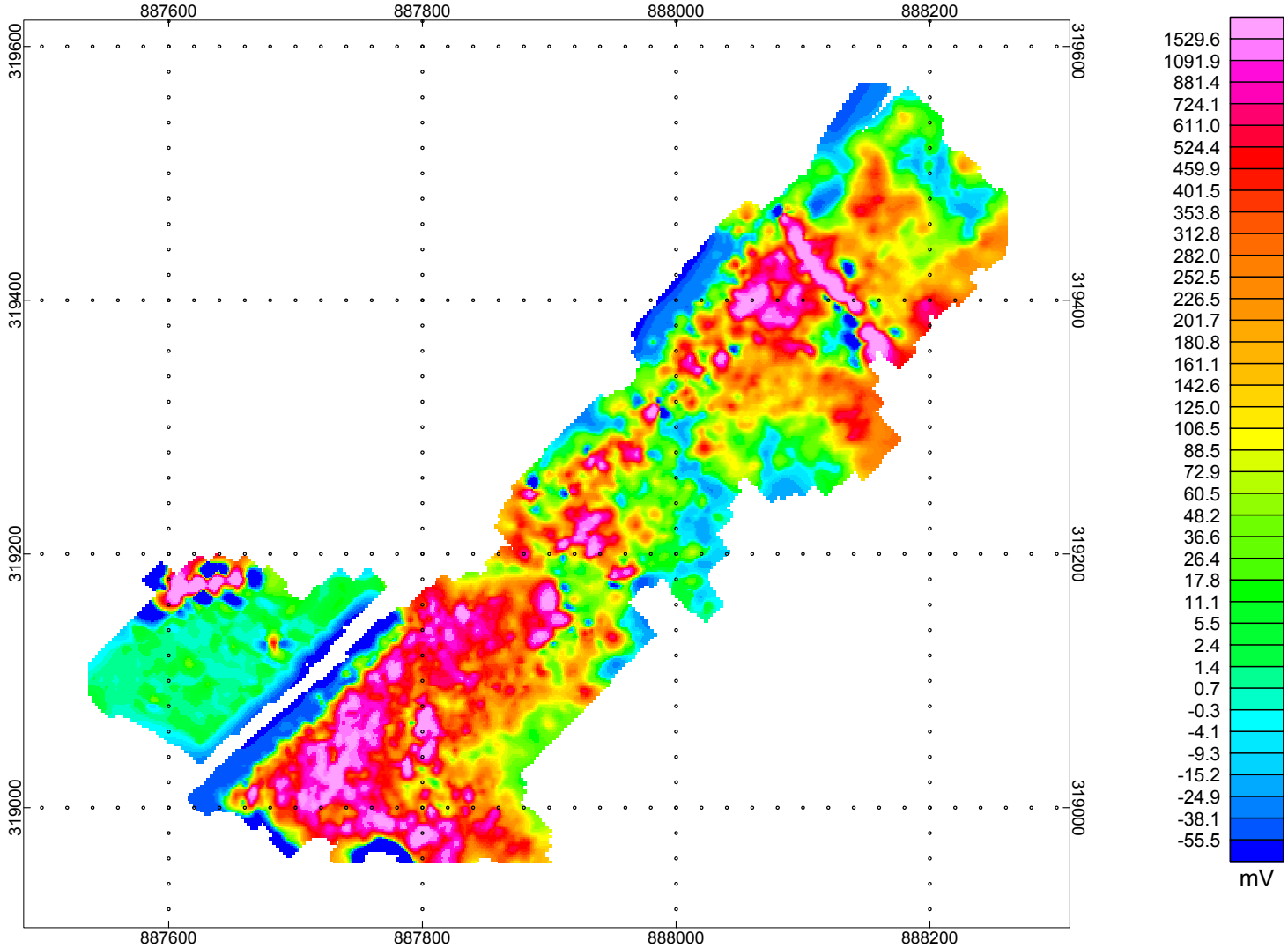
Grid Geometry

X Minimum:	-89.1357362
X Maximum:	-89.13564445
X Spacing:	2.2937499998932E-006
Y Minimum:	30.37406312
Y Maximum:	30.37428928
Y Spacing:	2.2844444444487E-006

Grid Statistics

Z Minimum:	-2064.4324652759
Z 25%-tile:	-244.06331295086
Z Median:	747.16183155021
Z 75%-tile:	1738.3869761129

Z Maximum:	3558.0528528789
Z Midrange:	746.81019380151
Z Range:	5622.4853181548
Z Interquartile Range:	1982.4502890638
Z Median Abs. Deviation:	991.22514456273
Z Mean:	746.81019380151
Z Trim Mean (10%):	746.81019380151
Z Standard Deviation:	1249.7832164763
Z Variance:	1561958.0881859
Z Coef. of Variation:	1.67349512212
Z Coef. of Skewness:	-2.4784233979824E-017
Z Root Mean Square:	1455.9133057129
Z Mean Square:	2119683.5537518



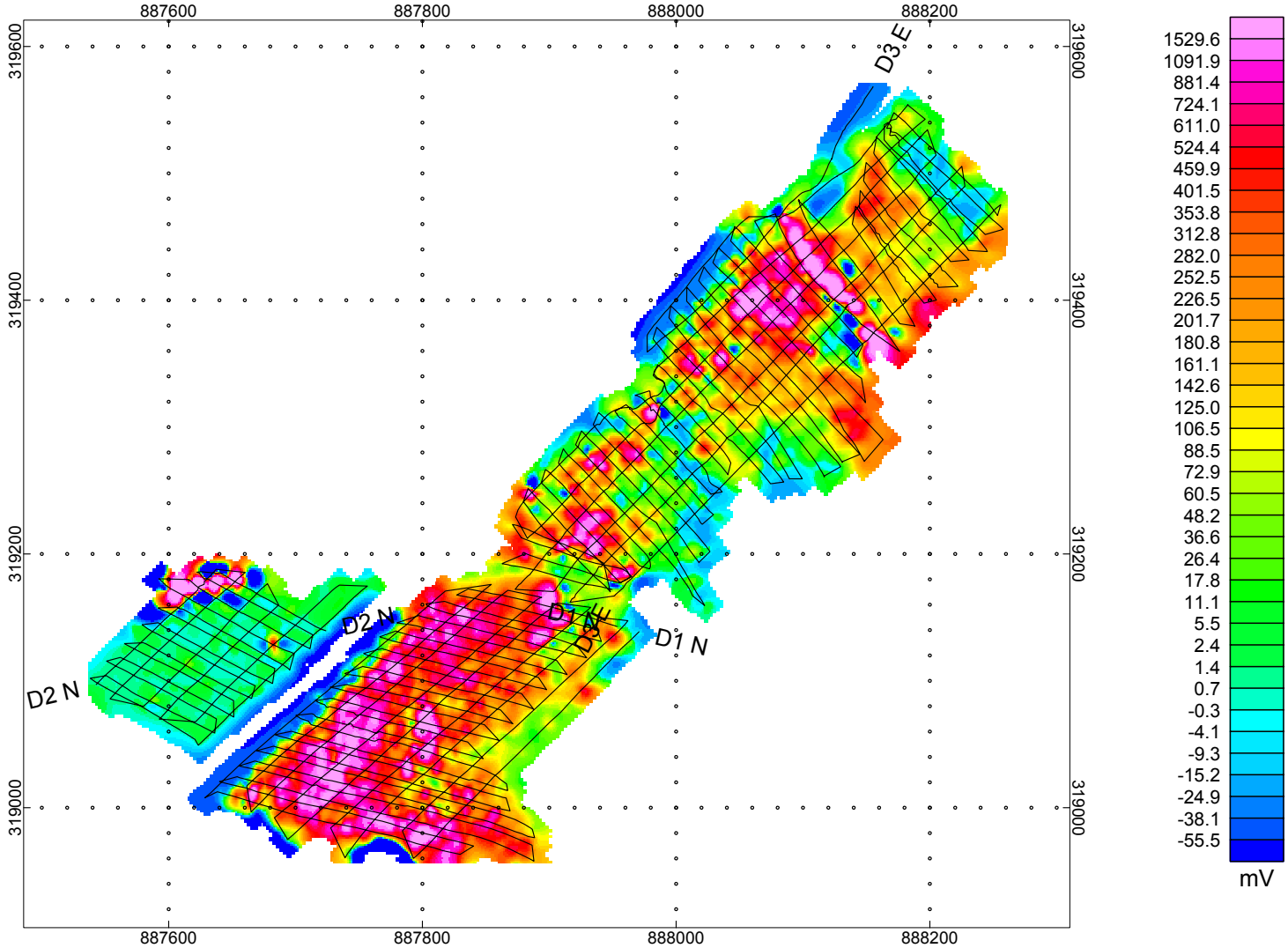
Gulfport NCBC Site 4

EM 61 Results

100 0 100

US survey foot

NAD83 / Mississippi CS83 East zone



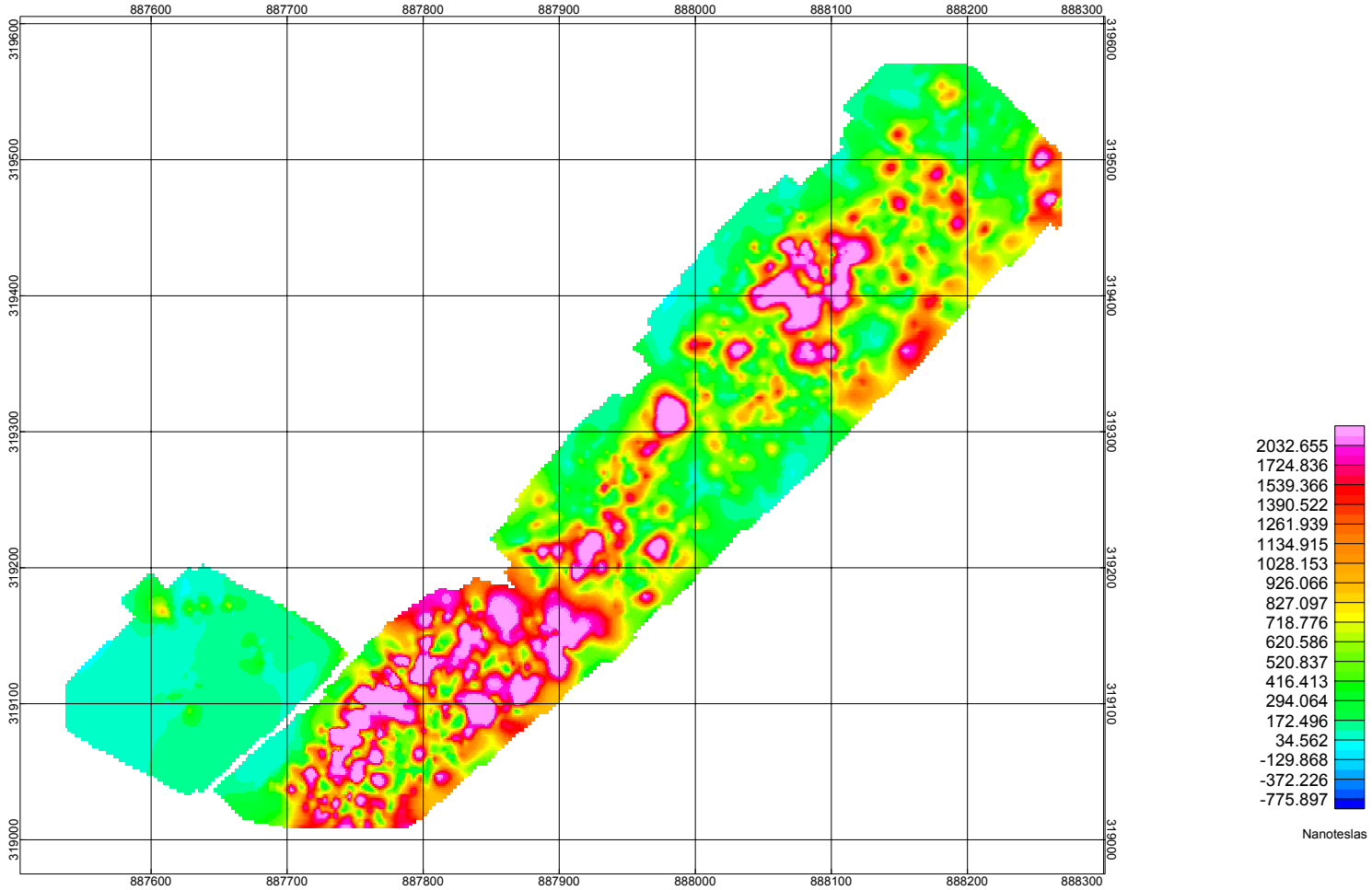
Gulfport NCBC Site 4

EM 61 Coverage

100 0 100

US survey foot

NAD83 / Mississippi CS83 East zone



Gulfport NCBC Site 4

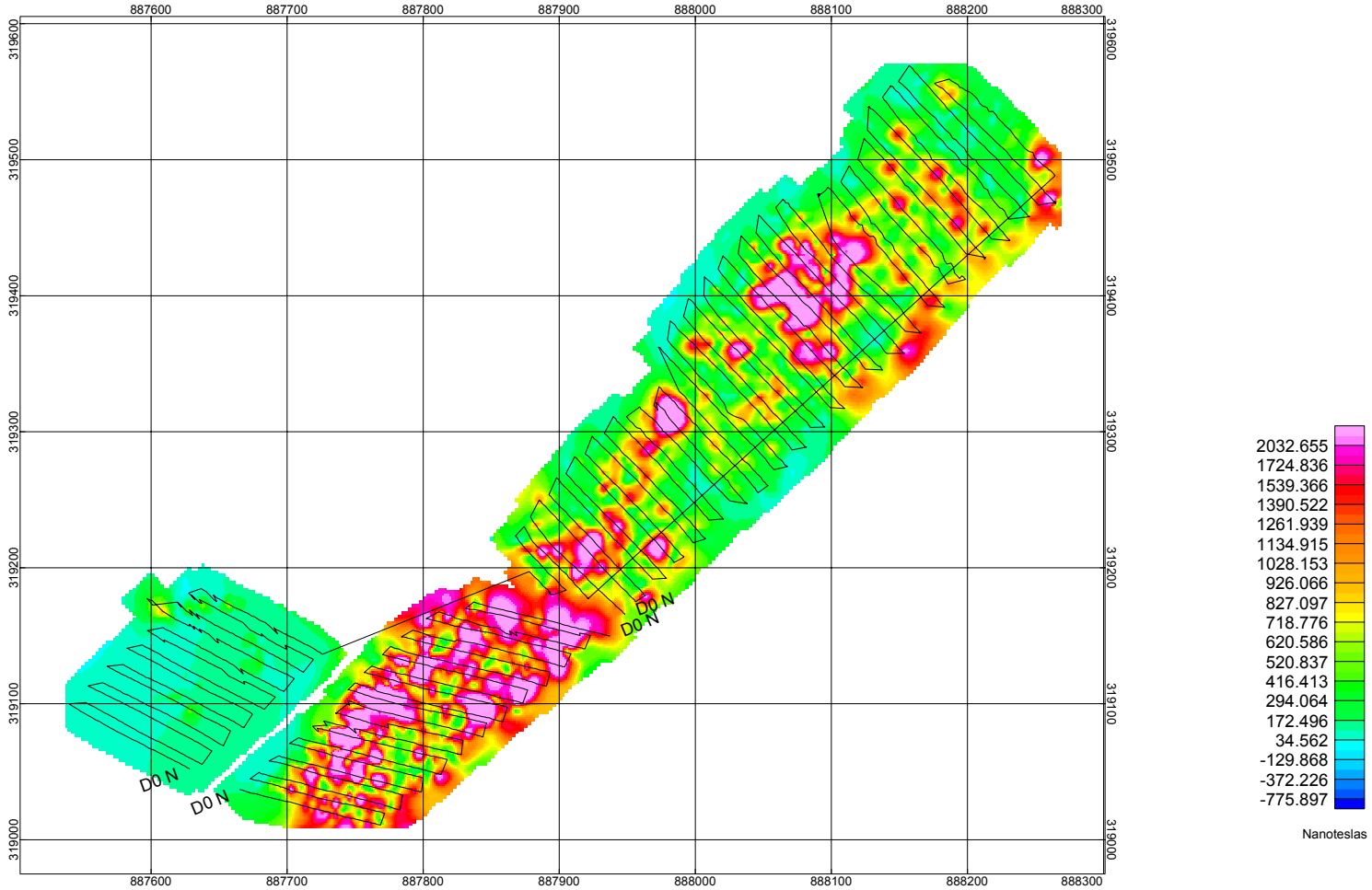
Magnetic Vertical Gradient

Analytic Signal Processing

50 0 50 100

US survey foot

NAD83 / Mississippi CS83 East zone



Gulfport NCBC Site 4

Magnetic Vertical Gradient

Coverage

50 0 50 100

US survey foot

NAD83 / Mississippi CS83 East zone

APPENDIX B
FIELD DATA

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NCBC6P/ Site 4
Project No.: N9666

Sample ID No.: 04SW0101
Sample Location: #01
Sampled By: JB
C.O.C. No.:

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Canal 1
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ ORP (mV)
Date: 8/5/4								
Time: 0900								
Depth: Surface								
Method: Gravity	clear	6.71	.198	28.00	36.7	4.24	0.0	67

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40mL ~~[illegible]~~ Vial	3
SVOC	—	1L Amber	2
Pest/PCB	—	1L Amber	2
TAL Metals	HNO_3	500mL HDPE	1
CN	NaOH	250mL HDPE	1
Appx IX Herb	—	1L Amber	2
Dioxins/Furans	—	1L Amber	2

OBSERVATIONS / NOTES:

HS-C: .05 mg/L
Fe^{2+}: 0.0 mg/L
DO: 2 mg/L
Total Alk: 13 mg/L (ppm)
CO_2: 2500+ mg/L

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
	04SW0101D	

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site4
Project No.: 9666

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Canal #1
[] QA Sample Type:

Sample ID No.: 04SW0201
Sample Location: #02
Sampled By: JB
C.O.C. No.:

Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ ORP mV
Date: 8/12/4								
Time: 1100								
Depth: surface								
Method: gravity		6.46	.135	28.34	32.7	8.88	0.0	49

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

DO- 3mg/L
HS-C- 0.05 mg/L
Fe- 0.0 mg/L
Alk- 11 mg/L
CO_2- 2500+ mg/L

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Stream
[] Spring
[] Pond
[] Lake
[X] Other: Canal #1
[] QA Sample Type:

Sample ID No.: 04SW0301
Sample Location: #03
Sampled By: JB
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/17/4
Time: 1400
Depth: Surface
Method: gravity

Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL VOA	3
SVOC	—	1 L Amber	2
Pest/PCB	—	1 L Amber	2
Appx IX Herb	—	1 L Amber	2
Dioxin/Furan	—	1 L Amber	2
TAL Metals	HNO_3	500 mL HDPE	1
CN	NaOH	250 mL HDPE	1

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

04SW0301MS / 04SW0301MSD

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBC6P/Site 4
Project No.: N9666

[] Surface Soil
[] Subsurface Soil
[X] Sediment – Canal #1
[] Other:
[] QA Sample Type:

Sample ID No.: 04SD0101
Sample Location: #01
Sampled By: JB
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/5/4 Time: 0930 Method: Hand Auger Monitor Reading (ppm): 0	0-1'	Gray/brown	Silty Sand

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	40 mL Vial	4	
SVOC/Pest/PCB/Approx IR Herb	8 oz Glass	1	
TAL Metals + CN	2 oz Glass	1	
TOC	2 oz Glass	1	
Dioxins/Furans	4 oz Glass	1	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: 04SD0101D

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: N9666

Sample ID No.: 045D0201
Sample Location: Location #2
Sampled By: JB
C.O.C. No.:

[] Surface Soil
[] Subsurface Soil
[X] Sediment Canal #1
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/6/4 Time: 1030 Method: Hand Auger Monitor Reading (ppm): 0	0-1'	Grey	sandy clay

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
VOC	40 mL Vial w/ DI H_2O	3	
VOC	40 mL Vial w/ CH_3OH	1	
SVOC/Pest/PCB/Appix IX Herb	8 oz Glass	1	
TOC	2 oz Glass	1	
TAL Metals + CN	2 oz Glass	1	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBC6P/Site 4
Project No.: 9666

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 045D0301
Sample Location: Location #3
Sampled By: JR
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/12/4 Time: 1000 Method: hand auger Monitor Reading (ppm): 0	0-1'	gray	silty sand

COMPOSITE SAMPLE DATA:

	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
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.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 4666

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: 04SD0401
Sample Location: #04
Sampled By: JB
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/12/4 Time: 1130 Method: hand auger Monitor Reading (ppm): 0	0-1'	black	Silty Clay

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	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.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: N9666

Sample ID No.: 04SD0501
Sample Location: #05
Sampled By: JB
C.O.C. No.:

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 8-13-4
Time: 0830
Method: hand auger
Monitor Reading (ppm): 0

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0-1'	gray	silty clay

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	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.:

04SD0501MS + 04SD0501MSD

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NCBCGP / Site 4
Project No.: 9666

[] Surface Soil
[] Subsurface Soil
[X] Sediment
[] Other:
[] QA Sample Type:

Canal #1

Sample ID No.: 04SD0701
Sample Location: #07
Sampled By: JB
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/17/4 Time: 1420 Method: hand auger Monitor Reading (ppm): 0	0-1'	gray	sandy silt

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	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.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP/Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0101
Sample Location: Location #01
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/17/4								
Time: 815								
Method: peristaltic	Clear	6.93	.472	23.76	260	1.28	-322	0753

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/17/4								
Method: peristaltic	Initial	7.01	.469	23.85	999	2.10	-310	
Monitor Reading (ppm): Ø	2 gal	6.98	.468	23.78	333	1.60	-290	
Well Casing Diameter & Material	3 gal	6.97	.471	23.76	205	1.29	-313	
Type: 1" Steel Rod	4 gal	6.93	.472	23.76	260	1.28	-322	
Total Well Depth (TD): 15'								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs): 0720								
End Purge (hrs): 0755								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): ~4 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES:

Field Test Kit Results

Dissolved Oxygen	0.5 mg/L
Ferrous Iron	4.8 mg/L
Hydrogen Sulfide H2S-C	5.0 mg/L
Carbon Dioxide	13 mg/L
Alkalinity	15 mg/L
Sulfide	

*Turbidity reading is suspect due to faulty sensor. Awaiting arrival of replacement via FedEx.

Circle if Applicable:
MS/MSD Duplicate ID No.: 04GP0101MS / 04GP0101MSD
TBD: To Be Determined

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP/Site 4
Project No.: 9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0201
Sample Location: #02
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/12/4								
Time: 1528								
Method: peristaltic	clear	5.44	.102	24.28	155	2.88	41	1525

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/12/04								
Method: peristaltic	Initial	7.03	.296	25.54	999	5.19	-170	
Monitor Reading (ppm): Ø	1435	5.93	.137	24.98	999	3.04	5	
Well Casing Diameter & Material	1445	5.73	.124	25.10	481	3.76	29	
Type: 1"	1455	5.55	.117	24.48	247	2.51	42	
Total Well Depth (TD):	1505	5.50	.114	24.29	198	7.00	44	
Static Water Level (WL):	1515	6.51	.114	24.49	162	2.90	41	
One Casing Volume(gal/L):	1525	5.44	.102	24.28	155	2.88	41	
Start Purge (hrs): 1425								
End Purge (hrs): 1525								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): ~6 gal								

*Water Level Meter probe was incompatible w/ temp. well. (too large)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	~~2 - 1L Amber~~	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-~~250mL~~ 500 HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
CN	NaOH	1-25mL	yes

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	—
Ferrous Iron	—
Hydrogen Sulfide	—
Carbon Dioxide	—
Alkalinity	—
Sulfide HS-C	0.1 mg/L

*Water became very turbid following VOC sampling. Do to time constraints, those NA parameters requiring clear water were not ran.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0301
Sample Location: #03
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/13/4								
Time: 1005								
Method: peristaltic	clear	6.33	.171	23.56	114	1.25	-74	1005

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/13/4								
Method: peristaltic	Initial	6.55	.226	23.11	999	5.59	-58	
Monitor Reading (ppm): Ø	0912	6.50	.208	23.49	999	4.61	-69	
Well Casing Diameter & Material	0932	6.33	.180	23.53	999	2.92	-46	
Type: Steel rod, 1"	0952	6.32	.167	23.54	248	2.08	-63	
Total Well Depth (TD): /	1002	6.33	.171	23.56	114	1.25	-74	
Static Water Level (WL): 8.72								
One Casing Volume(gal/L): /								
Start Purge (hrs): 0852								
End Purge (hrs): 1005								
Total Purge Time (min): 73								
Total Vol. Purged (gal/L): ~5 gal								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

NA not completed due to time constraints

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0401
Sample Location: #04
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/13/4								
Time: 1130								
Method: peristaltic	cloudy	6.16	.180	23.38	212	1.01	-35	1125

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/13/4								
Method: peristaltic	Initial	6.22	.185	23.72	999	1.92	-25	
Monitor Reading (ppm): Ø	1110	6.17	.182	23.42	413	1.18	-31	
Well Casing Diameter & Material	1120	6.17	.182	23.40	340	1.08	-33	
Type: Steel rod/1"	1125	6.16	.180	23.38	212	1.01	-35	
Total Well Depth (TD): /								
Static Water Level (WL): 10.04								
One Casing Volume(gal/L): /								
Start Purge (hrs): 1050								
End Purge (hrs): 1125								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L) ~5 gal								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.4 mg/L
Ferrous Iron	~~0.4 mg/L~~ 5.6 mg/L
Hydrogen Sulfide	
Carbon Dioxide	12 mg/L
Alkalinity	14 mg/L
Sulfide H2S-C	0.2 mg/L

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0501
Sample Location: #05
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/18/4								
Time: 1018								
Method: peristaltic	murky	5.36	.185	23.90	999	1.11	-173	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/18/4								
Method: peristaltic	Initial	5.28	0.172	23.79	999	5.41	-46	
Monitor Reading (ppm): Ø	0930	5.34	.182	24.00	999	1.76	-109	
Well Casing Diameter & Material	0950	5.37	.185	23.93	999	1.40	-142	
Type: 1" Steel Rod	1010	5.36	.185	23.90	999	1.11	-173	
Total Well Depth (TD): 16'								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs): 0910								
End Purge (hrs): 1010								
Total Purge Time (min): 60								
Total Vol. Purged (gal/L): ~5 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	(YES) / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	(YES) / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	(YES) / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	(YES) / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	(YES) / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	(YES) / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	(YES) / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	(YES) / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	(YES) / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / (NO)

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide HS-C 0.7 mg/L
Carbon Dioxide
Alkalinity
Sulfide

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP/Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0601
Sample Location: #06
Sampled By: SB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/18/4	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1220								
Method: peristaltic								

PURGE DATA:

Date: 8/17/4	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: peristaltic	Initial	6.64	.514	24.85	999	7.94	-154	
Monitor Reading (ppm): Ø	1205	6.96	.502	23.97	317	1.34	-169	
Well Casing Diameter & Material	1210	6.99	.501	24.07	95	2.03	-175	
Type: 1" Steel rod	1215	6.99	.501	24.02	50	2.08	-176	
Total Well Depth (TD): 18'								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs): 1155								
End Purge (hrs): 1215								
Total Purge Time (min): 20 min								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	(YES) / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	(YES) / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	(YES) / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	(YES) / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	(YES) / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	(YES) / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	(YES) / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	(YES) / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	(YES) / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / (NO)

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.1
Ferrous Iron	7.2
Hydrogen Sulfide HSC	0.05
Carbon Dioxide	12
Alkalinity	11
Sulfide	

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0701
Sample Location: #07
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/18/4								
Time: 1530								
Method: peristaltic								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/18/4								
Method: peristaltic	Initial	6.50	.645	24.51	999	6.90	-223	
Monitor Reading (ppm): Ø	1500	6.55	.348	23.84	999	2.15	-244	
Well Casing Diameter & Material	1510	6.51	.340	23.71	999	1.41	-268	
Type: 1" Steel Rod	1520	6.47	~~.344~~ .345	23.66	999	0.98	-274	
Total Well Depth (TD): 20'								
Static Water Level (WL):	1530	6.49	.344	23.63	999	0.93	-276	
One Casing Volume(gal/L):								
Start Purge (hrs): 1445								
End Purge (hrs): 1530								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0801
Sample Location: #08
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/19/4	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Time: 1500	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Time
Method: peristaltic	clear	7.03	2.18	25.41	4	4.39	-122	

PURGE DATA:

Date: 8/19/4	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: peristaltic	Initial	7.02	2.26	28.49	1100	4.67	-158	
Monitor Reading (ppm): 0	1420	6.95	2.24	25.58	400	2.88	-118	
Well Casing Diameter & Material	1430	7.00	2.19	26.61	320	4.40	-119	
Type: 1" ~~Steel~~ Rod	1440	7.03	2.19	25.65	150	4.44	-121	
Total Well Depth (TD): 20'	1450	7.03	2.18	25.50	55	4.39	-121	
Static Water Level (WL):	1500	7.03	2.18	25.41	4	4.39	-122	
One Casing Volume(gal/L):								
Start Purge (hrs): 1410								
End Purge (hrs): 1500								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): ~13 gal								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

****Field Test Kit Results****

Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

Circle if Applicable:

MS/MSD **Duplicate ID No.:** 04GP0801D

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP/Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP0901
Sample Location: #09
Sampled By: SJB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 8/19/4								
Time: 0930								
Method: peristaltic	Clear	6.33	1.12	24.42	8	0.93	-326	

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 8/19/4								
Method: peristaltic	Initial	6.59	1.17	24.60	999	4.48	-277	
Monitor Reading (ppm): Ø	0855	6.[illegible]	1.13	24.56	190	1.48	-304	
Well Casing Diameter & Material	0905	6.37	1.12	24.47	50	1.06	-320	
Type: 1" Steel Rod	0915	6.31	1.14	24.84	27	1.09	-322	
Total Well Depth (TD):	0925	6.33	1.12	24.42	8	0.93	-326	
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs): 0850								
End Purge (hrs): 0925								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L) ~ 9 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES:

Field Test Kit Results

Dissolved Oxygen: 0.6 mg/L
Ferrous Iron: 3.6 mg/L
Hydrogen Sulfide: 5.0+ mg/L
Carbon Dioxide: 11 mg/L
Alkalinity: 63 mg/L
Sulfide:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP / Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GP1001
Sample Location: #10
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/19/4	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1111								
Method: peristaltic	clear	6.64	.405	24.81	4	1.53	-111	

PURGE DATA:

Date: 8/19/4	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: peristaltic	Initial	6.81	.395	25.08	210	4.39	-99	
Monitor Reading (ppm): Ø	1040	6.65	.389	24.80	110	1.31	-103	
Well Casing Diameter & Material	1050	6.64	.395	24.78	98	1.44	-111	
Type: 1" Steel Rod	1100	6.64	.404	24.76	50	1.50	-115	
Total Well Depth (TD):	1110	6.64	.405	24.81	4	1.53	-111	
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs): 1030								
End Purge (hrs): 1110								
Total Purge Time (min): 40 min								
Total Vol. Purged (gal/L): ~ 10 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 415.1 - TOC	H2SO4	12- 40mL VOA	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen 0.9 mg/L
Ferrous Iron 7.8 mg/L ~~0.9 mg/L~~
Hydrogen Sulfide 0.0 mg/L
Carbon Dioxide 12 mg/L
Alkalinity 14 mg/L
Sulfide

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBG-GP/Site 4
Project No.: 119666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 04GP1101
Sample Location: P-11
Sampled By: JB/BO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/10/04	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: 1147								
Method: peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40mL Vial	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 046P1201
Sample Location: P-12
Sampled By: DB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/10/04	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: 1500								
Method: peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Vial	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 04GP1301
Sample Location: P-13
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/10/4	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: 1630								
Method: peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40mL Vial	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC GP/Site 4
Project No.: 9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 04GP1401
Sample Location: P-14
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/11/4	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time:								
Method: peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40mL Vial	

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 04GP150L
Sample Location: P-15
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/11/04								
Time: 1030								
Method: peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Vial	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBCGP/Site 4
Project No.: 9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. Well
[] QA Sample Type:

Sample ID No.: 04GP1601
Sample Location: P-16
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 8/11/4								
Time: 1410								
Method: peristaltic								

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date:								
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Vial	4

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: GPT Site 4
Project No.: W9666

[] Domestic Well Data
[] Monitoring Well Data
[X] Other Well Type: Temp. well
[] QA Sample Type:

Sample ID No.: 04GP1701
Sample Location: P17
Sampled By: [illegible]
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 8/11/04	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: 1150								
Method: Peristaltic								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
Monitor Reading (ppm):								
Well Casing Diameter & Material								
Type:								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
8260 VOC	HCL	4x 40ml	Y

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N 9666

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: 04SB0101
Sample Location: PDL
Sampled By: WPO
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/11/04 Time: 1600 Method: DPT Monitor Reading (ppm): 239	34-36	GRAY	SANDY Clay

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC/PEST/PCB/Approx 1X Herb	1 X 8oz	✓	
VOC	4x40ml/B-DI + 1 MeOH	✓	
TAL metals + CN	1 x 2oz	✓	
TOC	1 x 2oz	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N9666

Sample ID No.: 04SB0201
Sample Location: P02
Sampled By: WDO
C.O.C. No.:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/12/04 Time: 1035 Method: DPT Monitor Reading (ppm): 5.8	4-6'	Dk Grg	silty sand w/wood and other debris

COMPOSITE SAMPLE DATA:

	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC/PEST/PCB/TPPX 1x Herb	1 x 8oz	✓	
VOC	4x 40ml/3-DI + LMeOH	✓	
TAL metals + CN	1 x 2oz	✓	
TOC	1 x 2oz	✓	

OBSERVATIONS / NOTES:

wood fragments had creosote odor

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): W. D. Olson

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N9666

Sample ID No.: 045B030L
Sample Location: P04
Sampled By: WDO
C.O.C. No.:

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/12/04 Time: 1440 Method: DPT Monitor Reading (ppm): 4.9	16-18	off white	Fine sand some well rounded shell fragments

COMPOSITE SAMPLE DATA:

	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC / Pest / PCB / Appx IX Herb	1 x 8oz	✓	
VOC (8260)	4x40ml / 3-DI + 1 MeOH	✓	
TAL metals + CN	1 x 2oz	✓	
TOC	1 x 2oz	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): WDO

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N9666

Sample ID No.: 04SB0301
Sample Location: P04
Sampled By: WDO
C.O.C. No.:

- [ ] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: 8-12/04
Time: 1615
Method: DPT
Monitor Reading (ppm): 5.6

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
12-14	Off white	Fine Sand

COMPOSITE SAMPLE DATA:

Date:
Method:
Monitor Readings (Range in ppm):

Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
SVOC / Pest / PCB / Herb	1 x 8oz	✓	
TCL VOC	4 x 40ml / 3-DI + 1 MeOH	✓	
TAL metals + CN	1 x 2oz	✓	
TOC	1 x 2oz	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N 9666

Sample ID No.: 04SB0501
Sample Location: PØ5
Sampled By: WDO
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 8/13/04 Time: 1010 Method: DPT Monitor Reading (ppm): 4.5	14-16	gray	Fine sand with shell fragments

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TCL SVOC / PEST / PCB / Herb	1 x 8 oz	✓	
TCL VOC	4 x 40 ml / 3-DI + 1 MeOH	✓	
TAL metals + CN	1 x 2 oz	✓	
TOC	1 x 2 oz	✓	
Grainsize / moisture / Atterburg	1 x 32 oz	✓	
Dioxins / Furans	1 x 4 oz	✓	

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:
MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666
DRILLING COMPANY: ABCS
DRILLING RIG: 6600
BORING NUMBER: P01
DATE: 8/11/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
											0.0	0.0	0.0
							lt gray Clay w/ small sand stringers		142.7				
							lg roots @ 7'		146.1		0	0	0
							lt brown silty sand w/ roots		138.4				
							gray fine sand		0.0		0.0	0.0	0.0
							to lt gray fine		0.0				
									0.0		0.0	0	0
					16.5		gray sandy clay cohesive		0.0				
							occasional roots		0.0				
									0.0		0	0	0
									0.0				
							gray clay						

* When rock coring, enter rock brokenlbs.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPJ 5.6 4 R1
PROJECT NUMBER: W9666
DRILLING COMPANY: HESS
DRILLING RIG: 6600

BORING NUMBER: A01
DATE: 8/11/06
GEOLOGIST: W.D. OLSON
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or RQD (%)	Sample Recovery/Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
25													
26							gray clay		23.5				
27							gray clayey sand/ sandy clay						
28									14.9		Ø	Ø	Ø
30									38.8				
32							gray FS w/clay		62.2		Ø	Ø	Ø
34									135				
35							gray sandy clay		239				
36											Ø	Ø	Ø
38							H brn FS w/ silt v. loose		128				
40							gray FS		3.4				
42							green/gray silty clay		20.1		Ø	Ø	Ø
44									36.7				
45													
50													

045B010 34-36'

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6600

BORING NUMBER: PC2
DATE: 8/12/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
2													
4													
6							Dk gray silty sand		5.8	Ø	Ø	Ø	045302 4-6'
8							Black sandy clay w/ ~~Crushed wood~~		1.4				
10							black sandy clay brown sandy silt Loose		0.7	Ø	Ø	Ø	
12									0.2				
14							Tan Silty Sand		1.9	Ø	Ø	Ø	
16							lt brn FS w/silt		0.2				
18									0.4	Ø	Ø	Ø	
20							lt brn FS ~~w/gravel~~ Root to 6ob only		0.5				
22							Lt brn FS some wood chips		0.7	Ø	Ø	Ø	
24									0.9				

* When rock coring, enter rock brokenness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: W 9666
DRILLING COMPANY: AECS
DRILLING RIG: 6606
BORING NUMBER: P02
DATE: 8/12/94
GEOLOGIST: W.D Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
25													
26							Sand		0.2				
							Lt brown/tan PS no odor		0.9		Ø	Ø	Ø
28							gray clayey sand		0.9				
30							to gray/brown Sandy clay		0.4				
32							gray clay silt		0.6		Ø	Ø	Ø
34							gray clayey sand		0.2				
36							Peat / org mat rd/Brn		0.9		Ø	Ø	Ø
38							then gray silty sand		2.2				
40													

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: W9666
DRILLING COMPANY: ABCS
DRILLING RIG: 6600

BORING NUMBER: P03
DATE: 8/12/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole BZ**	Driller BZ**
	4												
	6								ref. @ 5'				
									Preparing to wash 8'		Ø	Ø	Ø
	8												
	10						Black sand w/gravel and debris		Slow 2.8		Ø	Ø	Ø
	12						Tan silty FS w/clay		2.1				
	14						Grades to brown ~~some wood~~ debris		1.6		Ø	Ø	Ø
	16								3.2				
	18						Off white FS some well rnd shell fragments		4.9		Ø	Ø	Ø
	20								3.5				
	22						Tan FS horizons of wood fragments		1.7				
	24								1.4		Ø	Ø	Ø

045R0201
1648

* When rock coring, enter rock brokeness.
** Include monitor reading in 8 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666
DRILLING COMPANY: ARCS
DRILLING RIG: 6600
BORING NUMBER: P03
DATE: 8/12/04
GEOLOGIST: W.D. Gibson
DRILLER: R. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
25													
26							Same as aba		3.9		Ø	Ø	Ø
							gray clayey sand						
28							gray clay		2.5				
30									3.4				
32									3.5		Ø	0.1	0.1
34							gray sandy clay		0.3		0.1	0.1	0.1
36									3.4				
38							Problem w/sampler did not sample 36-40						
40													

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.1

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of 1

PROJECT NAME: GPT SMe 4 RA
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6606

BORING NUMBER: P04
DATE: 8/12/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or RQD (%)	Sample Recovery/Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm)** Sample	Sampler BZ	Borehole**	Driller BZ**
	2												
	4												
	6						brown sandy silt		3.0	0	0	0	
	8						white clay w/ orange mottling		3.2				
	10						inc. silt		5.5				
	12						tans sandy clay w/ orange frags		4.6	0.1	0.1	0.1	
	14						off white FS		5.6				
	16								4.5	0.1	0.1	0.1	
	18								4.6				
	20								3.8	0.1	0.1	0.1	
	22								3.4				
	24						gray sandy clay		4.4				

045B04
12-14'

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.1

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666*
DRILLING COMPANY: AECS
DRILLING RIG: 6600

BORING NUMBER: P05
DATE: 8/13/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	2										Ø	Ø	Ø
	4												
	6					I	Brown silty clay w/small frags		3.7				
	8					I	Brown clayey silt		3.0	Ø	Ø	Ø	
	10					I	Tan/gray clayey silt, some sand, no odor		2.9				
	12					I			4.5	Ø	0.1	Ø	
	14					I	Brown silty sand, 100% [illegible]		2.8				
	16					I	Gray fs w/ small frags	Softer odor	4.5	0.1	Ø	Ø	
	18				gray	I	silty sand w/ wood 1+ [illegible] fs		4.4				
	20					I	Some wood debris		2.1				
	22					I			3.0	Ø	Ø	Ø	
	24					I	gray silty clay		2.9				

0458050I 14-16' MS/MSD
dioxin sample
geotech sample

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666
DRILLING COMPANY: ABCS
DRILLING RIG: 6606
BORING NUMBER: P05
DATE: 8/13/04
GEOLOGIST: W. P-Oh/04
DRILLER: D. Lobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
23													
26							gray clay						
							some wood						
28							debris			Ø	0.1	0.1	

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.1

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GP Site 4 RI
PROJECT NUMBER: N9660
DRILLING COMPANY: ARCS
DRILLING RIG: 6600

BORING NUMBER: P06
DATE: 8/18/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
							Pilot to 4'			Ø	Ø	Ø	
							BFA Brownish sand						
							Black clay w/ sand and gravel		2.9 FID	Ø	0.1	Ø	
									1.9				
							Obst pre-probe to 12'						
										0.1	0.1	0.1	
							DK Brown sandy clay soils		44.5				
							TAW FS w/clay						
							TAW FS w/ silt to FS		2.8	0.1	0.1	0.1	
									4.4	0.1	0.1	0.1	
							Brown FS w/ rounded gravel		4.7				
							White FS sulfur odor some wood debris		6.2	0.2	0.2	0.2	
									6.7				

045B0601 12-14'
04GP0601 14-18'

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response noted.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT site LRI
PROJECT NUMBER: W9666
DRILLING COMPANY:
DRILLING RIG:

BORING NUMBER: P06
DATE: 8/18/04
GEOLOGIST:
DRILLER:

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Texture Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
25													
26							BRN FS						
							some well rnd						
							fine gravel		5.5	0	0.2	0.2	0.2
28							abrasive FS						
30													
							gray sandy						
32							clay				0.2	0.2	0.2

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4R1
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6600
BORING NUMBER: P07
DATE: 8/18/04
GEOLOGIST: W.D. Okow
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil/Rock Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
									Sample		0.4	0.4	0.4
2									PID				
4							DK BRN Sandy Silty Clay		75.6				
6													
8							Tan Silty Sand w/clay		57.4		0.3	0.3	0.3
10									50.8				
							Tan FS less Silt		47.1		0.3	0.3	0.3
							Brown FS some wood frags well rnd gravel		25.8				
14													
16									8.0		0.3	0.3	0.3
							TAN FS		10.6				
18													
20									8.2		0.4	0.6	0.6
							gray Sandy Clay and clay		23.5				
22									28.2				
24													

04SB07 ~~10~~ 20-22
04GP07 ~~10-14~~ 16-20

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI
PROJECT NUMBER: W9666
DRILLING COMPANY: ACS
DRILLING RIG: 6600

BORING No.: P08
DATE: 8/19/04
GEOLOGIST: W. A. Olson
DRILLER: D. Cobb

Depth (Ft.)	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
4								black silty clay w/gravel & concrete & wood debris						
6				50%								0	0	0
8										0.0 ppm				
								Dk gray silty clay		807		0	0	0
10														
								Lt gray clayey sand some wood debris		5694				
12														
										0.0				
14								white to lt brown FS w/silt				0	0	0
										0.0				
16								Brn FS w/rnd gravel						
										0.0				
18														
										0.0		0	0	0
20														
										0.0				
22														
								gray med sand and gravel		886				
24								gray silty clay						
26														
28														

04SB08
10-12'
04G-P08
12'

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4 RI
PROJECT NUMBER: N9666
DRILLING COMPANY: ARCS
DRILLING RIG: 6600

BORING NUMBER: P09
DATE: 8/18/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
											0.6	0.2	0.7
4													
							Dark brown silty clay		16.6				
6							1" sand layer @ 8'						
									19.0		0.3	0.3	0.3
8							Tan FS						
									16.0				
10													
									19.4				
12							BROWN FS some RND gravel				0.3	0.3	0.3
									20.2				
14													
									19.9				
16											0.3	0.3	0.3
									20.1				
18													
							Gray Blue to ~~med sand with~~ rnd gravel		13.6				
20													
							grey sandy clay		12.1				
22													
									7.0				
24													
26													

045809 16.18'
046P09 16-20'

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.7

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site URI
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6600

BORING NUMBER: P10
DATE: 9/18/04
GEOLOGIST: W.D. Olson
DRILLER: D. Coby

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	8						0-8 White FS		Chest Prepackaged 8346	Ø	Ø	Ø	Ø
									0.0	Ø	Ø	Ø	Ø
	10						Brn Sl Oly Sandy clay						
	12								Over 9999				
									0.0		Ø	Ø	Ø
	14												
							Tan FS						
	16						Brn FS		0.0		Ø	Ø	Ø
	18						~~Some silt~~		0.0				
	20								1627		Ø	Ø	Ø
									0.0				
	22												
									1464				
	24												
							L+ Brn FS ~~Some Red staining~~		0.0				
	26												
							Off white FS		0.0				
	28												
							Gray Sandy Clay in end of sampler						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ____ No X Well I.D. #: ____

046SB10 10-12'

046P10 12-16'

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6600

BORING NUMBER: P11
DATE: 8/10/04
GEOLOGIST: W. D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
									0-18 bls: no posl		0.0		0.0
18													
19							Gray silty sandy clay						
20										0.0	0.0	0.0	0.0
21							gray silty clayey						
22							gray clay			0.0			
23							gray silty clay						
24										0.0	0.0	0.0	0.0
25							within PS strata						
26							1 min thick			0.0			
27													
28													

* When rock coring, enter rock brokenes.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4
PROJECT NUMBER: N9666
DRILLING COMPANY: AESS
DRILLING RIG: 6600

BORING NUMBER: P12
DATE: 8/10/04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
										Direct push to 18'	0.0	0.0	0.0	
18														Bkg 6.0
19								Lt gray fs, trace silt brown org layers @ 18.5 wet	SP	1030 ppm			4.0	6.0
20														
21										769 ppm				
22														
23								gray clayey sandy cohesive stiff	SC	12.2				Gw Sample 18.22 @ 4GP12
24														
25										12.8				
26														
27														
28														

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4
PROJECT NUMBER: N9666
DRILLING COMPANY: ABCS
DRILLING RIG: 6600
BORING NUMBER: P13
DATE: 8/10/04
GEOLOGIST: W. D. Olsen
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
									Blow to 10'			0.0	0.0
10													
11							Lt gray silty fine sand trace clay						
12									13.2 ppm				
13							off white fs and silty fine sand						
14									15.0 ppm				
15							Gray silty fs org odor @ 15.5			0.0	0.0	0.0	3.0 WSO
16									19.2 ppm				
17							GRS qtz sand and wood						
18									44.3 ppm	0.0	1.0	0.0	
													GW sample 16-20

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4
PROJECT NUMBER: N9666
DRILLING COMPANY: AECS
DRILLING RIG: 6600

BORING NUMBER: P14
DATE: 8/11/04
GEOLOGIST: W.D. Osborn
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
									Blind 10 ft			0.0	0.0
8													
9							Lt gray m+f sand						
10							w/gravel		3.0			0.0	0.0
11							Lt gray f-s						
12							Gray silty clay cohesive		2.4			0.0	0.0
13							Lt gray f-s						
14									3.9				
15							Gray silty clay trace sand						
16							cohesive wood fragments @ 15.5'		3.1				

GW Sample 11-15' 04GP140 was sulfur odor

* When rock coring, enter rock brokenness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: GPT Site 4
PROJECT NUMBER: N9666
DRILLING COMPANY: ARCS
DRILLING RIG: 6600

BORING NUMBER: P15
DATE: 8 11 04
GEOLOGIST: W.D. Olson
DRILLER: D. Cobb

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
8													
9							Ltgray silty FS		Bkw to 8		0.0	0.0	0.0
10									3.7				
11							Lt gray FS w/wood debris						
12									4.4		0.0	0.0	0.0
13													
14									3.9				
15													
16					15.5		Lgray sandy clay		4.7				

GW Sample 11-15' 04GP15

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): Ø

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO 283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04-GP-45
DATE:
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample O_2	Sampler BZ LEL	Borehole** CO	Driller BZ** H_2S	PID
	1						Dark Brown Silts			20	Ø	Ø	Ø	Ø.Ø
	2						, Sand. w/ Clays							HS=1
	1													
														HS=2
	4						grey fine Sand		wet @ 4'					
	1						w/ Clays							HS=1
	6													
	1						Clay Stringer w/			20	Ø	Ø	Ø	0.0
	8						Wood Debris							HS=1
	1						Grey fine Sand							H_2S=1 6
	10						Brown Stringer @ 9'							HS=19
	1						Loss Silty Wood							
	12						Debris			20.8	Ø	Ø	Ø	0.0
	1													CO=2.
	14						grey fine							HS=9
	1						Sand.							H_2S
	16									20.8	Ø	Ø	Ø	HS=7.
	1						grey Sandy Clay							CO=2
	18						Slightly Stiff/Plastic							H_2S=0
	1													ND
	20													
	1													HS=7
	22									20.8	Ø	Ø	Ø	
	1						Same as above.							HS=3
	24													
	1													

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CT0083
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04-6P-45
DATE:
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	1						grey/Sandy/Clay/						
	26						Slightly Stiff/Plastic						
	1												
	28						T.D. = 28 ft						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG: DPT

BORING No.: 04SB26
DATE: 3-28/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	BZ PID
							Orange FS w/silt			21.0	Ø	Ø	Ø	0.0
														HS=2
2							Dk gray FS							HS=2
							w/silt							CO=1
4														HS=3
							Tan FS			20.0	Ø	Ø	Ø	0.0
6							Brown FS							HS=1
							inc. silt							
8														HS
														CO:
10							Gray FS w/silt			20.8	Ø	Ø	Ø	
							Some wood debris							CO=
12							Brown FS							HS=
														4.1=H
14										20.9	Ø	Ø	Ø	Ø.Ø
														HS=4
16							Brn FS / gray FS							CO=24
														HS=3.
18							gray sandy clay							HS=12
										20.9	Ø	Ø	Ø	0.0
20														
							Same							
22														
							gray clay							
24							TD 24'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG: DPT

BORING No.: 04SB27
DATE: 3-28-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample O_2	Sampler BZ LEL	Borehole** CO	Driller BZ** H_2S	BZ PID
							DK Brn clay & Sand			20.9	Ø	Ø	Ø	0.0
														HS=9.7
2														HS=7.
														CO=3
4							wood debris							CO=11
							tan sand stringer							VOC=8.
6							Tan FS							VOC 3.
							gray FS							H_2S
8										20.9	Ø	Ø	Ø	0.0
														CO=20
10														VOC=0.
														VOC=3.
														CO=9
12							Brown FS w/gravel							VOC=2
							wood debris							H_2S=1
14							Brown FS							VOC 1
														H_2S=
16										20.9	Ø	Ø	Ø	0.0
														CO=6
														VOC=
18							some gravel							H_2S=
														CO=3
														H_2S= VOC=5
20										20.9	Ø	Ø	Ø	0.0
							gray sandy clay							
22														
24							TD 24'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page 1 of ___

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04SB28
DATE: 3-28-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample O_2	Sample CO_2	Sampler BZ LEL	Borehole** H_2S	Driller BZ**	BZ PID
							Black silt w/rock fragments		Tan silt	21.0	0	0	0		0.0 VOC=0
2							Pre probe to 4ft		Black clay						VOC= CO=
							to clear debris		Sand w/debris						
4										21.0	0	0	0		0.2 VOC=
							obst @ 5'								
6							Pre probe to 8ft								
									wet @ 8'						
8															CO=
										21.0	0	0	0		
10									Brown FS						
									TAN FS						
12															VOC
14															VOC
										20.9	0	0	0		0.0
16									Gray FS						CO=3 VOC=7
									Clay stringers						
18									green gray FS						VOC= CO=
20															CO VOC 0.0
										21.0	0	0	0		
22															VOC= CO=
24									gray clay						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP29
DATE: 3-29/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** LEL	BZ PID
							gray silt w/sand		wet @ 3'	20.7	Ø	1	Ø	0.6
														roc=6
2														
														5.8=U
4							gray clayey sand			20.8	Ø	Ø	Ø	0.5
														VOC=11.
6							plastic							
							roots							VOC=1
8							grades to gray FS							
							gray silty FS							VOC=1
10										20.7	Ø	Ø	Ø	.0
														VOC=
12							gray FS, little							
							silt some							VOC=10
14							gray clay stringers			20.6	Ø	Ø	Ø	1.9 VOC
							wood frag.							=10.
16							gray sandy clay							VOC=
														31.3
18										20.6	Ø	Ø	Ø	VOC
														57.2
20							TD 20'							
22														

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 3.3

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP30
DATE: 3-29-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**	Header
							Brn silt w/sand		0.1	20.2	Ø	Ø	Ø	VOC= CO=2
2							gray silt sand							VOC= CO=2
4							Brn silt & clay		0.1	20.6	Ø	1	Ø	VOC= CO=1
6							gray silty sand							VOC= CO 2
8							gray FS		0.0	20.6	Ø	Ø	Ø	VOC= CO=3
10														C= CO=
12							Gray FS		0.5	20.7	Ø	1	Ø	VOC= CO=
14														CO=1 VOC=
16														
18							gray sandy clay							CO= VOC 2
20									0.1	20.8	Ø	1	Ø	
							TD 20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP31
DATE: 3-29/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks RE PID	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** (%)	
							Lt brown silt		0.0	20.8	Ø	Ø	Ø	VOC=1.
2							Dk brn silt + sand							VOC=3 CO=3
4									0.0	20.8	Ø	Ø	Ø	CO=4 VOC=7
							Gray clayey sand							
6							gray sandy clay w/orange mottling							CO 1 VOC 15
8							to gray clay		0.0	20.8	Ø	Ø	Ø	CO 7 VOC 3
							gray FS							
10														CO=6 VOC=3
12							gray FS							CO= VOC=1
									0.0	20.8	Ø	1	Ø	
14														CO=3 VOC=2
16														CO=1 VOC=1
18							gray sandy clay		0.0	20.8	Ø	Ø	Ø	CO= VOC=6
20							gray clay TD=20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP32
DATE: 3-29/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks BZ PID	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	
							Brn silt							CO = .
							↓		0.0	20.9	Ø	Ø	Ø	H_2S =
2							gray silty clay							CO = 2
							↓							VOC = 0
4														H_2S = .
							gray clay w/silt							CO = 5
														VOC = 0
6									0.0	20.9	Ø	Ø	Ø	VOC =
8														CO = 2
														VOC = 1
10														H_2S =
							gray FS w/silt		0.0	20.9	Ø	Ø	Ø	VOC = 0
							↓							H_2S =
12							gray FS							CO = 2
														VOC = 0
14									0.0	20.9	Ø	Ø	Ø	CO = 1
														VOC =
16														CO = 1
														VOC = 0
							gray clay		0.0	21.0	Ø	Ø	Ø	
18							and sandy clay							CO =
							↓ wood frags							VOC =
20							TD 20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area

Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP33
DATE: 3-29/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks: BZ PID	PID/FID Reading (ppm): Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	HEADS
							Brn clayey silt		0.0	20.9	Ø	Ø	Ø	CO=1 VOC=0
2														
														CO=1 VOC=0 H2S=2
							Tan clayey silt w/orange mottles							
4														CO VOC H2S
							wood debris		0.0	20.9	Ø	Ø	Ø	
6							gray sandy clay							CO VOC
8														CO VOC H2S
							gray FS							
10									0.0	21.6	Ø	Ø	Ø	CO VOC H2S
12														CO VOC H2S
							Some med well rnd sand		0.0	21.0	Ø	Ø	Ø	
14														CO VOC H2S
16							gray sandy clay							CO VOC H2S
18									0.0	21.0	Ø	Ø	Ø	CO VOC
20							TD 20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP34
DATE: 3-29/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks: BZ PID	PID/FID Reading (ppm): Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** VOC	Head
							Red/brown fill w/ gravel		0.0	20.9	Ø	Ø	Ø	VOC=
2							Dk gray silty sand							VOC=
4									0.0	20.9	Ø	Ø	Ø	
							Tan sandy clay							CO2= VOC=
6									0.0	20.9	Ø	Ø	Ø	CO= VOC=
8							TAN FS							H2S= CO VOC
10							Gray FS		0.0	20.9	Ø	Ø	Ø	VOC=
12														CO VOC
14									0.0	20.9	Ø	Ø	Ø	CO VOC
16														CO VOC
18							Gray sandy clay		0.0	20.9	Ø	Ø	Ø	CO VOC
20							TD = 20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP35
DATE: 3-30/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks BZPID	PID/FID Reading (ppm): Sample O_2	Sampler BZ LEL	Borehole** CO	Driller BZ** H_2S	HEAD
							Brn S: 14		1.0	20.7	Ø	2	Ø	VOC 22
							↓							
2							Rock debris							CO 2
							Black clay (Rock Dust)		2.0	20.7	1	1	Ø	VOC 16
4							Rock (brick debris)							CO 5
							black clayey sand		wet @ 5					VOC 19
6							DK gray clayey		4.0	20.6	1	1	Ø	CO 12
							sand							VOC 11
8							↓							CO
									4.8	20.6	1	1	Ø	VOC 7
10							gray clayey sand							VOC 1
							w/gravel							H_2S
12							whitish w/sand							VOC
							brn FS		5.1	20.6	1	Ø	Ø	H_2S 1
14							↓							VOC 8
														H_2S 1
16							↓							VOC 1
							↓							H_2S 1
							TAN FS, wood debris		5.3	20.6	1	Ø	Ø	32.5
18							↓							7 H
							↓							
20							TAN FS							CO 2
							some well rnd		5.2	20.6	1	Ø	Ø	VOC 11 H_2S
22							fine gravel							CO 9
														VOC 12
24							↓							
							gray sandy clay							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 1.0

up to 4.0

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04 GP35
DATE: 3-30/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
25													
26							Gray Sandy clay						
28							TD 28'						

CO 1
VOC 5

CO
VOC 2

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP36
DATE: 3-30/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks BZ PID	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	Headspace
							Tan silt		0.0	20.9	Ø	Ø	Ø	VOC 0
							↓							
2							Black sandy clay							
							wood debris							VOC
4							Tan FS		0.0	21.0	Ø	1	Ø	CO 2
														VOC 4
6							↓							
							Black sandy clay							CO 1
							w/debris		0.0	20.9	Ø	Ø	Ø	VOC 5
8							gray sand 3" loose							CO 2
							↓ Black clay							VOC 6
10							gray clayey sand							CO
									0.0	21.0	Ø	Ø	Ø	VOC 5
12							↓							CO
							gray brown FS							VOC 8
14														CO
									0.5	20.9	Ø	1	Ø	VOC 5
16														CO
							some angular gravel							VOC 6
18														CO
														VOC 9
20									0.4	20.9	Ø	Ø	Ø	CO 1
														VOC 3
														H2S
22							↓							CO
														VOC 5
24							gray sandy clay w/ wood							
							TD 24'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP37
DATE: 8-30/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks BZ PID	PID/FID Reading (ppm): Sample PC	Sampler BZ BK	Borehole** CO	Driller BZ** AS	Head Space
							Brn silt		0.0	99	Ø	Ø	Ø	VOC
							red silt							
2							TAN FS/silt							CO VOC
							w/debris		0.0	20.9	Ø	Ø	Ø	
4							Black clayey							CO VOC
							Sand w/debris		wet @ 6'					
6							wood							CO VOC
							↓		0.0	20.9	Ø	Ø	Ø	
8							DK gray sand							CO VOC
							some gravel							
10							TAN FS w/clay							CO VOC
							↓		0.0	20.9	Ø	1	Ø	
12							gray FS							CO VOC
							↓							
14							TAN FS some		0.0	20.9	Ø	Ø	Ø	CO VOC
							well round CS							
16							↓							CO VOC
									0.0	20.9	Ø	Ø	Ø	
18							some wood							CO VOC
							H_2S odor							
20							↓ Tagged clay @							X
							20', in shoe							
22							TD = 20'							
24														X

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP38
DATE: 3-30/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks BZ PID	PID/FID Reading (ppm) Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	Head
							DKBrn silt		0.0	20.9	Ø	Ø	Ø	VOC
2							Brn Clayey Sand w/gravel							
4									0.0	20.9	Ø	Ø	Ø	VOC
									wet @ 4'					VOC
6				04 GP 38 02			grey clayey FS and FS							VOC
8							Tan FS							
							some well Rd crs sand/shell @ top							VOC
10				04 GP 38 02			wood @ 10' @ 12'							VOC
12							some Clay stringers							
				04GP 3803			TAN FS		0.0	20.9	Ø	Ø	Ø	CO VOC H2S
14							wood @ 14'							CO VOC H2S
16														CO
18									0.0	20.9	Ø	Ø	Ø	VOC CO VOC
							Gray clayey Sand							
20							TD 20'							

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP39
DATE: 3-30-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	Head Space
									BZ PID	CO	H2S	CO	H2S	
							Brn silt		0.0	20.9	Ø	Ø	Ø	VOC
2							↓							
							Lt Brn clayey sand							CO
4									0.0	20.9	Ø	Ø	Ø	VOC 3
														CO
														VOC
6														H2S
							TAN FS							CO
8									0.0	20.9	Ø	Ø	Ø	VOC 11.
														H2S 1
10							Skipped							
12														
							ref. @ 13'							
14														
16														
18														
20														

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: ____

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP40
DATE: 3-31-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks: BZ PID	PID/FID Reading (ppm): Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S	Headspace
									~~0.0~~ 5.2 wet	20.8	Ø	Ø	Ø	X
														X
							Closed Barrel		5.7	20.8	Ø	Ø	Ø	CO 17 VOC 5
							Black Clay sand w/debris							
							gray FS wood debris wet @ 8							VOC LEL
														VOC 5
									6.7	20.8	Ø	Ø	Ø	LEL
							Black FS wkly							VOC
							TAN FS							Drager VOC 5
									5.8	20.8	Ø	Ø	Ø	
														VOC
						Lt	gray FS							
														VOC
							BRN FS		5.3	20.8	Ø	Ø	Ø	VOC
														X
														CO 15 VOC 23
														CO 16 VOC 2 H2S 3
							gray FS		4.3					

* When rock coring, enter rock brokeness.

gray clay in shoe

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Filter on PID damp due to humidity changed

Drilling Area Background (ppm): 5.7

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP41 / ~~HR~~
DATE: 3-31/06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ
							Brns: 10		BZ PID 0.0	Ø	Ø	Ø	Ø
2													
							Brn sandy clay w/ debris						
4													
6							well screen only						
									0.0	2.0	Ø	Ø	Ø
8				04GP41(0)									
10													
12				04GP41(2)									
									0.0	2.0	Ø	Ø	Ø
14													
16				04GP41(3)									
18									0.0	2.0	Ø	Ø	Ø
20				04GP41(4)									
22													
24									0.0	2.0	Ø	Ø	Ø

Hand

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP42
DATE: 3-31-06
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks BZ PID	PID/FID Reading (ppm): Sample O2	Sampler BZ LEL	Borehole** CO	Driller BZ** H2S
							well screen		0.0	21.0	Ø	Ø	Ø
									0.0	21.0	Ø	Ø	Ø
				04GP42D1					0.0	21.0	Ø	Ø	Ø
				04GP42D2									
									0.0	21.0	Ø	Ø	Ø
				04GP42D3									
									0.0	21.0	Ø	Ø	Ø
20							TD 20'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP43
DATE:
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks (137 PID)	PID/FID Reading (ppm): Sample O_2	Sampler BZ CH_4	Borehole** CO	Driller BZ** H_2S
									0.0	21.2	Ø	Ø	Ø
									0.0	21.0	Ø	1	Ø
									0.0	21.0	Ø	Ø	Ø
				04GP4301					0.0	21.2	Ø	Ø	Ø
				04GP4302					0.0	21.2	Ø	Ø	Ø
				04GP4303					0.0	21.2	Ø	Ø	Ø
				04GP4304									
24							TD 24'						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0.0

Remarks:

Converted to Well: Yes _____ No _____ Well I.D. #: _____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: Site 4 RI/TS
PROJECT NUMBER: N9666/CTO283
DRILLING COMPANY: Singley
DRILLING RIG:

BORING No.: 04GP44
DATE:
GEOLOGIST: Bill Olson
DRILLER: Charles Breeland

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks BZ PID	PID/FID Reading (ppm): Sample O2	Sampler BZ CO	Borehole**	Driller BZ**
									0.0	21.2	Ø	Ø	Ø
									0.0	21.2	Ø	Ø	Ø
04GP44									0.0	21.2	Ø	Ø	Ø
04GP44				04GP44									
04GP44				04GP44					0.0	21.2	Ø	Ø	Ø
				04GP44			TD 18'		0.0	21.2	Ø	Ø	Ø

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0.0

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME:
PROJECT NUMBER:
DRILLING COMPANY:
DRILLING RIG:

BORING NUMBER: 04MP01
DATE: 4-18/06
GEOLOGIST:
DRILLER:

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
BKG										PID	O_2	CO	LEL	H2S	
0'										0.0	23	1	1	4	
										0.0	22	0	0	0	
5										0.0	23.2	0	0	0	
10															
										0.0	23.3	0	0	3	04MP01 TS U
															dry tan clayey Sand
15										0.0	23.3	0	0	2	
18															

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes _____ No _____ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME:
PROJECT NUMBER:
DRILLING COMPANY:
DRILLING RIG:

BORING NUMBER: 04MP02
DATE:
GEOLOGIST:
DRILLER:

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**	
BKG										PID	O_2	CO	LEL	H_2S	
0										0.0	21.4	0	0	2	
										0.0	21.4	2	0	0	
5										0.0	21.5	1	0	1	
10										0.0	21.2	0	0	0	
								gray silty sand							04MP02 CVOC TOC
15										0.0	21.4	1	0	0	
										0.0	21.7	1	0	0	TD 18'
20															

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes X No ___ Well I.D. #: 04MP02

screened 8-18

1" riser 10' Prepack

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME:
PROJECT NUMBER:
DRILLING COMPANY:
DRILLING RIG:

BORING NUMBER: 04MP03
DATE:
GEOLOGIST:
DRILLER:

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
BKG 0'									PID	OC	BZ	CO	HCS
									0.0	22.4	Ø	Ø	Ø
									0.0	22.8	Ø	Ø	Ø
5'									0.0	22.2	Ø	Ø	Ø
10'									0.0	22.0	Ø	Ø	Ø
15'													
									0.0	23.1	1	Ø	Ø
18'													

Hard drilling

Obs - 0 12

04MP030 TOC VOC

Sample 14-1 NR Sample 16-1 ID 1981

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm):

Converted to Well: Yes ____ No ____ Well I.D. #: 04MP03

10' Prepack
3/4" riser

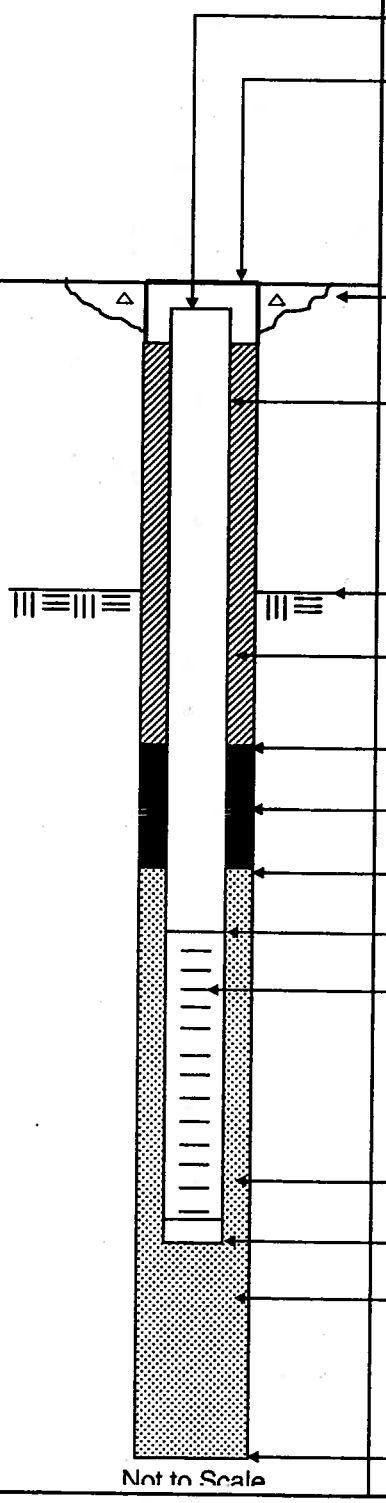
Tetra Tech NUS, Inc.

WELL No.: GPT-04-10R

MONITORING WELL SHEET

PROJECT:	GPT	DRILLING Co.:	AECS	BORING No.:	—
PROJECT No.:	112G-W9686	DRILLER:		DATE COMPLETED:	8-16-04
SITE:	Site 4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	WB-OBrien	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:	/ NA
Elevation / Height of Top of Surface Casing:	/ NA
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	FM PAD
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/ NA
Type of Backfill:	FM PAD
Elevation / Depth of Seal:	/ 1'
Type of Seal:	Bentonite
Elevation / Depth of Top of Filter Pack:	/ 2'
Elevation / Depth of Top of Screen:	/ 4'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 14
Elevation / Depth of Bottom of Filter Pack:	/ 14
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 15

Tetra Tech NUS, Inc.

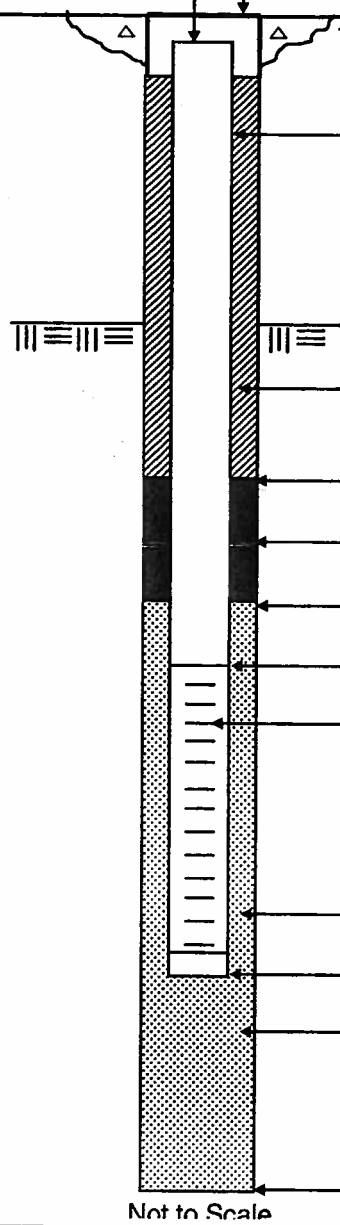
WELL No.: GPT-04-11R

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	112G-N9666	DRILLER:	Dave Oly	DATE COMPLETED:	8-17-04
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olsen	DEV. METHOD:	Swing/pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/NA
Elevation / Height of Top of Surface Casing:	/NA
I.D. of Surface Casing:	8"
Type of Surface Casing:	bolt down
Type of Surface Seal:	Fm pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/26
Type of Seal:	bentonite
Elevation / Depth of Top of Filter Pack:	/28'
Elevation / Depth of Top of Screen:	/30'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 x 5'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/35'
Elevation / Depth of Bottom of Filter Pack:	/35'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/36'

Tetra Tech NUS, Inc.

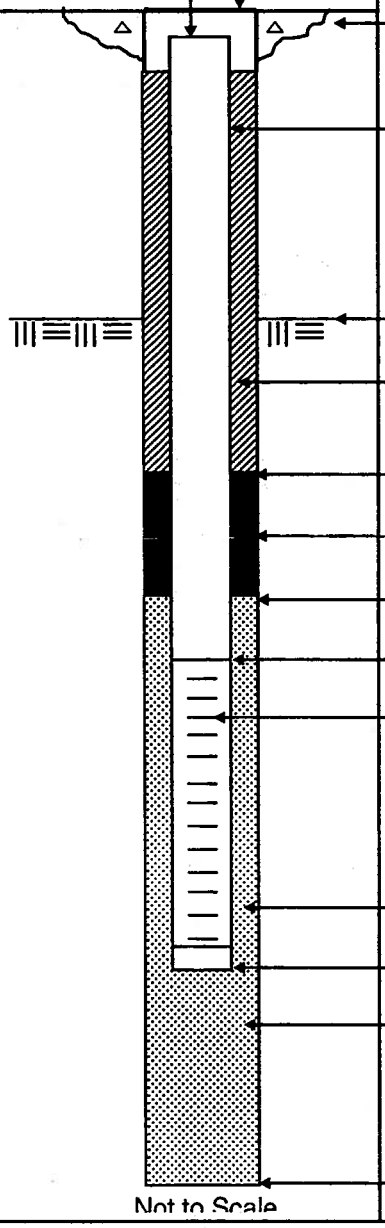
WELL No.: GPT-04-16

MONITORING WELL SHEET

PROJECT:	GPT	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	N9666	DRILLER:	D. Cobb	DATE COMPLETED:	8-14-04
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	NA
Elevation / Height of Top of Surface Casing:	NA
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	FM PAD
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA
Type of Backfill:	FM PAD
Elevation / Depth of Seal:	1
Type of Seal:	Fine Sand
Elevation / Depth of Top of Filter Pack:	2
Elevation / Depth of Top of Screen:	4
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 X 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30
Elevation / Depth of Bottom of Screen:	14
Elevation / Depth of Bottom of Filter Pack:	14
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	15

Tetra Tech NUS, Inc.

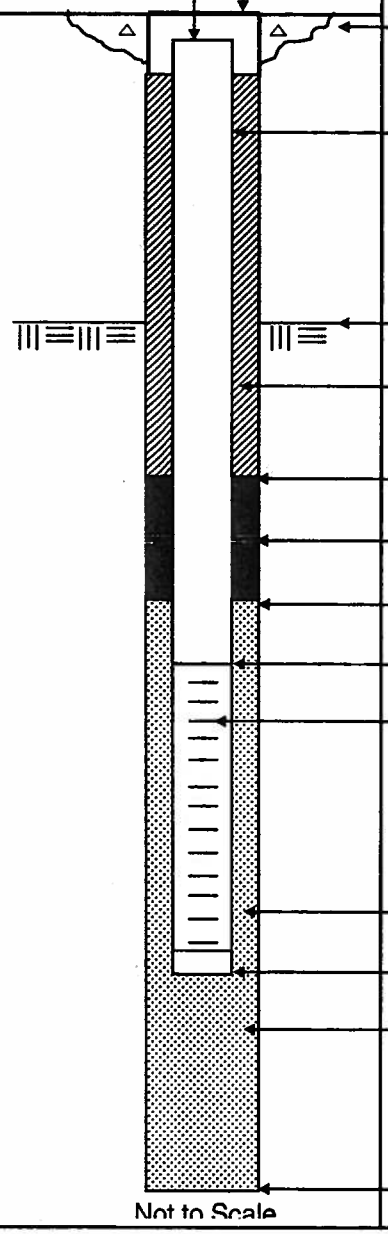
WELL No.: GPT-04-17

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	N 9666	DRILLER:	D. Cobb	DATE COMPLETED:	8-15/04
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W. D. Olsen	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

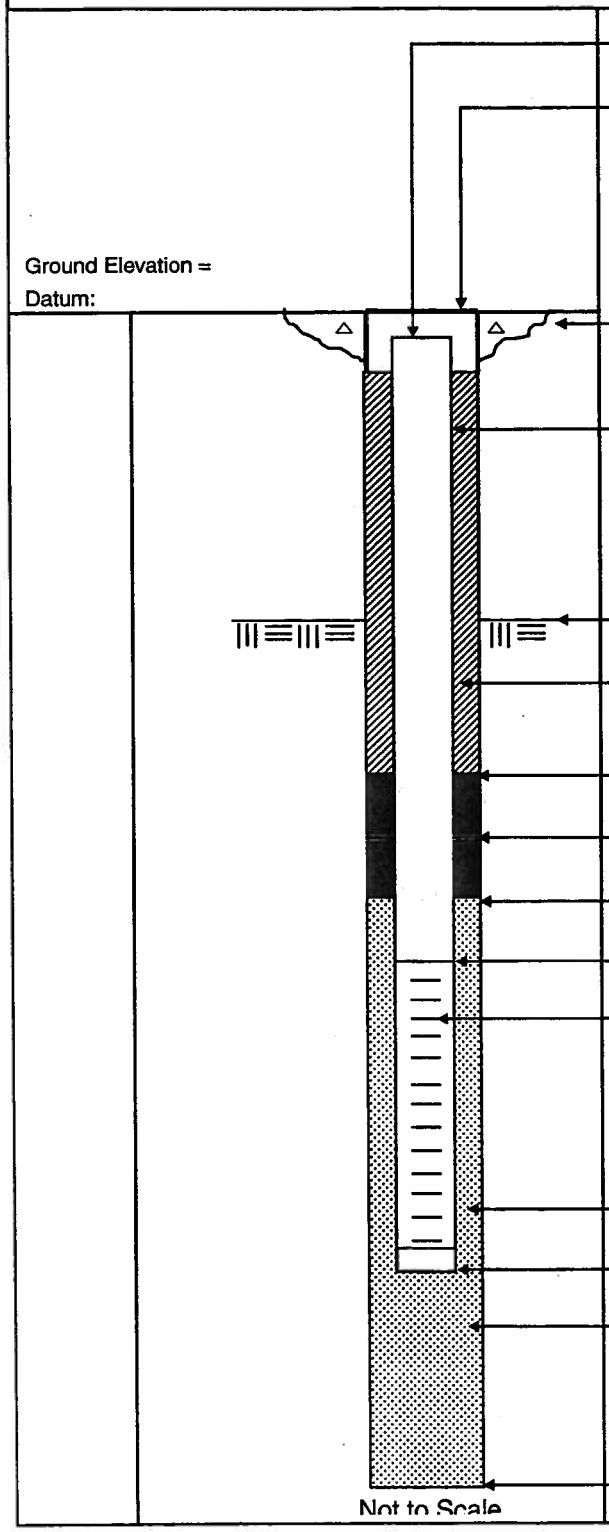
Elevation / Depth of Top of Riser:	/ NA
Elevation / Height of Top of Surface Casing:	/ NA
I.D. of Surface Casing:	8"
Type of Surface Casing:	bolt down
Type of Surface Seal:	FM pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/ NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 30'
Type of Seal:	Bentonite
Elevation / Depth of Top of Filter Pack:	/ 32'
Elevation / Depth of Top of Screen:	/ 35'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 x 5'
I.D. of Screen:	2"
Type of Filter Pack:	20/30
Elevation / Depth of Bottom of Screen:	/ 40'
Elevation / Depth of Bottom of Filter Pack:	/ 40'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 41'

Tetra Tech NUS, Inc.

WELL No.: GPT-04-18

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	N9666	DRILLER:	D. Cobb	DATE COMPLETED:	8-14-04
SITE:	H	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W. D. Olson	DEV. METHOD:	Surge/Pump	EASTING:	



Elevation / Depth of Top of Riser: / NA

Elevation / Height of Top of Surface Casing: / NA

I.D. of Surface Casing: 8"

Type of Surface Casing: Bolt down

Type of Surface Seal: FM PAD

I.D. of Riser: 2"

Type of Riser: PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: / NA

Type of Backfill: grout

Elevation / Depth of Seal: / 7

Type of Seal: bentonite

Elevation / Depth of Top of Filter Pack: / 9

Elevation / Depth of Top of Screen: / 11

Type of Screen: Sched 40 PVC

Slot Size x Length: 0.010 x 10'

I.D. of Screen: 2"

Type of Filter Pack: 20/30

Elevation / Depth of Bottom of Screen: / 21

Elevation / Depth of Bottom of Filter Pack: / 21

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: / 22'

Tetra Tech NUS, Inc.

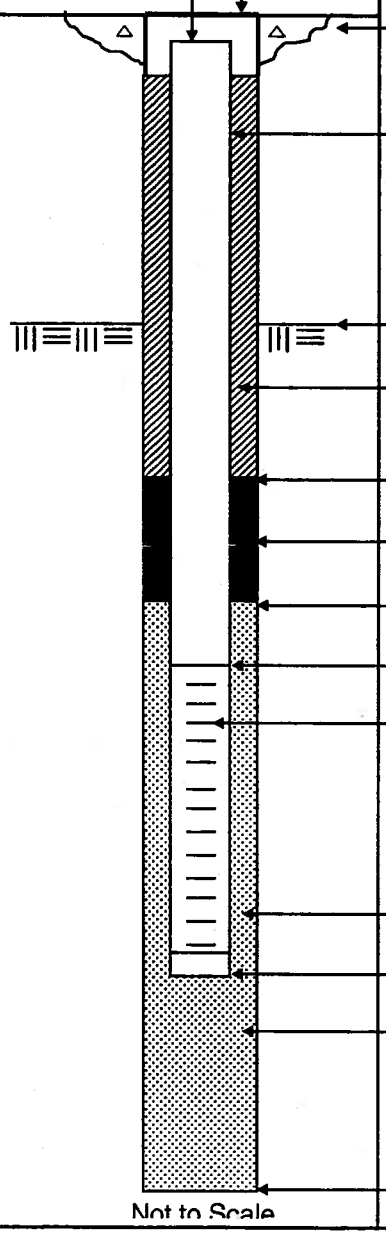
WELL No.: GPT-04-19

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	N9666	DRILLER:	D. Cook	DATE COMPLETED:	8-15/04
SITE:	H	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	N. Dixon	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

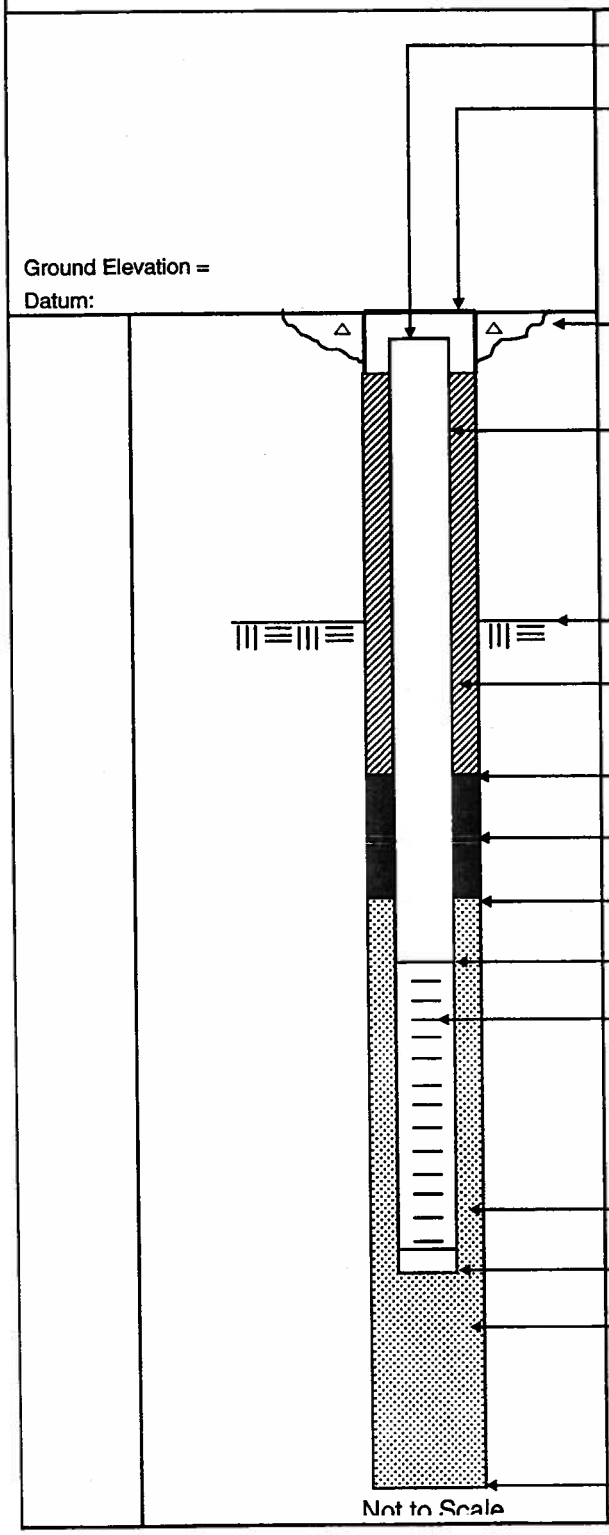
Elevation / Depth of Top of Riser:	/ NA
Elevation / Height of Top of Surface Casing:	/ NA
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	FM PAD
I.D. of Riser:	2"
Type of Riser:	PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/ NA
Type of Backfill:	Grout
Elevation / Depth of Seal:	/ 5'
Type of Seal:	Bentonite
Elevation / Depth of Top of Filter Pack:	/ 7'
Elevation / Depth of Top of Screen:	/ 9'
Type of Screen:	PVC
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30
Elevation / Depth of Bottom of Screen:	/ 19'
Elevation / Depth of Bottom of Filter Pack:	/ 19'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 20'

Tetra Tech NUS, Inc.

WELL No.: GPT-04-20

MONITORING WELL SHEET

PROJECT:	GPT R1	DRILLING Co.:	AECS	BORING No.:	
PROJECT No.:	N9666	DRILLER:	D. Cobb	DATE COMPLETED:	8-17-04
SITE:	H	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olsen	DEV. METHOD:	Surge/Purge	EASTING:	



Elevation / Depth of Top of Riser: / NA

Elevation / Height of Top of Surface Casing: / NA

I.D. of Surface Casing: 8"

Type of Surface Casing: bolt down

Type of Surface Seal: FM PAD

I.D. of Riser: 2"

Type of Riser: PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: / NA

Type of Backfill: grout

Elevation / Depth of Seal: / 25'

Type of Seal: bentonite

Elevation / Depth of Top of Filter Pack: / 27'

Elevation / Depth of Top of Screen: / 30'

Type of Screen: PVC

Slot Size x Length: 0.010 x 5'

I.D. of Screen: 2"

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 35'

Elevation / Depth of Bottom of Filter Pack: / 35'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: / 36'

Tetra Tech NUS, Inc.

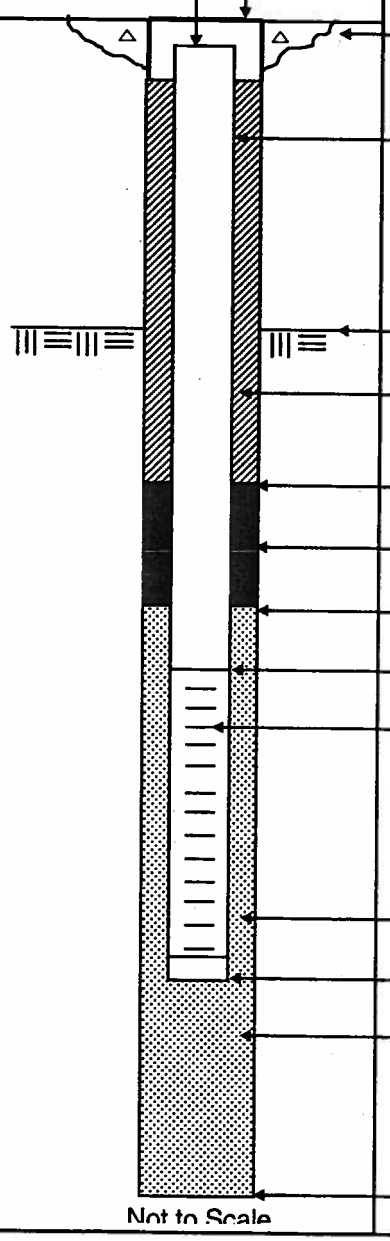
WELL No.: GPT-04-21

MONITORING WELL SHEET

PROJECT:	GPT Site 4 RI	DRILLING Co.:	Singley	BORING No.:	—
PROJECT No.:	N9666	DRILLER:	G. Breslau	DATE COMPLETED:	4-11-06
SITE:	Site 4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	2'Ø Rnd pad
I.D. of Riser:	2"
Type of Riser:	Sched. 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 2'
Type of Seal:	Enviroplug med.
Elevation / Depth of Top of Filter Pack:	/ 4'
Elevation / Depth of Top of Screen:	/ 6'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 X 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 SFM
Elevation / Depth of Bottom of Screen:	/ 16'
Elevation / Depth of Bottom of Filter Pack:	/ 16'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 16'

Tetra Tech NUS, Inc.

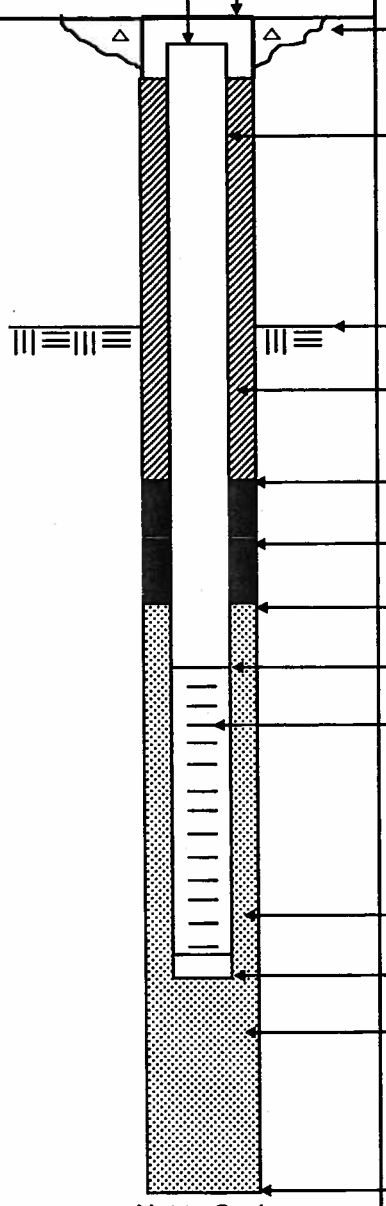
WELL No.: GPT-04-22

MONITORING WELL SHEET

PROJECT:	GPTRI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	8-11/06
SITE:	Site 4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/
I.D. of Surface Casing:	8"	
Type of Surface Casing:	Bolt down	
Type of Surface Seal:	2' ϕ Pad	
I.D. of Riser:	2"	
Type of Riser:	Sched 40 PVC	
Borehole Diameter:	8"	
Elevation / Depth Top of Rock:		/NA
Type of Backfill:	grout	
Elevation / Depth of Seal:		/15'
Type of Seal:	Envirophlg ned.	
Elevation / Depth of Top of Filter Pack:		/~~13~~ ~~15~~ 17'
Elevation / Depth of Top of Screen:		/~~14~~ ~~17~~ 19'
Type of Screen:	Sched 40 PVC	
Slot Size x Length:	0.010 X 10'	
I.D. of Screen:	2"	
Type of Filter Pack:	20/30 SFM	
Elevation / Depth of Bottom of Screen:		/24'
Elevation / Depth of Bottom of Filter Pack:		/24'
Type of Backfill Below Well:	N/A	
Elevation / Total Depth of Borehole:		/24'

Tetra Tech NUS, Inc.

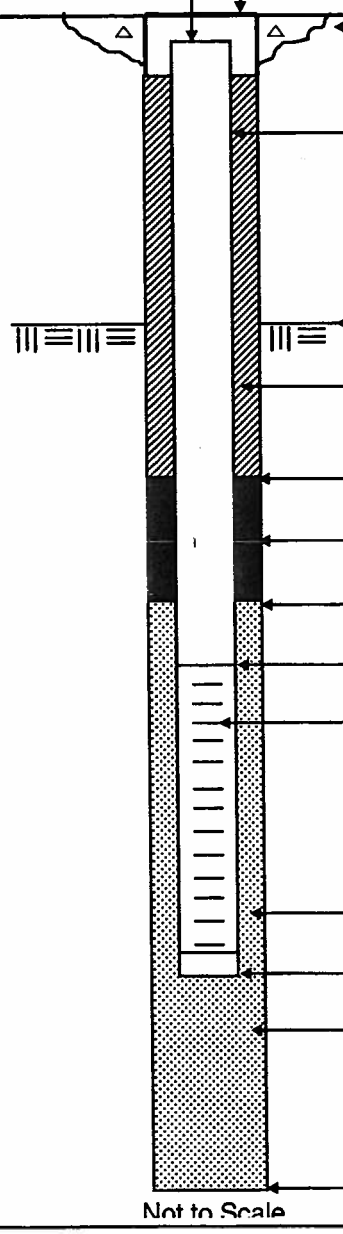
WELL No.: GPT-04-24

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-11/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /

I.D. of Surface Casing: 8"

Type of Surface Casing: Bolt down

Type of Surface Seal: 2' ϕ Pad

I.D. of Riser: 2"

Type of Riser: Schad 40 PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: NA / NA

Type of Backfill: grout

Elevation / Depth of Seal: /2'

Type of Seal: Enviroplug med.

Elevation / Depth of Top of Filter Pack: /4'

Elevation / Depth of Top of Screen: /6'

Type of Screen: Schad. 40 PVC

Slot Size x Length: 0.010 X 10'

I.D. of Screen: 2"

Type of Filter Pack: 20/30 SFM

Elevation / Depth of Bottom of Screen: /16'

Elevation / Depth of Bottom of Filter Pack: /16'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: /16'

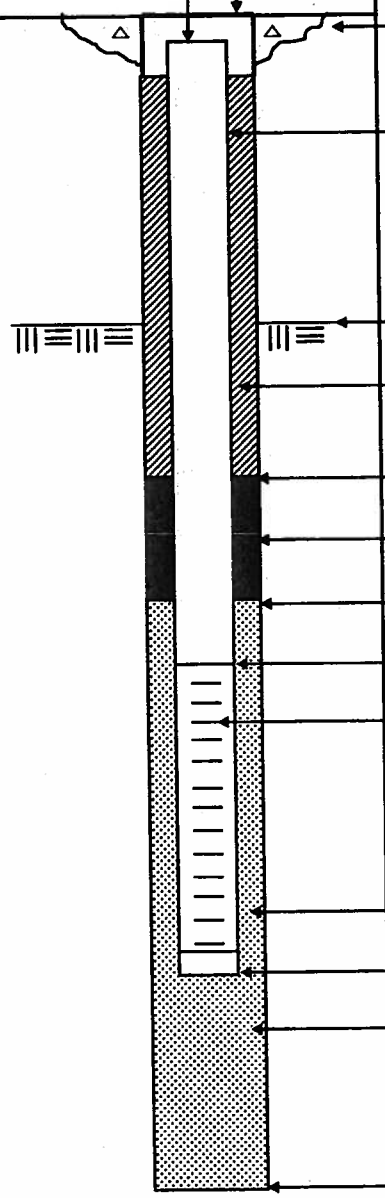
a Tech NUS, Inc.

WELL No.: G-PT-04-25

MONITORING WELL SHEET

	GPT RI	DRILLING Co.:	Singley	BORING No.:	
No.:	N 9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-11/06
	4	DRILLING METHOD:	HSA	NORTHING:	
ST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

d Elevation =
:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	2' Ø Pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 pvc
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 2'
Type of Seal:	enviroplug med.
Elevation / Depth of Top of Filter Pack:	/ 4'
Elevation / Depth of Top of Screen:	/ 6'
Type of Screen:	Sched 40 pvc
Slot Size x Length:	0.010 X 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 SFM
Elevation / Depth of Bottom of Screen:	/ 16'
Elevation / Depth of Bottom of Filter Pack:	/ 16'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 16'

Tetra Tech NUS, Inc.

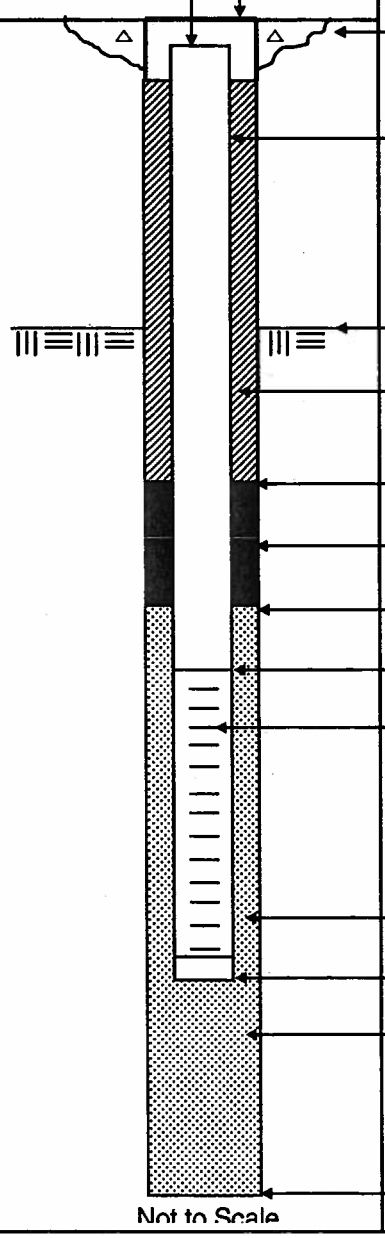
WELL No.: GPT-04-26

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-11/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W. A. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	2' Ø Pad
I.D. of Riser:	2"
Type of Riser:	Schd 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 23
Type of Seal:	Enviroplug med.
Elevation / Depth of Top of Filter Pack:	/ 25
Elevation / Depth of Top of Screen:	/ 28
Type of Screen:	Schd. 40 PVC
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 SRM
Elevation / Depth of Bottom of Screen:	/ 38'
Elevation / Depth of Bottom of Filter Pack:	/ 38'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 38'

Tetra Tech NUS, Inc.

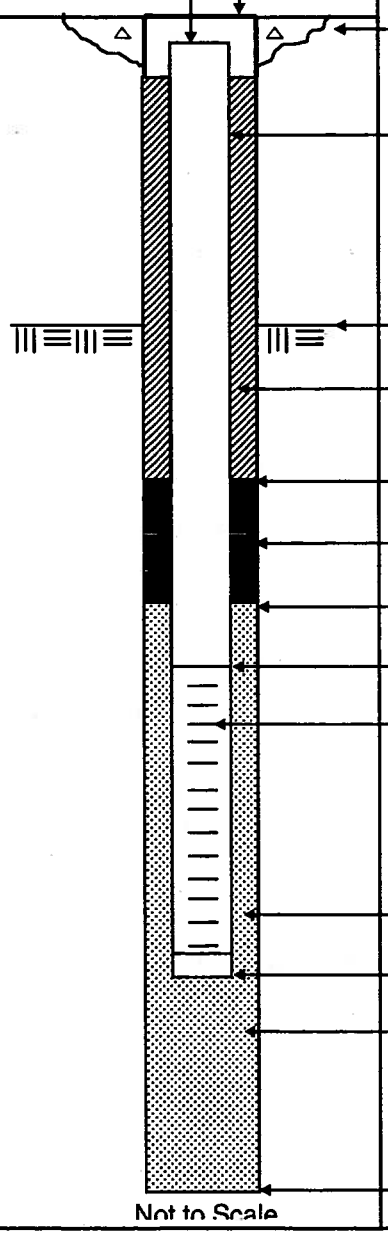
WELL No.: GPT-04-27

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-12/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	2' ϕ Pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 1'
Type of Seal:	Enviroplug med.
Elevation / Depth of Top of Filter Pack:	/ 3'
Elevation / Depth of Top of Screen:	/ 5'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 X 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 SFM
Elevation / Depth of Bottom of Screen:	/ 15'
Elevation / Depth of Bottom of Filter Pack:	/ 15'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 15'

Tetra Tech NUS, Inc.

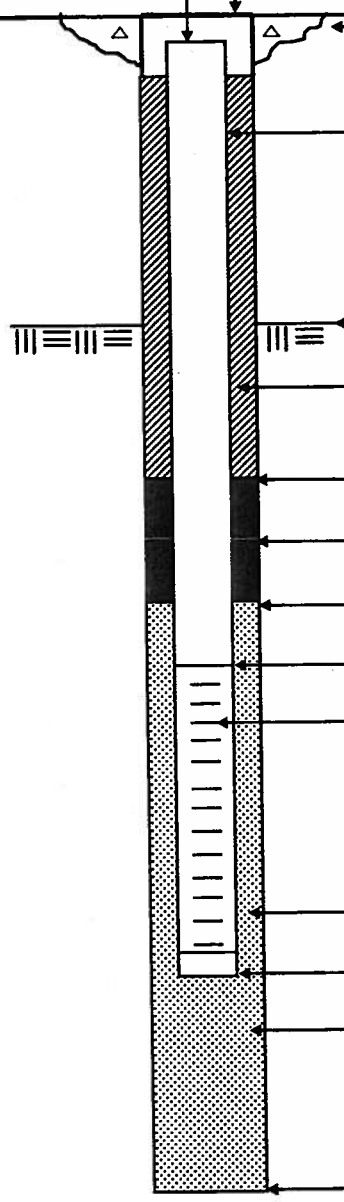
WELL No.: GPT-04-28

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-12/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

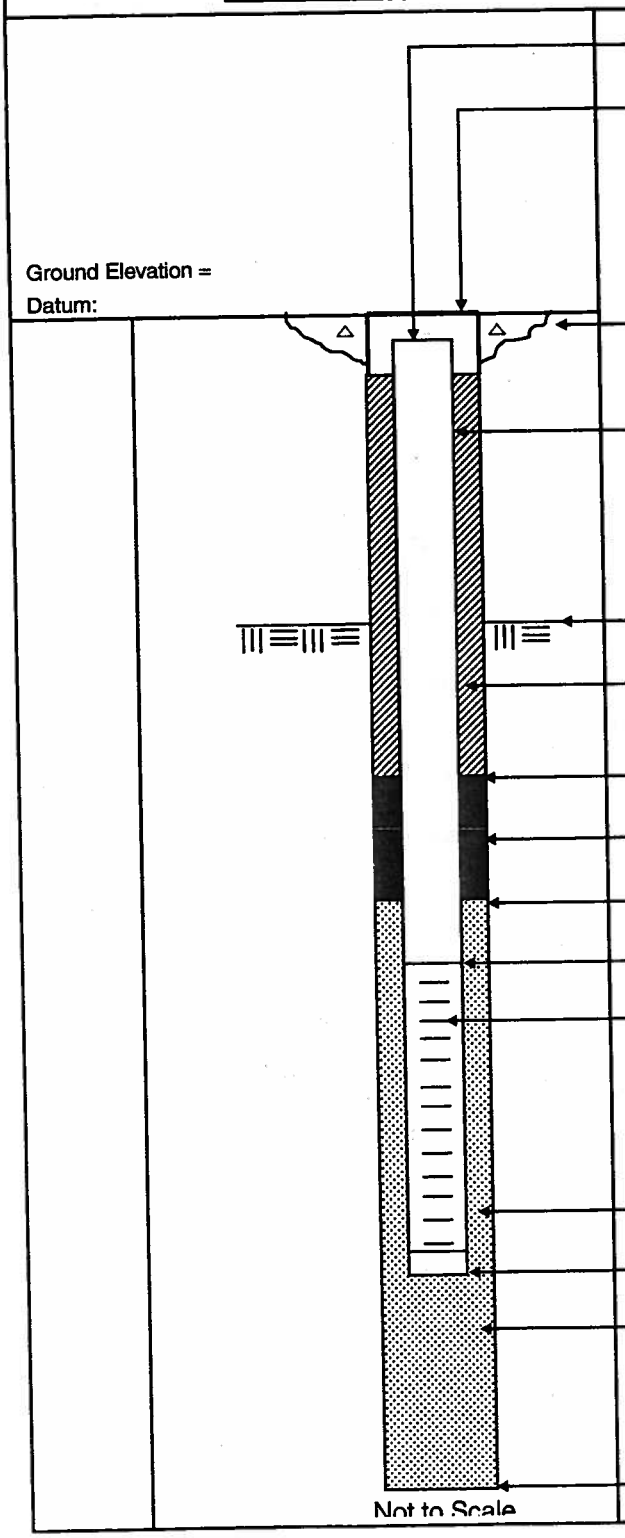
Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt down
Type of Surface Seal:	2' ϕ Pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 2'
Type of Seal:	Envirosplug med.
Elevation / Depth of Top of Filter Pack:	/ 4'
Elevation / Depth of Top of Screen:	/ 6'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 16'
Elevation / Depth of Bottom of Filter Pack:	/ 16'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 16'

Tetra Tech NUS, Inc.

WELL No.: GPT-04-29

MONITORING WELL SHEET

PROJECT:	GPT RI	DRILLING Co.:	Singleys	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	3-12/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /

I.D. of Surface Casing: 8"

Type of Surface Casing: Bolt down

Type of Surface Seal: 2' ϕ Pad

I.D. of Riser: 2"

Type of Riser: Sched 40 PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: NA / NA

Type of Backfill: grout

Elevation / Depth of Seal: /21'

Type of Seal: Envirosplug med.

Elevation / Depth of Top of Filter Pack: /23'

Elevation / Depth of Top of Screen: /25'

Type of Screen: Sched 40 PVC

Slot Size x Length: 0.010 X 10'

I.D. of Screen: 2"

Type of Filter Pack: 20/30 BFM

Elevation / Depth of Bottom of Screen: /35'

Elevation / Depth of Bottom of Filter Pack: /35'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: /35'

Tetra Tech NUS, Inc.

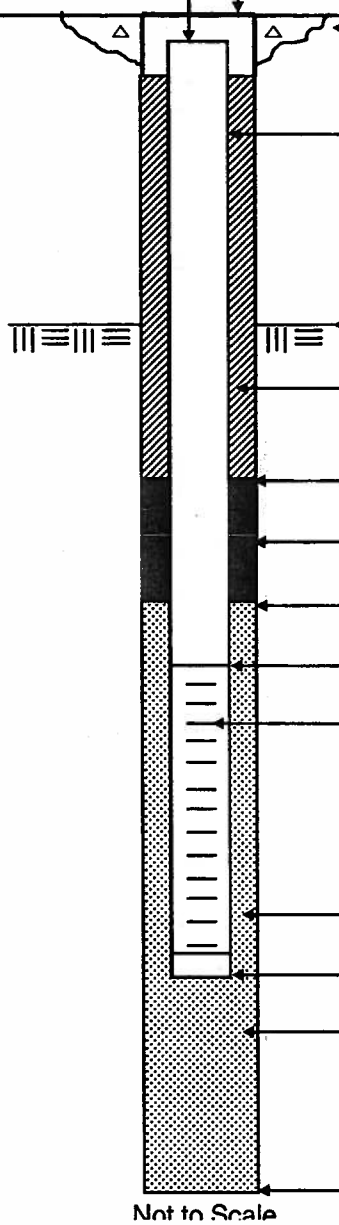
WELL No.: GPT-04-30

MONITORING WELL SHEET

PROJECT:	GPT 4 RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	W9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-12/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surged Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	Bolt Down
Type of Surface Seal:	2' Ø Pad
I.D. of Riser:	2"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	grout
Elevation / Depth of Seal:	/ 1'
Type of Seal:	Envirophlug med.
Elevation / Depth of Top of Filter Pack:	/ 3'
Elevation / Depth of Top of Screen:	/ 5'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 SAM
Elevation / Depth of Bottom of Screen:	/ 15'
Elevation / Depth of Bottom of Filter Pack:	/ 15'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 15'

Tetra Tech NUS, Inc.

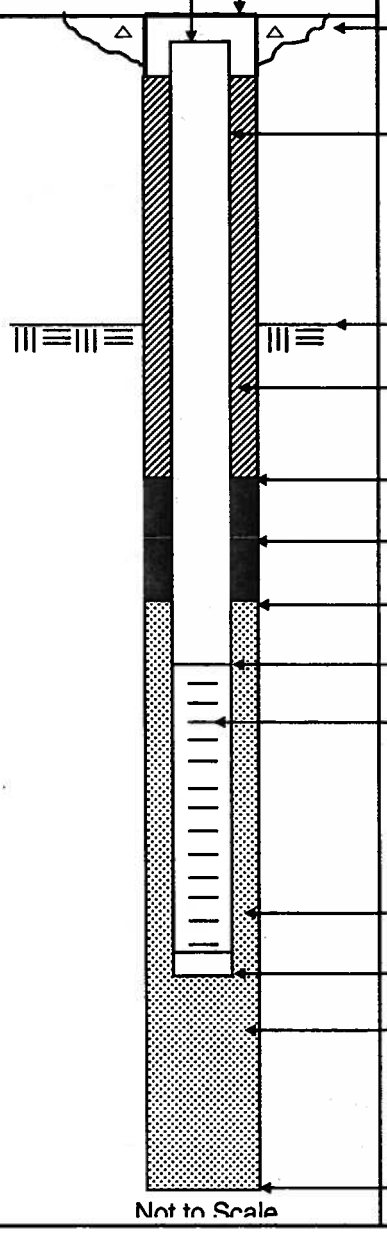
WELL No.: GFT-04-MP01

MONITORING WELL SHEET

PROJECT:	GFT 4 RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	W9666	DRILLER:	G. Brejard	DATE COMPLETED:	4-13/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	NA
Type of Surface Casing:	NA
Type of Surface Seal:	NA
I.D. of Riser:	3/4"
Type of Riser:	Sched 40 pvc
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / Rock
Type of Backfill:	Natural / 20/30 Sand
Elevation / Depth of Seal:	/ 3'
Type of Seal:	Enviroplug Med.
Elevation / Depth of Top of Filter Pack:	/ 6'
Elevation / Depth of Top of Screen:	/ 8'
Type of Screen:	PVC prepack
Slot Size x Length:	10'
I.D. of Screen:	1"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 18'
Elevation / Depth of Bottom of Filter Pack:	/ 18'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 18'

2' stick up

2" PVC to 3' over riser

Tetra Tech NUS, Inc.

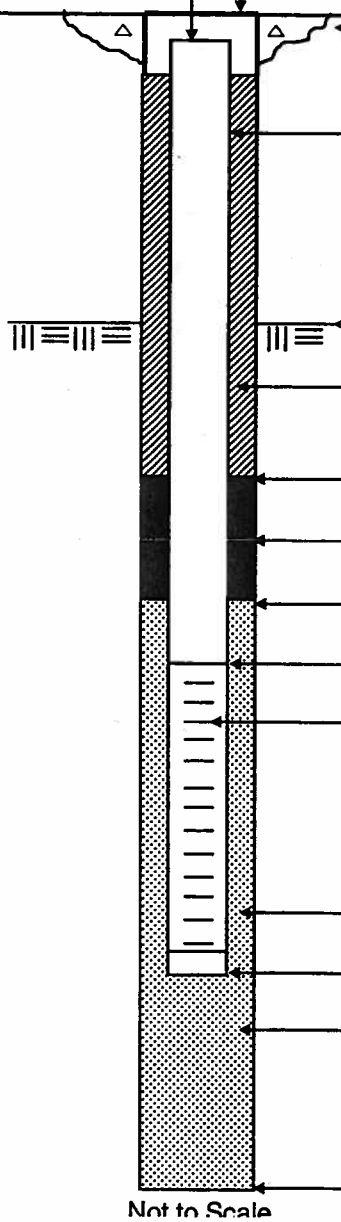
WELL No.: GPT-04-MP2

MONITORING WELL SHEET

PROJECT:	GPT 4 RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-13/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge Purge	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	2' Stick up /
I.D. of Surface Casing:	2"
Type of Surface Casing:	PVC
Type of Surface Seal:	NA
I.D. of Riser:	1"
Type of Riser:	Sched 40 PVC
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	NA / NA
Type of Backfill:	Natural / 20/30 Sand
Elevation / Depth of Seal:	/ 3'
Type of Seal:	Enviroplug med.
Elevation / Depth of Top of Filter Pack:	/ 6'
Elevation / Depth of Top of Screen:	/ 8'
Type of Screen:	Sched 40 PVC
Slot Size x Length:	10'
I.D. of Screen:	1"
Type of Filter Pack:	Prepack 20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 18'
Elevation / Depth of Bottom of Filter Pack:	/ 18'
Type of Backfill Below Well:	NA
Elevation / Total Depth of Borehole:	/ 18'

Tetra Tech NUS, Inc.

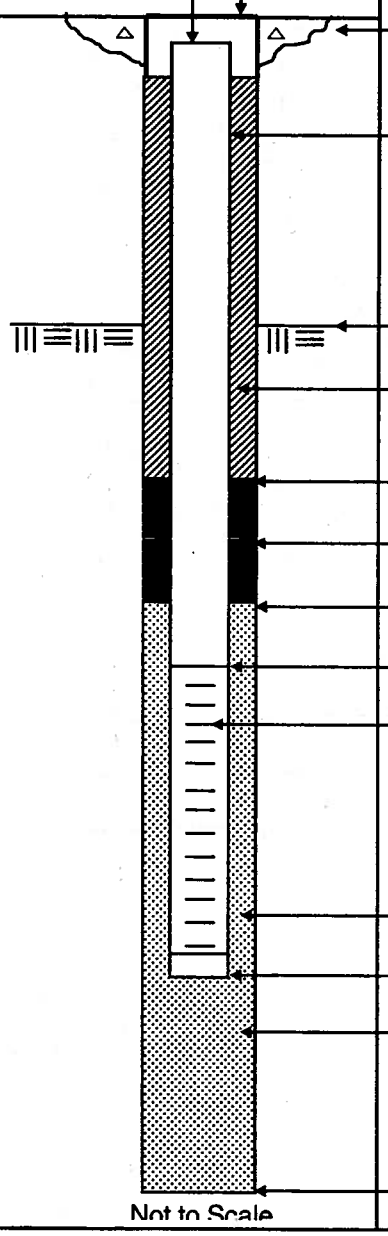
WELL No.: GPT-04 MP03

MONITORING WELL SHEET

PROJECT:	GPT 4 RI	DRILLING Co.:	Singley	BORING No.:	
PROJECT No.:	N9666	DRILLER:	G. Breeland	DATE COMPLETED:	4-13/06
SITE:	4	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Pump	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser: / 2" stick up

Elevation / Height of Top of Surface Casing: 2" PVC to 3' /

I.D. of Surface Casing: 2"

Type of Surface Casing: PVC

Type of Surface Seal: NA

I.D. of Riser: 3/4"

Type of Riser: Sch 40 PVC

Borehole Diameter: 8"

Elevation / Depth Top of Rock: NA / NA

Type of Backfill: Natural

Elevation / Depth of Seal: / 3'

Type of Seal: Envirodrop med.

Elevation / Depth of Top of Filter Pack: / 6'

Elevation / Depth of Top of Screen: / 8'

Type of Screen: PVC Prepack

Slot Size x Length: 10'

I.D. of Screen: 3/4"

Type of Filter Pack: Prepack 20/30 Sand

Elevation / Depth of Bottom of Screen: / 18'

Elevation / Depth of Bottom of Filter Pack: / 18'

Type of Backfill Below Well: NA

Elevation / Total Depth of Borehole: / 18'

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NCBC GULFPORT
Project No.: N9666
Location: Site 4 R1
Personnel: W.D. Olson
Weather Conditions:
Measuring Device: Keck WL
Tidally Influenced: Yes ___ No X
Remarks:

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
~~MW 8~~ MW 11	9/22/04	1531	~~24.13~~ 21.96	44.94	3.58		~~20.55~~	
11R		1536		35.20	4.95			Tubing stripped down
10R		1538		13.92	3.49			
15		1542	21.02	14.79	2.11		18.91	
20		1547		35.25	2.27			
17		1550		39.55	2.68			
16		1552		23.60	2.16			
18		1554		20.92	7.21			
13		1556	27.28	33.90	8.08		19.20	
14		1558	27.26	15.21	6.95		20.31	
12		1604	27.94	16.41	7.77		20.17	
19		1607		19.38	7.55			
9		1611	28.44	28.68	7.08		21.36	

*All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: GULFPORT Site 4 RI
Project No.: N9666
Location: Site 4
Personnel: W.D. Olson
Weather Conditions:
Measuring Device: Keck W41
Tidally Influenced: Yes ___ No X
Remarks:

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
mw 9	9/8	1030	28.44	25.69	7.31	—		PID 0.0
mw 11B	~~11/8~~	1035		3.94	35.20	—		PID 2.7
10R		1040		3.71	13.73	—		0.5 ppm
15		1047	26.02	2.40	14.79	—		0.0 ppm
20		1053		2.29	35.27	—		0.2 ppm
17		1100		2.69	39.55	—		0.0 ppm
16		1106		2.42	13.60	—		10.5 ppm 0.1 B7
18		1112		7.44	20.96	—		0.5 ppm
13		1120	27.28	8.55	33.90	—		0.0 ppm
14		1128	27.26	7.19	15.21	—		0.0 ppm
12		1132	27.94	8.15	16.43	—		0.0 ppm
19		1140		7.77	18.40	—		0.0 ppm

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW0801
Sample Location: GPT-04-08
Sampled By: WBO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 0945								
Method:								

PURGE DATA:

Date: 9/22/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	IN, T	6.69	19	22.9	18	1.52	-56	0742
Monitor Reading (ppm): 0.7	5	6.61	19	22.6	34	0.00	-57	0810
Well Casing Diameter & Material	10	6.54	20	22.4	21	0.00	-54	0835
Type: 2" PVC	15	6.51	19	22.4	23	0.00	-53	0910
Total Well Depth (TD): 44.94	20	6.51	19	22.4	23	0.00	-52	0935
Static Water Level (WL): 3.63	21	6.47	19	22.4	24	0.00	-52	0940
One Casing Volume (gal/L): 6.60								
Start Purge (hrs): 0740								
End Purge (hrs): 0940								
Total Purge Time (min): 120								
Total Vol. Purged (gal/L): 21								

@600
DDB.7
10.0
10.72
11.23

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3 / NaOH	1x500mL / 1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
TOC	H2SO4	2x 40mL	

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES:

Field Test Kit Results

Dissolved Oxygen	0.3
Ferrous Iron	3.4
Hydrogen Sulfide	0.1
Carbon Dioxide	18
Alkalinity	13
~~Sulfide~~	

Slug of V. turbid water initially
Turb appears to be rising high
water is clear

44.94
3.63
41.31

4.13
2.06
.41
6.60

Circle if Applicable.

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW0901
Sample Location: MW09
Sampled By: WOO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. µS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date: 9/8/04								
Time: 1315								
Method: Low Flow	Clear	4.77	15	23.2	—	0.22	91	1315

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Date: 9/8/04									
Method: Low Flow	IN.T	5.00	17	23.5	130	5.59	119	1205 0.5	DD7
Monitor Reading (ppm): 0.0	1 gal	4.90	16	23.4	94	3.87	115	1217	DD7.4
Well Casing Diameter & Material Type: 2"	2 gal	4.82	17	23.3	96	2.30	105	1225	DD7.0
	3 gal	4.77	16	23.2	110	1.55	102	1233	DD7.
Total Well Depth (TD): 25.69	5 gal	4.76	15	23.2	116	0.85	99	1247	DD7.4
Static Water Level (WL): 7.31	7 gal	4.77	15	23.1	100	0.32	93	1300	1300
One Casing Volume(gal/L): 2.94	9 gal	4.77	15	23.2	99	0.22	91	1310	DD7.0
Start Purge (hrs): 1200									
End Purge (hrs): 1310									
Total Purge Time (min): 70									
Total Vol. Purged (gal/L): 9									

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/~~7000A~~ - TAL Metals/~~CN~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
only on CW collected			

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	~~0.4~~ 0.2 mg/L	Turbidity not working
Ferrous Iron	1.8 mg/l	copper cap
Hydrogen Sulfide	0.1 mg/L	water is crystal
Carbon Dioxide	12.5 mg/L	clear w/ slight
Alkalinity	≤1000	yellowish cast
~~Sulfide~~		

turned bright red, stayed red @ all 3 ranges

25.69
7.31
18.38

1.84
.92
.18
2.94

Circle if Applicable:
MS/MSD
Duplicate ID No.:

Signature(s): Matt D. Der

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1001
Sample Location: GPT.04-10R
Sampled By: WMO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date:								
Time: 1100								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 9/9/04								
Method: Low Flow	INIT	8.15	76	24.7	150	3.78	-210	1012
Monitor Reading (ppm): 2.0	1.5	8.45	70	24.7	52	1.27	-303	1027
Well Casing Diameter & Material	3.0	8.41	70	24.7	34	1.10	-316	1035
Type: 2"	4.0	8.41	70	24.7	23	0.93	-322	1043
Total Well Depth (TD): 13.73	4.5	8.40	69	24.7	19	0.81	-325	1047
Static Water Level (WL): 3.79	5.0	8.37	69	24.7	12	0.63	-327	1052
One Casing Volume (gal/L): 1.5	5.5	8.36	69	24.7	9	0.53	-327	1055
Start Purge (hrs): 1010								
End Purge (hrs): 1055								
Total Purge Time (min): 45								
Total Vol. Purged (gal/L): 5.5								

DD 3.
500
375
DD3.
DD3.
DD3.9
DD 3.
DD3.
DD3.9

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/~~Cal~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
7000A CN	NaOH	1X 250ml	YES/NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	1 mg/L	Sulfur odor	13.73	.99
Ferrous Iron	0.8 mg/L	H_2S = 3 ppm	3.79	.50
Hydrogen Sulfide	5 mg/L (max range)	from Purge bucket	9.94	.01
Carbon Dioxide	12 mg/L	water turns black		1.50
Alkalinity	16 mg/L			
~~Sulfide~~				

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name:
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1101
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date:								
Time: 1220								
Method:	Clear							

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 9/8/04								
Method: Low Flow	INIT	6.01	27	24.2	65	1.78	-77	1107
Monitor Reading (ppm): 0	5	5.93	25	23.2	210	0.34	-69	1145
Well Casing Diameter & Material	10	6.00	22	23.0	75	1.58	-59	1220
Type: 2" PVC	15	6.00	22	22.9	98	0.19	-58	1247
Total Well Depth (TD): 35.20	14.5	6.02	22	23.0	210	0.18	-57	1252
Static Water Level (WL): 3.95	15	6.03	22	23.0	200	0.18	-37	1257
One Casing Volume (gal/L): 4.9								
Start Purge (hrs): 1105								
End Purge (hrs): 1200								
Total Purge Time (min): 115								
Total Vol. Purged (gal/L): 15								

375 ml
DO 5.15
DO 14.
DO 17.
DO 18.
DO 18
DO 18.

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/~~7000A~~ - TAL Metals/~~CN~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
7009 CN	NaOH	1x250ml Poly	yes/no

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES:

Field Test Kit Results

Dissolved Oxygen	0.2 mg/L
Ferrous Iron	~~13mm~~ 5.2 mg/L
Hydrogen Sulfide	0.3 mg/L
Carbon Dioxide	16 mg/L
Alkalinity	13 mg/L
Sulfide	

Turb not working

38.20
3.95
31.25

3.1
1.5
.3
4.9

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1201
Sample Location: GPT-04-12
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: / Time: / Method:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time

PURGE DATA:

Date: 9/14/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	IN it	7.15	0.19	24.6	2	0.99	-98	0740
Monitor Reading (ppm): 0.0	1	7.16	0.18	24.6	7	0.51	-107	0748
Well Casing Diameter & Material	2	7.06	0.17	24.1	10	0.17	-102	0756
Type: 2" PVC	3	7.08	0.17	24.0	13	0.10	-106	0804
Total Well Depth (TD): 16.43	4	7.08	0.17	24.1	12	0.45	-109	0812
Static Water Level (WL): 8.09	5	7.09	0.17	24.0	10	1.07	-119	0820
One Casing Volume(gal/L): 1.33								
Start Purge (hrs): 0740								
End Purge (hrs): 0820								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 5								

Rem
500m
DO 10.
DO 11.4
DO 11.3
DO 11.

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements		Collected
SW-846 8260B - VOCs	HCL	2 X	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 X	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	2 X	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 X	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 X	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/Cd	HNO3	2 X	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 X	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2 X	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 X	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2 X	2-1L Amber	YES / NO
7000A CN	NaOH	4 X	1 X 250ml Poly	Y/N

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.6 mg/L	
Ferrous Iron	0.9 mg/L	
Hydrogen Sulfide	> 5.0 mg/L blew through top	
Carbon Dioxide	11 mg/L	
Alkalinity	<10 mg/L	
~~Sulfide~~		

water turns dark on exposure to air
WOO
~~Domestic~~
DO probe may have gone out indicated by risen DO

16.43	.83
8.09	.42
8.34	.08
	1.33

Circle if Applicable:

MS/MSD	Duplicate ID No.:
For CN	04GW1201D

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1301
Sample Location: GPT-04-13
Sampled By: WOD
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date:								
Time: 0950								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Date: 9/22/04									
Method: Low Flow	INIT	8.76	80	22.7	10	6.94	-64	0758	45gal DD9.
Monitor Reading (ppm): 1.1	4	8.60	0.12	22.9	19	0.52	-58	0834	DD9.
Well Casing Diameter & Material	8	8.44	0.13	23.0	11	3.69	-45	0910	10.2
Type: 2" PVC	12	8.36	0.12	23.1	15	5.12	-40	0940	10.3
Total Well Depth (TD): 33.90	13	8.34	0.12	23.1	17	5.31	-38	0946	10.21
Static Water Level (WL): 8.07									
One Casing Volume(gal/L): 4.13									
Start Purge (hrs): 0755									
End Purge (hrs): 0946									
Total Purge Time (min):									
Total Vol. Purged (gal/L): 13									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3 / NaOH	1 X 500mL 1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
TOC	H2SO4	2 X 40ml	

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	3.0 / 3.0 mg/L	
Ferrous Iron	9.8 / 9.2 mg/L	
Hydrogen Sulfide	0.0 / 0.0 mg/L	
Carbon Dioxide	11 / 11 mg/L	
Alkalinity	11 / 11.5 mg/L	
~~Sulfide~~		

~~100% of well removed when well opened~~

33.90
8.07
25.83

2.58
1.29
.26
4.13

Circle if Applicable:

MS/MSD

Duplicate ID No.: Dup of Field NA Parents

Signature(s): Matt Olson

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1401
Sample Location: 04GW1401
Sampled By: WDO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date:								
Time: 0835								
Method:								

PURGE DATA

Date: 9/22/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Method: Low Flow	INIT	8.74	0.14	24.5	4	0.46	-74	0807	500mL
Monitor Reading (ppm): 0.0	1	8.69	0.14	25.1	8	0.24	-69	0815	DDB.
Well Casing Diameter & Material	2	8.72	0.14	24.9	8	0.10	-73	0823	DD10.
Type: 2" PVC	3	8.68	0.14	24.5	10	0.35	-68	0831	DD11.7
Total Well Depth (TD): 15.21									DD12.
Static Water Level (WL): 7.79									
One Casing Volume(gal/L): 1.18									
Start Purge (hrs): 0805									
End Purge (hrs): 0831									
Total Purge Time (min): 26									
Total Vol. Purged (gal/L): 3									

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.8 ~~ppm~~ mg/L
Ferrous Iron	2.6 mg/L
Hydrogen Sulfide	0.1 mg/L
Carbon Dioxide	10.5 mg/L
Alkalinity	11 mg/L
Sulfide	

100% LEL Reading when well opened

Well purged dry during sampling reduced flow rate

Total Well Depth	15.21
Static Water Level	7.79
	7.42

.74	
.37	
.07	
1.18	

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1501
Sample Location: GPT-04-15
Sampled By: WBD
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 0910								
Method:								

PURGE DATA:

Date: 9/10/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	DD
Method: Low Flow	IW IT	7.60	59	25.6	130	5.03	-97	0832	500ml
Monitor Reading (ppm): 0.0	2	7.61	81	25.2	11	1.80	-127	0842	2.66
Well Casing Diameter & Material	4	7.54	79	25.2	1	1.18	-130	0852	2.67
Type: 2" PVC	5	7.52	78	25.2	-2	0.91	-132	0858	2.67
Total Well Depth (TD): 14.79	6	7.49	78	25.3	-3	0.63	-133	0902	
Static Water Level (WL): 2.52									
One Casing Volume(gal/L): 1.97									
Start Purge (hrs): 0830									
End Purge (hrs): 0905									
Total Purge Time (min): 35									
Total Vol. Purged (gal/L): 6									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/~~7000A~~ - TAL Metals/~~Sb~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
7000A CN	NaOH	2 x 250 ml poly	Y/N

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	1.0 mg/L
Ferrous Iron	5.2 mg/L
Hydrogen Sulfide	0.5 mg/L
Carbon Dioxide	11.5 mg/L
Alkalinity	12 mg/L
~~Sulfide~~	

14.79
2.52
12.27

1.23
.62
.12
1.97

Circle if Applicable.

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 A
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1601
Sample Location: GPT-04-16
Sampled By: WAO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Time: 0915	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Time
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Method:	INIT	6.54	0.12	25.2	250	1.10	-43	0830	500ml
Monitor Reading (ppm):	2	6.44	0.12	25.2	66	11.46	-53	0842	DD 2.
Well Casing Diameter & Material	4	6.40	0.13	25.2	85	14.94	-54	0853	DD 2.
Type:	5	6.37	0.12	25.2	89	16.03	-53	0859	DD 2.
Total Well Depth (TD): 13.60	6	6.39	0.13	25.3	34	14.01	-52	0905	DD 2.
Static Water Level (WL): 2.30	7	6.36	0.13	25.3	49	14.24	-52	0911	DD. 2.
One Casing Volume (gal/L): 1.79									
Start Purge (hrs): 0830									
End Purge (hrs): 0911									
Total Purge Time (min): 41									
Total Vol. Purged (gal/L): 7									

Rem

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/~~7000A~~ TAL Metals/~~CN~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
7000A CN	NaOH	1x250ml Poly	Y/N

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.3 mg/L
Ferrous Iron	8.0 mg/L
Hydrogen Sulfide	1.0 mg/L
Carbon Dioxide	11 mg/L
Alkalinity	10 mg/L
~~Sulfide~~	

Turb. not working correctly, when is clean, D.O. not working properly

13.60	1.13
2.30	.55
11.30	.11
	1.79

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1701
Sample Location: GPT-04-17
Sampled By: WBO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1125								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method:	IWIT	7.66	31	24.0	680	4.23	-106	0822
Monitor Reading (ppm):	5	7.76	32	23.5	740	0.76	-176	0919
Well Casing Diameter & Material	10	7.55	30	23.7	500	0.58	-161	1000
Type:	15	7.40	29	23.6	220	0.34	-145	1048
Total Well Depth (TD): 39.55	16	7.44	29	23.5	180	0.00	-146	1100
Static Water Level (WL): 2.63	17	7.44	29	23.5	240	0.00	-146	1110
One Casing Volume (gal/L): 5.59	18	7.45	29	23.6	260	0.00	-145	1120
Start Purge (hrs): 0818	~~19~~							
End Purge (hrs): 1120	~~20~~							
Total Purge Time (min): 122								
Total Vol. Purged (gal/L): 18								

Comm
Hom
DD 7.
DD 7.
DD 8.
DD. 8.

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/~~7060~~ - TAL Metals/~~CN~~	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
70004 CN	NaOH	1 x 250ml Poly	Y/N

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.3 mg/L
Ferrous Iron	3.4 mg/L
Hydrogen Sulfide	0.1 mg/L
Carbon Dioxide	18 mg/L
Alkalinity	14 mg/L
~~Sulfide~~	

Turbidity Erratic
Other Params
Stable

39.55	3.49
2.63	1.75
34.92	.35
	5.59

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 R1
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1801
Sample Location: GPT-04-18
Sampled By: WDO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 0950								
Method:								

PURGE DATA:

Date: 9/21/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Method: Low Flow	IN IT	6.17	62	23.7	49	2.58	-90	0852	500ml/
Monitor Reading (ppm): 0.4	2	6.37	57	23.6	27	3.23	-184	0905	DD 7.8
Well Casing Diameter & Material Type: 2" PVC	4	6.22	56	23.7	19	6.33	-184	0917	DD7.3
	6	6.05	57	23.7	21	7.83	-170	0929	DD7.4
Total Well Depth (TD): 20.96	7	5.96	57	23.7	16	8.27	-160	0935	DD 7.4
Static Water Level (WL): 7.19	7.5	5.91	56	23.7	18	8.60	-154	0941	DD7.4
One Casing Volume (gal/L): 2.21	8	5.88	56	23.7	18	8.82	-151	0947	DD7.4
Start Purge (hrs): 0849									
End Purge (hrs): 0947									
Total Purge Time (min): 58									
Total Vol. Purged (gal/L): 8									

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3 /NaOH	1x250 1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
TOC	H_2SO_4		

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.8 mg/L
Ferrous Iron	0.8 mg/L
Hydrogen Sulfide	>5 mg/L
Carbon Dioxide	12 mg/L
Alkalinity	14 mg/L
~~Sulfide~~	

Strong Sulfur odor
H_2S 1ppm on
purge bucket
D.O. meter malfunctioning

20.96	1.38
7.19	.69
13.77	.14
	2.21

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature]

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4 RI
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1901
Sample Location: GPT-04-19
Sampled By: WAO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Date:								
Time: 1245								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Date: 9/21/04									
Method: Low Flow	INIT	6.64	61	26.3	7	1.08	-114	1141	Sound
Monitor Reading (ppm): 0.0	2	6.31	61	26.3	15	0.08	-113	1157	DD 8.
Well Casing Diameter & Material	4	6.24	60	26.3	49	0.02	-115	1210	DD 8.
Type: 2" PVC	5	6.24	60	26.3	56	0.00	-116	1217	DD 8.1
Total Well Depth (TD): 18.40	5.5	6.22	59	26.3	56	0.00	-116	1221	DD 8.
Static Water Level (WL): 7.61									
One Casing Volume (gal/L): 1.73									
Start Purge (hrs): 1140									
End Purge (hrs): 1221									
Total Purge Time (min): 41									
Total Vol. Purged (gal/L): 5.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals/CN	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.6 ppm
Ferrous Iron	5.2 mg/L
Hydrogen Sulfide	0.0 mg/L
Carbon Dioxide	13.5 mg/L
Alkalinity	12 mg/L
~~Sulfide~~	

LBC 65% open well
Turbidity from matrix
is high, water is clear
water turns orange

18.40	1.08
7.61	.54
10.79	.11
	1.73

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: GPT Site 4
Project No.: W9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW2001
Sample Location: GPT-04-26
Sampled By: LMD
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1055								
Method:								

PURGE DATA:

Date: 9/10/04	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	DD
Method: Low Flow	2W 1T	6.52	37	23.9	75	1.47	-104	0828	400m
Monitor Reading (ppm): 0.1	5	6.49	33	23.5	130	0.36	-82	0905	18.2
Well Casing Diameter & Material	10	6.43	33	23.5	46	0.14	-79	0940	27.8
Type: 2" PVC	15	6.39	31	24.6	~10	0.64	-76	1052	29.5
Total Well Depth (TD): 35.27									
Static Water Level (WL): 2.17									
One Casing Volume (gal/L): 5.29									
Start Purge (hrs): 0825									
End Purge (hrs): 1052									
Total Purge Time (min): 147									
Total Vol. Purged (gal/L): 15									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - VOCs	HCL	3 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs	4degC	2 - 1L Amber	YES / NO
USEPA 300.0 - Anions (NO3/NO2/SO4/SO3/Cl-)	4degC	1 - 1L HDPE	YES / NO
SW-846 8081A - TCL PEST	4degC	2 - 1L Amber	YES / NO
SW-846 8082 - TCL PCBs	4degC	2 - 1L Amber	YES / NO
SW-846 6010B/7000A - TAL Metals	HNO3	1-250mL HDPE	YES / NO
SW-846 8151B - Appx IX Chlor Herb.	4degC	2 - 1L Amber	YES / NO
SW-846 8141 (sub to STL - Pitt) - Appx IX OP PEST	4degC	2-1L Amber	YES / NO
AM20GAx (bubble strip) - Hydrogen/Light Gases	4degC	2 - 40 ml TSP/ 1 gas vial	YES / NO
SW-846 8290 - Dioxins/Furans	4degC	2-1L Amber	YES / NO
7000A CN	NaOH	1x250mL Poly	Y/N

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	0.3 mg/L
Ferrous Iron	6 mg/L
Hydrogen Sulfide	0.1 mg/L
Carbon Dioxide	15 mg/L
Alkalinity	12 mg/L
Sulfide	

Turb not working
water is clear

35.27
2.17
33.10

3.31
1.65
.33
5.29

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 RI
Project No.: N9666

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Sample ID No.: 04MW1202
Sample Location: MW-12
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 4/1/06 Time: 1535 Method: peristaltic	clear	6.87	2.01	21.6	7.0	0.00	0.1	-200

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other ORP
Date: 4/1/6 Method: peristaltic	Initial	6.93	2.07	21.6	34.3	0.53	0.1	-151
Monitor Reading (ppm): 0	1st	6.88	2.03	21.4	29.2	0.00	0.1	-162
Well Casing Diameter & Material Type: 2 PVC	2nd	6.86	2.03	21.4	10.2	0.00	0.1	-174
	3rd	6.87	2.01	21.6	7.0	0.00	0.1	-200
Total Well Depth (TD): 16.45								
Static Water Level (WL): 9.50								
One Casing Volume (gal/L): 1.1								
Start Purge (hrs): 1510								
End Purge (hrs): 1535								
Total Purge Time (min): 25								
Total Vol. Purged (gal/L): 3.3								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL VOA	3

OBSERVATIONS / NOTES:

16.45
9.50
6.95
.16
3780
695

1,0730

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4- Golfpar
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW13-02
Sample Location: GPT-04-03
Sampled By: CD
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity~~ ORP (mV)	Other Tim
Date: 9/11/06								
Time: 1545								
Method: low flow	clear	6.72	1.48	21.31	15.8	1.48	-116	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Time	
Date: 9/11/06									SWL
Method: low flow	2.5	6.61	1.48	20.79	45.8	0.89	-110	1520	9.04
Monitor Reading (ppm): Ø	5.0	6.72	1.47	21.16	34.2	2.64	-119	1525	10.54
Well Casing Diameter & Material	7.5	6.67	1.46	20.95	26.3	1.05	-116	1530	11.16
Type: 2.0" PVC	10.0	6.72	1.48	21.31	15.8	1.48	-116	~~1540~~	
Total Well Depth (TD): 15.15	12.5							~~1550~~ 1555	
Static Water Level (WL): 7.45	15.0							~~1545~~ 1600	
One Casing Volume(gal/L): 4.68									
Start Purge (hrs): 1515									
End Purge (hrs): 1540									
Total Purge Time (min): 25									
Total Vol. Purged (gal/L): 10.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	2x 40 mls glass vial	Y

OBSERVATIONS / NOTES:

well was purged below readable by water level indicator, but still produced water -

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Site 4 - Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW14-02
Sample Location: GPT-04-14
Sampled By: C. Dixon
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 4-13-06								
Time: 0931								
Method: low flow	Clear	6.18	.931	22.22	0.0	0.42	-84	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Time	SWL
Date: 4-13-06									
Method: low flow	10L	6.10	.637	22.02	0.0	0.64	-77	0810	10.26
Monitor Reading (ppm): Ø	15L	6.12	.817	22.22	0.0	0.54	-77	0820	10.68
Well Casing Diameter & Material Type: 2.0" PVC	30L	6.16	.902	22.13	0.0	0.45	-80	0850	11.2[illegible]
	40L	6.17	.914	22.20	0.0	0.42	-83	0910	10.8[illegible]
Total Well Depth (TD): 34.82	42.5	6.17	0.921	22.20	0.0	0.43	-83	0915	10.8[illegible]
Static Water Level (WL): 8.39	45.0	6.18	.923	22.20	0.0	0.41	-83	0920	10.79
One Casing Volume(gal/L): 16.07	47.5	6.18	0.930	22.16	0.0	0.41	-84	0925	10.74
Start Purge (hrs): 0750	50.0	6.18	.931	22.22	0.0	0.42	-84	0930	10.72
End Purge (hrs): 0930									
Total Purge Time (min): 100									
Total Vol. Purged (gal/L): 50.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3x40 mL glass vials	Y

OBSERVATIONS / NOTES:

3 well volumes ≈ 48.21

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 RI
Project No.: 9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MW1~~5~~02
Sample Location: ~~MW-14~~ GP-04-14
Sampled By:
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 4/11/06 Time: 1130 Method: peristaltic	clear	6.55	1.60	20.50	6.6	0.57	0.1	-89

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~ ORP
Date: 4/11/06 Method: peristaltic	Initial	6.34	1.75	20.16	96.7	2.19	0.1	-50
Monitor Reading (ppm): Ø	R	6.40	1.63	20.13	17.6	~~[illegible]~~	0.1	-74
Well Casing Diameter & Material						0.55	~~[illegible]~~	
Type: 2" PVC	2nd	6.46	1.54	20.13	3.2	0.47	0.1	-82
Total Well Depth (TD): 14.75	3rd	6.55	1.60	20.50	6.6	0.57	0.1	-89
Static Water Level (WL): 2.62								
One Casing Volume(gal/L): 1.94								
Start Purge (hrs): 1036								
End Purge (hrs): 1130								
Total Purge Time (min): 54								
Total Vol. Purged (gal/L): ~6 gal								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Vial	3
~~Sulfide~~			
~~Diss. Fe~~	~~HNO3~~		
~~Tot. Fe~~	~~HNO3~~		
~~Anions~~			

OBSERVATIONS / NOTES:

14.75
2.62
12.13
.16
12.78
12.13

1.9408

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NCBC Gulfport - Site 4 RI/TS
Project No.: N9666/CTO283

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW1602
Sample Location: Site 4
Sampled By: J. Bourgeois/B. Olson
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 3/30/06								
Time: 1430								
Method: low flow	Clear	6.31	1.09	20.4	103	1.30	0.04	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 3/30/06	Initial	6.97	1.15	20.6	999	1.96	0.05	500 mL/min
Method: low flow	1st	6.12	.815	20.5	250	1.97	0.03	400 mL/min
Monitor Reading (ppm): Ø	2nd	6.13	.847	20.5	141	1.14	0.03	400 mL/min
Well Casing Diameter & Material Type: 2" PVC	3rd	6.31	1.09	20.4	103	1.30	0.04	400 mL/min
Total Well Depth (TD): 13.60								
Static Water Level (WL): 2.33								
One Casing Volume (gal/L): 1.8								
Start Purge (hrs): 1349								
End Purge (hrs): 1430								
Total Purge Time (min): 41								
Total Vol. Purged (gal/L): 5.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Glass Vial	3
Anions, Ortho	Ice	500 mL Plastic	1
Diss Fe	HNO_3	250 mL Plastic	1
Total Fe	HNO_3	250 mL Plastic	1
~~Sulfate~~ Sulfide	Zn Acetate	250 mL Plastic	1
TOC			
Hydrogen			
Volatile Fatty Acids (VFA)			
Dissolved Gases			
~~Bubble Strip~~			
Baseline Microbial Community Analysis			

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 - Gulfport
Project No.: N4666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MW1702
Sample Location: GPT-04-17
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 4/13/06 Time: 1145 Method: low flow	clear	6.70	.177	22.2	11.9	0.00	.01	-137

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other ORP	WL
Date: 4/13/06 Method: low flow	Initial	6.84	.279	21.4	999	3.34	.01	-130	3.35
Monitor Reading (ppm): Ø	1st	6.70	0.18	21.8	193	0.00	.01	-148	5.39
Well Casing Diameter & Material Type: 2" PVC	2nd	6.67	.190	22.2	59.4	1.34	.01	-133	7.68
	3rd	6.70	.177	22.2	13.4	0.00	.01	-137	6.70
Total Well Depth (TD): 39.55	4th	6.71	.177	22.2	12.3	0.00	.01	-135	6.71
Static Water Level (WL): 2.65	5th	6.70	.177	22.2	11.9	0.00	.01	-137	6.70
One Casing Volume(gal/L): 5.8									
Start Purge (hrs): 0817									
End Purge (hrs): 1135									
Total Purge Time (min): 198									
Total Vol. Purged (gal/L): 240									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40 mL VOA	3

OBSERVATIONS / NOTES:

39.55
2.65
3690
.16
21540
3690

5.8440

300 mL/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

3482

15:15

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Site 4 - Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MW2002
Sample Location: GPT-04-20
Sampled By: C. John
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity~~ ORP	~~Other~~ Sal
Date: 4/11/06								
Time: 1255								
Method: low flow	Clear	6.69	.253	21.9	7	0.0	-152	2.52

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Sal	Time
Date: 4/11/06									
Method: low flow	2.0	6.68	.275	21.9	15	0.0	-147	2.51	1005
Monitor Reading (ppm): Ø	4.5	6.68	.269	21.9	11	0.0	-149	2.52	1010
Well Casing Diameter & Material Type: 2.0" PVC	2.0	6.69	.252	21.9	9	0.0	-152	2.52	1015
	9.5	6.69	.253	21.9	7	0.0	-152	2.52	1020
Total Well Depth (TD): 39.92									
Static Water Level (WL): 2.50									
One Casing Volume(gal/L): 22.74L									
Start Purge (hrs): 1000									
End Purge (hrs): 1020									
Total Purge Time (min): 20									
Total Vol. Purged (gal/L): 9.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
~~Gross Alpha~~			
~~Total Rad~~			
~~Gamma~~			
CVOC	HCl	40mL VOA	3

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: Gulfport NCBC site 4
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW21-01
Sample Location: MW21
Sampled By: C. Day
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ SWL
Date: 4-21-06								
Time: 0840								
Method: peristaltic	clear	6.82	1.857	21.82	7.6	0.49	-110.3	12.15

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Time	SWL
Date: 4-21-06									
Method: peristaltic	6.0 L	6.89	1.867	21.68	60.0	0.89	-119.2	0813	12.15
Monitor Reading (ppm): 0	9.5 L	6.89	1.871	21.96	18	0.86	-112.8	0823	11.15
Well Casing Diameter & Material	14.52	6.85	1.863	21.80	10	0.47	-113.8	0833	12.07
Type: 2.0" PVC	16.0 L	6.84	1.860	21.81	8.5	0.49	-111.3	0836	12.05
Total Well Depth (TD): 16.51	17.5	6.82	1.857	21.82	7.6	0.49	-110.3	0839	12.15
Static Water Level (WL): 8.55									
One Casing Volume(gal/L): 4.84									
Start Purge (hrs): 0803									
End Purge (hrs): 0839									
Total Purge Time (min): 36									
Total Vol. Purged (gal/L): 17.5 L									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

3 well volumes = 14.52

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Gulfport NCBC site 1
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW22-01
Sample Location: MW22
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ SWL
Date: 4-21-06								
Time: 0955								
Method: peristaltic	clear	5.75	.916	22.56	2.4	0.44	-19.1	10.56

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ DRP	~~Other~~ Time	SWL
Date: 4-21-06									
Method: peristaltic	5.0L	5.81	1.065	22.36	10	0.97	17.1	0902	9.89
Monitor Reading (ppm): Ø	15.0L	5.75	.961	22.25	3.7	0.80	2.5	0922	10.35
Well Casing Diameter & Material	25.0L	5.75	.928	22.37	2.5	0.43	-13.8	0942	10.54
Type: 2" PVC	27.5	5.75	.924	22.54	2.1	0.42	-17.0	0947	10.55
Total Well Depth (TD): 24.40	30.0	5.75	.916	22.56	2.4	0.44	-19.1	0952	10.56
Static Water Level (WL): 9.19									
One Casing Volume(gal/L): 9.24									
Start Purge (hrs): 0852									
End Purge (hrs): 0952									
Total Purge Time (min): 60									
Total Vol. Purged (gal/L): 30.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

3 well volumes = 27.74 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 RI/TS
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04GW2301
Sample Location: MW-23
Sampled By: SB/CO
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Date: 7/20/06								
Time: 1400								
Method: peristaltic								

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 7/20/06	Initial	6.18	.220	24.18	999	19.99	0.0	-1
Method: peristaltic	1st	6.4	.220	24.12	999	19.99	0.0	-12
Monitor Reading (ppm): Ø	2nd	6.18	.219	24.00	999	19.99	0.0	-33
Well Casing Diameter & Material Type: 2" PVC	3rd	6.17	.218	23.99	999	19.99	0.0	-45
Total Well Depth (TD): 37.73								
Static Water Level (WL): 13.33								
One Casing Volume(gal/L): 3.9								
Start Purge (hrs): 1148								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40mL Vial x3	✓

OBSERVATIONS / NOTES:

37.73
-13.33
24.40
x .16
3.9

* Resampled on 07/28/06 @ 1530, samples lost by FedEx.

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 - Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW24-01
Sample Location: GPT-04-24
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity (%)~~ ORP	Other
Date: 4-20-06								
Time: 1610								
Method: low flow	clear	6.90	2.827	21.10	5.9	11.96	-280.8	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ T.S	
Date: 4/20/06									SWL
Method: low flow	3.0	6.92	2.820	21.07	26.0	11.94	-280.2	1545	8.0
Monitor Reading (ppm): Ø	9.0	6.90	2.824	21.07	23	12.10	-280.4	1555	8.02
Well Casing Diameter & Material	15.0	6.90	2.826	21.10	11	11.85	-281.2	1605	8.04
Type: 2.0" PVC	16.5	6.90	2.827	21.10	5.9	11.96	-280.9	1608	8.03
Total Well Depth (TD): 16.30									
Static Water Level (WL): 7.59									
One Casing Volume(gal/L): 5.29									
Start Purge (hrs): 1535									
End Purge (hrs): 1608									
Total Purge Time (min): 33									
Total Vol. Purged (gal/L): 16.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40mL VOA	3

OBSERVATIONS / NOTES:

3 well volumes = 15.89 L
Chem cfs DO = <1

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Site 4-Gulfport
Project No.: N9666

Sample ID No.: 04MW2501
Sample Location: GPT-04-25-01
Sampled By: JB
C.O.C. No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ ORP
Date: 4/21/06								
Time: 0815								
Method: low flow	clear	6.41	.596	20.26	5.90	2.71	N/A	-75.5

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~ORP~~ Other
Date: 4/21/06								
Method: low flow	Initial	6.67	1657	20.25	60.1	2.43		-64.3
Monitor Reading (ppm): Ø	1st	6.46	1624	20.06	16.4	2.95		-71.3
Well Casing Diameter & Material	2nd	6.40	1595	20.06	6.46	2.70		-76.1
Type: 2" PVC	3rd	6.41	1596	20.26	5.90	2.71		-75.5
Total Well Depth (TD): 15.86								
Static Water Level (WL): 2.90								
One Casing Volume(gal/L): 2.1								
Start Purge (hrs): 0740								
End Purge (hrs): ~~0748~~ 0815								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): ~6.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40 mL VOA	3

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Site 4, Gulfport
Project No.: N9666

Sample ID No.: 04MW2601
Sample Location: GTP-MW26
Sampled By: JB
C.O.C. No.:

[ ] Domestic Well Data
[x] Monitoring Well Data
[ ] Other Well Type:
[ ] QA Sample Type:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ ORP
Date: 4/21/06								
Time: 1005								
Method: low flow	clear	6.66	203	22.24	54.4	0.73	N/A	-346.1

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~ ORP
Date: 4/21/06								
Method: low flow	Initial	7.29	~~[illegible]~~	22.03	999	2.56	N/A	-107.2
Monitor Reading (ppm): 0			283					
Well Casing Diameter & Material	1st	6.81	223	22.06	143	2.34		-152.7
Type: 2" PVC	2nd	6.69	206	22.05	87.9	0.91		-150.2
Total Well Depth (TD): 38.02	3rd	6.66	203	22.24	54.4	0.73		-346.1
Static Water Level (WL): 2.80								
One Casing Volume(gal/L): 5.6								
Start Purge (hrs): 0820								
End Purge (hrs): 1000								
Total Purge Time (min): 80								
Total Vol. Purged (gal/L): ~17								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40mL VOA	3

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: Gulfport NCBC site 4
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW27-01
Sample Location: MW27
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity~~ ORP (%)	~~Other~~ SWL
Date: 4-21-06								
Time: 1105								
Method: peristaltic	clear	6.40	1.525	21.08	6.1	0.52	-72.6	1.86

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Time	SWL
Date: 4-21-06									
Method: ~~Pump~~ peristaltic	5.0	6.45	1.540	21.15	26	0.76	-72.4	1022	1.84
Monitor Reading (ppm): 0	15.0	6.44	1.558	22.24	11	0.85	-72.4	1042	1.84
Well Casing Diameter & Material	~~20.0~~ 17.5	6.40	1.540	21.31	9.3	0.50	-72.4	~~1045~~ 1052	1.84
Type: 20" PVC	20.0	6.42	1.540	21.18	7.2	0.46	-73.1	1052	1.85
Total Well Depth (TD): 14.68	22.5	6.41	1.531	21.08	6.8	0.48	-72.8	1057	1.87
Static Water Level (WL): 1.76	25.0	6.40	1.525	21.08	6.1	0.52	-72.6	1102	1.86
One Casing Volume(gal/L): 7.85									
Start Purge (hrs): 1012									
End Purge (hrs): 1102									
Total Purge Time (min): 50									
Total Vol. Purged (gal/L): 25.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

3 well volumes = 23.57

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 - Gulfport
Project No.: N9866

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MW2801
Sample Location: GPT-04528
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 4/20/06								
Time: 1620								
Method: low flow	clear	5.46	.181	20.98	13.31	0.44	N/A	51.3

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 4/20/06								
Method: low flow	Initial	5.49	.186	20.77	160	0.75	N/A	61.1
Monitor Reading (ppm): Ø	1st	5.43	.180	20.77	36	0.50		60.2
Well Casing Diameter & Material	2nd	5.45	.181	20.94	25	0.49		52.9
Type: 2" PVC	3rd	5.45	.181	20.98	13.31	0.44		51.3
Total Well Depth (TD): 16.40								
Static Water Level (WL): 3.22								
One Casing Volume(gal/L): 2.1								
Start Purge (hrs): 1530								
End Purge (hrs): 1620								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): ~10								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40mL VOA	3

OBSERVATIONS / NOTES:

16.40
3.22
13.18
.16
1908
1318
2.1088

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MW2901
Sample Location: GPT-04-MW-29
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 4/20/06 Time: 1525 Method: peristaltic	clear	6.36	.263	22.38	40	0.58	N/A	-56.2

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 4/20/06 Method: peristaltic	Initial	7.18	.364	23.33	557	1.66	N/A	79.4
Monitor Reading (ppm): 0	1st	6.49	.264	22.22	240	0.57		-76.1
Well Casing Diameter & Material Type: 2" PVC	2nd	6.54	.243	22.40	95	0.49		-89.8
	3rd	6.36	.263	22.38	40	0.58		-56.2
Total Well Depth (TD): 34.58								
Static Water Level (WL): 3.64								
One Casing Volume(gal/L): 4.9								
Start Purge (hrs): 1359								
End Purge (hrs): 1520								
Total Purge Time (min): 81								
Total Vol. Purged (gal/L): ~15								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCl	40 mL VOA	3

OBSERVATIONS / NOTES:

~~500 mL/min~~
100

49504

34.58
3.64
30.94

30.94
.16
185 64
3094

Circle if Applicable:

MS/MSD	Duplicate ID No.: 04MW2901D

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: NCBC Gulfport
Project No.: Site 4

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04-MW30-01
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 4-20-06	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity~~ ORP (%)	~~Other~~ SWL
Time: 1505								
Method: peristaltic	clear	5.18	.173	20.92	60.0	2.03	-489.5	3.86

PURGE DATA:

Date: 4-20-06	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~ Lic	SWL
Method: low flow	3.0	5.74	.150	20.52	475	2.65	-440.3	1414	3.95
Monitor Reading (ppm): 0	9.0	4.69	.135	20.51	270	2.46	-387.4	1424	3.94
Well Casing Diameter & Material	12.0	4.94	.136	21.02	149	2.49	-278.2	1434	3.86
Type: 2.0" PVC	15.0	4.99	.145	21.02	109	2.38	-235.9	1444	3.86
Total Well Depth (TD): 14.20	19.5	5.17	.167	20.84	64.2	2.13	-489.4	1459	3.86
Static Water Level (WL): 3.59	21.0	5.18	.173	20.92	60.0	2.03	-489.5	1524	3.86
One Casing Volume(gal/L): 6.45									
Start Purge (hrs): 1409									
End Purge (hrs): 1504									
Total Purge Time (min): 55									
Total Vol. Purged (gal/L): 21.0L									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

3 well volumes = 19.36 L

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 - Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MP0101
Sample Location: GPT04MP01
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other ORP
Date: 4/13/06								
Time: 0825								
Method: low flow	Clear	6.56	1.909	21.61	8.00	0.36	N/A	-116.2

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date: 4/13/06								
Method: low flow	Initial	6.59	1.894	21.63	119	9.21	N/A	-95.3
Monitor Reading (ppm): Ø	0813	6.55	1.903	21.64	23.4	0.55		-124.8
Well Casing Diameter & Material	0818	6.56	1.911	21.65	20.5	0.57		-117.8
Type: 2" PVC	0820	6.56	1.909	21.61	8.00	0.36		-116.2
Total Well Depth (TD): 14.81								
Static Water Level (WL): 11.05								
One Casing Volume(gal/L): 3								
Start Purge (hrs): 0805								
End Purge (hrs): 0821								
Total Purge Time (min): 16								
Total Vol. Purged (gal/L): 16								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC			
TOC			
Anions			
Tot Fe			
Diss Fe			
Sulfide			
Microbial			

OBSERVATIONS / NOTES:

400mL/min

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: NCBC Gulfport
Project No.: Site 4

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: ~~[illegible]~~ 04-MP02-01
Sample Location: GPT-04-MP02
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	~~Salinity~~ ORP (%)	~~Other~~ SWL
Date: 4-20-06								
Time: 0920								
Method: peristaltic	clear	6.83	2.025	21.48	11.3	0.14	-197.0	11.49

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	~~Salinity~~ ORP	~~Other~~	
Date: 4-20-06									SWL
Method: peristaltic	6.0L	6.78	2.02	21.32	207	3.64	-185.5	0840	11.50
Monitor Reading (ppm): 0	12.0L	6.81	2.021	21.34	119	2.16	-192.7	0850	11.50
Well Casing Diameter & Material	18.0L	6.83	2.031	21.50	26.9	1.37	-193.9	0900	11.48
Type: 1.0" PVC	24.0	6.83	2.025	21.48	11.3	0.14	-197.0	0910	11.49
Total Well Depth (TD): 19.65									
Static Water Level (WL): 10.99									
One Casing Volume(gal/L):									
Start Purge (hrs): 0830									
End Purge (hrs): 0910									
Total Purge Time (min): 40									
Total Vol. Purged (gal/L): 24.0L									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: Site 4 Gulfport
Project No.: N9666

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 04MP0301
Sample Location: GPT-04-MP-03
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	~~Other~~ ORP
Date: 4/20/06 Time: 1005 Method: peristaltic	clear	6.85	2.195	22.22	6.16	N/A	N/A	-132.2

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	~~Other~~ ORP
Date: 4/20/06								
Method: peristaltic	Initial	6.88	2.211	22.45	107.0	N/A	N/A	-127.6
Monitor Reading (ppm): Ø	0954	6.85	2.197	22.25	21.7			-133.2
Well Casing Diameter & Material	0957	6.85	2.196	22.20	9.11			-133.0
Type: 2" PVC	1000	6.85	2.195	22.22	6.16			-132.2
Total Well Depth (TD): 19.93								
Static Water Level (WL): 11.50								
One Casing Volume(gal/L): ~~1.95~~								
Start Purge (hrs): 0943								
End Purge (hrs): 1000								
Total Purge Time (min): 17								
Total Vol. Purged (gal/L): 1.3								

SAMPLE COLLECTION INFORMATION:

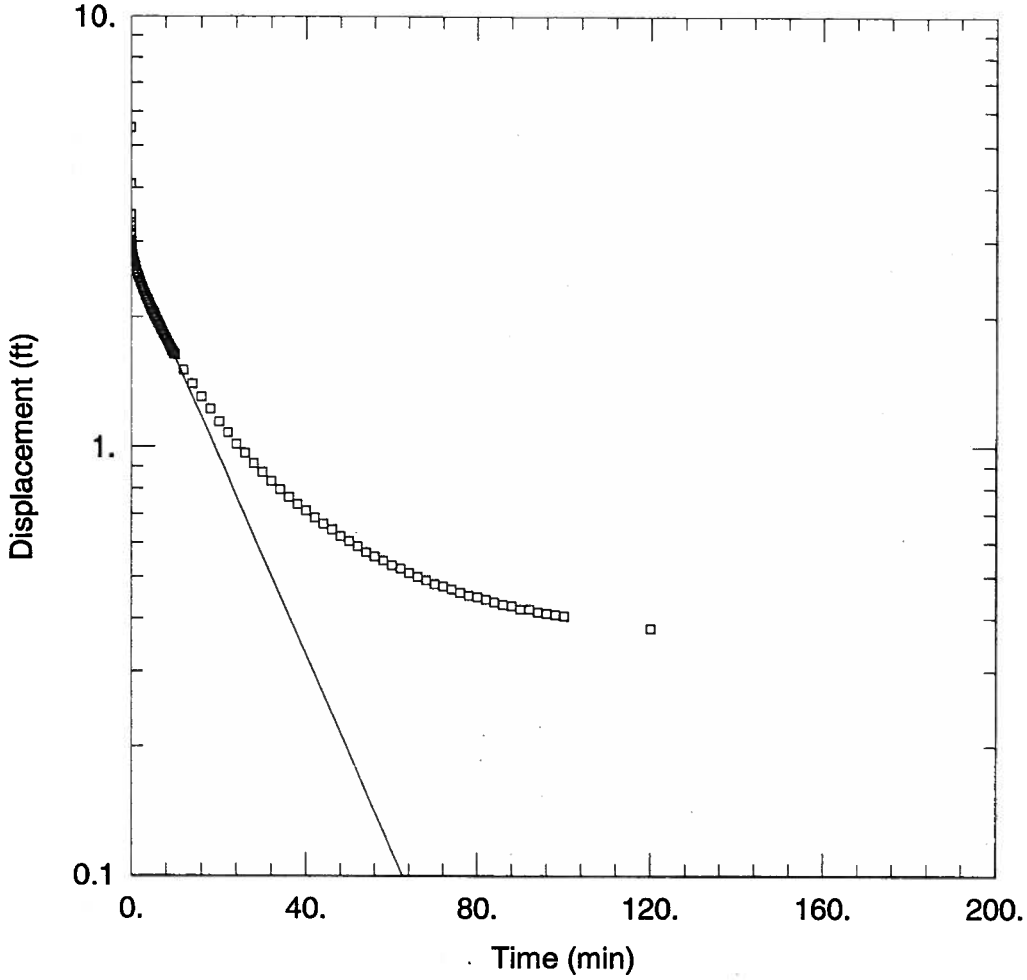
Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

- DO sensor has failed/erratic readings

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW11OU1.AQT
Date: 10/02/06 Time: 15:48:17

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-11R
Test Date: 9/12/2004

AQUIFER DATA

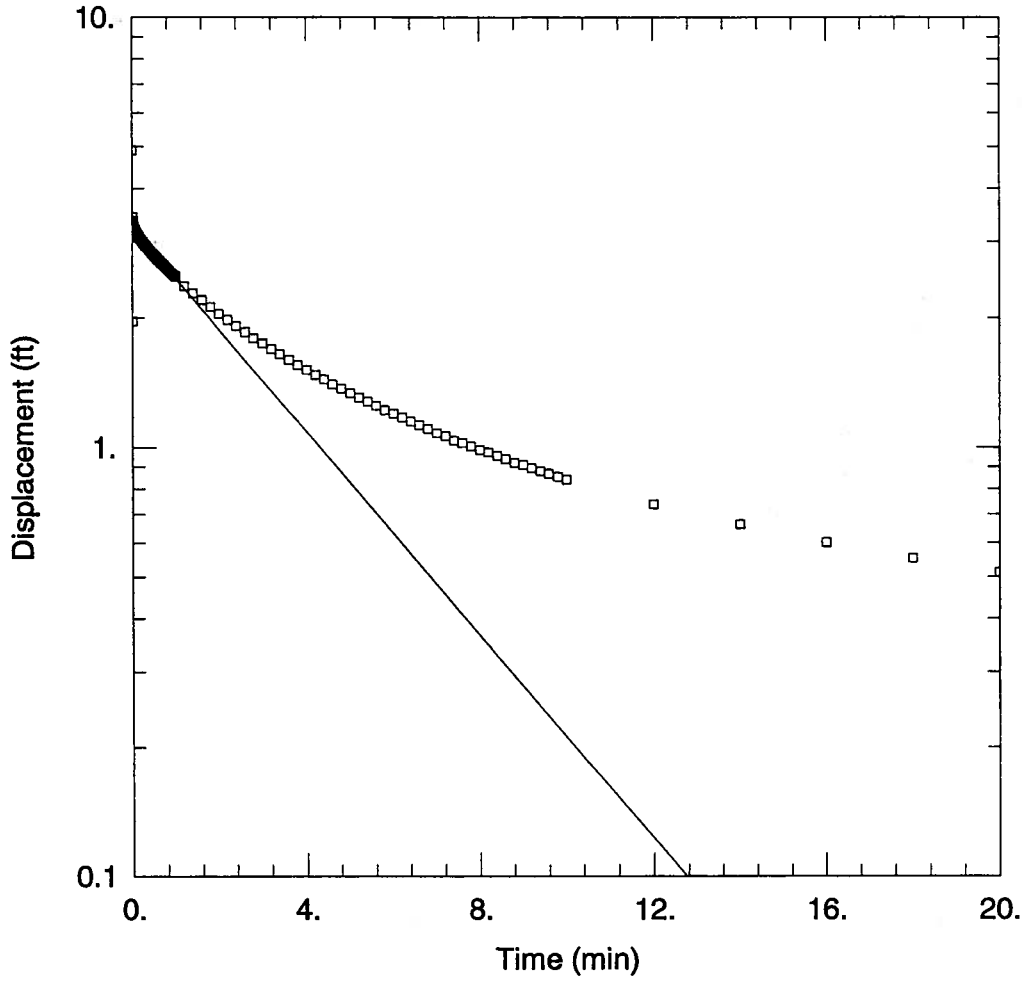
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 5.505 ft
Casing Radius: 0.0833 ft
Screen Length: 5. ft
Water Column Height: 30.95 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0006907 ft/min
y0 = 2.749 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW17OU1.AQT
Date: 10/02/06 Time: 15:47:59

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-17
Test Date: 9/12/2004

AQUIFER DATA

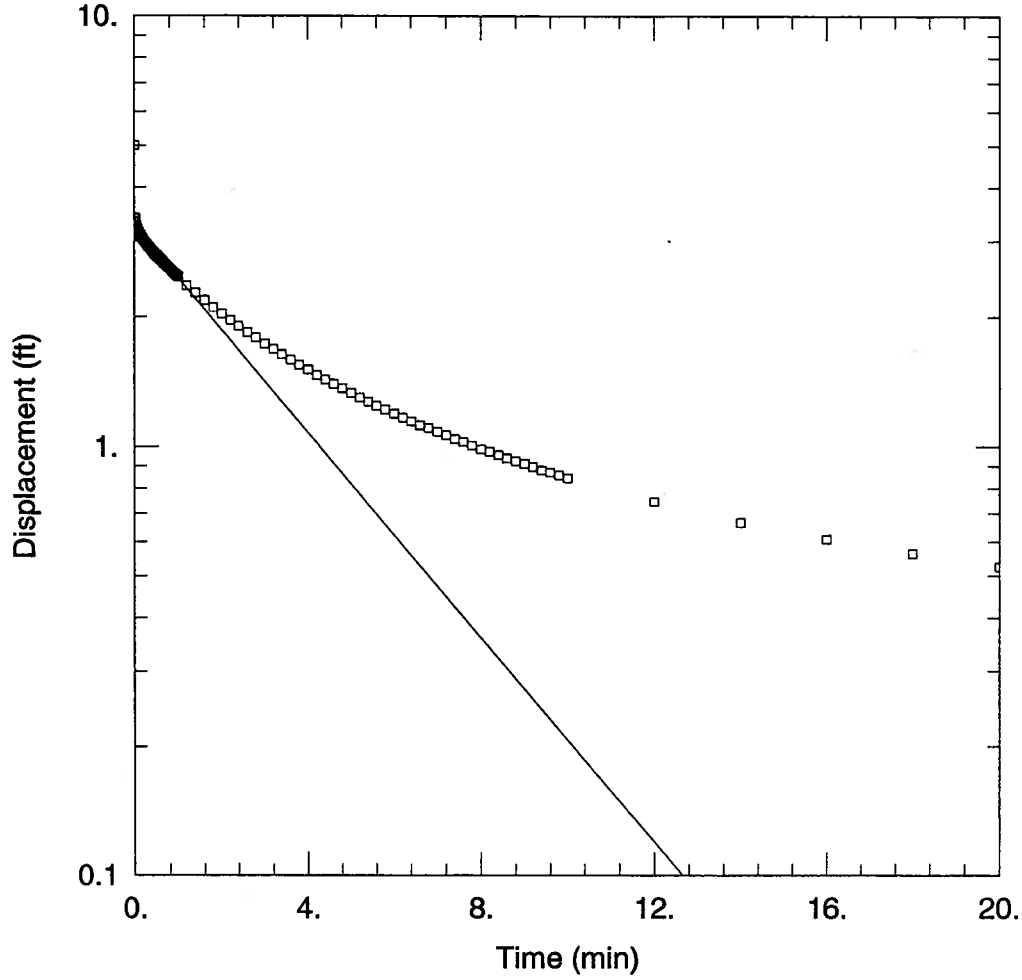
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 4.906 ft
Casing Radius: 0.0833 ft
Screen Length: 5. ft
Water Column Height: 36.75 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.003752 ft/min
y0 = 3.238 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW17OU2.AQT
Date: 10/02/06 Time: 15:48:07

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-17
Test Date: 9/12/2004

AQUIFER DATA

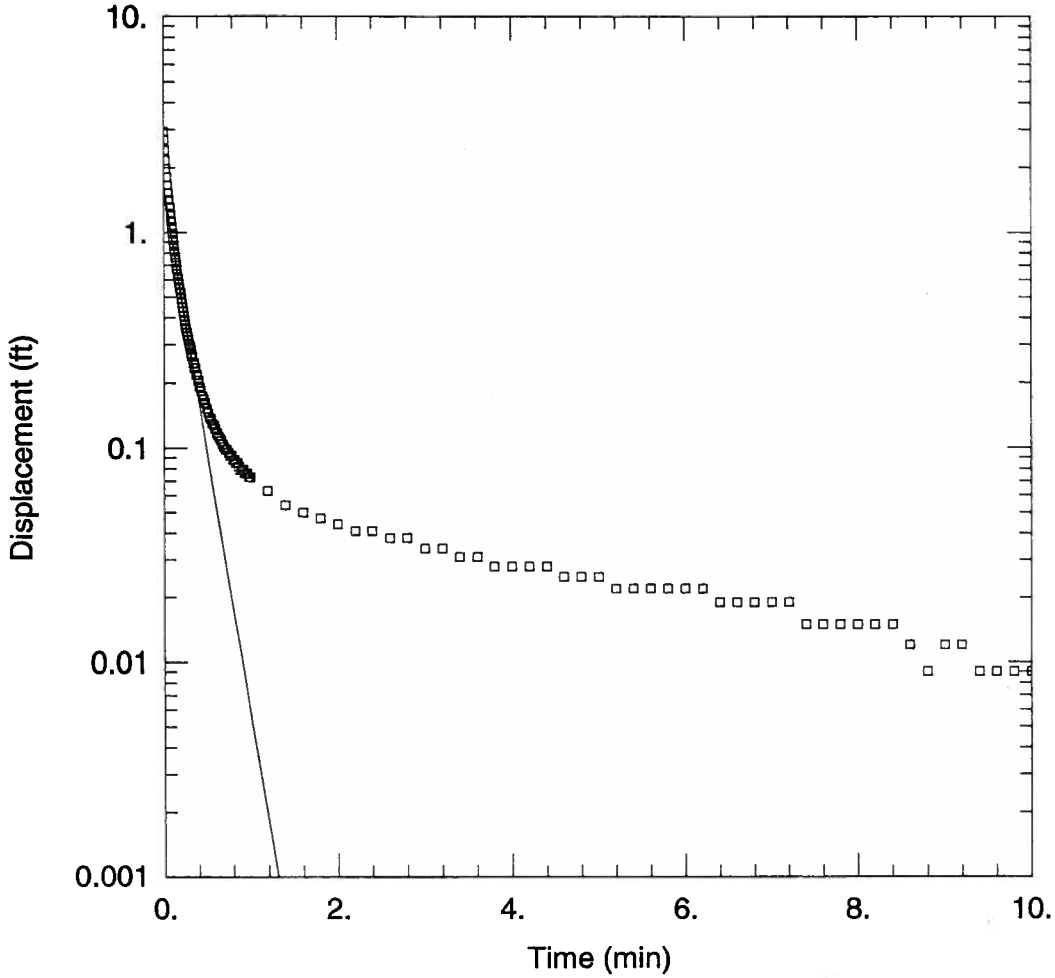
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 5.008 ft
Casing Radius: 0.0833 ft
Screen Length: 5. ft
Water Column Height: 36.75 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.003778 ft/min
y0 = 3.232 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW9OU1.AQT
Date: 10/02/06 Time: 15:48:25

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: South EFD
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-09
Test Date: 9/10/2004

AQUIFER DATA

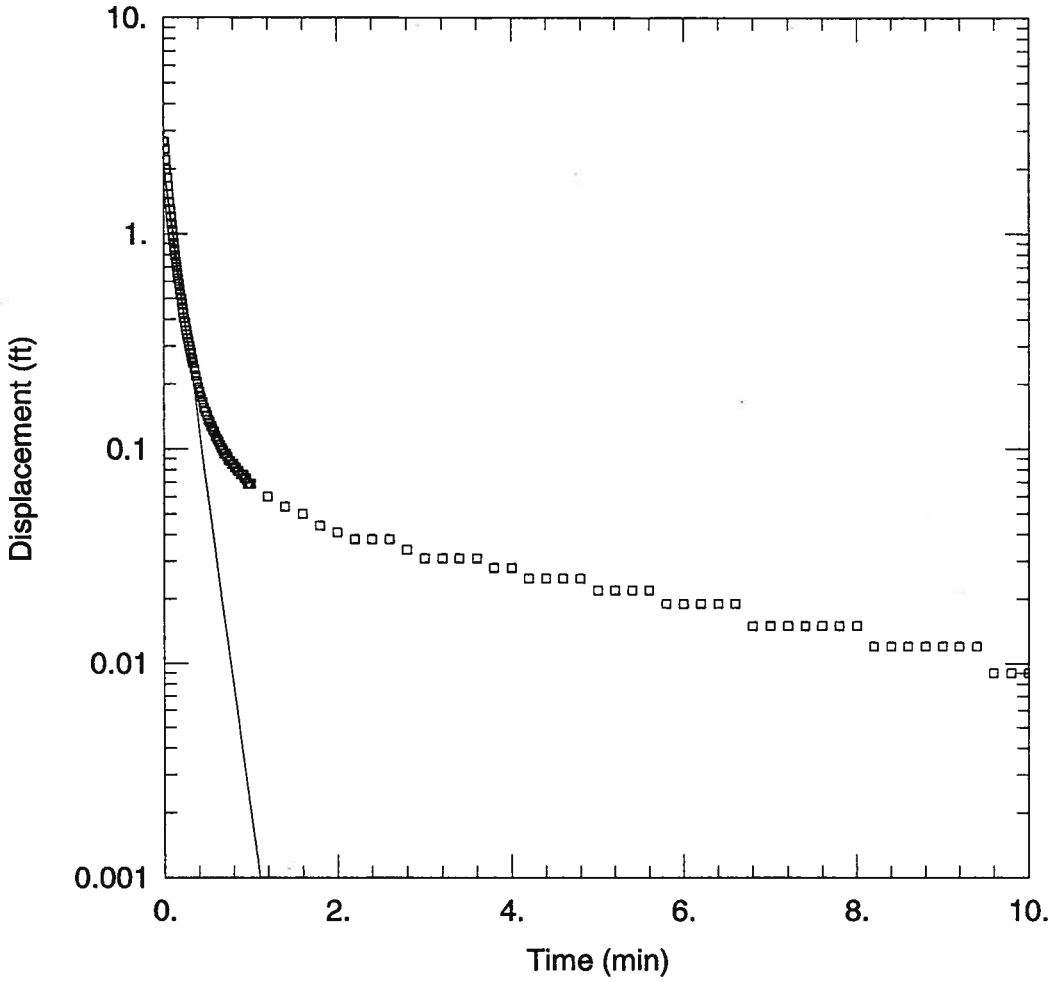
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 2.938 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 18.19 ft
Wellbore Radius: 0.26 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02523 ft/min
y0 = 1.642 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW9OU2.AQT
Date: 10/02/06 Time: 15:48:31

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-09
Test Date: 9/10/2004

AQUIFER DATA

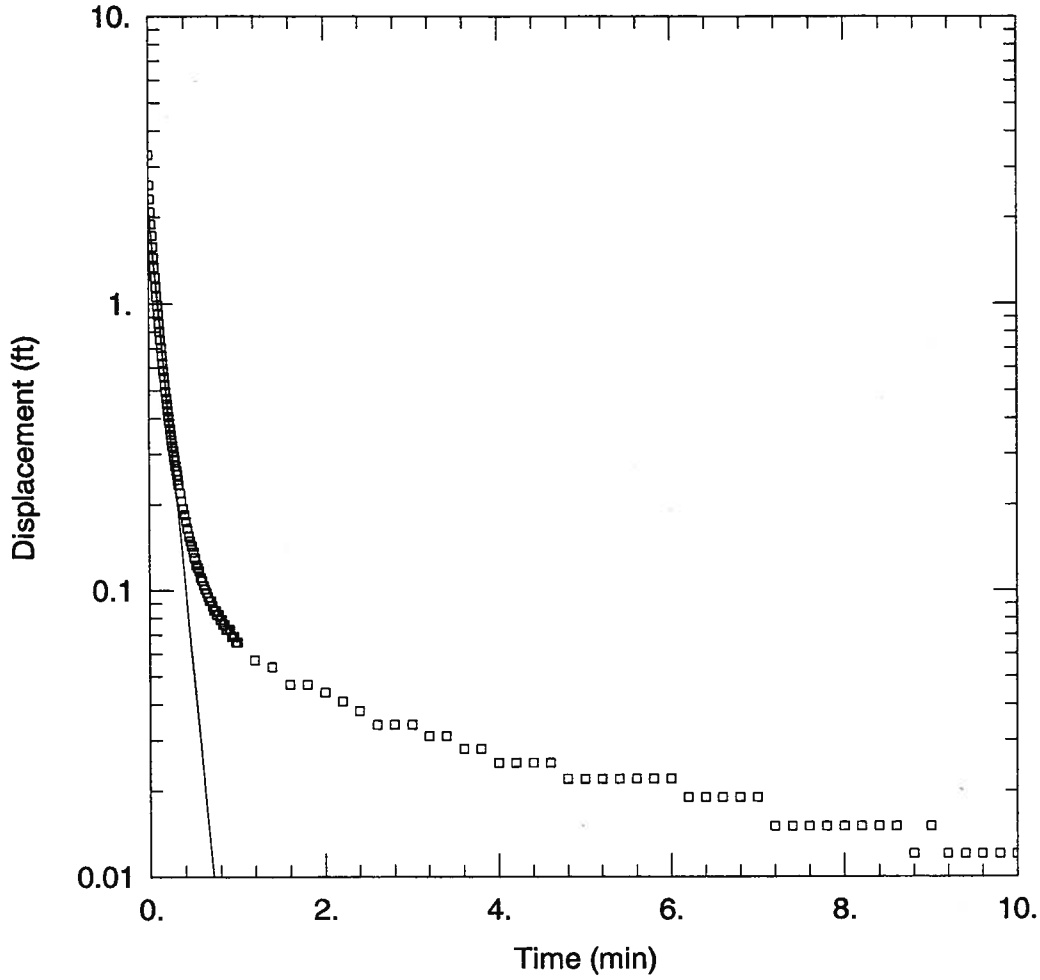
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 2.677 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 18.19 ft
Wellbore Radius: 0.26 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03097 ft/min
y0 = 2.078 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW9OU3.AQT
Date: 10/02/06 Time: 15:48:36

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-09
Test Date: 9/10/2004

AQUIFER DATA

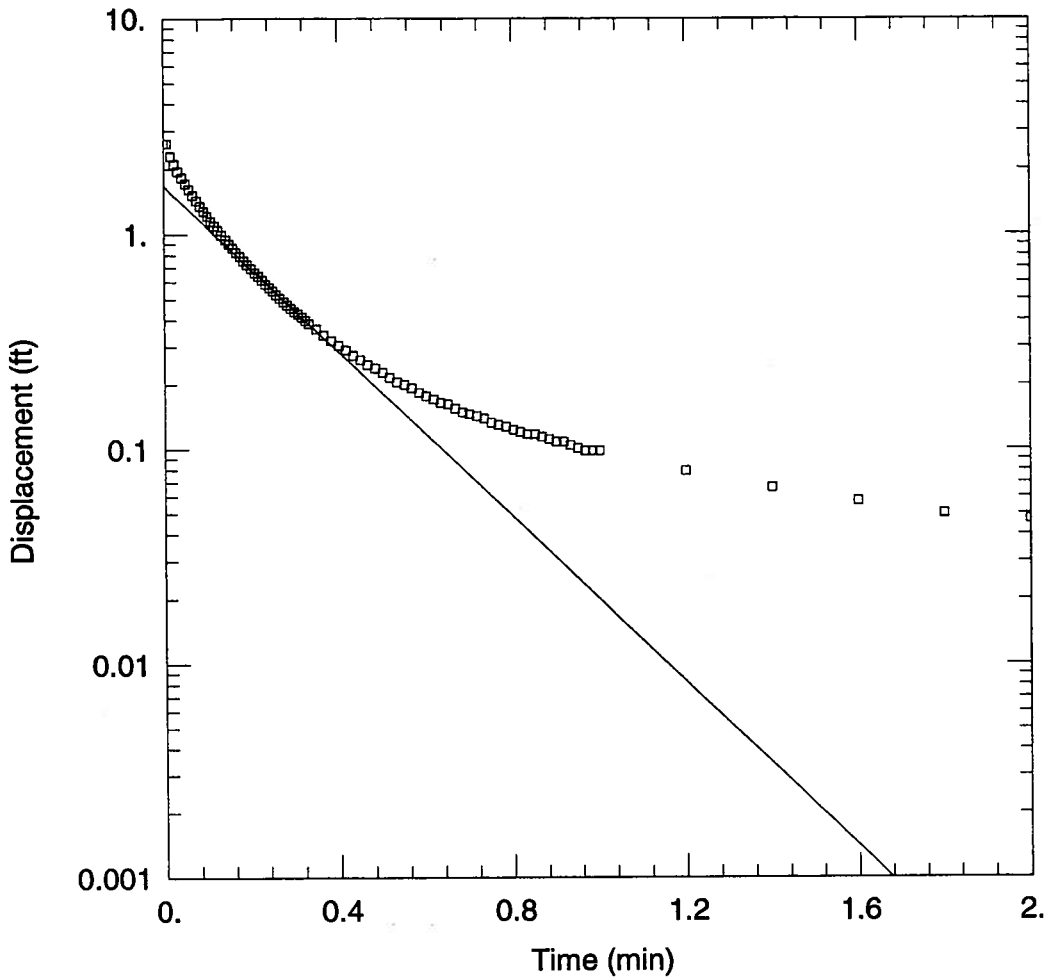
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 3.296 ft
Casing Radius: 0.08333 ft
Screen Length: 10. ft
Water Column Height: 18.19 ft
Wellbore Radius: 0.26 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03326 ft/min
y0 = 2.147 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW16OU1.AQT
Date: 10/02/06 Time: 15:48:46

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-16
Test Date: 9/11/2004

AQUIFER DATA

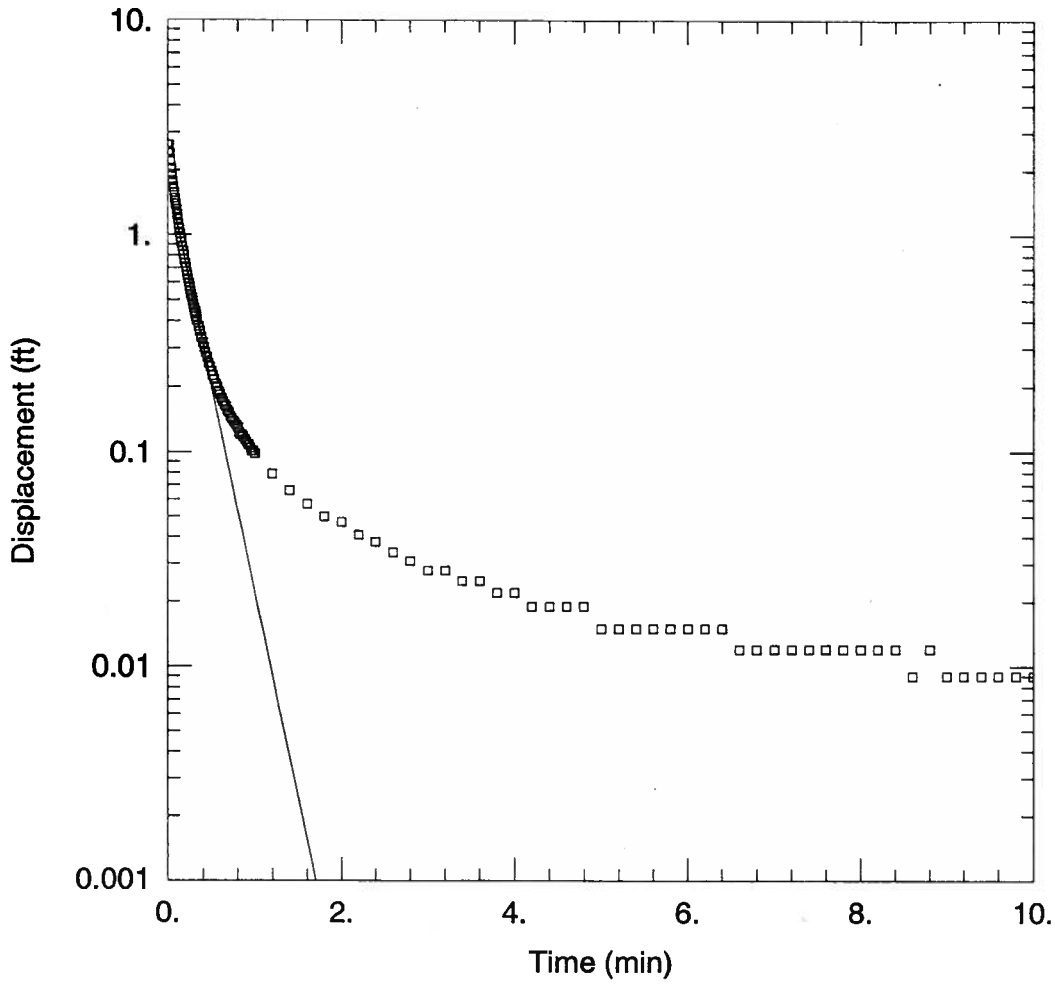
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 2.624 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 10.95 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02693 ft/min
y0 = 1.67 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW16OU2.AQT
Date: 10/02/06 Time: 15:48:52

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-16
Test Date: 9/11/2004

AQUIFER DATA

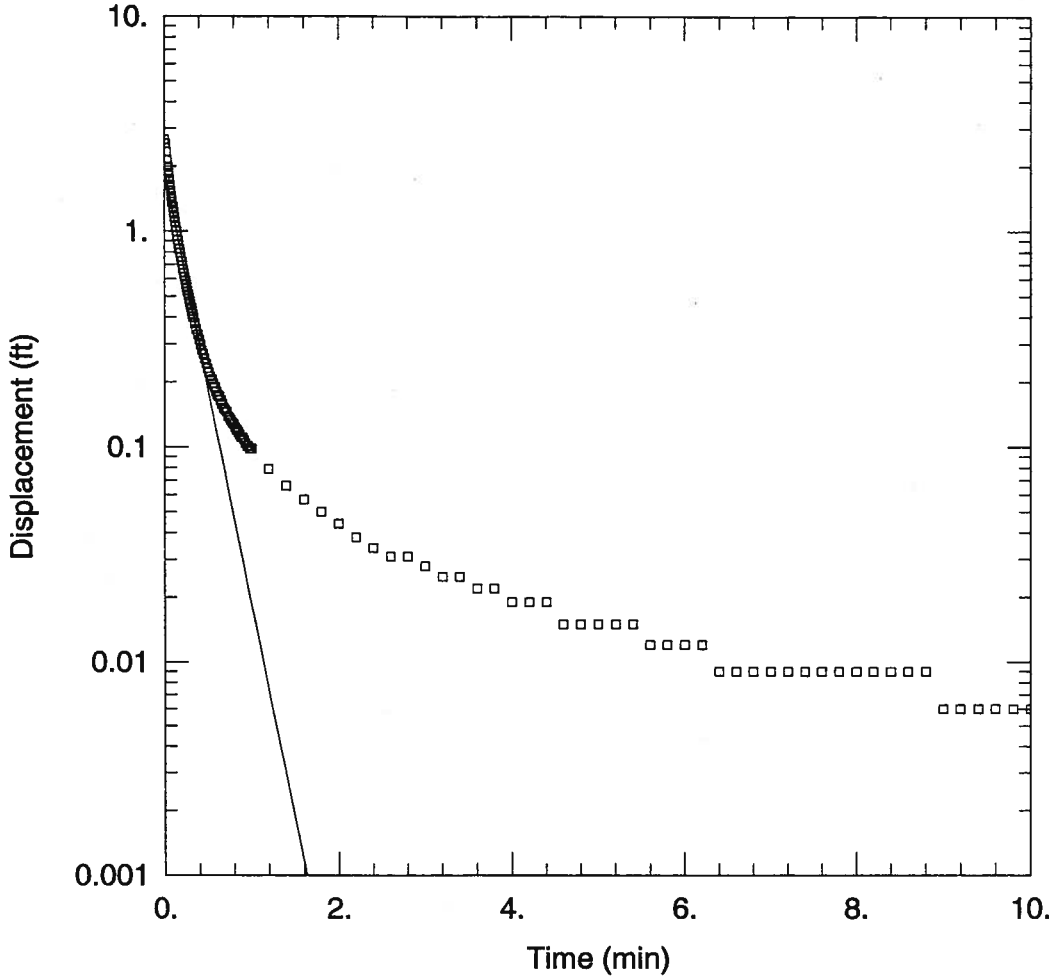
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 2.639 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 10.95 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02685 ft/min
y0 = 1.83 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW16OU3.AQT
Date: 10/02/06 Time: 15:48:57

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-16
Test Date: 9/11/2004

AQUIFER DATA

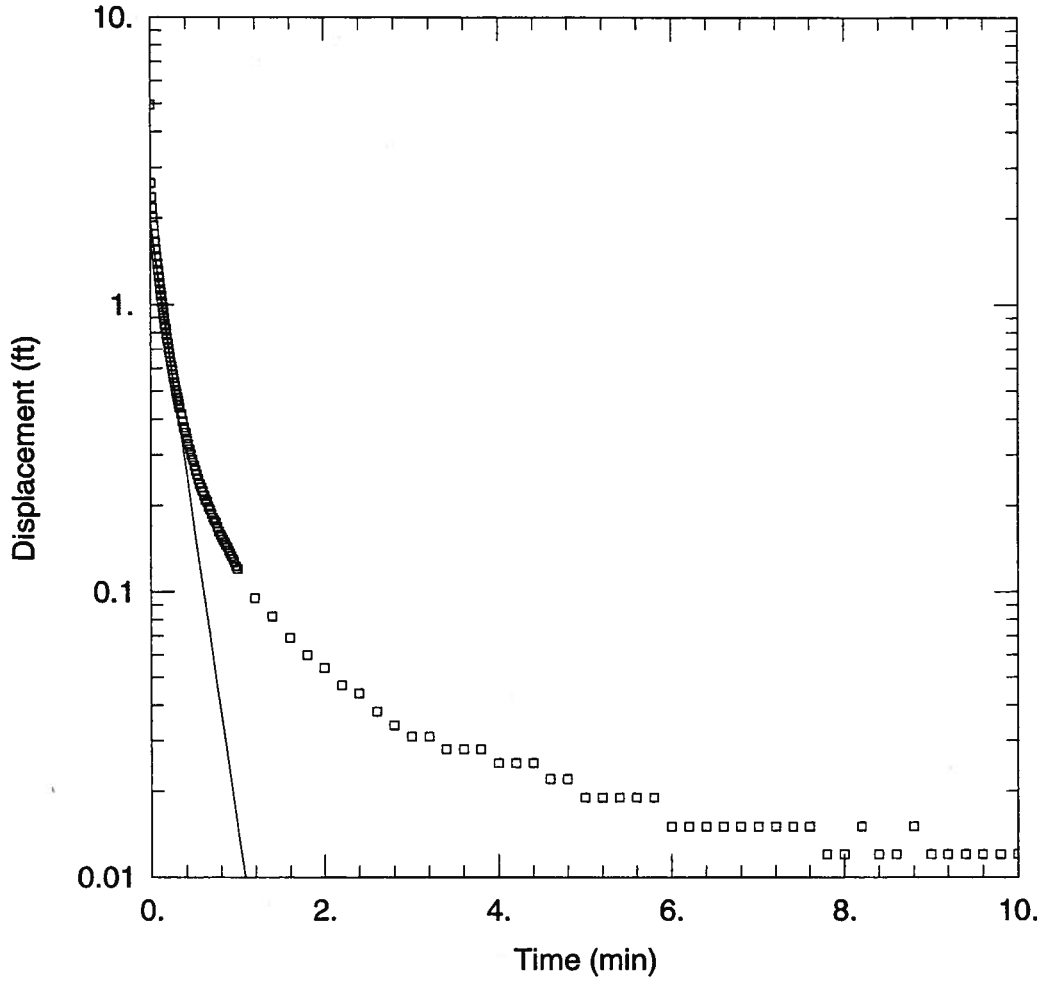
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 2.659 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 10.95 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02822 ft/min
y0 = 1.942 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW18OU1.AQT
Date: 10/02/06 Time: 15:49:04

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-18
Test Date: 9/11/2004

AQUIFER DATA

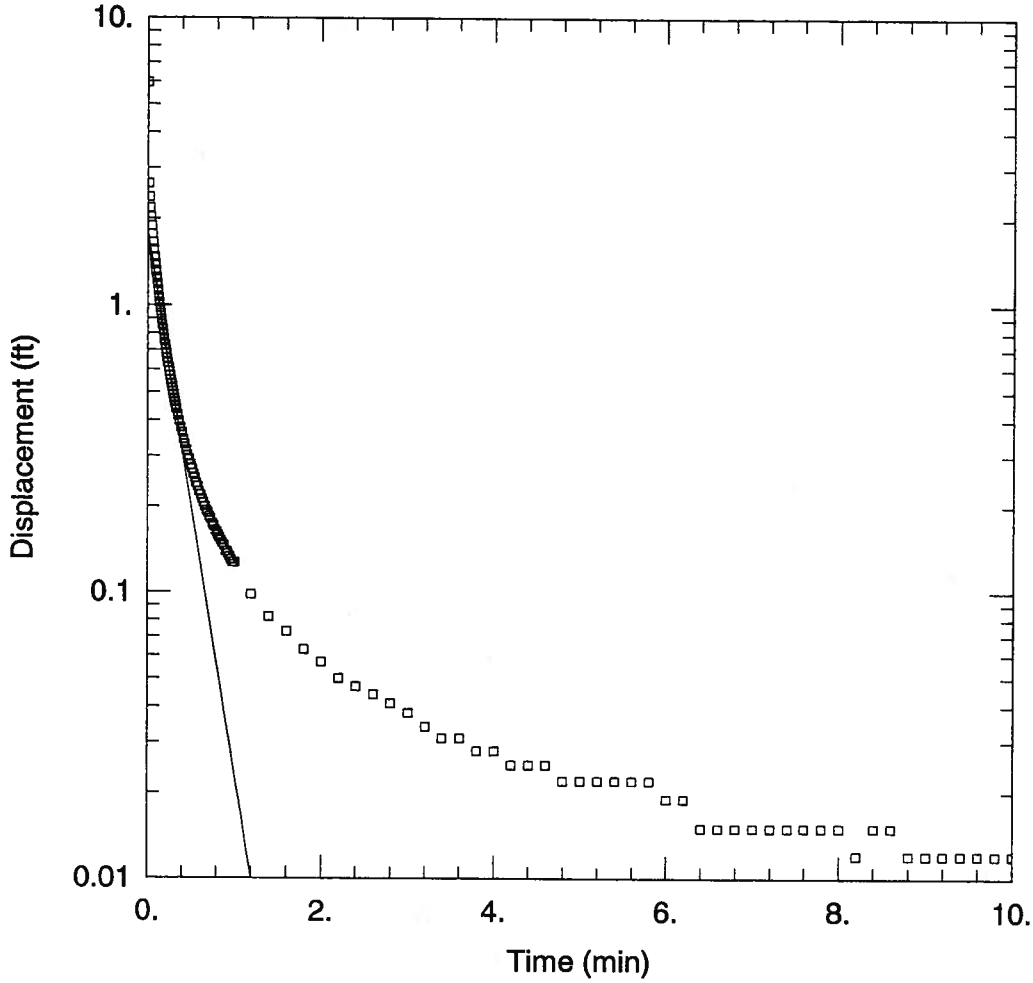
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 4.949 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 13.36 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03069 ft/min
y0 = 1.946 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW18OU2.AQT
Date: 10/02/06 Time: 15:49:09

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-18
Test Date: 9/12/2004

AQUIFER DATA

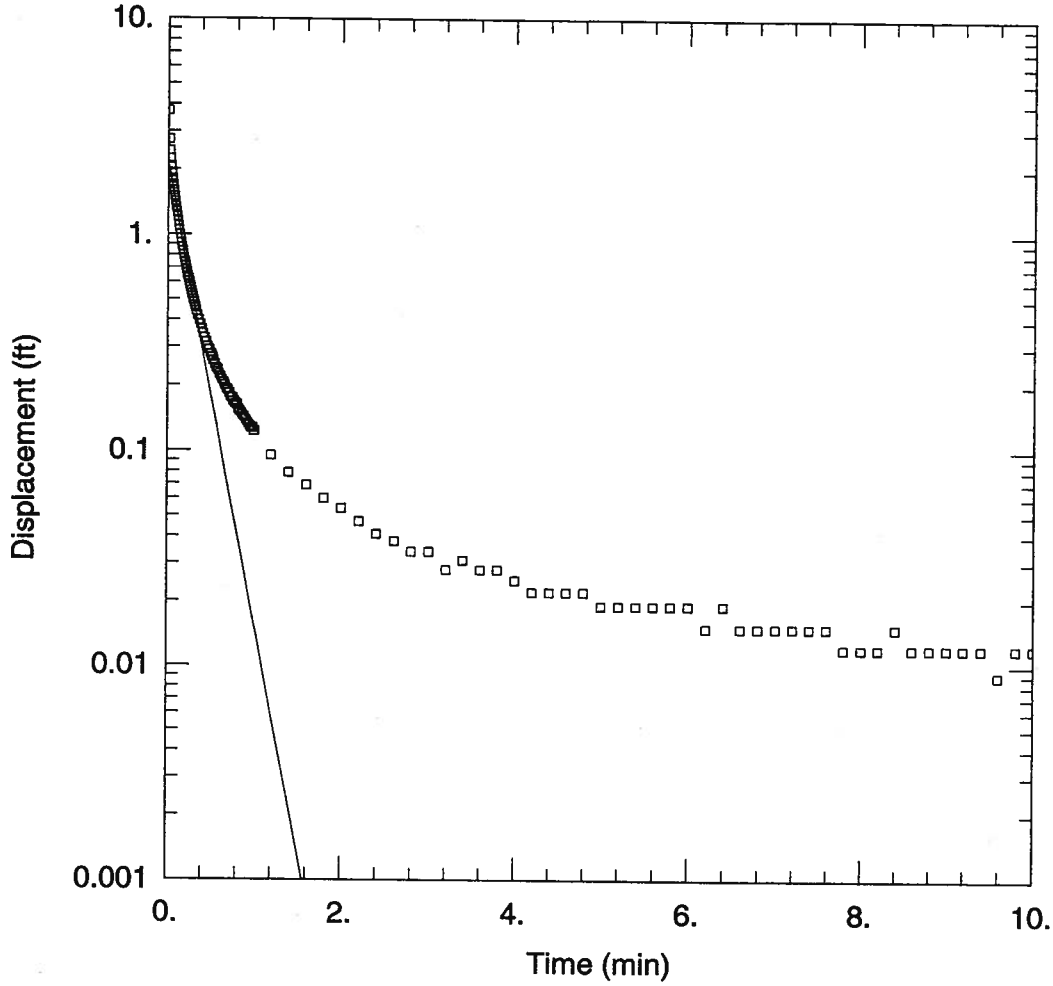
Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 5.961 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 13.36 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02701 ft/min
y0 = 1.764 ft



WELL TEST ANALYSIS

Data Set: Y:\NAVY\MISSIS~1\CTO283~1\FIELDD~1\SLUGTE~1\SOLUTI~1\MW18OU3.AQT
Date: 10/02/06 Time: 15:49:14

PROJECT INFORMATION

Company: Tetra Tech NUS
Client: EFD South
Project: N9666
Test Location: NCBC Gulfport Site 4
Test Well: GPT-04-18
Test Date: 9/11/2004

AQUIFER DATA

Saturated Thickness: 40. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 3.741 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 13.36 ft
Wellbore Radius: 0.34 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03064 ft/min
y0 = 2.093 ft

HYDRAULIC CONDUCTIVITY SUMMARY
Site 4 RI Report
NCBC Gulfport

Shallow Wells

GPT-04-09	0.025 ft/min
GPT-04-09	0.031 ft/min
GPT-04-09	0.033 ft/min
GPT-04-16	0.027 ft/min
GPT-04-16	0.027 ft/min
GPT-04-16	0.028 ft/min
GPT-04-18	0.031 ft/min
GPT-04-18	0.027 ft/min
GPT-04-18	0.031 ft/min
Geometric mean	**0.029 ft/min**

Deep Well

GPT-04-18	0.0007 ft/min
GPT-04-18	0.004 ft/min
Geometric mean	**0.002 ft/min**

APPENDIX C
VALIDATED LABORATORY DATA

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 11, 2004**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/SVOA/PEST/PCB/HERB/OPPEST**
CTO 283, NCBC GULFPORT
SDG 2831

SAMPLES: 21/Aqueous

04GP0101	04GP0201	04GP0301	04GP0401
04GP0501	04GP0601	04GP0701	04RS0815SB
04RS0815SD	04RW0815GP	04RW0815MW	04SW0101D
04SW0101	04SW0201	04SW0301	04TB0805
04TB0806	04TB0812	04TB0813	04TB0817
04TB0818			

OVERVIEW

The sample set for CTO 283 NCBC Gulfport, SDG 2831 consists of fifteen (11) aqueous environmental samples, four (4) rinse blanks, and six (6) trip blanks. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOC), semivolatile organic compounds, organochloride pesticides (PEST), organophosphorus pesticides (OPPEST), polychlorinated biphenyls (PCB), and herbicides (HERB). One field duplicate pair was included in the SDG: 04SW0101 and 04SW0101D.

The samples were collected by TetraTech NUS on August 5, 12, 13, 15, 17, and 18, 2004 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 8081A, 8082, 8141 and 8151 analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
• Initial/continuing calibrations
• Laboratory method blank results
• Surrogate Recoveries
• Blank Spike/Blank Spike Duplicate Results
• Matrix Spike/Matrix Spike Duplicate Results
• Internal Standards
* • 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.

Volatiles

The following compounds were detected in the method blanks or trip blanks:

Compound	Maximum Concentration	Blank Action Level
Methylene chloride	3.0 ug/L	30 ug/L
Tetrachloroethene	0.4 ug/L	2.0 ug/L
Toluene	0.2 ug/L	1.0 ug/L
*Acetone	2.0 ug/L	10 ug/L
*Trichlorotrifluoroethane	5 ug/L	25 ug/L

* - This compound was detected in the trip blanks.

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.

An action level of 10X the maximum contaminant concentration was established for methylene chloride; 5X for tetrachloroethene, toluene, and trichlorotrifluoroethane to evaluate laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. The positive results for acetone, methylene chloride, tetrachloroethene, and toluene below the blank action level were qualified as non-detected, U. Field quality control blanks were not qualified due to method blank contamination.

The surrogate dibromofluoromethane had a recovery less than the quality control criterion for sample 04TB0805. The positive and non-detected results for sample 04TB0805 have been qualified as estimated (J) and (UJ), respectively.

The surrogate P-bromofluorobenzene had a recovery greater than the quality control criterion for sample 04TB0817. The positive results for sample 04TB0817 have been qualified as estimated (J).

The compound cyclohexane was not spiked into the LCS. No action was taken on this basis.

The LCSs analyzed on 8/13/04, 8/18/04, 8/19/04, 8/20/04 had recoveries for carbon tetrachloride greater than the quality control criterion. No action was taken on basis because the samples associated with these LCSs did not have detections for carbon tetrachloride.

The LCSs analyzed on 8/13/04 and 8/19/04 had recoveries for pentachloroethane greater than the quality control criterion. No action was taken on basis because the samples associated with these LCSs did not have detections for pentachloroethane.

The MS/MSD performed on sample 04GP0101 had recoveries for dichlorodifluoromethane, trichlorofluoromethane, and carbon tetrachloride greater than the quality control criterion. No action was taken on this basis because the aforementioned compounds were not detected in sample 04GP0101.

The initial calibrations and all continuing calibrations, except those analyzed on 8/23/04 and 8/24/04 had a relative response factor (RRF) less than the 0.05 quality control criterion for acetone. The positive acetone results for all samples have been estimated (J) and non-detected results have been rejected (UR).

Calibration verification had percent differences (%Ds) that exceeded the 25% quality control limit for dichlorodifluoromethane and carbon tetrachloride on 08/11/04 @ 07:46. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for sample 04TB0805.

Calibration verification had %Ds that exceeded the 25% quality control limit for dichlorodifluoromethane and carbon tetrachloride on 08/13/04 @ 07:43. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04TB0806, 04SW0101, and 04SW0101D.

Calibration verification had %Ds that exceeded the 25% quality control limit for dichlorodifluoromethane and carbon tetrachloride on 08/16/04 @ 11:14. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for sample 04GP0201.

Calibration verification had %Ds that exceeded the 25% quality control limit for dichlorodifluoromethane, bromomethane, trichlorofluoromethane, carbon disulfide, cyclohexane, carbon tetrachloride, methylcyclohexane, and 4-methyl-2-pentanone on 08/18/04 @ 07:12. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04TB0812, 04TB0813, 04SW0201, 04GP0301, and 04GP0401.

Calibration verification had %Ds that exceeded the 25% quality control limit for dichlorodifluoromethane, trichlorofluoromethane, cyclohexane, carbon tetrachloride, and 4-methyl-2-pentanone on 08/19/04 @ 07:21. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04RS0815SB, 04RW0815GP, 04RW0815MW, 04RS0815SD, and 04SW0301.

Calibration verification had %Ds that exceeded the 25% quality control limit for dichlorodifluoromethane, trichlorofluoromethane, carbon disulfide, cyclohexane, carbon tetrachloride, and 4-methyl-2-pentanone on 08/20/04 @ 06:55. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04TB0817 and 04GP0101.

A calibration verification had %D that exceeded the 25% quality control limit for bromomethane on 08/24/04 @ 07:49. Only QC samples were associated with this continuing calibration these did not require qualification based on this noncompliance.

Semivolatile

The sample 04GP0601 had internal standard recoveries below the ± 50 to 100 percent recovery limits for chrysene-d12 and perylene-d12. The sample was reanalyzed and had recoveries above the ± 50 to 100 percent recovery limits for chrysene-d12 and perylene-d12. The re-analysis was used for validation and no qualification of the data was necessary because only non-detects were associated with internal standards outside of the criteria limits.

The surrogates 2-fluorophenol and 2-fluorobiphenyl had recoveries greater than the quality control criterion for sample 04SW0101. No action was taken on this basis because only one surrogate per fraction was out of criteria and no semivolatiles were detected in the sample.

The surrogate 2-fluorobiphenyl had a recovery greater than the quality control criterion for sample 04GP0601. The sample was re-analyzed with similar results. The re-analysis was used for validation because of the better internal standard recoveries for the re-analysis. No action was taken on this basis because only one surrogate per fraction was out of criteria and no semivolatiles were detected in the sample.

The surrogate 2,4,6-tribromophenol had recoveries greater than the quality control criterion for samples 04GP0101 and 04GP0501. No action was taken on this basis because only one surrogate per fraction was out of criteria and no semivolatiles were detected in the sample.

Several surrogates had recoveries greater than the quality control criterion for several QC samples (blanks, LCSs, and MS/MSDs). No action was taken on this basis because QC samples are not qualified.

The LCS/LCSD extracted on 8/09/04 had recoveries for naphthalene, 2,6-dinitrotoluene, acenaphthene, dibenzofuran, diethylphthalate, fluorene, hexachlorobenzene, phenanthrene, pyrene, and benzo (a) anthracene greater than the quality control criterion. No action was taken on basis because the samples associated with this LCSLCSD did not have detections for the aforementioned compounds.

The LCS extracted on 8/18/04 had a recovery for benzo(k)fluoranthene greater than the quality control criterion. No action was taken on basis because the samples associated with this LCS did not have detections for benzo(k)fluoranthene.

The LCS extracted on 8/20/04 had a recovery for pyrene and benzo(k)fluoranthene greater than the

quality control criterion. No action was taken on basis because the samples associated with this LCS did not have detections for pyrene and benzo(k)fluoranthene.

The LCS/LCSD extracted on 8/23/04 had recoveries for 4-chlorophenyl-phenyl ether and pyrene greater than the quality control criterion. No action was taken on basis because the samples associated with this LCSLCSD did not have detections for the aforementioned compounds.

The LCS/LCSD extracted on 8/23/04 had a LCSD recovery for indeno(1,2,3-cd)pyrene less than the quality control criterion and a relative percent difference above the quality control criterion. No action was taken on this basis because the LCS recovery was within criteria and indeno(1,2,3-cd)pyrene was not detected in the associated samples.

The MS/MSD performed on sample 04SW0301 had recoveries less than the quality control criterion for hexachloroethane, hexachlorocyclopentadiene, diethylphthalate, and butylbenzylphthalate. In addition, the recovery for dimethylphthalate had a zero percent recovery. The non-detected results for the aforementioned compounds, except dimethylphthalate, have been qualified as estimated (UJ) for sample 04SW0301. The non-detected dimethylphthalate result for 04SW0301 has been rejected (UR). The matrix spike for sample 04SW0301 had low recoveries for hexachlorobutadiene, di-n-butylphthalate, 3,3'-dichlorobenzidine, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. No action was taken on this basis because the aforementioned compounds were not detected in sample 04SW0301 and the recoveries meet criteria in the matrix spike duplicate.

The MS/MSD performed on sample 04SW0301 had recoveries greater than the quality control criterion for N-nitrosodiphenylamine and a high MS recovery for di-n-octylphthalate. In addition, the relative percent difference (RPD) was above the quality control criterion for hexachlorocyclopentadiene, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, di-n-octylphthalate, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. No action was taken on this basis because the aforementioned compounds were not detected in sample 04SW0301.

The MS/MSD performed on sample 04GP0101 had recoveries less than the quality control criterion for hexachloroethane, hexachlorocyclopentadiene, and 3,3'-dichlorobenzidine. The non-detected results for the aforementioned compounds have been qualified as estimated (UJ) for sample 04GP0101. The matrix spike for sample 04GP0101 had low recoveries for 4-chloroaniline and hexchlorobutadiene. No action was taken on this basis because the aforementioned compounds were not detected in sample 04GP0101 and the recoveries meet criteria in the matrix spike duplicate.

The MS/MSD performed on sample 04GP0101 had recoveries greater than the quality control criterion for 2-chlorophenol, N-nitrosodphenylamine and di-n-octylphthalate. In addition, the relative percent difference (RPD) was above the quality control criterion for N-nitroso-di-n-propylamine, nitrobenzene, isophhorone, naphthalene, 4-chloroaniline, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, carbazole, and di-n-butylphthalate. No action was taken on this basis because the aforementioned compounds were not detected in sample 04GP0101.

The 5th and 6th internal standards for sample 04SW0301 had low area counts less than 50% of the associated continuing calibration. The non-detected results quantitated using these internal standards have been qualified as estimated (UJ) in sample 04SW0301.

All initial calibrations associated with this SDG, had a percent relative standard deviation (%RSD) that exceeded the 30% quality control limit for benzaldehyde. All non-detected results reported for benzaldehyde were qualified as estimated (UJ) in all samples.

The initial calibration analyzed on 08/24/04 on instrument GCMS-U, had %RSDs that exceeded the 30% quality control limit for 2-chloronaphthalene and 2,4-dinitrophenol. The non-detected results reported for the aforementioned compounds were qualified as estimated (UJ) in samples 04SW0101, 04SW0101D, 04GP0301, 04GP0401, and 04RS0815SB.

The initial calibration analyzed on 09/7/04 on instrument GCMS-X, had a %RSD that exceeded the 30% quality control limit for hexachloroethane. The non-detected results reported for the aforementioned compounds were qualified as estimated (UJ) in samples 04GP0601 and 04SW0301.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde and 2,4-

dinitrophenol on instrument GCMS-K on 09/02/04 @ 11:27. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04GP0201, 04SW0201, 04RW0815GP, 04RW0815MW, and 04RS0815SD.

A calibration verification had a %D that exceeded the 25% quality control limit for caprolactam on 08/12/04 @ 13:39. No action was taken on this basis because only QC samples were associated with this continuing calibration.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde, caprolactum, 2,4-dinitrophenol, 4-nitrophenol, 4-nitroaniline, and di-n-octylphthalate on 08/18/04 @ 12:55. No action was taken on this basis because only QC samples were associated with this continuing calibration.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde, hexachlorocyclopentadiene, dimethylphthalate, acenaphthylene, 2,4-dinitrophenol, and 4-nitrophenol on 09/01/04 @ 08:39. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04SW0101, 04SW0101D, 04GP0301, 04GP0401, and 04RS0815SB.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde, 2-nitroaniline, 2,4-dinitrophenol, 4-nitrophenol, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene on 09/10/04 @ 14:30. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for sample 04GP0601 and 04SW0301.

Calibration verification had %Ds that exceeded the 25% quality control limit for 2,4-dinitrophenol, 3,3'-dichlorobenzidine, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene on 09/13/04 @ 13:07. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for sample 04GP0101, 04GP0501, 04GP0601, and 04GP0701.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde, hexachlorocyclopentadiene, and 2-chloronaphthalene on 09/15/04 @ 11:20. No action was taken on this basis because only QC samples were associated with this continuing calibration.

Organochloride Pesticides

The surrogate decachlorobiphenyl had recoveries less than the quality control criterion for samples 04SW0201 and 04GP0701 on both columns. The non-detected results have been qualified as estimated (UJ) for samples 04SW0201 and 04GP0701.

The MS/MSD performed on sample 04GP0101 had RPDs greater than the quality control criterion for 4,4'-DDT and methoxychlor. No action was taken on this basis because the aforementioned compounds were not detected in sample 04GP0101 and the percent recoveries were within recovery limits.

The MS/MSD performed on sample 04SW0301 had a recover greater than the quality control criterion for gama-chlordane. In addition, the RPD was above the quality control criterion for gamma-chlordane. No action was taken on this basis because gamma-chlordane was not detected in sample 04SW0301.

A continuing calibration %D exceeded the 15% quality control limit on 09/15/04 @ 11:13 on column RTX-CLPI for alpha-BHC. No qualifiers were assigned on this basis since the aforementioned compound was compliant on column RTX-CLPII.

Continuing calibration %Ds exceeded the 15% quality control limit on 09/15/04 @ 19:35 on column RTX-CLPI for alpha-BHC and 4,4'-DDT. The 4,4'-DDT %D also exceeded the quality control limit on the RTX-CLPII column. The non-detected 4,4'-DDT result for sample 04GP0501 has been qualified as estimated (UJ). No qualifiers were assigned on this basis for alpha-BHC because it was compliant on column RTX-CLPII.

PCBs

The surrogate decachlorobiphenyl had recoveries less than the quality control criterion for samples 04GP0201, 04SW0201, 04GP0301, 04GP0401, 04GP0601, 04GP0101, 04GP0701, and 04GP0501 on both columns. The

non-detected results have been qualified as estimated (UJ) for the aforementioned samples.

The surrogate decachlorobiphenyl had a recovery less than the quality control criterion for sample 04SW0301 on RTX-5 column. No qualifiers were assigned on this basis because the RTX-35 column was compliant.

The continuing calibration average percent difference exceeded the 15% quality control limit on 09/01/04 @15:24 on column RTX-5 for Aroclor-1260. No action was taken on this basis because the RTX-35 column met average percent difference criterion.

The continuing calibration average percent difference exceeded the 15% quality control limit on 09/14/04 @00:33 on the column RTX-5 for Aroclor-1260. No action was taken on this basis because the RTX-35 column met average percent difference criterion.

The continuing calibration average percent difference exceeded the 15% quality control limit on 09/11/04 @16:59 on the RTX-5 and RTX-35 columns for Aroclor-1260. The non-detected Aroclor-1260 results have been qualified as estimated (UJ) for samples 04GP0201, 04SW0201, 04GP0301, 04GP0401, 04RS0815SB, 04RW0815GP, 04RW0815MW, and 04RS0815SD.

Herbicides

The surrogate 2,4-dichlorophenylacetic acid had a recovery greater than the quality control criterion for sample 04GP0601 on the SPB-608 column. No qualifiers were assigned on this basis because the RTX-CLPII column was compliant.

The LCS/LCSD had surrogate recoveries greater than the quality control criterion for batches WG9303 and WG9419 on the SPB-608 and/or RTX-CLPII columns. No action was taken on this basis.

The LCSD for batch WG9303 had a recovery greater than the quality control criterion for 2,4,5-T. No action was taken on this basis because the LCS had an acceptable recovery and no herbicides were detected in the associated samples.

The LCS/LCSD for batch WG9419 had recoveries greater then the quality control criterion for 2,4-D, silvex, and 2,4,5-T. No action was taken on this basis because no herbicides were detected in the associated samples.

A continuing calibration %D exceeded the 15% quality control limit on 08/18/04 @ 11:58 on column RTX-CLPII for 2,4,5-T. No qualifiers were assigned on this basis since 2,4,5-T was compliant on column SPB-608.

Continuing calibration %Ds exceeded the 15% quality control limit on 08/18/04 @ 17:59 on column RTX-CLPII for 2,4-D and 2,4,5-T. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on column SPB-608.

Continuing calibration %Ds exceeded the 15% quality control limit on 08/23/04 @ 10:08 on column RTX-CLPII for 2,4-D and 2,4,5-T. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on column SPB-608.

Continuing calibration %Ds exceeded the 15% quality control limit on 08/26/04 @ 11:04 on column RTX-CLPII for 2,4,5-T. No qualifiers were assigned on this basis since 2,4,5-T was compliant on column SPB-608.

Continuing calibration %Ds exceeded the 15% quality control limit on 08/26/04 @ 16:57 on column SPB-608 for 2,4,5-T and dinoseb. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on column RTX-CLPII.

Continuing calibration %Ds exceeded the 15% quality control limit on 09/09/04 @ 10:23 on column SPB-608 for 2,4-D and silvex. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on the column RTX-CLPII. Dinoseb exceeded the 15% quality control limit on 09/09/04 @ 10:23 on column RTX-CLPII. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on the column SPB-608.

Organophosphorus Pesticides

The surrogate tributyl phosphate had recoveries greater than the quality control criterion for samples 04GP0101 and 04GP0501 on the RTX-OPP column. No qualifiers were assigned on this basis because the RTX-OPP2 column was compliant.

Additional Comments:

None.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Several volatile compounds were detected in the method or trip blanks. Several volatile and semivolatile compounds exceeded the initial and/or continuing calibration %D and/or minimum RRF criteria. Several volatile, semivolatile, and herbicide compounds had LCS/LCSD percent recovery and RPD non-compliances.

Other Factors Affecting Data Quality: Several volatile, semivolatile, and organochloride pesticides had MS/MSD percent recovery and RPD non-compliances. Surrogate non-compliance occurred in the volatile, semivolatile, organochloride pesticides, PCBs, herbicides, and organophosphorus pesticides. Two internal standard non-compliances occurred in one semivolatile sample.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), and the NFESC guidelines IRCDQM (Sept., 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Edward Sedlmyer

Tetra Tech NUS

Edward Sedlmyer
Chemist/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

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	0.3	J	P
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	5	U	B
BENZENE	0.4	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.4	J	CP
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5		
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	A
TOLUENE	5	U	A
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	2	J	P
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	290	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.6	J	P
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	5	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	UJ	C
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	UJ	C
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	5	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	UJ	C
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	UJ	C
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04GP0501
samp_date	8/18/2004
lab_id	WU2577-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0501
samp_date	8/18/2004
lab_id	WU2577-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	6	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	2	J	P
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	0.9	J	P

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0701
samp_date	8/18/2004
lab_id	WU2577-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	0.2	J	P
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GP0701
samp_date	8/18/2004
lab_id	WU2577-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	0.6	J	P

nsample	04RS0815SB
samp_date	8/15/2004
lab_id	WU2524-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	12		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	23	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04RS0815SB
samp_date	8/15/2004
lab_id	WU2524-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	11		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	25	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	14		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	24	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	10		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	28	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	0.5	J	P
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04SW0101
samp_date	8/5/2004
lab_id	WU2396-1RA2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04SW0101
samp_date	8/5/2004
lab_id	WU2396-1RA2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04SW0101D
samp_date	8/5/2004
lab_id	WU2396-2RA2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04SW0101

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	7	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04SW0101D
samp_date	8/5/2004
lab_id	WU2396-2RA2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04SW0101

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	10	U	B
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	UJ	C
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04SW0201	nsample	04SW0301	nsample	04SW0301
samp_date	8/12/2004	samp_date	8/17/2004	samp_date	8/17/2004
lab_id	WU2493-2RA	lab_id	WU2544-3	lab_id	WU2544-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	UJ	C
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	11	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	3	J	P
TOLUENE	2	J	P
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04TB0805	nsample	04TB0805	nsample	04TB0806
samp_date	8/5/2004	samp_date	8/5/2004	samp_date	8/6/2004
lab_id	WU2396-5	lab_id	WU2396-5	lab_id	WU2441-1RA
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	UJ	R
1,1,2,2-TETRACHLOROETHANE	5	UJ	R
1,1,2-TRICHLOROETHANE	5	UJ	R
1,1,2-TRICHLOROTRIFLUOROETHANE	5	UJ	R
1,1-DICHLOROETHANE	5	UJ	R
1,1-DICHLOROETHENE	5	UJ	R
1,2,4-TRICHLOROBENZENE	5	UJ	R
1,2-DIBROMO-3-CHLOROPROPANE	5	UJ	R
1,2-DIBROMOETHANE	5	UJ	R
1,2-DICHLOROBENZENE	5	UJ	R
1,2-DICHLOROETHANE	5	UJ	R
1,2-DICHLOROPROPANE	5	UJ	R
1,3-DICHLOROBENZENE	5	UJ	R
1,4-DICHLOROBENZENE	5	UJ	R
2-BUTANONE	5	UJ	R
2-HEXANONE	5	UJ	R
4-METHYL-2-PENTANONE	5	UJ	R
ACETONE	5	UR	C
BENZENE	5	UJ	R
BROMODICHLOROMETHANE	5	UJ	R
BROMOFORM	5	UJ	R
BROMOMETHANE	5	UJ	R
CARBON DISULFIDE	5	UJ	R
CARBON TETRACHLORIDE	5	UJ	CR
CHLOROBENZENE	5	UJ	R
CHLORODIBROMOMETHANE	5	UJ	R
CHLOROETHANE	5	UJ	R
CHLOROFORM	5	UJ	R
CHLOROMETHANE	5	UJ	R
CIS-1,2-DICHLOROETHENE	5	UJ	R
CIS-1,3-DICHLOROPROPENE	5	UJ	R
CYCLOHEXANE	5	U	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	CR
ETHYLBENZENE	5	UJ	R
ISOPROPYLBENZENE	5	UJ	R
M+P-XYLENES	10	UJ	R
METHYL ACETATE	5	UJ	R
METHYL CYCLOHEXANE	5	UJ	R
METHYL TERT-BUTYL ETHER	5	UJ	R
METHYLENE CHLORIDE	0.6	J	PR
O-XYLENE	5	UJ	R
STYRENE	5	UJ	R
TETRACHLOROETHENE	5	UJ	R
TOLUENE	5	UJ	R
TOTAL 1,2-DICHLOROETHENE	10	UJ	R
TOTAL XYLENES	15	UJ	R
TRANS-1,2-DICHLOROETHENE	5	UJ	R
TRANS-1,3-DICHLOROPROPENE	5	UJ	R
TRICHLOROETHENE	5	UJ	R
TRICHLOROFLUOROMETHANE	5	UJ	R
VINYL CHLORIDE	5	UJ	R

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	J	P
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04TB0806
samp_date	8/6/2004
lab_id	WU2441-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	0.8	J	P
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TB0812
samp_date	8/12/2004
lab_id	WU2493-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	UJ	C
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04TB0812
samp_date	8/12/2004
lab_id	WU2493-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	UJ	C
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	0.5	J	P
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04TB0813
samp_date	8/13/2004
lab_id	WU2509-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	2	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	UJ	C
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

nsample	04TB0813
samp_date	8/13/2004
lab_id	WU2509-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	UJ	C
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	0.7	J	P
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04TB0817
samp_date	8/17/2004
lab_id	WU2544-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	UJ	C
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	C
CARBON TETRACHLORIDE	5	UJ	C
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UJ	C

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OV

nsample	04TB0817
samp_date	8/17/2004
lab_id	WU2544-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	C
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	1	J	PR
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	0.6	J	PR
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	UJ	C
VINYL CHLORIDE	5	U	

nsample	04TB0818
samp_date	8/18/2004
lab_id	WU2577-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	2	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TB0818
samp_date	8/18/2004
lab_id	WU2577-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2RA
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	UJ	CD
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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	D
HEXACHLOROETHANE	10	UJ	CD
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1RA
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	26	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	26	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	UJ	C
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	26	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	26	U	
4,6-DINITRO-2-METHYLPHENOL	26	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-METHYLPHENOL	10	U	
4-NITROANILINE	26	U	
4-NITROPHENOL	26	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	UJ	C
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	C
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	26	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	UJ	C
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	UJ	C
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	C
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0501	nsample	04GP0501	nsample	04GP0501
samp_date	8/18/2004	samp_date	8/18/2004	samp_date	8/18/2004
lab_id	WU2577-1RA	lab_id	WU2577-1RA	lab_id	WU2577-1RA
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	UJ	C
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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	UJ	C
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2RA
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	UJ	C
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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	UJ	C
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0701	nsample	04GP0701	nsample	04GP0701
samp_date	8/18/2004	samp_date	8/18/2004	samp_date	8/18/2004
lab_id	WU2577-3RA	lab_id	WU2577-3RA	lab_id	WU2577-3RA
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	UJ	C
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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	UJ	C
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04RS0815SB	nsample	04RS0815SB	nsample	04RS0815SB
samp_date	8/15/2004	samp_date	8/15/2004	samp_date	8/15/2004
lab_id	WU2524-1	lab_id	WU2524-1	lab_id	WU2524-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	26	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	26	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	UJ	C
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	26	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	26	U	
4,6-DINITRO-2-METHYLPHENOL	26	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-METHYLPHENOL	10	U	
4-NITROANILINE	26	U	
4-NITROPHENOL	26	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	UJ	C
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	C
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	26	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	26	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	26	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	26	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	26	U	
4,6-DINITRO-2-METHYLPHENOL	26	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-METHYLPHENOL	10	U	
4-NITROANILINE	26	U	
4-NITROPHENOL	26	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10		
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	5	J	P
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	26	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	26	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	26	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	26	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	26	U	
4,6-DINITRO-2-METHYLPHENOL	26	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-METHYLPHENOL	10	U	
4-NITROANILINE	26	U	
4-NITROPHENOL	26	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	26	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	U	
2,4,5-TRICHLOROPHENOL	26	U	
2,4,6-TRICHLOROPHENOL	10	U	
2,4-DICHLOROPHENOL	10	U	
2,4-DIMETHYLPHENOL	10	U	
2,4-DINITROPHENOL	26	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	26	U	
2-NITROPHENOL	10	U	
3,3'-DICHLOROBENZIDINE	10	U	
3-NITROANILINE	26	U	
4,6-DINITRO-2-METHYLPHENOL	26	U	
4-BROMOPHENYL PHENYL ETHER	10	U	
4-CHLORO-3-METHYLPHENOL	10	U	
4-CHLOROANILINE	10	U	
4-CHLOROPHENYL PHENYL ETHER	10	U	
4-METHYLPHENOL	10	U	
4-NITROANILINE	26	U	
4-NITROPHENOL	26	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10		
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	5	J	P
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	26	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04SW0101	nsample	04SW0101	nsample	04SW0101
samp_date	8/5/2004	samp_date	8/5/2004	samp_date	8/5/2004
lab_id	WU2396-1	lab_id	WU2396-1	lab_id	WU2396-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	UJ	C
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	UJ	C
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	C
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04SW0101D	nsample	04SW0101D	nsample	04SW0101D
samp_date	8/5/2004	samp_date	8/5/2004	samp_date	8/5/2004
lab_id	WU2396-2	lab_id	WU2396-2	lab_id	WU2396-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:	04SW0101	DUP_OF:	04SW0101	DUP_OF:	04SW0101

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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	UJ	C
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	UJ	C
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	C
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2RA
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OS

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-3
qc_type	NM
units	UG/L
Pct_Solids	
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	UJ	C
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	UJ	C
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	UJ	C
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	UJ	N

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	UJ	N
BENZO(B)FLUORANTHENE	10	UJ	N
BENZO(G,H,I)PERYLENE	10	UJ	CN
BENZO(K)FLUORANTHENE	10	UJ	N
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	N
BUTYL BENZYL PHTHALATE	10	UJ	DN
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	UJ	N
DIBENZO(A,H)ANTHRACENE	10	UJ	CN
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	UJ	D
DIMETHYL PHTHALATE	10	UR	D
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	UJ	N
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	D
HEXACHLOROETHANE	10	UJ	CD
INDENO(1,2,3-CD)PYRENE	10	UJ	CN
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	UJ	N

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GP0101	nsample	04GP0201	nsample	04GP0301
samp_date	8/17/2004	samp_date	8/12/2004	samp_date	8/13/2004
lab_id	SCWU2544-2	lab_id	WU2493-1	lab_id	SCWU2509-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	R
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	CR
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	CR
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GP0401	nsample	04GP0501	nsample	04GP0601
samp_date	8/13/2004	samp_date	8/18/2004	samp_date	8/18/2004
lab_id	SCWU2509-3	lab_id	SCWU2577-1	lab_id	WU2577-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	CR
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	UJ	C
ALDRIN	0.052	U	
ALPHA-BHC	0.052	U	
ALPHA-CHLORDANE	0.052	U	
AROCLOR-1016	0.52	UJ	R
AROCLOR-1221	0.52	UJ	R
AROCLOR-1232	0.52	UJ	R
AROCLOR-1242	0.52	UJ	R
AROCLOR-1248	0.52	UJ	R
AROCLOR-1254	0.52	UJ	R
AROCLOR-1260	0.52	UJ	R
BETA-BHC	0.052	U	
DELTA-BHC	0.052	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.052	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.052	U	
GAMMA-CHLORDANE	0.052	U	
HEPTACHLOR	0.052	U	
HEPTACHLOR EPOXIDE	0.052	U	
METHOXYCHLOR	0.52	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.051	U	
ALPHA-BHC	0.051	U	
ALPHA-CHLORDANE	0.051	U	
AROCLOR-1016	0.51	UJ	R
AROCLOR-1221	0.51	UJ	R
AROCLOR-1232	0.51	UJ	R
AROCLOR-1242	0.51	UJ	R
AROCLOR-1248	0.51	UJ	R
AROCLOR-1254	0.51	UJ	R
AROCLOR-1260	0.51	UJ	R
BETA-BHC	0.051	U	
DELTA-BHC	0.051	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.051	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.051	U	
GAMMA-CHLORDANE	0.051	U	
HEPTACHLOR	0.051	U	
HEPTACHLOR EPOXIDE	0.051	U	
METHOXYCHLOR	0.51	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GP0701
samp_date	8/18/2004
lab_id	SCWU2577-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	UJ	R
4,4'-DDE	0.1	UJ	R
4,4'-DDT	0.1	UJ	R
ALDRIN	0.05	UJ	R
ALPHA-BHC	0.05	UJ	R
ALPHA-CHLORDANE	0.05	UJ	R
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	R
BETA-BHC	0.05	UJ	R
DELTA-BHC	0.05	UJ	R
DIELDRIN	0.1	UJ	R
ENDOSULFAN I	0.05	UJ	R
ENDOSULFAN II	0.1	UJ	R
ENDOSULFAN SULFATE	0.1	UJ	R
ENDRIN	0.1	UJ	R
ENDRIN ALDEHYDE	0.1	UJ	R
ENDRIN KETONE	0.1	UJ	R
GAMMA-BHC (LINDANE)	0.05	UJ	R
GAMMA-CHLORDANE	0.05	UJ	R
HEPTACHLOR	0.05	UJ	R
HEPTACHLOR EPOXIDE	0.05	UJ	R
METHOXYCHLOR	0.5	UJ	R
TOXAPHENE	1	UJ	R

nsample	04RS0815SB
samp_date	8/15/2004
lab_id	WU2524-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.052	U	
ALPHA-BHC	0.052	U	
ALPHA-CHLORDANE	0.052	U	
AROCLOR-1016	0.52	U	
AROCLOR-1221	0.52	U	
AROCLOR-1232	0.52	U	
AROCLOR-1242	0.52	U	
AROCLOR-1248	0.52	U	
AROCLOR-1254	0.52	U	
AROCLOR-1260	0.52	UJ	C
BETA-BHC	0.052	U	
DELTA-BHC	0.052	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.052	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.052	U	
GAMMA-CHLORDANE	0.052	U	
HEPTACHLOR	0.052	U	
HEPTACHLOR EPOXIDE	0.052	U	
METHOXYCHLOR	0.52	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04RW0815GP	nsample	04RW0815MW	nsample	04SW0101
samp_date	8/15/2004	samp_date	8/15/2004	samp_date	8/5/2004
lab_id	WU2524-2	lab_id	WU2524-3	lab_id	WU2396-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.052	U	
ALPHA-BHC	0.052	U	
ALPHA-CHLORDANE	0.052	U	
AROCLOR-1016	0.52	U	
AROCLOR-1221	0.52	U	
AROCLOR-1232	0.52	U	
AROCLOR-1242	0.52	U	
AROCLOR-1248	0.52	U	
AROCLOR-1254	0.52	U	
AROCLOR-1260	0.52	UJ	C
BETA-BHC	0.052	U	
DELTA-BHC	0.052	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.052	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.052	U	
GAMMA-CHLORDANE	0.052	U	
HEPTACHLOR	0.052	U	
HEPTACHLOR EPOXIDE	0.052	U	
METHOXYCHLOR	0.52	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.052	U	
ALPHA-BHC	0.052	U	
ALPHA-CHLORDANE	0.052	U	
AROCLOR-1016	0.52	U	
AROCLOR-1221	0.52	U	
AROCLOR-1232	0.52	U	
AROCLOR-1242	0.52	U	
AROCLOR-1248	0.52	U	
AROCLOR-1254	0.52	U	
AROCLOR-1260	0.52	UJ	C
BETA-BHC	0.052	U	
DELTA-BHC	0.052	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.052	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.052	U	
GAMMA-CHLORDANE	0.052	U	
HEPTACHLOR	0.052	U	
HEPTACHLOR EPOXIDE	0.052	U	
METHOXYCHLOR	0.52	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04SW0101D	nsample	04SW0201	nsample	04SW0301
samp_date	8/5/2004	samp_date	8/12/2004	samp_date	8/17/2004
lab_id	WU2396-2	lab_id	WU2493-2	lab_id	WU2544-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:	04SW0101	DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	UJ	R
4,4'-DDE	0.1	UJ	R
4,4'-DDT	0.1	UJ	R
ALDRIN	0.05	UJ	R
ALPHA-BHC	0.05	UJ	R
ALPHA-CHLORDANE	0.05	UJ	R
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	CR
BETA-BHC	0.05	UJ	R
DELTA-BHC	0.05	UJ	R
DIELDRIN	0.1	UJ	R
ENDOSULFAN I	0.05	UJ	R
ENDOSULFAN II	0.1	UJ	R
ENDOSULFAN SULFATE	0.1	UJ	R
ENDRIN	0.1	UJ	R
ENDRIN ALDEHYDE	0.1	UJ	R
ENDRIN KETONE	0.1	UJ	R
GAMMA-BHC (LINDANE)	0.05	UJ	R
GAMMA-CHLORDANE	0.05	UJ	R
HEPTACHLOR	0.05	UJ	R
HEPTACHLOR EPOXIDE	0.05	UJ	R
METHOXYCHLOR	0.5	UJ	R
TOXAPHENE	1	UJ	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: HERB

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3.1	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3.1	U	
DINOSEB	5.1	U	

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: HERB

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GP0501
samp_date	8/18/2004
lab_id	WU2577-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: HERB

nsample	04GP0701
samp_date	8/18/2004
lab_id	WU2577-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04RS0815SB
samp_date	8/15/2004
lab_id	WU2524-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3.2	U	
2,4,5-TP (SILVEX)	1.1	U	
2,4-D	3.2	U	
DINOSEB	5.3	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: HERB

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04SW0101
samp_date	8/5/2004
lab_id	WU2396-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: HERB

nsample	04SW0101D
samp_date	8/5/2004
lab_id	WU2396-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04SW0101

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GP0101
samp_date	8/17/2004
lab_id	C4H180211001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GP0201
samp_date	8/12/2004
lab_id	C4H130402001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GP0301
samp_date	8/12/2004
lab_id	C4H140182001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	1	U	
DISULFOTON	1	U	
ETHYL PARATHION	1	U	
FAMPHUR	1	U	
METHYL PARATHION	1	U	
PHORATE	1	U	
SULFOTEPP	1	U	
THIONAZIN	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GP0401
samp_date	8/12/2004
lab_id	C4H140182002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GP0501
samp_date	8/18/2004
lab_id	C4H190164001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.99	U	
DISULFOTON	0.99	U	
ETHYL PARATHION	0.99	U	
FAMPHUR	0.99	U	
METHYL PARATHION	0.99	U	
PHORATE	0.99	U	
SULFOTEPP	0.99	U	
THIONAZIN	0.99	U	

nsample	04GP0601
samp_date	8/18/2004
lab_id	C4H190164002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	1	U	
DISULFOTON	1	U	
ETHYL PARATHION	1	U	
FAMPHUR	1	U	
METHYL PARATHION	1	U	
PHORATE	1	U	
SULFOTEPP	1	U	
THIONAZIN	1	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GP0701	nsample	04RW0815GP	nsample	04RW0815MW
samp_date	8/18/2004	samp_date	8/15/2004	samp_date	8/15/2004
lab_id	C4H190164003	lab_id	C4H170160002	lab_id	C4H170160001
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.99	U	
DISULFOTON	0.99	U	
ETHYL PARATHION	0.99	U	
FAMPHUR	0.99	U	
METHYL PARATHION	0.99	U	
PHORATE	0.99	U	
SULFOTEPP	0.99	U	
THIONAZIN	0.99	U	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	1	U	
DISULFOTON	1	U	
ETHYL PARATHION	1	U	
FAMPHUR	1	U	
METHYL PARATHION	1	U	
PHORATE	1	U	
SULFOTEPP	1	U	
THIONAZIN	1	U	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	1	U	
DISULFOTON	1	U	
ETHYL PARATHION	1	U	
FAMPHUR	1	U	
METHYL PARATHION	1	U	
PHORATE	1	U	
SULFOTEPP	1	U	
THIONAZIN	1	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. FISHER **DATE:** NOVEMBER 12, 2004

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SUBJECT: ORGANIC DATA VALIDATION – VOC/SVOC/PEST/PCB/HERB
CTO 283, NCBC GULFPORT
SDG: 2832

SAMPLES: 11 / Soil / VOC/SVOC/PEST/PCB/HERB

04SB0101	04SB0201	04SB0301	04SB0401
04SB0501	04SB0601	04SB0701	04SB0801
04SB0801D	04SB0901	04SB1001	

9 / Sediment / VOC/SVOC/PEST/PCB/HERB

04SD0101D	04SD0101	04SD0201	04SD0301
04SD0401	04SD0501	04SD0601	04SD0701
04SD0801			

Overview

The sample set for CTO 283; NCBC Gulfport; SDG 2832 consists of eleven (11) soil and nine (9) sediment environmental samples including two field duplicates. As detailed above, the environmental samples were analyzed for Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), organochlorine Pesticides (PEST), Polychlorinated Biphenyls (PCBs), and organochlorine Herbicides (HERB). Two field duplicate pairs were included in this SDG: 04SB0101 / 04SD0101D and 04SB0801 / 04SB0801D.

The samples were collected by Tetra Tech NUS on August 6th, 8th, 11th, 12th, 13th, 14th, 17th, 18th, and 19th, 2004 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using .S. EPA Test Methods for Evaluating Solid Waste (SW-846) Methods 8260B, 8270C, 8081, 8082, and 8151 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * GC/MS Tuning
- Initial and Continuing Calibration
- Blank Contamination
- Surrogate Recoveries
- Internal Standard Recoveries
- Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- Field Duplicate Precision

* • Detection Limits
* • Compound Identification
* • Compound Quantitation

The symbol (*) indicates that all 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.

VOC

An initial calibration Relative Response Factor (RRF) fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 07/14/04. Positive and nondetected results were reported for acetone and these were qualified as estimated (J) and rejected (UR), respectively in the affected samples.

An initial calibration RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/12/04. Positive and nondetected results were reported for acetone and these were qualified as estimated (J) and rejected (UR), respectively in the affected samples.

An initial calibration RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/26/04. Only positive results were reported for acetone and these were qualified as estimated (J) in the affected sample.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/11/04, at 08:30. Positive and nondetected results were reported for acetone and these were qualified as estimated (J) and rejected (UR), respectively, in the affected samples.

A calibration verification percent Difference (%D) exceeded the 25% quality control limit for 2-butanone on instrument GCMS-M, on 08/11/04, at 08:30. Only nondetected results were reported for 2-butanone and these were qualified as estimated (UJ) in the affected samples.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/16/04, at 08:02. Only positive results were reported for acetone and these were qualified as estimated (J) in the affected samples.

A calibration verification %D exceeded the 25% quality control limit for 2-butanone on instrument GCMS-M, on 08/16/04, at 08:02. Positive and nondetected results were reported for 2-butanone and these were qualified as estimated (J) and (UJ), respectively, in the affected samples.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/17/04, at 08:42. Only positive results were reported for acetone and these were qualified as estimated (J) in the affected samples.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/23/04, at 09:30. Positive and nondetected results were reported for acetone and these were qualified as estimated (J) and rejected (UR), respectively, in the affected samples.

A calibration verification %D exceeded the 25% quality control limit for 2-butanone on instrument GCMS-M, on 08/23/04, at 09:30. Positive and nondetected results were reported for 2-butanone and these were qualified as estimated (J) and (UJ), respectively, in the affected samples.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/24/04, at 08:21. Only positive results were reported for acetone and these were qualified as estimated (J) in the affected samples.

A calibration verification RRF fell below the 0.05 quality control limit for acetone on instrument GCMS-M, on 08/27/04, at 08:29. Only positive results were reported for acetone and these were qualified as estimated (J) in the affected sample.

The following compounds were detected in the laboratory method blanks at the concentrations indicated below:

Compound	Maximum Concentration (µg/kg)	Action Level (µg/kg)
Chloroform	0.7	3.5
Methylene chloride	15	150
1,2-dibromo-3-chloropropane	1	5

Blank Actions

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.
- Value > RL and > action level; report value unqualified.

An action level of 10X the maximum contaminant concentration was established to evaluate laboratory method blank contamination for methylene chloride. An action level of 5X the maximum contaminant concentration was established to evaluate laboratory method blank contamination for chloroform and 1,2-dibromo-3-chloropropane. Dilution factors, percent moisture, and sample aliquots were taken into consideration during the application of blank action levels. Results for acetone and methylene chloride were qualified as false positives (U) due to laboratory method blank contamination.

The common laboratory contaminant acetone was detected in the environmental samples but not in the associated laboratory method blanks. Despite the presence of acetone in the method blanks, positive acetone results were qualified as estimated (J) in the environmental samples, due to suspected laboratory contamination.

Recovery of the VOC surrogate: 1,2-dichloroethane exceeded the 61%-120% quality control limit for the analysis of samples 04SD0101D, 04SD0101D(RA2) and 04SD0101. No data validation action was taken based on these noncompliances.

Recovery of the VOC surrogate: p-bromofluorobenzene fell below the 38%-131% quality control limit for the analysis of sample 04SD0201D. Results from this sample analysis were not used for data validation purposes.

Recovery of the VOC internal standards: pentafluorobenzene, 1,4-difluorobenzene, chlorobenzene-d5 and 1,4-dichlorobenzene fell below the -50% quality control limit for the analysis of sample 04SD0101D. The sample was reanalyzed (04SD0101DRA2), resulting in similar internal standard recoveries. Therefore, the positive and nondetected results from the original sample analysis were qualified as estimated (J) and (UJ), respectively, and used for data validation purposes.

Recovery of the VOC internal standard: 1,4-dichlorobenzene fell below the -50%-+150% quality control

limit for the analysis of samples 04SD0101 and 04SD0201. The samples were reanalyzed [04SD0101(RA2) and 04SD0201(RA2)], resulting in more severe internal standard noncompliances. Therefore, the nondetected results for the affected compounds from the original sample analysis were qualified as estimated (J) and (UJ), respectively, and used for data validation purposes.

Recovery of the VOC internal standards: pentafluorobenzene, 1,4-difluorobenzene, chlorobenzene-d5 and 1,4-dichlorobenzene fell below the -50%-+150% quality control limit for the analysis of samples 04SD0101(RA2), 04SD0101D(RA2), and 04SD0201(RA2). As noted above, results from these analyses were not used for data validation purposes.

Recovery of the VOC internal standard: 1,4-dichlorobenzene fell below the -50% quality control limit for the analysis of sample 04SD0401. The sample was reanalyzed (04SD0401RA), resulting in a similar internal standard recovery. Therefore, the nondetected results for the affected target compounds from the original sample analysis were qualified as estimated (UJ), and used for data validation purposes.

Recovery of the VOC internal standard: 1,4-dichlorobenzene fell below the -50% quality control limit for the analysis of samples, 04SD0501, 04SD0501(RA), 04SD0601, 04SD0601(RA), 04SB0601, 04SD0701 and 04SD0701(RA). The "RA" suffix denotes a reanalysis. Because the internal standard recoveries were similar for the all of the aforementioned sample reanalysis, the nondetected results from the original sample analysis were qualified as estimated (UJ) and used for data validation purposes.

Laboratory Control Sample (LCS) recovery of acetone and 2-butanone exceeded their respective quality control limits for the analysis of LCSs analyzed on 08/11/04, 08/16/04 (and methylene chloride) , 08/17/04, and 08/23/04. No data validation action was taken based on these noncompliances.

As indicated on the Chain of Custody (COC) documentation, the laboratory prepared and analyzed a Matrix Spike/Matrix Spike Duplicate (MS/MSD) for the VOC fraction of sample 04SB0501. MS/MSD recovery of dichlorodifluoromethane, methyl-tert-butyl ether (MTBE), and 2-butanone exceeded their respective quality control limits. No data validation action was taken based on these noncompliances. MS/MSD recovery of 1,2,4-trichlorobenzene fell below the 60%-140% quality control limit. The nondetected result reported for 1,2,4-trichlorobenzene was qualified as estimated (UJ) in the native sample 04SB0501 only. MSD recovery of styrene fell below the 60%-140% quality control limit and MS recovery of isopropylbenzene exceeded the 60%-140% quality control limit. No data validation action was taken based on these noncompliances. Relative Percent Differences (RPDs) for styrene and isopropylbenzene exceeded the 30% quality control limit. No data validation action was taken based on these noncompliances.

As indicated on the COC documentation, the laboratory prepared and analyzed a Matrix Spike/Matrix Spike Duplicate (MS/MSD) for the VOC fraction of sample 04SD0501. MS/MSD recovery of dichlorodifluoromethane, acetone, MTBE and 2-butanone exceeded the 60%-140% quality control limit. No data validation action was taken based on these noncompliances. MSD recovery of isopropylbenzene, 1,1,2,2-tetrachloroethane and 1,2,4-trichlorobenzene fell below the 60%-140% quality control limit. No data validation action was taken based on these noncompliances.

Due to the presence of toluene at a concentration that exceeded the linear range of the instrument calibration, sample 04SB0601 was reanalyzed at a 50X dilution factor. Toluene was not detected in the diluted sample analysis; therefore, the original sample result for toluene was qualified as estimated (J) and used for data validation purposes. The qualification of toluene as estimated is due to calibration range exceedance.

SVOC

An initial calibration percent Relative Standard Deviation (%RSD) exceeded 30% quality control limit for benzaldehyde on instrument GCMS-K, on 08/30/04. Only nondetected results were reported for benzaldehyde and these were qualified as estimated (UJ) in the affected samples.
An initial calibration percent %RSD exceeded 30% quality control limit for benzaldehyde on instrument GCMS-K, on 09/03/04. Only nondetected results were reported for benzaldehyde and these were qualified as estimated (UJ) in the affected samples.

An initial calibration percent %RSD exceeded 30% quality control limit for benzaldehyde on instrument GCMS-X, on 08/20/04. Only nondetected results were reported for benzaldehyde and these were qualified as estimated (UJ) in the affected sample.

An initial calibration percent %RSD exceeded 30% quality control limit for benzaldehyde on instrument GCMS-X, on 09/14/04. Only nondetected results were reported for benzaldehyde and these were qualified as estimated (UJ) in the affected samples.

Calibration verification percent %Ds exceeded the 25% quality control limit for benzaldehyde and 2,4-dinitrophenol on instrument GCMS-K, on 09/02/04, at 11:27. Only nondetected results were reported for benzaldehyde and 2,4-dinitrophenol and these were qualified as estimated (UJ) in the affected samples.

Calibration verification percent %Ds exceeded the 25% quality control limit for benzaldehyde and 4-nitrophenol on instrument GCMS-K, on 09/13/04, at 16:19. Positive and nondetected results were reported for benzaldehyde and these were qualified as estimated (J) and (UJ), respectively. Only nondetected results were reported for 4-nitrophenol and these were qualified as estimated (UJ) in the affected samples.

A calibration verification percent %D exceeded the 25% quality control limit for benzaldehyde on instrument GCMS-K, on 09/14/04, at 15:45. Only nondetected results were reported for benzaldehyde and these were qualified as estimated (UJ) in the affected samples.

Calibration verification percent %Ds exceeded the 25% quality control limit for benzaldehyde and butylbenzyl phthalate on instrument GCMS-K, on 09/15/04, at 11:39. Positive and nondetected results were reported for benzaldehyde and these were qualified as estimated (J) and (UJ), respectively. Only nondetected results were reported for butylbenzylphthalate and these were qualified as estimated (UJ) in the affected samples.

Calibration verification percent %Ds exceeded the 25% quality control limit for hexachlorobutadiene, butylbenzylphthalate and di-n-octylphthalate on instrument GCMS-X, on 08/23/04, at 08:26. Only nondetected results were reported for hexachlorocyclopentadiene, butylbenzylphthalate and di-N-octylphthalate and these were qualified as estimated (UJ) in the affected samples.

Calibration verification percent %Ds exceeded the 25% quality control limit for benzaldehyde and 2-chloronaphthalene on instrument GCMS-X, on 09/15/04, at 11:20. Only nondetected results were reported for benzaldehyde and 2-chloronaphthalene and these were qualified as estimated (UJ) in the affected samples.

The following compounds were detected in the laboratory method blanks at the concentrations indicated below:

Compound	Maximum Concentration (µg/kg)	Action Level (µg/kg)
Di-n-octyl phthalate	220	2200
di-n-butyl phthalate	180	1800

Blank Actions

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.
- Value > RL and > action level; report value unqualified.

An action level of 10X the maximum contaminant concentration was established to evaluate laboratory method blank contamination for all blank contaminants. Dilution factors, percent moisture, and sample aliquots were taken into consideration during the application of blank action levels. Positive results for di-n-butyl phthalate were qualified as false positives (U) due to laboratory method blank contamination.

Recovery of the base/neutral surrogates: 2-fluorobiphenyl and terphenyl-d14 exceeded their respective quality control limits for the analysis of samples 04SD0301, 04SD0401, and 04SB0201(RA). No data validation action was taken based on these noncompliances.

Recovery of the base/neutral surrogates: nitrobenzene-d5, 2-fluorobiphenyl and terphenyl-d14 exceeded their respective quality control limits for the analysis of sample 04SB0201. As noted above, the sample was re-analyzed with similar surrogate recoveries. No data validation action was taken based on these noncompliances.

Recovery of the base/neutral surrogate: terphenyl-d14 and the acid surrogate: 2,4,6-tribromophenol exceeded their respective quality control limits for the analysis of samples 04SB0801D and 04SB1001. No data validation action was taken based on these noncompliances.

Recovery of 2 base/neutral surrogates exceeded their respective quality control limits for the analysis of the laboratory method blank associated with extraction batch WG9390 and sample 04SB0101. No data validation action was taken based on these noncompliances.

Recovery of one base/neutral surrogate exceeded its quality control limit for the analysis of the laboratory method blank associated with extraction batch WG0950. No data validation action was taken based on this noncompliance.

Recovery of the SVOC internal standards: chrysene-d12 and perylene-d12 fell below the -50% quality control limit for the analysis of sample 04SB0201. The sample was re-analyzed resulting in compliant chrysene-d12 and perylene-d12 recoveries. However, the internal standards 1,4-dichlorobenzene-d4, naphthalene-d8 and acenaphthene-d10 were recovered above the ~~-50%~~ +100% quality control limit and the internal standard perylene-d12 was recovered below the -50% quality control limit. Because the internal standard recoveries were less severe for the re-analysis, positive and nondetected results from the re-analysis for the affected target compounds were qualified as estimated (J) and (UJ), respectively, and used for data validation purposes. 11-15-04 JAO

Recovery of the SVOC target compound benzo(k)fluoranthene exceeded the 52%-117% quality control limit for the analysis of the Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

associated with extraction batch No. WG9050. No data validation action was taken on this basis.

Recovery of the SVOC target compounds hexachloroethane and hexachlorobutadiene fell below their respective quality control limits for the analysis of the LCS/LCSD associated with extraction batch No. WG9174. The Relative Percent Difference (RPD) between the LCS/LCSD recovery of hexachloroethane and hexachlorobutadiene exceeded the 50% quality control limit. No data validation action was taken based on these noncompliances.

LCSD recovery of the SVOC target compound dibenzo(a,h)anthracene exceeded the 42%-113% quality control limit for the analysis of the LCS/LCSD associated with extraction batch No. WG9387. No data validation action was taken on this basis.

LCS recovery of the SVOC target compound phenanthrene exceeded the 55%-112% quality control limit for the analysis of the LCS/LCSD associated with extraction batch No. WG9390. No data validation action was taken on this basis.

LCS recovery of the SVOC target compound 4-chloroaniline fell below the 49%-107% quality control limit for the analysis of the LCS/LCSD associated with extraction batch No. WG9435. No data validation action was taken on this basis.

As indicated on the Chain of Custody documentation (COC), the laboratory prepared and analyzed a Matrix Spike/Matrix Spike Duplicate (MS/MSD) for the SVOC fraction of sample 04SD0501. Recovery of Hexachloroethane (48% and 37%), hexachlorocyclopentadiene (<10%) and 3,3'-dichlorobenzidine (<10%) fell below the 60%-140% quality control limit for the MS/MSD analysis of sample 04SD0501. The nondetected result reported for Hexachloroethane was qualified as estimated (UJ) in the native sample 04SD0501 only. Only nondetected results were reported for hexachlorocyclopentadiene and 3,3'-dichlorobenzidine and these were rejected (UR) in the native sample 04SD0501 only. Recovery of benzo(a)anthracene, chrysene, benzo(a)pyrene, benzo(b)fluoranthene and benzo(k)fluoroanthene fell below the 60%-140% quality control limit for the MS/MSD analysis of sample 04SD0501. In addition, the RPD for benzo(b)fluoranthene and benzo(k)fluoranthene recoveries exceeded the 50% quality control limit. The aforementioned compounds were detected in the native sample at elevated concentrations (at or above the spiked concentration); therefore, no data validation action was taken based on these noncompliances. Recovery of 4-chloroaniline fell below the 60%-140% quality control limit and acenaphthene and di-n-octylphthalate exceeded the 60%-140% quality control limit for the MSD analysis of sample 04SD0501. No data validation action was taken based on these noncompliances.

As indicated on the COC documentation, the laboratory prepared and analyzed a MS/MSD for the SVOC fraction of sample 04SB0501. Recovery of hexachlorocyclopentadiene fell below the 60%-140% quality control limit for the MS/MSD analysis of sample 04SB0501. The nondetected result reported for hexachlorocyclopentadiene was qualified as estimated (UJ) in the native sample 05SB0501 only. Recovery of pyrene exceeded the 30%-136% quality control limit for the MSD analysis of sample 05SB0501. No data validation action was taken based on this noncompliance.

The SVOC extraction of sample 04SB0201 was concentrated to a final volume of 2 ml instead of 1ml. This has the effect of a 2X dilution factor and accounts for the elevated reporting limits for this sample.

PEST/PCB

A calibration verification %D exceeded the 15% quality control limit for 4,4'-DDT on both analytical columns, on instrument GC08, on 09/04/04, at 02:17. Only nondetected result were reported for 4,4'-DDT and these were qualified as estimated (J) in the affected samples.

Calibration verification %Ds exceeded the 15% quality control limit for 4,4'-DDD and heptachlor on one analytical column, on instrument GC08, on 09/04/04, at 02:17. No data validation action was taken based on these noncompliances.

Calibration verification %Ds exceeded the 15% quality control limit for 4,4'-DDD, heptachlor and methoxychlor on one analytical column, on instrument GC08, on 08/21/04, at 03:21. No data validation action was taken based on these noncompliances.

Calibration verification %Ds exceeded the 15% quality control limit for 4,4'-DDT, 4,4'-DDD, delta-BHC, Endosulfan Sulfate, Endrin Ketone and alpha-Chlordane on both analytical columns, on instrument GC08, on 09/08/04, at 03:09. Only nondetected result were reported for 4,4'-DDT, 4,4'-DDD, delta-BHC, Endosulfan Sulfate, Endrin Ketone and alpha-Chlordane and these were qualified as estimated (UJ) in the affected sample.

Calibration verification %Ds exceeded the 15% quality control limit for 4,4'-DDT, 4,4'-DDD, delta-BHC, Endrin Ketone and methoxychlor on both analytical columns, on instrument GC08, on 09/17/04, at 16:37. Only nondetected result were reported for 4,4'-DDT, 4,4'-DDD, delta-BHC, Endrin Ketone and methoxychlor and these were qualified as estimated (UJ) in the affected samples.

A calibration verification %D exceeded the 15% quality control limit for alpha-BHC on one analytical column, on instrument GC08, on 09/17/04, at 10:15. No data validation action was taken based on this noncompliance.

A calibration verification %D exceeded the 15% quality control limit for 4,4'-DDT on both analytical columns, on instrument GC08, on 09/15/04, at 19:35. Positive and nondetected results were reported for 4,4'-DDT and these were qualified as estimated (J) and (UJ), respectively, in the affected samples.

A calibration verification %D exceeded the 15% quality control limit for alpha-BHC on one analytical column, on instrument GC08, on 09/15/04, at 19:35. No data validation action was taken based on this noncompliance.

A calibration verification %D exceeded the 15% quality control limit for delta-BHC on one analytical column, on instrument GC08, on 09/17/04, at 10:15. No data validation action was taken based on this noncompliance.

A calibration verification %D exceeded the 15% quality control limit for delta-BHC on one analytical column, on instrument GC08, on 09/20/04, at 11:46. No data validation action was taken based on this noncompliance.

Calibration verification %Ds exceeded the 15% quality control limit for all target pesticide compounds (except 4,4'-DDD) on both analytical columns, on instrument GC08, on 09/20/04, at 20:25. Positive and nondetected results were qualified as estimated (J) and (UJ), respectively, in the affected samples.

The following compounds were detected in the laboratory method blanks (associated with preparation batch No. SCWG9342 at the concentrations indicated below:

Compound	Maximum Concentration (µg/kg)	Action Level (µg/kg)
Heptachlor	3.5	17.5
Dieldrin	5.6	28
Toxaphene	300	1500
Endrin	2.4	12
Methoxychlor	1.5	7.5
Endosulfan sulfate	8	40
Alpha-BHC	1.3	6.5

Blank Actions

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.
- Value > RL and > action level; report value unqualified.

An action level of 5X the maximum contaminant concentration was established to evaluate laboratory method blank contamination for all blank contaminants. Dilution factors, percent moisture, and sample aliquots were taken into consideration during the application of blank action levels. Positive results reported for dieldrin in the associated samples (preparation batch No. SCWG9342) 04SB0201, 04SB0301, 04SD0301 and 04SD0401, were qualified as false positives (U) due to laboratory method blank contamination.

Recovery of the pesticide surrogate tetrachloro-m-xylene (TCX) fell below the 49%-110% quality control limit on analytical columns for the analysis of samples 04SD0101, 04SD0101D, 04SB0101, 04SD0201 and 04SD0701. Positive and nondetected results reported for all target pesticide compounds were qualified as estimated (J) and (UJ), respectively, in samples 04SD0101, 04SD0101D, 04SB0101, 04SD0201 and 04SD0701.

Recovery of the pesticide surrogate TCX fell below the 49%-110% quality control limit on one analytical column for the analysis of samples 04SD0401 and 04SB0201. No data validation action was taken based on these noncompliances.

Recovery of the pesticide surrogate TCX exceeded the 49%-110% quality control limit on one analytical column for the analysis of the LCS associated with extraction batch No. WG9342. No data validation action was taken based on this noncompliance.

The %D between analytical columns for positive pesticide results in the following samples exceeded the 25% quality control limit:

Sample	Compound	%D
04SD0404	4,4'-DDT	48.3
04SB0201	Gamma-Chlordane	92.4
04SD0801	Gamma-Chlordane	99.2
	Alpha-Chlordane	27.5

Positive results for the above target compounds were qualified as estimated (J), due to variance between analytical columns.

Recovery of the pesticide target compound Endosulfan II fell below the 61%-115% quality control limit the analysis of the LCS/LCSD associated with extraction batch No. WG9239. The Relative Percent Difference (RPD) between the LCS/LCSD recovery of Endrin Aldehyde exceeded the 50% quality control limit. No data validation action was taken based on these noncompliances.

Recovery of the pesticide target compounds Endosulfan I and Endosulfan II fell below their respective quality control limits the analysis of the LCS/LCSD associated with extraction batch No. WG9258. No data validation action was taken based on these noncompliances.

Due to oversight, the laboratory did not prepare and analyze a MS/MSD for the pesticide and PCB fractions of samples 04SD0501 and 04SB0501. This is noted as a data completeness issue.

The target pesticide gamma-Chlordane was present at a concentration that exceeded the linear range of the instrument calibration for samples 04SB0201 and 04SD0801. The samples were not diluted and reanalyzed; therefore, the positive results for gamma-Chlordane were qualified as estimated (J), due to calibration range exceedance.

A PCB calibration verification %D exceeded the 15% quality control limit on one analytical column for Aroclor-1016, on instrument GC06, on 08/30/04, at 15:45. No data validation action was taken based on this noncompliance.

PCB calibration verification %Ds exceeded the 15% quality control limit on one analytical column for Aroclor-1016 and Aroclor-1260, on instrument GC06, on 08/30/04, at 19:16. No data validation action was taken based on these noncompliances.

A PCB calibration verification %D exceeded the 15% quality control limit on one analytical column for Aroclor-1260, on instrument GC06, on 09/16/04, at 08:29. No data validation action was taken based on this noncompliance.

A PCB calibration verification %D exceeded the 15% quality control limit on one analytical column for Aroclor-1260, on instrument GC06, on 09/20/04, at 08:29. No data validation action was taken based on this noncompliance.

A PCB calibration verification %D exceeded the 15% quality control limit on one analytical column for Aroclor-1260, on instrument GC06, on 09/21/04, at 07:21. No data validation action was taken based on this noncompliance.

A PCB calibration verification %D exceeded the 15% quality control limit on one analytical column for Aroclor-1260, on instrument GC06, on 09/21/04, at 17:04. No data validation action was taken based on this noncompliance.

Recovery of the PCB surrogates TCX and decachlorobiphenyl (DCB) fell below their respective quality control limits on both analytical columns for the analysis of sample 04SD0101D. The sample was reanalyzed with acceptable surrogate recoveries. Therefore, the PCB results reported from the reanalysis are used for data validation purposes.

Recovery of the PCB surrogate DCB fell below the 56%-107% quality control limit on both analytical columns for the analysis of sample 04SB0501. Only nondetected results were reported for all target PCB

compounds and these were qualified as estimated (UJ), respectively, in sample 04SB0501.

Recovery of the PCB surrogate TCX fell below the 44%-103% quality control limit on both analytical columns for the analysis of sample 04SD0101. Only nondetected results were reported for all target PCB compounds and these were qualified as estimated (UJ), respectively, in sample 04SD0101.

Recovery of the PCB surrogate TCX fell below the 44%-103% quality control limit on both analytical columns for the analysis of samples 04SD0201 and 04SD0701. Only nondetected results were reported for all target PCB compounds and these were qualified as estimated (UJ), respectively, in samples 04SD0501 and 04SD0701.

Recovery of the PCB surrogate DCB fell below the 56%-107% quality control limit on one analytical column for the analysis of samples 04SD0201 and 04SD0701. No data validation action was taken based on these noncompliances.

Recovery of the PCB surrogate DCB fell below the 56%-107% quality control limit on both analytical columns for the analysis of sample 04SB0401. Only nondetected results were reported for all target PCB compounds and these were qualified as estimated (UJ), respectively, in sample 04SB0401.

Recovery of the PCB surrogate TCX exceeded the 44%-103% quality control limit on one analytical column for the analysis of the LCS associated with extraction batch No. WG9237. No data validation action was taken based on this noncompliance.

HERB

A calibration verification %D exceeded the 15% quality control limit for 2,4,5-T on one analytical column on instrument GC03H, on 09/13/04, at 15:26. No data validation action was taken based on this noncompliance.

A calibration verification %D exceeded the 15% quality control limit for 2,4,5-T on one analytical column on instrument GC03H, on 09/13/04, at 20:08. No data validation action was taken based on this noncompliance.

Recovery of the herbicide surrogate 2,4-dichlorophenylacetic acid (2,4-D) fell below the 32%-136% (and was <10% for one sample) quality control limit on both analytical columns for the analysis of samples 04SD0801 and 04SD0601. The samples were re-extracted and reanalyzed with an acceptable surrogate recoveries. However, the re-extraction was conducted 15-days beyond the allowable 14-day holding time. In the opinion of the reviewer, results reported from the reanalysis are of higher quality than those obtained from the analyses with surrogate recovery noncompliance; therefore, results from the re-extraction were qualified as estimated (UJ) and used for data validation purposes.

Recovery of the herbicide target compound 2,4,5-T fell below the 30%-120% quality control limit the analysis of the LCS/LCSD associated with extraction batch No. WG9968. No data validation action was taken based on these noncompliances.

As indicated on the COC documentation, the laboratory prepared and analyzed a MS/MSD for the herbicide fraction of sample 04SB0501. Recovery of Silvex and Dinoseb fell below the 30%-120% quality control limit for the MS analysis of sample 04SB0501. No data validation action was taken based on these noncompliances.

Additional Comments

Positive results less than the sample-specific Reporting Limit (RL) and greater than the Method Detection Limit (MDL) were qualified as estimated (J), due to uncertainty near the detection limit.

Field duplicate precision was evaluated for the field duplicate pair 04SD0101 and 04SD0101D. Field duplicate precision is measured by calculating the Relative Percent Difference (RPD) between positive results in the field duplicate pair. Precision is evaluated by comparing the calculated RPD against the quality control limit of 35% for aqueous matrices and 50% for solid/soil matrices. The target VOC acetone was identified in the field duplicate pair 04SD0101/04SD0101D, resulting in a RPD that exceeded the 50% quality control limit. Positive results for acetone were qualified as estimated (J) in the field duplicate pair, due to field duplicate imprecision. The target VOC trichlorotrifluoromethane was identified in the original sample 04SD0101 but not in the duplicate sample 04SD0101D, resulting in a RPD of 200%. No data validation action was taken because the trichlorotrifluoromethane result was less than 2X the RL. No target SVOCs, pesticides, or herbicides were detected in the field duplicate pair.

Field duplicate precision was evaluated for the field duplicate pair 04SB0801 and 04SB0801D. Field duplicate precision is measured by calculating the Relative Percent Difference (RPD) between positive results in the field duplicate pair. Precision is evaluated by comparing the calculated RPD against the quality control limit of 35% for aqueous matrices and 50% for solid/soil matrices. The target VOCs acetone, carbon disulfide and vinyl chloride were detected in the field duplicate pair 04SB0801/04SB0801D, resulting RPDs that exceeded the 50% quality control limit. Positive results for acetone were qualified as estimated (J), due to field duplicate imprecision. No data validation action was taken for carbon disulfide and vinyl chloride as these results were less than 2X the RL. The target VOCs toluene and trichlorotrifluoromethane were detected in the field duplicate pair 04SB0801/04SB0801D, resulting in acceptable RPDs. No target SVOCs, pesticides, or herbicides were detected in the field duplicate pair.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Noncompliances were observed for Initial and continuing calibrations, LCS recoveries, and dual column analysis %Ds. Some data were qualified as estimated (J) or rejected (R) based on these noncompliances. Method blank contamination was observed for the VOC, SVOC and Pesticide fractions. Data were qualified as false positives based on laboratory method blank contamination. Transcription and data completeness issues were noted for several fractions; however, no data were qualified on this basis.

Other Factors Affecting Data Quality: Noncompliances were observed for VOC, SVOC, PEST/PCB, and herbicide surrogates recoveries, resulting in the qualification of data as estimated (J). Noncompliances were noted for VOC and SVOC internal standard recoveries, resulting in the qualification of data as estimated (J). Noncompliant recoveries were observed for VOC and SVOC MS/MSD samples, resulting in the estimation (J) and rejection (R) of data. Several samples were re-extracted, re-analyzed or analyzed at dilution due to the presence of target compounds, poor surrogate/ internal standard recoveries or matrix interference. This accounts for some elevated reporting limits.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

TetraTech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	26	U	
2-HEXANONE	26	U	
4-METHYL-2-PENTANONE	26	U	
ACETONE	48	J	AC
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	5	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	16	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	1	J	P
VINYL CHLORIDE	5	U	

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	9	J	CP
2-HEXANONE	25	U	
4-METHYL-2-PENTANONE	25	U	
ACETONE	66	J	AC
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.7	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	3	J	P
ISOPROPYLBENZENE	0.8	J	P
M+P-XYLENES	2	J	P
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	6		
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	26	UJ	C
2-HEXANONE	26	U	
4-METHYL-2-PENTANONE	26	U	
ACETONE	22	J	ACP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	2	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	11	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	11	U	
METHYLENE CHLORIDE	5	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	11	U	
TOTAL XYLENES	16	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
units	UG/KG
Pct_Solids	79.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	7	U	
1,1,2,2-TETRACHLOROETHANE	7	U	
1,1,2-TRICHLOROETHANE	7	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	7	U	
1,1-DICHLOROETHANE	7	U	
1,1-DICHLOROETHENE	7	U	
1,2,4-TRICHLOROBENZENE	7	U	
1,2-DIBROMO-3-CHLOROPROPANE	7	U	
1,2-DIBROMOETHANE	7	U	
1,2-DICHLOROBENZENE	7	U	
1,2-DICHLOROETHANE	7	U	
1,2-DICHLOROPROPANE	7	U	
1,3-DICHLOROBENZENE	7	U	
1,4-DICHLOROBENZENE	7	U	
2-BUTANONE	37	UJ	C
2-HEXANONE	37	U	
4-METHYL-2-PENTANONE	37	U	
ACETONE	23	J	ACP
BENZENE	7	U	
BROMODICHLOROMETHANE	7	U	
BROMOFORM	7	U	
BROMOMETHANE	7	U	
CARBON DISULFIDE	2	J	P
CARBON TETRACHLORIDE	7	U	
CHLOROBENZENE	1	J	P
CHLORODIBROMOMETHANE	7	U	
CHLOROETHANE	7	U	
CHLOROFORM	7	U	
CHLOROMETHANE	7	U	
CIS-1,2-DICHLOROETHENE	7	U	
CIS-1,3-DICHLOROPROPENE	7	U	
CYCLOHEXANE	7	U	

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
units	UG/KG
Pct_Solids	79.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	7	U	
ETHYLBENZENE	7	U	
ISOPROPYLBENZENE	7	U	
M+P-XYLENES	15	U	
METHYL ACETATE	7	U	
METHYL CYCLOHEXANE	7	U	
METHYL TERT-BUTYL ETHER	15	U	
METHYLENE CHLORIDE	7	U	
O-XYLENE	7	U	
STYRENE	7	U	
TETRACHLOROETHENE	7	U	
TOLUENE	7	U	
TOTAL 1,2-DICHLOROETHENE	15	U	
TOTAL XYLENES	22	U	
TRANS-1,2-DICHLOROETHENE	7	U	
TRANS-1,3-DICHLOROPROPENE	7	U	
TRICHLOROETHENE	7	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	7	U	

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
units	UG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	D
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	27	U	
2-HEXANONE	27	U	
4-METHYL-2-PENTANONE	27	U	
ACETONE	27	J	AC
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	1	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
units	UG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	11	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	11	U	
METHYLENE CHLORIDE	7	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	11	U	
TOTAL XYLENES	16	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	5	U	

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	6	U	
1,1,2,2-TETRACHLOROETHANE	6	UJ	N
1,1,2-TRICHLOROETHANE	6	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	6	U	
1,1-DICHLOROETHANE	6	U	
1,1-DICHLOROETHENE	6	U	
1,2,4-TRICHLOROBENZENE	6	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	6	UJ	N
1,2-DIBROMOETHANE	6	U	
1,2-DICHLOROBENZENE	6	UJ	N
1,2-DICHLOROETHANE	6	U	
1,2-DICHLOROPROPANE	6	U	
1,3-DICHLOROBENZENE	6	UJ	N
1,4-DICHLOROBENZENE	6	UJ	N
2-BUTANONE	12	J	CP
2-HEXANONE	29	U	
4-METHYL-2-PENTANONE	29	U	
ACETONE	200	J	AC
BENZENE	6	U	
BROMODICHLOROMETHANE	6	U	
BROMOFORM	6	U	
BROMOMETHANE	6	U	
CARBON DISULFIDE	1	J	P
CARBON TETRACHLORIDE	6	U	
CHLOROBENZENE	6	U	
CHLORODIBROMOMETHANE	6	U	
CHLOROETHANE	6	U	
CHLOROFORM	6	U	
CHLOROMETHANE	6	U	
CIS-1,2-DICHLOROETHENE	6	U	
CIS-1,3-DICHLOROPROPENE	6	U	
CYCLOHEXANE	6	U	

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	6	U	
ETHYLBENZENE	170		
ISOPROPYLBENZENE	6	UJ	N
M+P-XYLENES	12	U	
METHYL ACETATE	6	U	
METHYL CYCLOHEXANE	2	J	P
METHYL TERT-BUTYL ETHER	12	U	
METHYLENE CHLORIDE	24	U	A
O-XYLENE	6	U	
STYRENE	88		
TETRACHLOROETHENE	6	U	
TOLUENE	360	J	L
TOTAL 1,2-DICHLOROETHENE	12	U	
TOTAL XYLENES	17	U	
TRANS-1,2-DICHLOROETHENE	6	U	
TRANS-1,3-DICHLOROPROPENE	6	U	
TRICHLOROETHENE	6	U	
TRICHLOROFLUOROMETHANE	4	J	P
VINYL CHLORIDE	6	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	6	U	
1,1,2,2-TETRACHLOROETHANE	6	U	
1,1,2-TRICHLOROETHANE	6	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	6	U	
1,1-DICHLOROETHANE	6	U	
1,1-DICHLOROETHENE	6	U	
1,2,4-TRICHLOROBENZENE	6	U	
1,2-DIBROMO-3-CHLOROPROPANE	6	U	
1,2-DIBROMOETHANE	6	U	
1,2-DICHLOROBENZENE	6	U	
1,2-DICHLOROETHANE	6	U	
1,2-DICHLOROPROPANE	6	U	
1,3-DICHLOROBENZENE	6	U	
1,4-DICHLOROBENZENE	6	U	
2-BUTANONE	29	UJ	C
2-HEXANONE	29	U	
4-METHYL-2-PENTANONE	29	U	
ACETONE	110	J	AC
BENZENE	6	U	
BROMODICHLOROMETHANE	6	U	
BROMOFORM	6	U	
BROMOMETHANE	6	U	
CARBON DISULFIDE	1	J	P
CARBON TETRACHLORIDE	6	U	
CHLOROBENZENE	6	U	
CHLORODIBROMOMETHANE	6	U	
CHLOROETHANE	6	U	
CHLOROFORM	6	U	
CHLOROMETHANE	6	U	
CIS-1,2-DICHLOROETHENE	6	U	
CIS-1,3-DICHLOROPROPENE	6	U	
CYCLOHEXANE	6	U	

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	6	U	
ETHYLBENZENE	6	U	
ISOPROPYLBENZENE	6	U	
M+P-XYLENES	12	U	
METHYL ACETATE	6	U	
METHYL CYCLOHEXANE	6	U	
METHYL TERT-BUTYL ETHER	12	U	
METHYLENE CHLORIDE	15	U	A
O-XYLENE	6	U	
STYRENE	6	U	
TETRACHLOROETHENE	6	U	
TOLUENE	6	U	
TOTAL 1,2-DICHLOROETHENE	12	U	
TOTAL XYLENES	18	U	
TRANS-1,2-DICHLOROETHENE	6	U	
TRANS-1,3-DICHLOROPROPENE	6	U	
TRICHLOROETHENE	6	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	6	U	

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2RA
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	25	U	
2-HEXANONE	25	U	
4-METHYL-2-PENTANONE	25	U	
ACETONE	130	J	ACG
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.9	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2RA
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	6	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	0.7	J	P
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	3	J	P
VINYL CHLORIDE	6		

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3RA2
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	6	U	
1,1,2,2-TETRACHLOROETHANE	6	U	
1,1,2-TRICHLOROETHANE	6	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	6	U	
1,1-DICHLOROETHANE	6	U	
1,1-DICHLOROETHENE	6	U	
1,2,4-TRICHLOROBENZENE	6	U	
1,2-DIBROMO-3-CHLOROPROPANE	6	U	
1,2-DIBROMOETHANE	6	U	
1,2-DICHLOROBENZENE	6	U	
1,2-DICHLOROETHANE	6	U	
1,2-DICHLOROPROPANE	6	U	
1,3-DICHLOROBENZENE	6	U	
1,4-DICHLOROBENZENE	6	U	
2-BUTANONE	30	U	
2-HEXANONE	30	U	
4-METHYL-2-PENTANONE	30	U	
ACETONE	270	J	ACG
BENZENE	6	U	
BROMODICHLOROMETHANE	6	U	
BROMOFORM	6	U	
BROMOMETHANE	6	U	
CARBON DISULFIDE	2	J	P
CARBON TETRACHLORIDE	6	U	
CHLOROBENZENE	6	U	
CHLORODIBROMOMETHANE	6	U	
CHLOROETHANE	6	U	
CHLOROFORM	6	U	
CHLOROMETHANE	6	U	
CIS-1,2-DICHLOROETHENE	6	U	
CIS-1,3-DICHLOROPROPENE	6	U	
CYCLOHEXANE	6	U	

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3RA2
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	6	U	
ETHYLBENZENE	6	U	
ISOPROPYLBENZENE	6	U	
M+P-XYLENES	12	U	
METHYL ACETATE	6	U	
METHYL CYCLOHEXANE	6	U	
METHYL TERT-BUTYL ETHER	12	U	
METHYLENE CHLORIDE	10	U	A
O-XYLENE	6	U	
STYRENE	6	U	
TETRACHLOROETHENE	6	U	
TOLUENE	0.9	J	P
TOTAL 1,2-DICHLOROETHENE	12	U	
TOTAL XYLENES	18	U	
TRANS-1,2-DICHLOROETHENE	6	U	
TRANS-1,3-DICHLOROPROPENE	6	U	
TRICHLOROETHENE	6	U	
TRICHLOROFLUOROMETHANE	3	J	P
VINYL CHLORIDE	3	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	25	UJ	C
2-HEXANONE	25	U	
4-METHYL-2-PENTANONE	25	U	
ACETONE	25	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	2	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	5	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	5	U	

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	25	UJ	C
2-HEXANONE	25	U	
4-METHYL-2-PENTANONE	25	U	
ACETONE	110	J	AC
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	6		
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	10	U	
METHYLENE CHLORIDE	30	U	A
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	3	J	P
VINYL CHLORIDE	5	U	

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	6	U	
1,1,2,2-TETRACHLOROETHANE	6	UJ	N
1,1,2-TRICHLOROETHANE	6	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	6	U	
1,1-DICHLOROETHANE	6	U	
1,1-DICHLOROETHENE	6	U	
1,2,4-TRICHLOROBENZENE	6	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	6	UJ	N
1,2-DIBROMOETHANE	6	U	
1,2-DICHLOROBENZENE	6	UJ	N
1,2-DICHLOROETHANE	6	U	
1,2-DICHLOROPROPANE	6	U	
1,3-DICHLOROBENZENE	6	UJ	N
1,4-DICHLOROBENZENE	6	UJ	N
2-BUTANONE	29	UJ	C
2-HEXANONE	29	U	
4-METHYL-2-PENTANONE	29	U	
ACETONE	38	J	ACG
BENZENE	6	U	
BROMODICHLOROMETHANE	6	U	
BROMOFORM	6	U	
BROMOMETHANE	6	U	
CARBON DISULFIDE	6	U	
CARBON TETRACHLORIDE	6	U	
CHLOROBENZENE	6	U	
CHLORODIBROMOMETHANE	6	U	
CHLOROETHANE	6	U	
CHLOROFORM	6	U	
CHLOROMETHANE	6	U	
CIS-1,2-DICHLOROETHENE	6	U	
CIS-1,3-DICHLOROPROPENE	6	U	
CYCLOHEXANE	6	U	

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	6	U	
ETHYLBENZENE	6	U	
ISOPROPYLBENZENE	6	UJ	N
M+P-XYLENES	12	U	
METHYL ACETATE	6	U	
METHYL CYCLOHEXANE	6	U	
METHYL TERT-BUTYL ETHER	12	U	
METHYLENE CHLORIDE	6	U	
O-XYLENE	6	U	
STYRENE	6	U	
TETRACHLOROETHENE	6	U	
TOLUENE	6	U	
TOTAL 1,2-DICHLOROETHENE	12	U	
TOTAL XYLENES	17	U	
TRANS-1,2-DICHLOROETHENE	6	U	
TRANS-1,3-DICHLOROPROPENE	6	U	
TRICHLOROETHENE	6	U	
TRICHLOROFLUOROMETHANE	1	J	P
VINYL CHLORIDE	6	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0101D	nsample	04SD0101D	nsample	04SD0201
samp_date	8/5/2004	samp_date	8/5/2004	samp_date	8/6/2004
lab_id	WU2405-2	lab_id	WU2405-2	lab_id	WU2414-1RA
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	75.2	Pct_Solids	75.2	Pct_Solids	61.6
DUP_OF:	04SD0101	DUP_OF:	04SD0101	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	11	UJ	N
1,1,2,2-TETRACHLOROETHANE	11	UJ	N
1,1,2-TRICHLOROETHANE	11	UJ	N
1,1,2-TRICHLOROTRIFLUOROETHANE	11	UJ	N
1,1-DICHLOROETHANE	11	UJ	N
1,1-DICHLOROETHENE	11	UJ	N
1,2,4-TRICHLOROBENZENE	11	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	11	UJ	N
1,2-DIBROMOETHANE	11	UJ	N
1,2-DICHLOROBENZENE	11	UJ	N
1,2-DICHLOROETHANE	11	UJ	N
1,2-DICHLOROPROPANE	11	UJ	N
1,3-DICHLOROBENZENE	11	UJ	N
1,4-DICHLOROBENZENE	11	UJ	N
2-BUTANONE	57	UJ	CN
2-HEXANONE	57	UJ	N
4-METHYL-2-PENTANONE	57	UJ	N
ACETONE	140	J	ACGN
BENZENE	11	UJ	N
BROMODICHLOROMETHANE	11	UJ	N
BROMOFORM	11	UJ	N
BROMOMETHANE	11	UJ	N
CARBON DISULFIDE	11	UJ	N
CARBON TETRACHLORIDE	11	UJ	N
CHLOROBENZENE	11	UJ	N
CHLORODIBROMOMETHANE	11	UJ	N
CHLOROETHANE	11	UJ	N
CHLOROFORM	11	UJ	N
CHLOROMETHANE	11	UJ	N
CIS-1,2-DICHLOROETHENE	11	UJ	N
CIS-1,3-DICHLOROPROPENE	11	UJ	N
CYCLOHEXANE	11	UJ	N

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	11	UJ	N
ETHYLBENZENE	11	UJ	N
ISOPROPYLBENZENE	11	UJ	N
M+P-XYLENES	23	UJ	N
METHYL ACETATE	11	UJ	N
METHYL CYCLOHEXANE	11	UJ	N
METHYL TERT-BUTYL ETHER	23	UJ	N
METHYLENE CHLORIDE	11	UJ	N
O-XYLENE	11	UJ	N
STYRENE	11	UJ	N
TETRACHLOROETHENE	11	UJ	N
TOLUENE	11	UJ	N
TOTAL 1,2-DICHLOROETHENE	23	UJ	N
TOTAL XYLENES	34	UJ	N
TRANS-1,2-DICHLOROETHENE	11	UJ	N
TRANS-1,3-DICHLOROPROPENE	11	UJ	N
TRICHLOROETHENE	11	UJ	N
TRICHLOROFLUOROMETHANE	11	UJ	N
VINYL CHLORIDE	11	UJ	N

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	8	U	
1,1,2,2-TETRACHLOROETHANE	8	UJ	N
1,1,2-TRICHLOROETHANE	8	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	8	U	
1,1-DICHLOROETHANE	8	U	
1,1-DICHLOROETHENE	8	U	
1,2,4-TRICHLOROBENZENE	8	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	8	UJ	N
1,2-DIBROMOETHANE	8	U	
1,2-DICHLOROBENZENE	8	UJ	N
1,2-DICHLOROETHANE	8	U	
1,2-DICHLOROPROPANE	8	U	
1,3-DICHLOROBENZENE	8	UJ	N
1,4-DICHLOROBENZENE	8	UJ	N
2-BUTANONE	40	J	C
2-HEXANONE	38	U	
4-METHYL-2-PENTANONE	38	U	
ACETONE	210	J	AC
BENZENE	8	U	
BROMODICHLOROMETHANE	8	U	
BROMOFORM	8	U	
BROMOMETHANE	8	U	
CARBON DISULFIDE	4	J	P
CARBON TETRACHLORIDE	8	U	
CHLOROBENZENE	8	U	
CHLORODIBROMOMETHANE	8	U	
CHLOROETHANE	2	J	P
CHLOROFORM	8	U	
CHLOROMETHANE	8	U	
CIS-1,2-DICHLOROETHENE	8	U	
CIS-1,3-DICHLOROPROPENE	8	U	
CYCLOHEXANE	0.7	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-1RA
qc_type	NM
units	UG/KG
Pct_Solids	61.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	8	U	
ETHYLBENZENE	8	U	
ISOPROPYLBENZENE	8	UJ	N
M+P-XYLENES	15	U	
METHYL ACETATE	8	U	
METHYL CYCLOHEXANE	8		
METHYL TERT-BUTYL ETHER	2	J	P
METHYLENE CHLORIDE	8	U	
O-XYLENE	8	U	
STYRENE	8	U	
TETRACHLOROETHENE	8	U	
TOLUENE	8	U	
TOTAL 1,2-DICHLOROETHENE	15	U	
TOTAL XYLENES	23	U	
TRANS-1,2-DICHLOROETHENE	8	U	
TRANS-1,3-DICHLOROPROPENE	8	U	
TRICHLOROETHENE	8	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	8	U	

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	6	U	
1,1,2,2-TETRACHLOROETHANE	6	U	
1,1,2-TRICHLOROETHANE	6	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	6	U	
1,1-DICHLOROETHANE	6	U	
1,1-DICHLOROETHENE	6	U	
1,2,4-TRICHLOROBENZENE	6	U	
1,2-DIBROMO-3-CHLOROPROPANE	6	U	
1,2-DIBROMOETHANE	6	U	
1,2-DICHLOROBENZENE	6	U	
1,2-DICHLOROETHANE	6	U	
1,2-DICHLOROPROPANE	6	U	
1,3-DICHLOROBENZENE	6	U	
1,4-DICHLOROBENZENE	6	U	
2-BUTANONE	16	J	CP
2-HEXANONE	29	U	
4-METHYL-2-PENTANONE	29	U	
ACETONE	83	J	AC
BENZENE	6	U	
BROMODICHLOROMETHANE	6	U	
BROMOFORM	6	U	
BROMOMETHANE	6	U	
CARBON DISULFIDE	0.9	J	P
CARBON TETRACHLORIDE	6	U	
CHLOROBENZENE	6	U	
CHLORODIBROMOMETHANE	6	U	
CHLOROETHANE	6	U	
CHLOROFORM	6	U	
CHLOROMETHANE	6	U	
CIS-1,2-DICHLOROETHENE	6	U	
CIS-1,3-DICHLOROPROPENE	6	U	
CYCLOHEXANE	6	U	

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	6	U	
ETHYLBENZENE	6	U	
ISOPROPYLBENZENE	6	U	
M+P-XYLENES	11	U	
METHYL ACETATE	6	U	
METHYL CYCLOHEXANE	6	U	
METHYL TERT-BUTYL ETHER	11	U	
METHYLENE CHLORIDE	6	U	
O-XYLENE	6	U	
STYRENE	6	U	
TETRACHLOROETHENE	6	U	
TOLUENE	6	U	
TOTAL 1,2-DICHLOROETHENE	11	U	
TOTAL XYLENES	17	U	
TRANS-1,2-DICHLOROETHENE	6	U	
TRANS-1,3-DICHLOROPROPENE	6	U	
TRICHLOROETHENE	6	U	
TRICHLOROFLUOROMETHANE	6	U	
VINYL CHLORIDE	6	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0401
samp_date	8/12/2004
lab_id	WU2494-2
qc_type	NM
units	UG/KG
Pct_Solids	57.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	10	U	
1,1,2,2-TETRACHLOROETHANE	10	UJ	N
1,1,2-TRICHLOROETHANE	10	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	10	U	
1,1-DICHLOROETHANE	10	U	
1,1-DICHLOROETHENE	10	U	
1,2,4-TRICHLOROBENZENE	10	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	10	UJ	N
1,2-DIBROMOETHANE	10	U	
1,2-DICHLOROBENZENE	10	UJ	N
1,2-DICHLOROETHANE	10	U	
1,2-DICHLOROPROPANE	10	U	
1,3-DICHLOROBENZENE	10	UJ	N
1,4-DICHLOROBENZENE	10	UJ	N
2-BUTANONE	62	J	C
2-HEXANONE	51	U	
4-METHYL-2-PENTANONE	51	U	
ACETONE	340	J	AC
BENZENE	10	U	
BROMODICHLOROMETHANE	10	U	
BROMOFORM	10	U	
BROMOMETHANE	10	U	
CARBON DISULFIDE	6	J	
CARBON TETRACHLORIDE	10	U	
CHLOROBENZENE	10	U	
CHLORODIBROMOMETHANE	10	U	
CHLOROETHANE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	10	U	
CIS-1,2-DICHLOROETHENE	10	U	
CIS-1,3-DICHLOROPROPENE	10	U	
CYCLOHEXANE	10	U	

nsample	04SD0401
samp_date	8/12/2004
lab_id	WU2494-2
qc_type	NM
units	UG/KG
Pct_Solids	57.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	10	U	
ETHYLBENZENE	10	U	
ISOPROPYLBENZENE	10	UJ	N
M+P-XYLENES	20	U	
METHYL ACETATE	10	U	
METHYL CYCLOHEXANE	10	U	
METHYL TERT-BUTYL ETHER	20	U	
METHYLENE CHLORIDE	10	U	A
O-XYLENE	10	U	
STYRENE	10	U	
TETRACHLOROETHENE	10	U	
TOLUENE	10	U	
TOTAL 1,2-DICHLOROETHENE	20	U	
TOTAL XYLENES	31	U	
TRANS-1,2-DICHLOROETHENE	10	U	
TRANS-1,3-DICHLOROPROPENE	10	U	
TRICHLOROETHENE	10	U	
TRICHLOROFLUOROMETHANE	3	J	P
VINYL CHLORIDE	10	U	

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	9	U	
1,1,2,2-TETRACHLOROETHANE	9	UJ	N
1,1,2-TRICHLOROETHANE	9	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	9	U	
1,1-DICHLOROETHANE	9	U	
1,1-DICHLOROETHENE	9	U	
1,2,4-TRICHLOROBENZENE	9	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	9	UJ	N
1,2-DIBROMOETHANE	9	U	
1,2-DICHLOROBENZENE	9	UJ	N
1,2-DICHLOROETHANE	9	U	
1,2-DICHLOROPROPANE	9	U	
1,3-DICHLOROBENZENE	9	UJ	N
1,4-DICHLOROBENZENE	9	UJ	N
2-BUTANONE	30	J	P
2-HEXANONE	45	U	
4-METHYL-2-PENTANONE	45	U	
ACETONE	160	J	AC
BENZENE	9	U	
BROMODICHLOROMETHANE	9	U	
BROMOFORM	9	U	
BROMOMETHANE	9	U	
CARBON DISULFIDE	3	J	P
CARBON TETRACHLORIDE	9	U	
CHLOROBENZENE	9	U	
CHLORODIBROMOMETHANE	9	U	
CHLOROETHANE	9	U	
CHLOROFORM	9	U	
CHLOROMETHANE	9	U	
CIS-1,2-DICHLOROETHENE	9	U	
CIS-1,3-DICHLOROPROPENE	9	U	
CYCLOHEXANE	9	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	9	U	
ETHYLBENZENE	9	U	
ISOPROPYLBENZENE	9	U	
M+P-XYLENES	18	U	
METHYL ACETATE	9	U	
METHYL CYCLOHEXANE	9	U	
METHYL TERT-BUTYL ETHER	18	U	
METHYLENE CHLORIDE	17	U	A
O-XYLENE	9	U	
STYRENE	9	U	
TETRACHLOROETHENE	9	U	
TOLUENE	9	U	
TOTAL 1,2-DICHLOROETHENE	18	U	
TOTAL XYLENES	27	U	
TRANS-1,2-DICHLOROETHENE	9	U	
TRANS-1,3-DICHLOROPROPENE	9	U	
TRICHLOROETHENE	9	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	9	U	

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	9	U	
1,1,2,2-TETRACHLOROETHANE	9	UJ	N
1,1,2-TRICHLOROETHANE	9	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	9	U	
1,1-DICHLOROETHANE	9	U	
1,1-DICHLOROETHENE	9	U	
1,2,4-TRICHLOROBENZENE	9	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	9	UJ	N
1,2-DIBROMOETHANE	9	U	
1,2-DICHLOROBENZENE	9	UJ	N
1,2-DICHLOROETHANE	9	U	
1,2-DICHLOROPROPANE	9	U	
1,3-DICHLOROBENZENE	9	UJ	N
1,4-DICHLOROBENZENE	9	UJ	N
2-BUTANONE	52	J	C
2-HEXANONE	46	U	
4-METHYL-2-PENTANONE	46	U	
ACETONE	260	J	AC
BENZENE	9	U	
BROMODICHLOROMETHANE	9	U	
BROMOFORM	9	U	
BROMOMETHANE	9	U	
CARBON DISULFIDE	7	J	P
CARBON TETRACHLORIDE	9	U	
CHLOROBENZENE	9	U	
CHLORODIBROMOMETHANE	9	U	
CHLOROETHANE	9	U	
CHLOROFORM	9	U	
CHLOROMETHANE	9	U	
CIS-1,2-DICHLOROETHENE	9	U	
CIS-1,3-DICHLOROPROPENE	9	U	
CYCLOHEXANE	9	U	

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	9	U	
ETHYLBENZENE	9	U	
ISOPROPYLBENZENE	9	UJ	N
M+P-XYLENES	18	U	
METHYL ACETATE	9	U	
METHYL CYCLOHEXANE	9	U	
METHYL TERT-BUTYL ETHER	18	U	
METHYLENE CHLORIDE	9	U	A
O-XYLENE	9	U	
STYRENE	9	U	
TETRACHLOROETHENE	9	U	
TOLUENE	9	U	
TOTAL 1,2-DICHLOROETHENE	18	U	
TOTAL XYLENES	27	U	
TRANS-1,2-DICHLOROETHENE	9	U	
TRANS-1,3-DICHLOROPROPENE	9	U	
TRICHLOROETHENE	9	U	
TRICHLOROFLUOROMETHANE	3	J	P
VINYL CHLORIDE	9	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	9	U	
1,1,2,2-TETRACHLOROETHANE	9	UJ	N
1,1,2-TRICHLOROETHANE	9	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	9	U	
1,1-DICHLOROETHANE	9	U	
1,1-DICHLOROETHENE	9	U	
1,2,4-TRICHLOROBENZENE	9	UJ	N
1,2-DIBROMO-3-CHLOROPROPANE	9	UJ	N
1,2-DIBROMOETHANE	9	U	
1,2-DICHLOROBENZENE	9	UJ	N
1,2-DICHLOROETHANE	9	U	
1,2-DICHLOROPROPANE	9	U	
1,3-DICHLOROBENZENE	9	UJ	N
1,4-DICHLOROBENZENE	9	UJ	N
2-BUTANONE	32	J	CP
2-HEXANONE	46	U	
4-METHYL-2-PENTANONE	46	U	
ACETONE	210	J	CA
BENZENE	9	U	
BROMODICHLOROMETHANE	9	U	
BROMOFORM	9	U	
BROMOMETHANE	9	U	
CARBON DISULFIDE	8	J	P
CARBON TETRACHLORIDE	9	U	
CHLOROBENZENE	9	U	
CHLORODIBROMOMETHANE	9	U	
CHLOROETHANE	9	U	
CHLOROFORM	9	U	A
CHLOROMETHANE	9	U	
CIS-1,2-DICHLOROETHENE	18		
CIS-1,3-DICHLOROPROPENE	9	U	
CYCLOHEXANE	0.8	J	P

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	9	U	
ETHYLBENZENE	9	U	
ISOPROPYLBENZENE	9	UJ	N
M+P-XYLENES	18	U	
METHYL ACETATE	9	U	
METHYL CYCLOHEXANE	9	U	
METHYL TERT-BUTYL ETHER	18	U	
METHYLENE CHLORIDE	52	U	A
O-XYLENE	9	U	
STYRENE	9	U	
TETRACHLOROETHENE	9	U	
TOLUENE	9	U	
TOTAL 1,2-DICHLOROETHENE	18	J	P
TOTAL XYLENES	28	U	
TRANS-1,2-DICHLOROETHENE	9	U	
TRANS-1,3-DICHLOROPROPENE	9	U	
TRICHLOROETHENE	1	J	P
TRICHLOROFLUOROMETHANE	6	J	P
VINYL CHLORIDE	44		

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	8	U	
1,1,2,2-TETRACHLOROETHANE	8	U	
1,1,2-TRICHLOROETHANE	8	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	8	U	
1,1-DICHLOROETHANE	8	U	
1,1-DICHLOROETHENE	8	U	
1,2,4-TRICHLOROBENZENE	8	U	
1,2-DIBROMO-3-CHLOROPROPANE	8	U	
1,2-DIBROMOETHANE	8	U	
1,2-DICHLOROBENZENE	8	U	
1,2-DICHLOROETHANE	8	U	
1,2-DICHLOROPROPANE	8	U	
1,3-DICHLOROBENZENE	8	U	
1,4-DICHLOROBENZENE	8	U	
2-BUTANONE	14	J	CP
2-HEXANONE	40	U	
4-METHYL-2-PENTANONE	40	U	
ACETONE	76	J	AC
BENZENE	8	U	
BROMODICHLOROMETHANE	8	U	
BROMOFORM	8	U	
BROMOMETHANE	8	U	
CARBON DISULFIDE	1	J	P
CARBON TETRACHLORIDE	8	U	
CHLOROBENZENE	8	U	
CHLORODIBROMOMETHANE	8	U	
CHLOROETHANE	8	U	
CHLOROFORM	8	U	
CHLOROMETHANE	8	U	
CIS-1,2-DICHLOROETHENE	8	U	
CIS-1,3-DICHLOROPROPENE	8	U	
CYCLOHEXANE	8	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OV

nsample	04SD0801
samp_date	8/18/2004
lab_Id	WU2576-2
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	8	U	
ETHYLBENZENE	8	U	
ISOPROPYLBENZENE	8	U	
M+P-XYLENES	16	U	
METHYL ACETATE	8	U	
METHYL CYCLOHEXANE	8	U	
METHYL TERT-BUTYL ETHER	16	U	
METHYLENE CHLORIDE	18	U	A
O-XYLENE	8	U	
STYRENE	8	U	
TETRACHLOROETHENE	8	U	
TOLUENE	2	J	P
TOTAL 1,2-DICHLOROETHENE	16	U	
TOTAL XYLENES	24	U	
TRANS-1,2-DICHLOROETHENE	8	U	
TRANS-1,3-DICHLOROPROPENE	8	U	
TRICHLOROETHENE	8	U	
TRICHLOROFLUOROMETHANE	2	J	P
VINYL CHLORIDE	8	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	U	
2,4,5-TRICHLOROPHENOL	980	U	
2,4,6-TRICHLOROPHENOL	400	U	
2,4-DICHLOROPHENOL	400	U	
2,4-DIMETHYLPHENOL	400	U	
2,4-DINITROPHENOL	980	U	
2,4-DINITROTOLUENE	400	U	
2,6-DINITROTOLUENE	400	U	
2-CHLORONAPHTHALENE	400	U	
2-CHLOROPHENOL	400	U	
2-METHYLNAPHTHALENE	400	U	
2-METHYLPHENOL	400	U	
2-NITROANILINE	980	U	
2-NITROPHENOL	400	U	
3,3'-DICHLOROBENZIDINE	400	U	
3-NITROANILINE	980	U	
4,6-DINITRO-2-METHYLPHENOL	980	U	
4-BROMOPHENYL PHENYL ETHER	400	U	
4-CHLORO-3-METHYLPHENOL	400	U	
4-CHLOROANILINE	400	U	
4-CHLOROPHENYL PHENYL ETHER	400	U	
4-METHYLPHENOL	400	U	
4-NITROANILINE	980	U	
4-NITROPHENOL	980	U	
ACENAPHTHENE	400	U	
ACENAPHTHYLENE	400	U	
ACETOPHENONE	400	U	
ANTHRACENE	400	U	
ATRAZINE	400	U	
BENZALDEHYDE	400	UJ	C
BENZO(A)ANTHRACENE	400	U	

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	400	U	
BENZO(B)FLUORANTHENE	400	U	
BENZO(G,H,I)PERYLENE	400	U	
BENZO(K)FLUORANTHENE	400	U	
BIS(2-CHLOROETHOXY)METHANE	400	U	
BIS(2-CHLOROETHYL)ETHER	400	U	
BIS(2-ETHYLHEXYL)PHTHALATE	400	U	
BUTYL BENZYL PHTHALATE	400	U	
CAPROLACTAM	400	U	
CARBAZOLE	400	U	
CHRYSENE	400	U	
DIBENZO(A,H)ANTHRACENE	400	U	
DIBENZOFURAN	400	U	
DIETHYL PHTHALATE	400	U	
DIMETHYL PHTHALATE	400	U	
DI-N-BUTYL PHTHALATE	400	U	
DI-N-OCTYL PHTHALATE	400	U	
FLUORANTHENE	400	U	
FLUORENE	400	U	
HEXACHLOROBENZENE	400	U	
HEXACHLOROBUTADIENE	400	U	
HEXACHLOROCYCLOPENTADIENE	400	U	
HEXACHLOROETHANE	400	U	
INDENO(1,2,3-CD)PYRENE	400	U	
ISOPHORONE	400	U	
NAPHTHALENE	400	U	
NITROBENZENE	400	U	
N-NITROSO-DI-N-PROPYLAMINE	400	U	
N-NITROSODIPHENYLAMINE	400	U	
PENTACHLOROPHENOL	980	U	
PHENANTHRENE	400	U	
PHENOL	400	U	

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	400	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3RA
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	340	J	P
2,2'-OXYBIS(1-CHLOROPROPANE)	760	U	
2,4,5-TRICHLOROPHENOL	1900	U	
2,4,6-TRICHLOROPHENOL	760	U	
2,4-DICHLOROPHENOL	760	U	
2,4-DIMETHYLPHENOL	760	U	
2,4-DINITROPHENOL	1900	U	
2,4-DINITROTOLUENE	760	U	
2,6-DINITROTOLUENE	760	U	
2-CHLORONAPHTHALENE	760	U	
2-CHLOROPHENOL	760	U	
2-METHYLNAPHTHALENE	2900	J	N
2-METHYLPHENOL	760	U	
2-NITROANILINE	1900	U	
2-NITROPHENOL	760	U	
3,3'-DICHLOROBENZIDINE	760	U	
3-NITROANILINE	1900	U	
4,6-DINITRO-2-METHYLPHENOL	1900	U	
4-BROMOPHENYL PHENYL ETHER	760	U	
4-CHLORO-3-METHYLPHENOL	760	U	
4-CHLOROANILINE	760	U	
4-CHLOROPHENYL PHENYL ETHER	760	U	
4-METHYLPHENOL	760	U	
4-NITROANILINE	1900	U	
4-NITROPHENOL	1900	U	
ACENAPHTHENE	6100	J	N
ACENAPHTHYLENE	760	U	
ACETOPHENONE	760	U	
ANTHRACENE	1700		
ATRAZINE	760	U	
BENZALDEHYDE	760	UJ	C
BENZO(A)ANTHRACENE	760	J	P

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3RA
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	760	UJ	N
BENZO(B)FLUORANTHENE	560	J	NP
BENZO(G,H,I)PERYLENE	390	J	NP
BENZO(K)FLUORANTHENE	870	J	N
BIS(2-CHLOROETHOXY)METHANE	760	U	
BIS(2-CHLOROETHYL)ETHER	760	U	
BIS(2-ETHYLHEXYL)PHTHALATE	600	J	P
BUTYL BENZYL PHTHALATE	760	U	
CAPROLACTAM	760	U	
CARBAZOLE	600	J	P
CHRYSENE	1200		
DIBENZO(A,H)ANTHRACENE	210	J	P
DIBENZOFURAN	2900	J	N
DIETHYL PHTHALATE	760	U	
DIMETHYL PHTHALATE	760	U	
DI-N-BUTYL PHTHALATE	760	U	
DI-N-OCTYL PHTHALATE	760	UJ	N
FLUORANTHENE	2700		
FLUORENE	4200	J	N
HEXACHLOROBENZENE	760	U	
HEXACHLOROBUTADIENE	760	U	
HEXACHLOROCYCLOPENTADIENE	760	U	
HEXACHLOROETHANE	760	U	
INDENO(1,2,3-CD)PYRENE	340	J	NP
ISOPHORONE	760	U	
NAPHTHALENE	2100	J	N
NITROBENZENE	760	U	
N-NITROSO-DI-N-PROPYLAMINE	760	U	
N-NITROSODIPHENYLAMINE	760	U	
PENTACHLOROPHENOL	1900	U	
PHENANTHRENE	7000		
PHENOL	760	U	

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3RA
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	4400		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	U	
2,4,5-TRICHLOROPHENOL	1000	U	
2,4,6-TRICHLOROPHENOL	400	U	
2,4-DICHLOROPHENOL	400	U	
2,4-DIMETHYLPHENOL	400	U	
2,4-DINITROPHENOL	1000	U	
2,4-DINITROTOLUENE	400	U	
2,6-DINITROTOLUENE	400	U	
2-CHLORONAPHTHALENE	400	U	
2-CHLOROPHENOL	400	U	
2-METHYLNAPHTHALENE	400	U	
2-METHYLPHENOL	400	U	
2-NITROANILINE	1000	U	
2-NITROPHENOL	400	U	
3,3'-DICHLOROBENZIDINE	400	U	
3-NITROANILINE	1000	U	
4,6-DINITRO-2-METHYLPHENOL	1000	U	
4-BROMOPHENYL PHENYL ETHER	400	U	
4-CHLORO-3-METHYLPHENOL	400	U	
4-CHLOROANILINE	400	U	
4-CHLOROPHENYL PHENYL ETHER	400	U	
4-METHYLPHENOL	400	U	
4-NITROANILINE	1000	U	
4-NITROPHENOL	1000	UJ	C
ACENAPHTHENE	400	U	
ACENAPHTHYLENE	400	U	
ACETOPHENONE	400	U	
ANTHRACENE	400	U	
ATRAZINE	400	U	
BENZALDEHYDE	400	UJ	C
BENZO(A)ANTHRACENE	400	U	

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	400	U	
BENZO(B)FLUORANTHENE	400	U	
BENZO(G,H,I)PERYLENE	400	U	
BENZO(K)FLUORANTHENE	400	U	
BIS(2-CHLOROETHOXY)METHANE	400	U	
BIS(2-CHLOROETHYL)ETHER	400	U	
BIS(2-ETHYLHEXYL)PHTHALATE	250	J	P
BUTYL BENZYL PHTHALATE	400	U	
CAPROLACTAM	400	U	
CARBAZOLE	400	U	
CHRYSENE	400	U	
DIBENZO(A,H)ANTHRACENE	400	U	
DIBENZOFURAN	400	U	
DIETHYL PHTHALATE	400	U	
DIMETHYL PHTHALATE	400	U	
DI-N-BUTYL PHTHALATE	400	U	
DI-N-OCTYL PHTHALATE	400	U	
FLUORANTHENE	400	U	
FLUORENE	400	U	
HEXACHLOROBENZENE	400	U	
HEXACHLOROBUTADIENE	400	U	
HEXACHLOROCYCLOPENTADIENE	400	U	
HEXACHLOROETHANE	400	U	
INDENO(1,2,3-CD)PYRENE	400	U	
ISOPHORONE	400	U	
NAPHTHALENE	400	U	
NITROBENZENE	400	U	
N-NITROSO-DI-N-PROPYLAMINE	400	U	
N-NITROSODIPHENYLAMINE	400	U	
PENTACHLOROPHENOL	1000	U	
PHENANTHRENE	400	U	
PHENOL	400	U	

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	400	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
units	UG/KG
Pct_Solids	79.4
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-METHYLNAPHTHALENE	420	U	
2-METHYLPHENOL	420	U	
2-NITROANILINE	1000	U	
2-NITROPHENOL	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-METHYLPHENOL	420	U	
4-NITROANILINE	1000	U	
4-NITROPHENOL	1000	UJ	C
ACENAPHTHENE	420	U	
ACENAPHTHYLENE	420	U	
ACETOPHENONE	420	U	
ANTHRACENE	420	U	
ATRAZINE	420	U	
BENZALDEHYDE	420	UJ	C
BENZO(A)ANTHRACENE	420	U	

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
units	UG/KG
Pct_Solids	79.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	420	U	
BENZO(B)FLUORANTHENE	420	U	
BENZO(G,H,I)PERYLENE	420	U	
BENZO(K)FLUORANTHENE	420	U	
BIS(2-CHLOROETHOXY)METHANE	420	U	
BIS(2-CHLOROETHYL)ETHER	420	U	
BIS(2-ETHYLHEXYL)PHTHALATE	260	J	P
BUTYL BENZYL PHTHALATE	420	U	
CAPROLACTAM	420	U	
CARBAZOLE	420	U	
CHRYSENE	420	U	
DIBENZO(A,H)ANTHRACENE	420	U	
DIBENZOFURAN	420	U	
DIETHYL PHTHALATE	420	U	
DIMETHYL PHTHALATE	420	U	
DI-N-BUTYL PHTHALATE	420	U	
DI-N-OCTYL PHTHALATE	420	U	
FLUORANTHENE	420	U	
FLUORENE	420	U	
HEXACHLOROBENZENE	420	U	
HEXACHLOROBUTADIENE	420	U	
HEXACHLOROCYCLOPENTADIENE	420	U	
HEXACHLOROETHANE	420	U	
INDENO(1,2,3-CD)PYRENE	420	U	
ISOPHORONE	420	U	
NAPHTHALENE	420	U	
NITROBENZENE	420	U	
N-NITROSO-DI-N-PROPYLAMINE	420	U	
N-NITROSODIPHENYLAMINE	420	U	
PENTACHLOROPHENOL	1000	U	
PHENANTHRENE	420	U	
PHENOL	420	U	

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
units	UG/KG
Pct_Solids	79.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	420	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
units	UG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	410	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	410	U	
2,4,5-TRICHLOROPHENOL	1000	U	
2,4,6-TRICHLOROPHENOL	410	U	
2,4-DICHLOROPHENOL	410	U	
2,4-DIMETHYLPHENOL	410	U	
2,4-DINITROPHENOL	1000	U	
2,4-DINITROTOLUENE	410	U	
2,6-DINITROTOLUENE	410	U	
2-CHLORONAPHTHALENE	410	U	
2-CHLOROPHENOL	410	U	
2-METHYLNAPHTHALENE	410	U	
2-METHYLPHENOL	410	U	
2-NITROANILINE	1000	U	
2-NITROPHENOL	410	U	
3,3'-DICHLOROBENZIDINE	410	U	
3-NITROANILINE	1000	U	
4,6-DINITRO-2-METHYLPHENOL	1000	U	
4-BROMOPHENYL PHENYL ETHER	410	U	
4-CHLORO-3-METHYLPHENOL	410	U	
4-CHLOROANILINE	410	U	
4-CHLOROPHENYL PHENYL ETHER	410	U	
4-METHYLPHENOL	410	U	
4-NITROANILINE	1000	U	
4-NITROPHENOL	1000	U	
ACENAPHTHENE	410	U	
ACENAPHTHYLENE	410	U	
ACETOPHENONE	410	U	
ANTHRACENE	410	U	
ATRAZINE	410	U	
BENZALDEHYDE	410	UJ	C
BENZO(A)ANTHRACENE	410	U	

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
units	UG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	410	U	
BENZO(B)FLUORANTHENE	410	U	
BENZO(G,H,I)PERYLENE	410	U	
BENZO(K)FLUORANTHENE	410	U	
BIS(2-CHLOROETHOXY)METHANE	410	U	
BIS(2-CHLOROETHYL)ETHER	410	U	
BIS(2-ETHYLHEXYL)PHTHALATE	240	J	P
BUTYL BENZYL PHTHALATE	410	UJ	C
CAPROLACTAM	410	U	
CARBAZOLE	410	U	
CHRYSENE	410	U	
DIBENZO(A,H)ANTHRACENE	410	U	
DIBENZOFURAN	410	U	
DIETHYL PHTHALATE	410	U	
DIMETHYL PHTHALATE	410	U	
DI-N-BUTYL PHTHALATE	410	U	
DI-N-OCTYL PHTHALATE	410	U	
FLUORANTHENE	410	U	
FLUORENE	410	U	
HEXACHLOROBENZENE	410	U	
HEXACHLOROBUTADIENE	410	U	
HEXACHLOROCYCLOPENTADIENE	410	UJ	D
HEXACHLOROETHANE	410	U	
INDENO(1,2,3-CD)PYRENE	410	U	
ISOPHORONE	410	U	
NAPHTHALENE	410	U	
NITROBENZENE	410	U	
N-NITROSO-DI-N-PROPYLAMINE	410	U	
N-NITROSODIPHENYLAMINE	410	U	
PENTACHLOROPHENOL	1000	U	
PHENANTHRENE	410	U	
PHENOL	410	U	

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
units	UG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	410	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	U	
2,4,5-TRICHLOROPHENOL	990	U	
2,4,6-TRICHLOROPHENOL	400	U	
2,4-DICHLOROPHENOL	400	U	
2,4-DIMETHYLPHENOL	400	U	
2,4-DINITROPHENOL	990	U	
2,4-DINITROTOLUENE	400	U	
2,6-DINITROTOLUENE	400	U	
2-CHLORONAPHTHALENE	400	U	
2-CHLOROPHENOL	400	U	
2-METHYLNAPHTHALENE	400	U	
2-METHYLPHENOL	400	U	
2-NITROANILINE	990	U	
2-NITROPHENOL	400	U	
3,3'-DICHLOROBENZIDINE	400	U	
3-NITROANILINE	990	U	
4,6-DINITRO-2-METHYLPHENOL	990	U	
4-BROMOPHENYL PHENYL ETHER	400	U	
4-CHLORO-3-METHYLPHENOL	400	U	
4-CHLOROANILINE	400	U	
4-CHLOROPHENYL PHENYL ETHER	400	U	
4-METHYLPHENOL	400	U	
4-NITROANILINE	990	U	
4-NITROPHENOL	990	U	
ACENAPHTHENE	400	U	
ACENAPHTHYLENE	400	U	
ACETOPHENONE	400	U	
ANTHRACENE	400	U	
ATRAZINE	400	U	
BENZALDEHYDE	260	J	CP
BENZO(A)ANTHRACENE	400	U	

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	400	U	
BENZO(B)FLUORANTHENE	400	U	
BENZO(G,H,I)PERYLENE	400	U	
BENZO(K)FLUORANTHENE	400	U	
BIS(2-CHLOROETHOXY)METHANE	400	U	
BIS(2-CHLOROETHYL)ETHER	400	U	
BIS(2-ETHYLHEXYL)PHTHALATE	400	U	
BUTYL BENZYL PHTHALATE	400	UJ	C
CAPROLACTAM	400	U	
CARBAZOLE	400	U	
CHRYSENE	400	U	
DIBENZO(A,H)ANTHRACENE	400	U	
DIBENZOFURAN	400	U	
DIETHYL PHTHALATE	400	U	
DIMETHYL PHTHALATE	400	U	
DI-N-BUTYL PHTHALATE	400	U	
DI-N-OCTYL PHTHALATE	400	U	
FLUORANTHENE	400	U	
FLUORENE	400	U	
HEXACHLOROBENZENE	400	U	
HEXACHLOROBUTADIENE	400	U	
HEXACHLOROCYCLOPENTADIENE	400	U	
HEXACHLOROETHANE	400	U	
INDENO(1,2,3-CD)PYRENE	400	U	
ISOPHORONE	400	U	
NAPHTHALENE	400	U	
NITROBENZENE	400	U	
N-NITROSO-DI-N-PROPYLAMINE	400	U	
N-NITROSODIPHENYLAMINE	400	U	
PENTACHLOROPHENOL	990	U	
PHENANTHRENE	400	U	
PHENOL	400	U	

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	400	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	440	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	440	U	
2,4,5-TRICHLOROPHENOL	1100	U	
2,4,6-TRICHLOROPHENOL	440	U	
2,4-DICHLOROPHENOL	440	U	
2,4-DIMETHYLPHENOL	440	U	
2,4-DINITROPHENOL	1100	U	
2,4-DINITROTOLUENE	440	U	
2,6-DINITROTOLUENE	440	U	
2-CHLORONAPHTHALENE	440	U	
2-CHLOROPHENOL	440	U	
2-METHYLNAPHTHALENE	440	U	
2-METHYLPHENOL	440	U	
2-NITROANILINE	1100	U	
2-NITROPHENOL	440	U	
3,3'-DICHLOROBENZIDINE	440	U	
3-NITROANILINE	1100	U	
4,6-DINITRO-2-METHYLPHENOL	1100	U	
4-BROMOPHENYL PHENYL ETHER	440	U	
4-CHLORO-3-METHYLPHENOL	440	U	
4-CHLOROANILINE	440	U	
4-CHLOROPHENYL PHENYL ETHER	440	U	
4-METHYLPHENOL	440	U	
4-NITROANILINE	1100	U	
4-NITROPHENOL	1100	U	
ACENAPHTHENE	440	U	
ACENAPHTHYLENE	440	U	
ACETOPHENONE	440	U	
ANTHRACENE	440	U	
ATRAZINE	440	U	
BENZALDEHYDE	440	UJ	C
BENZO(A)ANTHRACENE	440	U	

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	440	U	
BENZO(B)FLUORANTHENE	440	U	
BENZO(G,H,I)PERYLENE	440	U	
BENZO(K)FLUORANTHENE	440	U	
BIS(2-CHLOROETHOXY)METHANE	440	U	
BIS(2-CHLOROETHYL)ETHER	440	U	
BIS(2-ETHYLHEXYL)PHTHALATE	440	U	
BUTYL BENZYL PHTHALATE	440	UJ	C
CAPROLACTAM	440	U	
CARBAZOLE	440	U	
CHRYSENE	440	U	
DIBENZO(A,H)ANTHRACENE	440	U	
DIBENZOFURAN	440	U	
DIETHYL PHTHALATE	440	U	
DIMETHYL PHTHALATE	440	U	
DI-N-BUTYL PHTHALATE	440	U	
DI-N-OCTYL PHTHALATE	440	U	
FLUORANTHENE	440	U	
FLUORENE	440	U	
HEXACHLOROBENZENE	440	U	
HEXACHLOROBUTADIENE	440	U	
HEXACHLOROCYCLOPENTADIENE	440	U	
HEXACHLOROETHANE	440	U	
INDENO(1,2,3-CD)PYRENE	440	U	
ISOPHORONE	440	U	
NAPHTHALENE	440	U	
NITROBENZENE	440	U	
N-NITROSO-DI-N-PROPYLAMINE	440	U	
N-NITROSODIPHENYLAMINE	440	U	
PENTACHLOROPHENOL	1100	U	
PHENANTHRENE	440	U	
PHENOL	440	U	

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	440	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	390	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	390	U	
2,4,5-TRICHLOROPHENOL	970	U	
2,4,6-TRICHLOROPHENOL	390	U	
2,4-DICHLOROPHENOL	390	U	
2,4-DIMETHYLPHENOL	390	U	
2,4-DINITROPHENOL	970	U	
2,4-DINITROTOLUENE	390	U	
2,6-DINITROTOLUENE	390	U	
2-CHLORONAPHTHALENE	390	UJ	C
2-CHLOROPHENOL	390	U	
2-METHYLNAPHTHALENE	390	U	
2-METHYLPHENOL	390	U	
2-NITROANILINE	970	U	
2-NITROPHENOL	390	U	
3,3'-DICHLOROBENZIDINE	390	U	
3-NITROANILINE	970	U	
4,6-DINITRO-2-METHYLPHENOL	970	U	
4-BROMOPHENYL PHENYL ETHER	390	U	
4-CHLORO-3-METHYLPHENOL	390	U	
4-CHLOROANILINE	390	U	
4-CHLOROPHENYL PHENYL ETHER	390	U	
4-METHYLPHENOL	390	U	
4-NITROANILINE	970	U	
4-NITROPHENOL	970	U	
ACENAPHTHENE	390	U	
ACENAPHTHYLENE	390	U	
ACETOPHENONE	390	U	
ANTHRACENE	390	U	
ATRAZINE	390	U	
BENZALDEHYDE	390	UJ	C
BENZO(A)ANTHRACENE	390	U	

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	390	U	
BENZO(B)FLUORANTHENE	390	U	
BENZO(G,H,I)PERYLENE	390	U	
BENZO(K)FLUORANTHENE	390	U	
BIS(2-CHLOROETHOXY)METHANE	390	U	
BIS(2-CHLOROETHYL)ETHER	390	U	
BIS(2-ETHYLHEXYL)PHTHALATE	390	U	
BUTYL BENZYL PHTHALATE	390	U	
CAPROLACTAM	390	U	
CARBAZOLE	390	U	
CHRYSENE	390	U	
DIBENZO(A,H)ANTHRACENE	390	U	
DIBENZOFURAN	390	U	
DIETHYL PHTHALATE	390	U	
DIMETHYL PHTHALATE	390	U	
DI-N-BUTYL PHTHALATE	390	U	
DI-N-OCTYL PHTHALATE	390	U	
FLUORANTHENE	390	U	
FLUORENE	390	U	
HEXACHLOROBENZENE	390	U	
HEXACHLOROBUTADIENE	390	U	
HEXACHLOROCYCLOPENTADIENE	390	U	
HEXACHLOROETHANE	390	U	
INDENO(1,2,3-CD)PYRENE	390	U	
ISOPHORONE	390	U	
NAPHTHALENE	390	U	
NITROBENZENE	390	U	
N-NITROSO-DI-N-PROPYLAMINE	390	U	
N-NITROSODIPHENYLAMINE	390	U	
PENTACHLOROPHENOL	970	U	
PHENANTHRENE	390	U	
PHENOL	390	U	

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	390	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	390	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	390	U	
2,4,5-TRICHLOROPHENOL	980	U	
2,4,6-TRICHLOROPHENOL	390	U	
2,4-DICHLOROPHENOL	390	U	
2,4-DIMETHYLPHENOL	390	U	
2,4-DINITROPHENOL	980	U	
2,4-DINITROTOLUENE	390	U	
2,6-DINITROTOLUENE	390	U	
2-CHLORONAPHTHALENE	390	UJ	C
2-CHLOROPHENOL	390	U	
2-METHYLNAPHTHALENE	390	U	
2-METHYLPHENOL	390	U	
2-NITROANILINE	980	U	
2-NITROPHENOL	390	U	
3,3'-DICHLOROBENZIDINE	390	U	
3-NITROANILINE	980	U	
4,6-DINITRO-2-METHYLPHENOL	980	U	
4-BROMOPHENYL PHENYL ETHER	390	U	
4-CHLORO-3-METHYLPHENOL	390	U	
4-CHLOROANILINE	390	U	
4-CHLOROPHENYL PHENYL ETHER	390	U	
4-METHYLPHENOL	390	U	
4-NITROANILINE	980	U	
4-NITROPHENOL	980	U	
ACENAPHTHENE	390	U	
ACENAPHTHYLENE	390	U	
ACETOPHENONE	390	U	
ANTHRACENE	390	U	
ATRAZINE	390	U	
BENZALDEHYDE	390	UJ	C
BENZO(A)ANTHRACENE	390	U	

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	390	U	
BENZO(B)FLUORANTHENE	390	U	
BENZO(G,H,I)PERYLENE	390	U	
BENZO(K)FLUORANTHENE	390	U	
BIS(2-CHLOROETHOXY)METHANE	390	U	
BIS(2-CHLOROETHYL)ETHER	390	U	
BIS(2-ETHYLHEXYL)PHTHALATE	390	U	
BUTYL BENZYL PHTHALATE	390	U	
CAPROLACTAM	390	U	
CARBAZOLE	390	U	
CHRYSENE	390	U	
DIBENZO(A,H)ANTHRACENE	390	U	
DIBENZOFURAN	390	U	
DIETHYL PHTHALATE	390	U	
DIMETHYL PHTHALATE	390	U	
DI-N-BUTYL PHTHALATE	390	U	
DI-N-OCTYL PHTHALATE	390	U	
FLUORANTHENE	390	U	
FLUORENE	390	U	
HEXACHLOROBENZENE	390	U	
HEXACHLOROBUTADIENE	390	U	
HEXACHLOROCYCLOPENTADIENE	390	U	
HEXACHLOROETHANE	390	U	
INDENO(1,2,3-CD)PYRENE	390	U	
ISOPHORONE	390	U	
NAPHTHALENE	390	U	
NITROBENZENE	390	U	
N-NITROSO-DI-N-PROPYLAMINE	390	U	
N-NITROSODIPHENYLAMINE	390	U	
PENTACHLOROPHENOL	980	U	
PHENANTHRENE	390	U	
PHENOL	390	U	

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
PYRENE	390	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	U	
2,4,5-TRICHLOROPHENOL	990	U	
2,4,6-TRICHLOROPHENOL	400	U	
2,4-DICHLOROPHENOL	400	U	
2,4-DIMETHYLPHENOL	400	U	
2,4-DINITROPHENOL	990	U	
2,4-DINITROTOLUENE	400	U	
2,6-DINITROTOLUENE	400	U	
2-CHLORONAPHTHALENE	400	U	
2-CHLOROPHENOL	400	U	
2-METHYLNAPHTHALENE	400	U	
2-METHYLPHENOL	400	U	
2-NITROANILINE	990	U	
2-NITROPHENOL	400	U	
3,3'-DICHLOROBENZIDINE	400	U	
3-NITROANILINE	990	U	
4,6-DINITRO-2-METHYLPHENOL	990	U	
4-BROMOPHENYL PHENYL ETHER	400	U	
4-CHLORO-3-METHYLPHENOL	400	U	
4-CHLOROANILINE	400	U	
4-CHLOROPHENYL PHENYL ETHER	400	U	
4-METHYLPHENOL	400	U	
4-NITROANILINE	990	U	
4-NITROPHENOL	990	U	
ACENAPHTHENE	400	U	
ACENAPHTHYLENE	400	U	
ACETOPHENONE	400	U	
ANTHRACENE	400	U	
ATRAZINE	400	U	
BENZALDEHYDE	400	UJ	C
BENZO(A)ANTHRACENE	400	U	

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	400	U	
BENZO(B)FLUORANTHENE	400	U	
BENZO(G,H,I)PERYLENE	400	U	
BENZO(K)FLUORANTHENE	400	U	
BIS(2-CHLOROETHOXY)METHANE	400	U	
BIS(2-CHLOROETHYL)ETHER	400	U	
BIS(2-ETHYLHEXYL)PHTHALATE	400	U	
BUTYL BENZYL PHTHALATE	400	UJ	C
CAPROLACTAM	400	U	
CARBAZOLE	400	U	
CHRYSENE	400	U	
DIBENZO(A,H)ANTHRACENE	400	U	
DIBENZOFURAN	400	U	
DIETHYL PHTHALATE	400	U	
DIMETHYL PHTHALATE	400	U	
DI-N-BUTYL PHTHALATE	400	U	
DI-N-OCTYL PHTHALATE	400	U	
FLUORANTHENE	400	U	
FLUORENE	400	U	
HEXACHLOROBENZENE	400	U	
HEXACHLOROBUTADIENE	400	U	
HEXACHLOROCYCLOPENTADIENE	400	U	
HEXACHLOROETHANE	400	U	
INDENO(1,2,3-CD)PYRENE	400	U	
ISOPHORONE	400	U	
NAPHTHALENE	400	U	
NITROBENZENE	400	U	
N-NITROSO-DI-N-PROPYLAMINE	400	U	
N-NITROSODIPHENYLAMINE	400	U	
PENTACHLOROPHENOL	990	U	
PHENANTHRENE	400	U	
PHENOL	400	U	

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	400	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	400	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400	U	
2,4,5-TRICHLOROPHENOL	1000	U	
2,4,6-TRICHLOROPHENOL	400	U	
2,4-DICHLOROPHENOL	400	U	
2,4-DIMETHYLPHENOL	400	U	
2,4-DINITROPHENOL	1000	U	
2,4-DINITROTOLUENE	400	U	
2,6-DINITROTOLUENE	400	U	
2-CHLORONAPHTHALENE	400	UJ	C
2-CHLOROPHENOL	400	U	
2-METHYLNAPHTHALENE	400	U	
2-METHYLPHENOL	400	U	
2-NITROANILINE	1000	U	
2-NITROPHENOL	400	U	
3,3'-DICHLOROBENZIDINE	400	U	
3-NITROANILINE	1000	U	
4,6-DINITRO-2-METHYLPHENOL	1000	U	
4-BROMOPHENYL PHENYL ETHER	400	U	
4-CHLORO-3-METHYLPHENOL	400	U	
4-CHLOROANILINE	400	U	
4-CHLOROPHENYL PHENYL ETHER	400	U	
4-METHYLPHENOL	400	U	
4-NITROANILINE	1000	U	
4-NITROPHENOL	1000	U	
ACENAPHTHENE	400	U	
ACENAPHTHYLENE	400	U	
ACETOPHENONE	400	U	
ANTHRACENE	400	U	
ATRAZINE	400	U	
BENZALDEHYDE	400	UJ	C
BENZO(A)ANTHRACENE	400	U	

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	400	U	
BENZO(B)FLUORANTHENE	400	U	
BENZO(G,H,I)PERYLENE	400	U	
BENZO(K)FLUORANTHENE	400	U	
BIS(2-CHLOROETHOXY)METHANE	400	U	
BIS(2-CHLOROETHYL)ETHER	400	U	
BIS(2-ETHYLHEXYL)PHTHALATE	400	U	
BUTYL BENZYL PHTHALATE	400	U	
CAPROLACTAM	400	U	
CARBAZOLE	400	U	
CHRYSENE	400	U	
DIBENZO(A,H)ANTHRACENE	400	U	
DIBENZOFURAN	400	U	
DIETHYL PHTHALATE	400	U	
DIMETHYL PHTHALATE	400	U	
DI-N-BUTYL PHTHALATE	400	U	
DI-N-OCTYL PHTHALATE	400	U	
FLUORANTHENE	400	U	
FLUORENE	400	U	
HEXACHLOROBENZENE	400	U	
HEXACHLOROBUTADIENE	400	U	
HEXACHLOROCYCLOPENTADIENE	400	U	
HEXACHLOROETHANE	400	U	
INDENO(1,2,3-CD)PYRENE	400	U	
ISOPHORONE	400	U	
NAPHTHALENE	400	U	
NITROBENZENE	400	U	
N-NITROSO-DI-N-PROPYLAMINE	400	U	
N-NITROSODIPHENYLAMINE	400	U	
PENTACHLOROPHENOL	1000	U	
PHENANTHRENE	400	U	
PHENOL	400	U	

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	400	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	460	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	460	U	
2,4,5-TRICHLOROPHENOL	1100	U	
2,4,6-TRICHLOROPHENOL	460	U	
2,4-DICHLOROPHENOL	460	U	
2,4-DIMETHYLPHENOL	460	U	
2,4-DINITROPHENOL	1100	UJ	C
2,4-DINITROTOLUENE	460	U	
2,6-DINITROTOLUENE	460	U	
2-CHLORONAPHTHALENE	460	U	
2-CHLOROPHENOL	460	U	
2-METHYLNAPHTHALENE	460	U	
2-METHYLPHENOL	460	U	
2-NITROANILINE	1100	U	
2-NITROPHENOL	460	U	
3,3'-DICHLOROBENZIDINE	460	U	
3-NITROANILINE	1100	U	
4,6-DINITRO-2-METHYLPHENOL	1100	U	
4-BROMOPHENYL PHENYL ETHER	460	U	
4-CHLORO-3-METHYLPHENOL	460	U	
4-CHLOROANILINE	460	U	
4-CHLOROPHENYL PHENYL ETHER	460	U	
4-METHYLPHENOL	460	U	
4-NITROANILINE	1100	U	
4-NITROPHENOL	1100	U	
ACENAPHTHENE	460	U	
ACENAPHTHYLENE	460	U	
ACETOPHENONE	460	U	
ANTHRACENE	460	U	
ATRAZINE	460	U	
BENZALDEHYDE	460	UJ	C
BENZO(A)ANTHRACENE	460	U	

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	460	U	
BENZO(B)FLUORANTHENE	460	U	
BENZO(G,H,I)PERYLENE	460	U	
BENZO(K)FLUORANTHENE	460	U	
BIS(2-CHLOROETHOXY)METHANE	460	U	
BIS(2-CHLOROETHYL)ETHER	460	U	
BIS(2-ETHYLHEXYL)PHTHALATE	460	U	
BUTYL BENZYL PHTHALATE	460	U	
CAPROLACTAM	460	U	
CARBAZOLE	460	U	
CHRYSENE	460	U	
DIBENZO(A,H)ANTHRACENE	460	U	
DIBENZOFURAN	460	U	
DIETHYL PHTHALATE	460	U	
DIMETHYL PHTHALATE	460	U	
DI-N-BUTYL PHTHALATE	460	U	A
DI-N-OCTYL PHTHALATE	460	U	
FLUORANTHENE	460	U	
FLUORENE	460	U	
HEXACHLOROBENZENE	460	U	
HEXACHLOROBUTADIENE	460	U	
HEXACHLOROCYCLOPENTADIENE	460	U	
HEXACHLOROETHANE	460	U	
INDENO(1,2,3-CD)PYRENE	460	U	
ISOPHORONE	460	U	
NAPHTHALENE	460	U	
NITROBENZENE	460	U	
N-NITROSO-DI-N-PROPYLAMINE	460	U	
N-NITROSODIPHENYLAMINE	460	U	
PENTACHLOROPHENOL	1100	U	
PHENANTHRENE	460	U	
PHENOL	460	U	

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	460	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0101D	nsample	04SD0101D	nsample	04SD0101D
samp_date	8/5/2004	samp_date	8/5/2004	samp_date	8/5/2004
lab_id	WU2405-2	lab_id	WU2405-2	lab_id	WU2405-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	75.2	Pct_Solids	75.2	Pct_Solids	75.2
DUP_OF:	04SD0101	DUP_OF:	04SD0101	DUP_OF:	04SD0101

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	440	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	440	U	
2,4,5-TRICHLOROPHENOL	1100	U	
2,4,6-TRICHLOROPHENOL	440	U	
2,4-DICHLOROPHENOL	440	U	
2,4-DIMETHYLPHENOL	440	U	
2,4-DINITROPHENOL	1100	UJ	C
2,4-DINITROTOLUENE	440	U	
2,6-DINITROTOLUENE	440	U	
2-CHLORONAPHTHALENE	440	U	
2-CHLOROPHENOL	440	U	
2-METHYLNAPHTHALENE	440	U	
2-METHYLPHENOL	440	U	
2-NITROANILINE	1100	U	
2-NITROPHENOL	440	U	
3,3'-DICHLOROBENZIDINE	440	U	
3-NITROANILINE	1100	U	
4,6-DINITRO-2-METHYLPHENOL	1100	U	
4-BROMOPHENYL PHENYL ETHER	440	U	
4-CHLORO-3-METHYLPHENOL	440	U	
4-CHLOROANILINE	440	U	
4-CHLOROPHENYL PHENYL ETHER	440	U	
4-METHYLPHENOL	440	U	
4-NITROANILINE	1100	U	
4-NITROPHENOL	1100	U	
ACENAPHTHENE	440	U	
ACENAPHTHYLENE	440	U	
ACETOPHENONE	440	U	
ANTHRACENE	440	U	
ATRAZINE	440	U	
BENZALDEHYDE	440	UJ	C
BENZO(A)ANTHRACENE	440	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	440	U	
BENZO(B)FLUORANTHENE	440	U	
BENZO(G,H,I)PERYLENE	440	U	
BENZO(K)FLUORANTHENE	440	U	
BIS(2-CHLOROETHOXY)METHANE	440	U	
BIS(2-CHLOROETHYL)ETHER	440	U	
BIS(2-ETHYLHEXYL)PHTHALATE	440	U	
BUTYL BENZYL PHTHALATE	440	U	
CAPROLACTAM	440	U	
CARBAZOLE	440	U	
CHRYSENE	440	U	
DIBENZO(A,H)ANTHRACENE	440	U	
DIBENZOFURAN	440	U	
DIETHYL PHTHALATE	440	U	
DIMETHYL PHTHALATE	440	U	
DI-N-BUTYL PHTHALATE	440	U	A
DI-N-OCTYL PHTHALATE	440	U	
FLUORANTHENE	440	U	
FLUORENE	440	U	
HEXACHLOROBENZENE	440	U	
HEXACHLOROBUTADIENE	440	U	
HEXACHLOROCYCLOPENTADIENE	440	U	
HEXACHLOROETHANE	440	U	
INDENO(1,2,3-CD)PYRENE	440	U	
ISOPHORONE	440	U	
NAPHTHALENE	440	U	
NITROBENZENE	440	U	
N-NITROSO-DI-N-PROPYLAMINE	440	U	
N-NITROSODIPHENYLAMINE	440	U	
PENTACHLOROPHENOL	1100	U	
PHENANTHRENE	440	U	
PHENOL	440	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	440	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-1RA
qc_type	NM
units	UG/KG
Pct_Solids	61.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	540	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	540	U	
2,4,5-TRICHLOROPHENOL	1300	U	
2,4,6-TRICHLOROPHENOL	540	U	
2,4-DICHLOROPHENOL	540	U	
2,4-DIMETHYLPHENOL	540	U	
2,4-DINITROPHENOL	1300	U	
2,4-DINITROTOLUENE	540	U	
2,6-DINITROTOLUENE	540	U	
2-CHLORONAPHTHALENE	540	U	
2-CHLOROPHENOL	540	U	
2-METHYLNAPHTHALENE	540	U	
2-METHYLPHENOL	540	U	
2-NITROANILINE	1300	U	
2-NITROPHENOL	540	U	
3,3'-DICHLOROBENZIDINE	540	U	
3-NITROANILINE	1300	U	
4,6-DINITRO-2-METHYLPHENOL	1300	U	
4-BROMOPHENYL PHENYL ETHER	540	U	
4-CHLORO-3-METHYLPHENOL	540	U	
4-CHLOROANILINE	540	U	
4-CHLOROPHENYL PHENYL ETHER	540	U	
4-METHYLPHENOL	540	U	
4-NITROANILINE	1300	U	
4-NITROPHENOL	1300	U	
ACENAPHTHENE	540	U	
ACENAPHTHYLENE	540	U	
ACETOPHENONE	540	U	
ANTHRACENE	540	U	
ATRAZINE	540	U	
BENZALDEHYDE	540	UJ	C
BENZO(A)ANTHRACENE	100	J	P

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-1RA
qc_type	NM
units	UG/KG
Pct_Solids	61.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	240	J	P
BENZO(B)FLUORANTHENE	540	U	
BENZO(G,H,I)PERYLENE	540	U	
BENZO(K)FLUORANTHENE	82	J	P
BIS(2-CHLOROETHOXY)METHANE	540	U	
BIS(2-CHLOROETHYL)ETHER	540	U	
BIS(2-ETHYLHEXYL)PHTHALATE	540	U	
BUTYL BENZYL PHTHALATE	540	UJ	C
CAPROLACTAM	540	U	
CARBAZOLE	540	U	
CHRYSENE	150	J	P
DIBENZO(A,H)ANTHRACENE	540	U	
DIBENZOFURAN	540	U	
DIETHYL PHTHALATE	540	U	
DIMETHYL PHTHALATE	540	U	
DI-N-BUTYL PHTHALATE	540	U	
DI-N-OCTYL PHTHALATE	540	UJ	C
FLUORANTHENE	190	J	P
FLUORENE	540	U	
HEXACHLOROBENZENE	540	U	
HEXACHLOROBUTADIENE	540	U	
HEXACHLOROCYCLOPENTADIENE	540	U	
HEXACHLOROETHANE	540	U	
INDENO(1,2,3-CD)PYRENE	540	U	
ISOPHORONE	540	U	
NAPHTHALENE	540	U	
NITROBENZENE	540	U	
N-NITROSO-DI-N-PROPYLAMINE	540	U	
N-NITROSODIPHENYLAMINE	540	U	
PENTACHLOROPHENOL	1300	U	
PHENANTHRENE	48	J	P
PHENOL	540	U	

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-1RA
qc_type	NM
units	UG/KG
Pct_Solids	61.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	240	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	440	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	440	U	
2,4,5-TRICHLOROPHENOL	1100	U	
2,4,6-TRICHLOROPHENOL	440	U	
2,4-DICHLOROPHENOL	440	U	
2,4-DIMETHYLPHENOL	440	U	
2,4-DINITROPHENOL	1100	U	
2,4-DINITROTOLUENE	440	U	
2,6-DINITROTOLUENE	440	U	
2-CHLORONAPHTHALENE	440	U	
2-CHLOROPHENOL	440	U	
2-METHYLNAPHTHALENE	440	U	
2-METHYLPHENOL	440	U	
2-NITROANILINE	1100	U	
2-NITROPHENOL	440	U	
3,3'-DICHLOROBENZIDINE	440	U	
3-NITROANILINE	1100	U	
4,6-DINITRO-2-METHYLPHENOL	1100	U	
4-BROMOPHENYL PHENYL ETHER	440	U	
4-CHLORO-3-METHYLPHENOL	440	U	
4-CHLOROANILINE	440	U	
4-CHLOROPHENYL PHENYL ETHER	440	U	
4-METHYLPHENOL	440	U	
4-NITROANILINE	1100	U	
4-NITROPHENOL	1100	UJ	C
ACENAPHTHENE	440	U	
ACENAPHTHYLENE	440	U	
ACETOPHENONE	440	U	
ANTHRACENE	440	U	
ATRAZINE	440	U	
BENZALDEHYDE	440	UJ	C
BENZO(A)ANTHRACENE	43	J	P

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	63	J	P
BENZO(B)FLUORANTHENE	440	U	
BENZO(G,H,I)PERYLENE	70	J	P
BENZO(K)FLUORANTHENE	440	U	
BIS(2-CHLOROETHOXY)METHANE	440	U	
BIS(2-CHLOROETHYL)ETHER	440	U	
BIS(2-ETHYLHEXYL)PHTHALATE	440	U	
BUTYL BENZYL PHTHALATE	440	U	
CAPROLACTAM	440	U	
CARBAZOLE	440	U	
CHRYSENE	80	J	P
DIBENZO(A,H)ANTHRACENE	440	U	
DIBENZOFURAN	440	U	
DIETHYL PHTHALATE	440	U	
DIMETHYL PHTHALATE	440	U	
DI-N-BUTYL PHTHALATE	440	U	
DI-N-OCTYL PHTHALATE	440	U	
FLUORANTHENE	120	J	P
FLUORENE	440	U	
HEXACHLOROBENZENE	440	U	
HEXACHLOROBUTADIENE	440	U	
HEXACHLOROCYCLOPENTADIENE	440	U	
HEXACHLOROETHANE	440	U	
INDENO(1,2,3-CD)PYRENE	440	U	
ISOPHORONE	440	U	
NAPHTHALENE	440	U	
NITROBENZENE	440	U	
N-NITROSO-DI-N-PROPYLAMINE	440	U	
N-NITROSODIPHENYLAMINE	440	U	
PENTACHLOROPHENOL	1100	U	
PHENANTHRENE	42	J	P
PHENOL	440	U	

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	140	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0401	nsample	04SD0401	nsample	04SD0401
samp_date	8/12/2004	samp_date	8/12/2004	samp_date	8/12/2004
lab_id	WU2494-2	lab_id	WU2494-2	lab_id	WU2494-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	57.4	Pct_Solids	57.4	Pct_Solids	57.4
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	580	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	580	U	
2,4,5-TRICHLOROPHENOL	1400	U	
2,4,6-TRICHLOROPHENOL	580	U	
2,4-DICHLOROPHENOL	580	U	
2,4-DIMETHYLPHENOL	580	U	
2,4-DINITROPHENOL	1400	U	
2,4-DINITROTOLUENE	580	U	
2,6-DINITROTOLUENE	580	U	
2-CHLORONAPHTHALENE	580	U	
2-CHLOROPHENOL	580	U	
2-METHYLNAPHTHALENE	580	U	
2-METHYLPHENOL	580	U	
2-NITROANILINE	1400	U	
2-NITROPHENOL	580	U	
3,3'-DICHLOROBENZIDINE	580	U	
3-NITROANILINE	1400	U	
4,6-DINITRO-2-METHYLPHENOL	1400	U	
4-BROMOPHENYL PHENYL ETHER	580	U	
4-CHLORO-3-METHYLPHENOL	580	U	
4-CHLOROANILINE	580	U	
4-CHLOROPHENYL PHENYL ETHER	580	U	
4-METHYLPHENOL	580	U	
4-NITROANILINE	1400	U	
4-NITROPHENOL	1400	UJ	C
ACENAPHTHENE	580	U	
ACENAPHTHYLENE	580	U	
ACETOPHENONE	580	U	
ANTHRACENE	580	U	
ATRAZINE	580	U	
BENZALDEHYDE	430	J	CP
BENZO(A)ANTHRACENE	86	J	P

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	99	J	P
BENZO(B)FLUORANTHENE	580	U	
BENZO(G,H,I)PERYLENE	580	U	
BENZO(K)FLUORANTHENE	580	U	
BIS(2-CHLOROETHOXY)METHANE	580	U	
BIS(2-CHLOROETHYL)ETHER	580	U	
BIS(2-ETHYLHEXYL)PHTHALATE	610		
BUTYL BENZYL PHTHALATE	580	U	
CAPROLACTAM	580	U	
CARBAZOLE	580	U	
CHRYSENE	130	J	P
DIBENZO(A,H)ANTHRACENE	580	U	
DIBENZOFURAN	580	U	
DIETHYL PHTHALATE	580	U	
DIMETHYL PHTHALATE	580	U	
DI-N-BUTYL PHTHALATE	580	U	
DI-N-OCTYL PHTHALATE	580	U	
FLUORANTHENE	210	J	P
FLUORENE	580	U	
HEXACHLOROBENZENE	580	U	
HEXACHLOROBUTADIENE	580	U	
HEXACHLOROCYCLOPENTADIENE	580	U	
HEXACHLOROETHANE	580	U	
INDENO(1,2,3-CD)PYRENE	580	U	
ISOPHORONE	580	U	
NAPHTHALENE	580	U	
NITROBENZENE	580	U	
N-NITROSO-DI-N-PROPYLAMINE	580	U	
N-NITROSODIPHENYLAMINE	580	U	
PENTACHLOROPHENOL	1400	U	
PHENANTHRENE	87	J	P
PHENOL	580	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	310	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	580	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	580	U	
2,4,5-TRICHLOROPHENOL	1400	U	
2,4,6-TRICHLOROPHENOL	580	U	
2,4-DICHLOROPHENOL	580	U	
2,4-DIMETHYLPHENOL	580	U	
2,4-DINITROPHENOL	1400	U	
2,4-DINITROTOLUENE	580	U	
2,6-DINITROTOLUENE	580	U	
2-CHLORONAPHTHALENE	580	U	
2-CHLOROPHENOL	580	U	
2-METHYLNAPHTHALENE	580	U	
2-METHYLPHENOL	580	U	
2-NITROANILINE	1400	U	
2-NITROPHENOL	580	U	
3,3'-DICHLOROBENZIDINE	580	UR	D
3-NITROANILINE	1400	U	
4,6-DINITRO-2-METHYLPHENOL	1400	U	
4-BROMOPHENYL PHENYL ETHER	580	U	
4-CHLORO-3-METHYLPHENOL	580	U	
4-CHLOROANILINE	580	U	
4-CHLOROPHENYL PHENYL ETHER	580	U	
4-METHYLPHENOL	580	U	
4-NITROANILINE	1400	U	
4-NITROPHENOL	1400	U	
ACENAPHTHENE	150	J	P
ACENAPHTHYLENE	580	U	
ACETOPHENONE	580	U	
ANTHRACENE	280	J	P
ATRAZINE	580	U	
BENZALDEHYDE	580	UJ	C
BENZO(A)ANTHRACENE	1600		

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	1800		
BENZO(B)FLUORANTHENE	2500		
BENZO(G,H,I)PERYLENE	1000		
BENZO(K)FLUORANTHENE	1500		
BIS(2-CHLOROETHOXY)METHANE	580	U	
BIS(2-CHLOROETHYL)ETHER	580	U	
BIS(2-ETHYLHEXYL)PHTHALATE	580	U	
BUTYL BENZYL PHTHALATE	580	UJ	C
CAPROLACTAM	580	U	
CARBAZOLE	110	J	P
CHRYSENE	1800		
DIBENZO(A,H)ANTHRACENE	540	J	P
DIBENZOFURAN	92	J	P
DIETHYL PHTHALATE	580	U	
DIMETHYL PHTHALATE	580	U	
DI-N-BUTYL PHTHALATE	580	U	
DI-N-OCTYL PHTHALATE	580	U	
FLUORANTHENE	1200		
FLUORENE	200	J	P
HEXACHLOROBENZENE	580	U	
HEXACHLOROBUTADIENE	580	U	
HEXACHLOROCYCLOPENTADIENE	580	UR	D
HEXACHLOROETHANE	580	UJ	D
INDENO(1,2,3-CD)PYRENE	980		
ISOPHORONE	580	U	
NAPHTHALENE	580	U	
NITROBENZENE	580	U	
N-NITROSO-DI-N-PROPYLAMINE	580	U	
N-NITROSODIPHENYLAMINE	580	U	
PENTACHLOROPHENOL	1400	U	
PHENANTHRENE	800		
PHENOL	580	U	

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	2000		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	480	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	480	U	
2,4,5-TRICHLOROPHENOL	1200	U	
2,4,6-TRICHLOROPHENOL	480	U	
2,4-DICHLOROPHENOL	480	U	
2,4-DIMETHYLPHENOL	480	U	
2,4-DINITROPHENOL	1200	U	
2,4-DINITROTOLUENE	480	U	
2,6-DINITROTOLUENE	480	U	
2-CHLORONAPHTHALENE	480	U	
2-CHLOROPHENOL	480	U	
2-METHYLNAPHTHALENE	480	U	
2-METHYLPHENOL	480	U	
2-NITROANILINE	1200	U	
2-NITROPHENOL	480	U	
3,3'-DICHLOROBENZIDINE	480	U	
3-NITROANILINE	1200	U	
4,6-DINITRO-2-METHYLPHENOL	1200	U	
4-BROMOPHENYL PHENYL ETHER	480	U	
4-CHLORO-3-METHYLPHENOL	480	U	
4-CHLOROANILINE	480	U	
4-CHLOROPHENYL PHENYL ETHER	480	U	
4-METHYLPHENOL	480	U	
4-NITROANILINE	1200	U	
4-NITROPHENOL	1200	U	
ACENAPHTHENE	480	U	
ACENAPHTHYLENE	480	U	
ACETOPHENONE	480	U	
ANTHRACENE	480	U	
ATRAZINE	480	U	
BENZALDEHYDE	480	UJ	C
BENZO(A)ANTHRACENE	480	U	

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	480	U	
BENZO(B)FLUORANTHENE	480	U	
BENZO(G,H,I)PERYLENE	480	U	
BENZO(K)FLUORANTHENE	480	U	
BIS(2-CHLOROETHOXY)METHANE	480	U	
BIS(2-CHLOROETHYL)ETHER	480	U	
BIS(2-ETHYLHEXYL)PHTHALATE	480	U	
BUTYL BENZYL PHTHALATE	480	UJ	C
CAPROLACTAM	480	U	
CARBAZOLE	480	U	
CHRYSENE	480	U	
DIBENZO(A,H)ANTHRACENE	480	U	
DIBENZOFURAN	480	U	
DIETHYL PHTHALATE	480	U	
DIMETHYL PHTHALATE	480	U	
DI-N-BUTYL PHTHALATE	480	U	
DI-N-OCTYL PHTHALATE	480	U	
FLUORANTHENE	49	J	P
FLUORENE	480	U	
HEXACHLOROBENZENE	480	U	
HEXACHLOROBUTADIENE	480	U	
HEXACHLOROCYCLOPENTADIENE	480	U	
HEXACHLOROETHANE	480	U	
INDENO(1,2,3-CD)PYRENE	480	U	
ISOPHORONE	480	U	
NAPHTHALENE	480	U	
NITROBENZENE	480	U	
N-NITROSO-DI-N-PROPYLAMINE	480	U	
N-NITROSODIPHENYLAMINE	480	U	
PENTACHLOROPHENOL	1200	U	
PHENANTHRENE	480	U	
PHENOL	480	U	

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	59	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1RA
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	500	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	500	U	
2,4,5-TRICHLOROPHENOL	1200	U	
2,4,6-TRICHLOROPHENOL	500	U	
2,4-DICHLOROPHENOL	500	U	
2,4-DIMETHYLPHENOL	500	U	
2,4-DINITROPHENOL	1200	U	
2,4-DINITROTOLUENE	500	U	
2,6-DINITROTOLUENE	500	U	
2-CHLORONAPHTHALENE	500	U	
2-CHLOROPHENOL	500	U	
2-METHYLNAPHTHALENE	500	U	
2-METHYLPHENOL	500	U	
2-NITROANILINE	1200	U	
2-NITROPHENOL	500	U	
3,3'-DICHLOROBENZIDINE	500	U	
3-NITROANILINE	1200	U	
4,6-DINITRO-2-METHYLPHENOL	1200	U	
4-BROMOPHENYL PHENYL ETHER	500	U	
4-CHLORO-3-METHYLPHENOL	500	U	
4-CHLOROANILINE	500	U	
4-CHLOROPHENYL PHENYL ETHER	500	U	
4-METHYLPHENOL	500	U	
4-NITROANILINE	1200	U	
4-NITROPHENOL	1200	U	
ACENAPHTHENE	500	U	
ACENAPHTHYLENE	500	U	
ACETOPHENONE	500	U	
ANTHRACENE	500	U	
ATRAZINE	500	U	
BENZALDEHYDE	500	UJ	C
BENZO(A)ANTHRACENE	500	U	

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1RA
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	500	U	
BENZO(B)FLUORANTHENE	500	U	
BENZO(G,H,I)PERYLENE	500	U	
BENZO(K)FLUORANTHENE	500	U	
BIS(2-CHLOROETHOXY)METHANE	500	U	
BIS(2-CHLOROETHYL)ETHER	500	U	
BIS(2-ETHYLHEXYL)PHTHALATE	500	U	
BUTYL BENZYL PHTHALATE	500	U	
CAPROLACTAM	500	U	
CARBAZOLE	500	U	
CHRYSENE	500	U	
DIBENZO(A,H)ANTHRACENE	500	U	
DIBENZOFURAN	500	U	
DIETHYL PHTHALATE	500	U	
DIMETHYL PHTHALATE	500	U	
DI-N-BUTYL PHTHALATE	500	U	
DI-N-OCTYL PHTHALATE	500	U	
FLUORANTHENE	86	J	P
FLUORENE	500	U	
HEXACHLOROBENZENE	500	U	
HEXACHLOROBUTADIENE	500	U	
HEXACHLOROCYCLOPENTADIENE	500	U	
HEXACHLOROETHANE	500	U	
INDENO(1,2,3-CD)PYRENE	500	U	
ISOPHORONE	500	U	
NAPHTHALENE	500	U	
NITROBENZENE	500	U	
N-NITROSO-DI-N-PROPYLAMINE	500	U	
N-NITROSODIPHENYLAMINE	500	U	
PENTACHLOROPHENOL	1200	U	
PHENANTHRENE	500	U	
PHENOL	500	U	

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1RA
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	76	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: OS

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	500	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	500	U	
2,4,5-TRICHLOROPHENOL	1200	U	
2,4,6-TRICHLOROPHENOL	500	U	
2,4-DICHLOROPHENOL	500	U	
2,4-DIMETHYLPHENOL	500	U	
2,4-DINITROPHENOL	1200	U	
2,4-DINITROTOLUENE	500	U	
2,6-DINITROTOLUENE	500	U	
2-CHLORONAPHTHALENE	500	U	
2-CHLOROPHENOL	500	U	
2-METHYLNAPHTHALENE	500	U	
2-METHYLPHENOL	500	U	
2-NITROANILINE	1200	U	
2-NITROPHENOL	500	U	
3,3'-DICHLOROBENZIDINE	500	U	
3-NITROANILINE	1200	U	
4,6-DINITRO-2-METHYLPHENOL	1200	U	
4-BROMOPHENYL PHENYL ETHER	500	U	
4-CHLORO-3-METHYLPHENOL	500	U	
4-CHLOROANILINE	500	U	
4-CHLOROPHENYL PHENYL ETHER	500	U	
4-METHYLPHENOL	500	U	
4-NITROANILINE	1200	U	
4-NITROPHENOL	1200	U	
ACENAPHTHENE	500	U	
ACENAPHTHYLENE	500	U	
ACETOPHENONE	500	U	
ANTHRACENE	500	U	
ATRAZINE	500	U	
BENZALDEHYDE	500	UJ	C
BENZO(A)ANTHRACENE	500	U	

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	500	U	
BENZO(B)FLUORANTHENE	500	U	
BENZO(G,H,I)PERYLENE	500	U	
BENZO(K)FLUORANTHENE	500	U	
BIS(2-CHLOROETHOXY)METHANE	500	U	
BIS(2-CHLOROETHYL)ETHER	500	U	
BIS(2-ETHYLHEXYL)PHTHALATE	500	U	
BUTYL BENZYL PHTHALATE	500	UJ	C
CAPROLACTAM	500	U	
CARBAZOLE	500	U	
CHRYSENE	60	J	P
DIBENZO(A,H)ANTHRACENE	500	U	
DIBENZOFURAN	500	U	
DIETHYL PHTHALATE	500	U	
DIMETHYL PHTHALATE	500	U	
DI-N-BUTYL PHTHALATE	500	U	
DI-N-OCTYL PHTHALATE	500	U	
FLUORANTHENE	74	J	P
FLUORENE	500	U	
HEXACHLOROBENZENE	500	U	
HEXACHLOROBUTADIENE	500	U	
HEXACHLOROCYCLOPENTADIENE	500	U	
HEXACHLOROETHANE	500	U	
INDENO(1,2,3-CD)PYRENE	500	U	
ISOPHORONE	500	U	
NAPHTHALENE	500	U	
NITROBENZENE	500	U	
N-NITROSO-DI-N-PROPYLAMINE	500	U	
N-NITROSODIPHENYLAMINE	500	U	
PENTACHLOROPHENOL	1200	U	
PHENANTHRENE	500	U	
PHENOL	500	U	

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	100	J	P

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SB0101	nsample	04SB0201	nsample	04SB0301
samp_date	8/11/2004	samp_date	8/12/2004	samp_date	8/12/2004
lab_id	WU2511-1	lab_id	SCWU2494-3	lab_id	WU2494-4
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	83.5	Pct_Solids	86.4	Pct_Solids	81.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4	UJ	R
4,4'-DDE	4	UJ	R
4,4'-DDT	4	UJ	R
ALDRIN	2	UJ	R
ALPHA-BHC	2	UJ	R
ALPHA-CHLORDANE	2	UJ	R
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	
BETA-BHC	2	UJ	R
DELTA-BHC	2	UJ	R
DIELDRIN	4	UJ	R
ENDOSULFAN I	2	UJ	R
ENDOSULFAN II	4	UJ	R
ENDOSULFAN SULFATE	4	UJ	R
ENDRIN	4	UJ	R
ENDRIN ALDEHYDE	4	UJ	R
ENDRIN KETONE	4	UJ	R
GAMMA-BHC (LINDANE)	2	UJ	R
GAMMA-CHLORDANE	2	UJ	R
HEPTACHLOR	2	UJ	R
HEPTACHLOR EPOXIDE	2	UJ	R
METHOXYCHLOR	20	UJ	R
TOXAPHENE	40	UJ	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	6.3		
4,4'-DDE	3.7	J	P
4,4'-DDT	3.8	UJ	C
ALDRIN	2	U	
ALPHA-BHC	2	U	
ALPHA-CHLORDANE	24		
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	
BETA-BHC	2	U	
DELTA-BHC	2	U	
DIELDRIN	4.6	U	A
ENDOSULFAN I	2	U	
ENDOSULFAN II	3.8	U	
ENDOSULFAN SULFATE	3.8	U	
ENDRIN	3.8	U	
ENDRIN ALDEHYDE	3.8	U	
ENDRIN KETONE	3.8	U	
GAMMA-BHC (LINDANE)	2	U	
GAMMA-CHLORDANE	280	J	LU
HEPTACHLOR	2	U	
HEPTACHLOR EPOXIDE	2	U	
METHOXYCHLOR	20	U	
TOXAPHENE	38	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4	U	
4,4'-DDE	4	U	
4,4'-DDT	4	UJ	C
ALDRIN	2.1	U	
ALPHA-BHC	2.1	U	
ALPHA-CHLORDANE	2.1	U	
AROCLOR-1016	21	U	
AROCLOR-1221	21	U	
AROCLOR-1232	21	U	
AROCLOR-1242	21	U	
AROCLOR-1248	21	U	
AROCLOR-1254	21	U	
AROCLOR-1260	21	U	
BETA-BHC	2.1	U	
DELTA-BHC	2.1	U	
DIELDRIN	4	U	
ENDOSULFAN I	2.1	U	
ENDOSULFAN II	4	U	
ENDOSULFAN SULFATE	4	U	
ENDRIN	4	U	
ENDRIN ALDEHYDE	4	U	
ENDRIN KETONE	4	U	
GAMMA-BHC (LINDANE)	2.1	U	
GAMMA-CHLORDANE	2.1	U	
HEPTACHLOR	2.1	U	
HEPTACHLOR EPOXIDE	2.1	U	
METHOXYCHLOR	21	U	
TOXAPHENE	40	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SB0401	nsample	04SB0501	nsample	04SB0601
samp_date	8/12/2004	samp_date	8/13/2004	samp_date	8/18/2004
lab_id	WU2494-5	lab_id	SCWU2513-2	lab_id	WU2576-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	79.4	Pct_Solids	81.1	Pct_Solids	82.6
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.2	U	
4,4'-DDE	4.2	U	
4,4'-DDT	4.2	UJ	C
ALDRIN	2.1	U	
ALPHA-BHC	2.1	U	
ALPHA-CHLORDANE	2.1	U	
AROCLOR-1016	21	UJ	R
AROCLOR-1221	21	UJ	R
AROCLOR-1232	21	UJ	R
AROCLOR-1242	21	UJ	R
AROCLOR-1248	21	UJ	R
AROCLOR-1254	21	UJ	R
AROCLOR-1260	21	UJ	R
BETA-BHC	2.1	U	
DELTA-BHC	2.1	U	
DIELDRIN	4.2	U	
ENDOSULFAN I	2.1	U	
ENDOSULFAN II	4.2	U	
ENDOSULFAN SULFATE	4.2	U	
ENDRIN	4.2	U	
ENDRIN ALDEHYDE	4.2	U	
ENDRIN KETONE	4.2	U	
GAMMA-BHC (LINDANE)	2.1	U	
GAMMA-CHLORDANE	2.1	U	
HEPTACHLOR	2.1	U	
HEPTACHLOR EPOXIDE	2.1	U	
METHOXYCHLOR	21	U	
TOXAPHENE	42	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.1	U	
4,4'-DDE	4.1	U	
4,4'-DDT	4.1	UJ	C
ALDRIN	2.1	U	
ALPHA-BHC	2.1	U	
ALPHA-CHLORDANE	2.1	U	
AROCLOR-1016	21	UJ	R
AROCLOR-1221	21	UJ	R
AROCLOR-1232	21	UJ	R
AROCLOR-1242	21	UJ	R
AROCLOR-1248	21	UJ	R
AROCLOR-1254	21	UJ	R
AROCLOR-1260	21	UJ	R
BETA-BHC	2.1	U	
DELTA-BHC	2.1	U	
DIELDRIN	4.1	U	
ENDOSULFAN I	2.1	U	
ENDOSULFAN II	4.1	U	
ENDOSULFAN SULFATE	4.1	U	
ENDRIN	4.1	U	
ENDRIN ALDEHYDE	4.1	U	
ENDRIN KETONE	4.1	U	
GAMMA-BHC (LINDANE)	2.1	U	
GAMMA-CHLORDANE	2.1	U	
HEPTACHLOR	2.1	U	
HEPTACHLOR EPOXIDE	2.1	U	
METHOXYCHLOR	21	U	
TOXAPHENE	41	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4	UJ	C
4,4'-DDE	4	U	
4,4'-DDT	4	UJ	C
ALDRIN	2	U	
ALPHA-BHC	2	U	
ALPHA-CHLORDANE	2	U	
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	
BETA-BHC	2	U	
DELTA-BHC	2	UJ	C
DIELDRIN	4	U	
ENDOSULFAN I	2	U	
ENDOSULFAN II	4	U	
ENDOSULFAN SULFATE	4	U	
ENDRIN	4	U	
ENDRIN ALDEHYDE	4	U	
ENDRIN KETONE	4	UJ	C
GAMMA-BHC (LINDANE)	2	U	
GAMMA-CHLORDANE	2	U	
HEPTACHLOR	2	U	
HEPTACHLOR EPOXIDE	2	U	
METHOXYCHLOR	20	UJ	C
TOXAPHENE	40	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SB0701	nsample	04SB0801	nsample	04SB0801D
samp_date	8/18/2004	samp_date	8/19/2004	samp_date	8/19/2004
lab_id	WU2576-4	lab_id	WU2592-2	lab_id	WU2592-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	75.2	Pct_Solids	84.6	Pct_Solids	84.0
DUP_OF:		DUP_OF:		DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.4	UJ	C
4,4'-DDE	4.4	U	
4,4'-DDT	4.4	UJ	C
ALDRIN	2.3	U	
ALPHA-BHC	2.3	U	
ALPHA-CHLORDANE	2.3	U	
AROCLOR-1016	23	U	
AROCLOR-1221	23	U	
AROCLOR-1232	23	U	
AROCLOR-1242	23	U	
AROCLOR-1248	23	U	
AROCLOR-1254	23	U	
AROCLOR-1260	23	U	
BETA-BHC	2.3	U	
DELTA-BHC	2.3	UJ	C
DIELDRIN	4.4	U	
ENDOSULFAN I	2.3	U	
ENDOSULFAN II	4.4	U	
ENDOSULFAN SULFATE	4.4	U	
ENDRIN	4.4	U	
ENDRIN ALDEHYDE	4.4	U	
ENDRIN KETONE	4.4	UJ	C
GAMMA-BHC (LINDANE)	2.3	U	
GAMMA-CHLORDANE	2.3	U	
HEPTACHLOR	2.3	U	
HEPTACHLOR EPOXIDE	2.3	U	
METHOXYCHLOR	23	UJ	C
TOXAPHENE	44	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.9	U	
4,4'-DDE	3.9	U	
4,4'-DDT	3.9	UJ	C
ALDRIN	2	U	
ALPHA-BHC	2	U	
ALPHA-CHLORDANE	2	U	
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	
BETA-BHC	2	U	
DELTA-BHC	2	U	
DIELDRIN	3.9	U	
ENDOSULFAN I	2	U	
ENDOSULFAN II	3.9	U	
ENDOSULFAN SULFATE	3.9	U	
ENDRIN	3.9	U	
ENDRIN ALDEHYDE	3.9	U	
ENDRIN KETONE	3.9	U	
GAMMA-BHC (LINDANE)	2	U	
GAMMA-CHLORDANE	2	U	
HEPTACHLOR	2	U	
HEPTACHLOR EPOXIDE	2	U	
METHOXYCHLOR	20	U	
TOXAPHENE	39	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.9	U	
4,4'-DDE	3.9	U	
4,4'-DDT	3.9	UJ	C
ALDRIN	2	U	
ALPHA-BHC	2	U	
ALPHA-CHLORDANE	2	U	
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	
BETA-BHC	2	U	
DELTA-BHC	2	U	
DIELDRIN	3.9	U	
ENDOSULFAN I	2	U	
ENDOSULFAN II	3.9	U	
ENDOSULFAN SULFATE	3.9	U	
ENDRIN	3.9	U	
ENDRIN ALDEHYDE	3.9	U	
ENDRIN KETONE	3.9	U	
GAMMA-BHC (LINDANE)	2	U	
GAMMA-CHLORDANE	2	U	
HEPTACHLOR	2	U	
HEPTACHLOR EPOXIDE	2	U	
METHOXYCHLOR	20	U	
TOXAPHENE	39	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SB0901	nsample	04SB1001	nsample	04SD0101
samp_date	8/18/2004	samp_date	8/19/2004	samp_date	8/5/2004
lab_id	WU2576-5	lab_id	WU2592-1	lab_id	WU2405-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	82.6	Pct_Solids	82.2	Pct_Solids	72.1
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4	UJ	C
4,4'-DDE	4	U	
4,4'-DDT	4	UJ	C
ALDRIN	2	U	
ALPHA-BHC	2	U	
ALPHA-CHLORDANE	2	U	
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	
BETA-BHC	2	U	
DELTA-BHC	2	UJ	C
DIELDRIN	4	U	
ENDOSULFAN I	2	U	
ENDOSULFAN II	4	U	
ENDOSULFAN SULFATE	4	U	
ENDRIN	4	U	
ENDRIN ALDEHYDE	4	U	
ENDRIN KETONE	4	UJ	C
GAMMA-BHC (LINDANE)	2	U	
GAMMA-CHLORDANE	2	U	
HEPTACHLOR	2	U	
HEPTACHLOR EPOXIDE	2	U	
METHOXYCHLOR	20	UJ	C
TOXAPHENE	40	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4	U	
4,4'-DDE	4	U	
4,4'-DDT	4	UJ	C
ALDRIN	2.1	U	
ALPHA-BHC	2.1	U	
ALPHA-CHLORDANE	2.1	U	
AROCLOR-1016	21	U	
AROCLOR-1221	21	U	
AROCLOR-1232	21	U	
AROCLOR-1242	21	U	
AROCLOR-1248	21	U	
AROCLOR-1254	21	U	
AROCLOR-1260	21	U	
BETA-BHC	2.1	U	
DELTA-BHC	2.1	U	
DIELDRIN	4	U	
ENDOSULFAN I	2.1	U	
ENDOSULFAN II	4	U	
ENDOSULFAN SULFATE	4	U	
ENDRIN	4	U	
ENDRIN ALDEHYDE	4	U	
ENDRIN KETONE	4	U	
GAMMA-BHC (LINDANE)	2.1	U	
GAMMA-CHLORDANE	2.1	U	
HEPTACHLOR	2.1	U	
HEPTACHLOR EPOXIDE	2.1	U	
METHOXYCHLOR	21	U	
TOXAPHENE	40	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.6	UJ	R
4,4'-DDE	4.6	UJ	R
4,4'-DDT	4.6	UJ	R
ALDRIN	2.4	UJ	R
ALPHA-BHC	2.4	UJ	R
ALPHA-CHLORDANE	2.4	UJ	R
AROCLOR-1016	24	UJ	R
AROCLOR-1221	24	UJ	R
AROCLOR-1232	24	UJ	R
AROCLOR-1242	24	UJ	R
AROCLOR-1248	24	UJ	R
AROCLOR-1254	24	UJ	R
AROCLOR-1260	24	UJ	R
BETA-BHC	2.4	UJ	R
DELTA-BHC	2.4	UJ	R
DIELDRIN	4.6	UJ	R
ENDOSULFAN I	2.4	UJ	R
ENDOSULFAN II	4.6	UJ	R
ENDOSULFAN SULFATE	4.6	UJ	R
ENDRIN	4.6	UJ	R
ENDRIN ALDEHYDE	4.6	UJ	R
ENDRIN KETONE	4.6	UJ	R
GAMMA-BHC (LINDANE)	2.4	UJ	R
GAMMA-CHLORDANE	2.4	UJ	R
HEPTACHLOR	2.4	UJ	R
HEPTACHLOR EPOXIDE	2.4	UJ	R
METHOXYCHLOR	24	UJ	R
TOXAPHENE	46	UJ	R

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SD0101D	nsample	04SD0201	nsample	04SD0301
samp_date	8/5/2004	samp_date	8/6/2004	samp_date	8/12/2004
lab_id	WU2405-2	lab_id	SCWU2414-1	lab_id	SCWU2494-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	75.2	Pct_Solids	61.6	Pct_Solids	75.5
DUP_OF:	04SD0101	DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.4	UJ	R
4,4'-DDE	4.4	UJ	R
4,4'-DDT	4.4	UJ	R
ALDRIN	2.2	UJ	R
ALPHA-BHC	2.2	UJ	R
ALPHA-CHLORDANE	2.2	UJ	R
AROCLOR-1016	22	U	
AROCLOR-1221	22	U	
AROCLOR-1232	22	U	
AROCLOR-1242	22	U	
AROCLOR-1248	22	U	
AROCLOR-1254	22	U	
AROCLOR-1260	22	U	
BETA-BHC	2.2	UJ	R
DELTA-BHC	2.2	UJ	R
DIELDRIN	4.4	UJ	R
ENDOSULFAN I	2.2	UJ	R
ENDOSULFAN II	4.4	UJ	R
ENDOSULFAN SULFATE	4.4	UJ	R
ENDRIN	4.4	UJ	R
ENDRIN ALDEHYDE	4.4	UJ	R
ENDRIN KETONE	4.4	UJ	R
GAMMA-BHC (LINDANE)	2.2	UJ	R
GAMMA-CHLORDANE	2.2	UJ	R
HEPTACHLOR	2.2	UJ	R
HEPTACHLOR EPOXIDE	2.2	UJ	R
METHOXYCHLOR	22	UJ	R
TOXAPHENE	44	UJ	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	5.4	UJ	R
4,4'-DDE	5.4	UJ	R
4,4'-DDT	5.4	UJ	CR
ALDRIN	2.8	UJ	R
ALPHA-BHC	2.8	UJ	R
ALPHA-CHLORDANE	2.8	UJ	R
AROCLOR-1016	28	UJ	R
AROCLOR-1221	28	UJ	R
AROCLOR-1232	28	UJ	R
AROCLOR-1242	28	UJ	R
AROCLOR-1248	28	UJ	R
AROCLOR-1254	28	UJ	R
AROCLOR-1260	28	UJ	R
BETA-BHC	2.8	UJ	R
DELTA-BHC	2.8	UJ	R
DIELDRIN	5.4	UJ	R
ENDOSULFAN I	2.8	UJ	R
ENDOSULFAN II	5.4	UJ	R
ENDOSULFAN SULFATE	5.4	UJ	R
ENDRIN	5.4	UJ	R
ENDRIN ALDEHYDE	5.4	UJ	R
ENDRIN KETONE	5.4	UJ	R
GAMMA-BHC (LINDANE)	2.8	UJ	R
GAMMA-CHLORDANE	2.8	UJ	R
HEPTACHLOR	2.8	UJ	R
HEPTACHLOR EPOXIDE	2.8	UJ	R
METHOXYCHLOR	28	UJ	R
TOXAPHENE	54	UJ	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.4	U	
4,4'-DDE	4.4	U	
4,4'-DDT	4.4	UJ	C
ALDRIN	2.2	U	
ALPHA-BHC	2.2	U	
ALPHA-CHLORDANE	2.2	U	
AROCLOR-1016	22	U	
AROCLOR-1221	22	U	
AROCLOR-1232	22	U	
AROCLOR-1242	22	U	
AROCLOR-1248	22	U	
AROCLOR-1254	22	U	
AROCLOR-1260	22	U	
BETA-BHC	2.2	U	
DELTA-BHC	2.2	U	
DIELDRIN	4.4	U	
ENDOSULFAN I	2.2	U	
ENDOSULFAN II	4.4	U	
ENDOSULFAN SULFATE	4.4	U	
ENDRIN	4.4	U	
ENDRIN ALDEHYDE	4.4	U	
ENDRIN KETONE	4.4	U	
GAMMA-BHC (LINDANE)	2.2	U	
GAMMA-CHLORDANE	2.2	U	
HEPTACHLOR	2.2	U	
HEPTACHLOR EPOXIDE	2.2	U	
METHOXYCHLOR	22	U	
TOXAPHENE	44	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SD0401	nsample	04SD0501	nsample	04SD0601
samp_date	8/12/2004	samp_date	8/13/2004	samp_date	8/18/2004
lab_id	SCWU2494-2	lab_id	SCWU2513-1RE	lab_id	SCWU2576-1
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	57.4	Pct_Solids	56.7	Pct_Solids	69.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	2.6	J	P
4,4'-DDE	5.8	U	
4,4'-DDT	5	J	CPU
ALDRIN	3	U	
ALPHA-BHC	3	U	
ALPHA-CHLORDANE	3	U	
AROCLOR-1016	30	U	
AROCLOR-1221	30	U	
AROCLOR-1232	30	U	
AROCLOR-1242	30	U	
AROCLOR-1248	30	U	
AROCLOR-1254	30	U	
AROCLOR-1260	46		
BETA-BHC	3	U	
DELTA-BHC	3	U	
DIELDRIN	5.8	U	
ENDOSULFAN I	3	U	
ENDOSULFAN II	5.8	U	
ENDOSULFAN SULFATE	5.8	U	
ENDRIN	5.8	U	
ENDRIN ALDEHYDE	5.8	U	
ENDRIN KETONE	5.8	U	
GAMMA-BHC (LINDANE)	3	U	
GAMMA-CHLORDANE	3	U	
HEPTACHLOR	3	U	
HEPTACHLOR EPOXIDE	3	U	
METHOXYCHLOR	30	U	
TOXAPHENE	58	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	12	J	C
4,4'-DDE	5.8	U	
4,4'-DDT	5.8	UJ	C
ALDRIN	3	U	
ALPHA-BHC	3	U	
ALPHA-CHLORDANE	3	UJ	C
AROCLOR-1016	30	U	
AROCLOR-1221	30	U	
AROCLOR-1232	30	U	
AROCLOR-1242	30	U	
AROCLOR-1248	30	U	
AROCLOR-1254	30	U	
AROCLOR-1260	240		
BETA-BHC	3	U	
DELTA-BHC	3	UJ	C
DIELDRIN	5.8	U	
ENDOSULFAN I	3	U	
ENDOSULFAN II	5.8	U	
ENDOSULFAN SULFATE	5.8	UJ	C
ENDRIN	5.8	U	
ENDRIN ALDEHYDE	5.8	U	
ENDRIN KETONE	5.8	UJ	C
GAMMA-BHC (LINDANE)	3	U	
GAMMA-CHLORDANE	3	U	
HEPTACHLOR	3	U	
HEPTACHLOR EPOXIDE	3	U	
METHOXYCHLOR	30	U	
TOXAPHENE	58	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	4.8	U	
4,4'-DDE	4.8	UJ	C
4,4'-DDT	4.8	UJ	C
ALDRIN	2.5	UJ	C
ALPHA-BHC	2.5	UJ	C
ALPHA-CHLORDANE	2.5	UJ	C
AROCLOR-1016	25	U	
AROCLOR-1221	25	U	
AROCLOR-1232	25	U	
AROCLOR-1242	25	U	
AROCLOR-1248	25	U	
AROCLOR-1254	25	U	
AROCLOR-1260	140		
BETA-BHC	2.5	UJ	C
DELTA-BHC	2.5	UJ	C
DIELDRIN	4.8	UJ	C
ENDOSULFAN I	2.5	UJ	C
ENDOSULFAN II	4.8	UJ	C
ENDOSULFAN SULFATE	4.8	UJ	C
ENDRIN	4.8	UJ	C
ENDRIN ALDEHYDE	4.8	UJ	C
ENDRIN KETONE	4.8	UJ	C
GAMMA-BHC (LINDANE)	2.5	UJ	C
GAMMA-CHLORDANE	2.5	UJ	C
HEPTACHLOR	2.5	UJ	C
HEPTACHLOR EPOXIDE	2.5	UJ	C
METHOXYCHLOR	25	UJ	C
TOXAPHENE	48	UJ	C

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	04SD0701	nsample	04SD0801
samp_date	8/17/2004	samp_date	8/18/2004
lab_id	SCWU2545-1	lab_id	SCWU2576-2
qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG
Pct_Solids	66.6	Pct_Solids	65.6
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	5	UJ	R
4,4'-DDE	5	UJ	R
4,4'-DDT	5	UJ	CR
ALDRIN	2.6	UJ	R
ALPHA-BHC	2.6	UJ	R
ALPHA-CHLORDANE	2.6	UJ	R
AROCLOR-1016	26	UJ	R
AROCLOR-1221	26	UJ	R
AROCLOR-1232	26	UJ	R
AROCLOR-1242	26	UJ	R
AROCLOR-1248	26	UJ	R
AROCLOR-1254	26	UJ	R
AROCLOR-1260	26	UJ	R
BETA-BHC	2.6	UJ	R
DELTA-BHC	2.6	UJ	R
DIELDRIN	5	UJ	R
ENDOSULFAN I	2.6	UJ	R
ENDOSULFAN II	5	UJ	R
ENDOSULFAN SULFATE	5	UJ	R
ENDRIN	5	UJ	R
ENDRIN ALDEHYDE	5	UJ	R
ENDRIN KETONE	5	UJ	R
GAMMA-BHC (LINDANE)	2.6	UJ	R
GAMMA-CHLORDANE	2.6	UJ	R
HEPTACHLOR	2.6	UJ	R
HEPTACHLOR EPOXIDE	2.6	UJ	R
METHOXYCHLOR	26	UJ	R
TOXAPHENE	50	UJ	R

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	5	U	
4,4'-DDE	5	UJ	C
4,4'-DDT	5	UJ	C
ALDRIN	2.6	UJ	C
ALPHA-BHC	2.6	UJ	C
ALPHA-CHLORDANE	5.1	J	CU
AROCLOR-1016	26	U	
AROCLOR-1221	26	U	
AROCLOR-1232	26	U	
AROCLOR-1242	26	U	
AROCLOR-1248	26	U	
AROCLOR-1254	26	U	
AROCLOR-1260	160		
BETA-BHC	2.6	UJ	C
DELTA-BHC	2.6	UJ	C
DIELDRIN	5	U	A
ENDOSULFAN I	2.6	UJ	C
ENDOSULFAN II	5	UJ	C
ENDOSULFAN SULFATE	5	UJ	C
ENDRIN	5	UJ	C
ENDRIN ALDEHYDE	5	UJ	C
ENDRIN KETONE	5	UJ	C
GAMMA-BHC (LINDANE)	2.6	UJ	C
GAMMA-CHLORDANE	370	J	LU
HEPTACHLOR	2.6	UJ	C
HEPTACHLOR EPOXIDE	2.6	UJ	C
METHOXYCHLOR	26	UJ	C
TOXAPHENE	50	UJ	C

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-1
qc_type	NM
units	UG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	40	U	
2,4,5-TP (SILVEX)	40	U	
2,4-D	40	U	
DINOSEB	200	U	

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-3
qc_type	NM
units	UG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	38	U	
2,4,5-TP (SILVEX)	38	U	
2,4-D	38	U	
DINOSEB	200	U	

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-4
qc_type	NM
units	UG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	40	U	
2,4,5-TP (SILVEX)	40	U	
2,4-D	40	U	
DINOSEB	210	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SB0401	nsample	04SB0501	nsample	04SB0601
samp_date	8/12/2004	samp_date	8/13/2004	samp_date	8/18/2004
lab_id	WU2494-5	lab_id	WU2513-2	lab_id	WU2576-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	79.4	Pct_Solids	81.1	Pct_Solids	82.6
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	42	U	
2,4,5-TP (SILVEX)	42	U	
2,4-D	42	U	
DINOSEB	210	U	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	41	U	
2,4,5-TP (SILVEX)	41	U	
2,4-D	41	U	
DINOSEB	210	U	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	40	U	
2,4,5-TP (SILVEX)	40	U	
2,4-D	40	U	
DINOSEB	200	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	44	U	
2,4,5-TP (SILVEX)	44	U	
2,4-D	44	U	
DINOSEB	230	U	

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2
qc_type	NM
units	UG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	39	U	
2,4,5-TP (SILVEX)	39	U	
2,4-D	39	U	
DINOSEB	200	U	

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3
qc_type	NM
units	UG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
2,4,5-T	39	U	
2,4,5-TP (SILVEX)	39	U	
2,4-D	39	U	
DINOSEB	200	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
units	UG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	40	U	
2,4,5-TP (SILVEX)	40	U	
2,4-D	40	U	
DINOSEB	200	U	

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
units	UG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	40	U	
2,4,5-TP (SILVEX)	40	U	
2,4-D	40	U	
DINOSEB	210	U	

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
units	UG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	46	U	
2,4,5-TP (SILVEX)	46	U	
2,4-D	46	U	
DINOSEB	240	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SD0101D
samp_date	8/5/2004
lab_id	WU2405-2
qc_type	NM
units	UG/KG
Pct_Solids	75.2
DUP_OF:	04SD0101

Parameter	Result	Val Qual	Qual Code
2,4,5-T	44	U	
2,4,5-TP (SILVEX)	44	U	
2,4-D	44	U	
DINOSEB	220	U	

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-1
qc_type	NM
units	UG/KG
Pct_Solids	61.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	54	U	
2,4,5-TP (SILVEX)	54	U	
2,4-D	54	U	
DINOSEB	280	U	

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-1
qc_type	NM
units	UG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	44	U	
2,4,5-TP (SILVEX)	44	U	
2,4-D	44	U	
DINOSEB	220	U	

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SD0401
samp_date	8/12/2004
lab_id	WU2494-2
qc_type	NM
units	UG/KG
Pct_Solids	57.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	58	U	
2,4,5-TP (SILVEX)	58	U	
2,4-D	58	U	
DINOSEB	300	U	

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-1
qc_type	NM
units	UG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	58	U	
2,4,5-TP (SILVEX)	58	U	
2,4-D	58	U	
DINOSEB	300	U	

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-1RE
qc_type	NM
units	UG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	48	UJ	H
2,4,5-TP (SILVEX)	48	UJ	H
2,4-D	48	UJ	H
DINOSEB	250	UJ	H

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: HERB

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1
qc_type	NM
units	UG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	50	U	
2,4,5-TP (SILVEX)	50	U	
2,4-D	50	U	
DINOSEB	260	U	

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2RE
qc_type	NM
units	UG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	50	UJ	H
2,4,5-TP (SILVEX)	50	UJ	H
2,4-D	50	UJ	H
DINOSEB	260	UJ	H

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 11, 2004**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/SVOA/PEST/PCB/HERB/OPPEST**
CTO 283, NCBC GULFPORT
SDG 2833

SAMPLES: 7/Aqueous

04GP0801	04GP0801D	04GP0901	04GP1001
04GP2401	04GP2501	4TB0819	

OVERVIEW

The sample set for CTO 283 NCBC Gulfport, SDG 2833 consists of six (6) aqueous environmental samples and one (1) trip blank. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOC), semivolatile organic compounds, organochloride pesticides (PEST), organophosphorus pesticides (OPPEST), polychlorinated biphenyls (PCB), and herbicides (HERB). Samples 04GP2401, 04GP2501, and 4TB0819 were analyzed for VOAs only. One field duplicate pair was included in the SDG: 04GP0801 and 04GP0801D.

The samples were collected by TetraTech NUS on August 5, 12, 13, 15, 17, and 18, 2004 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 8081A, 8082, 8141 and 8151 analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

*	Data completeness
*	Holding times
	Initial/continuing calibrations
	Laboratory method blank results
	Surrogate Recoveries
	Blank Spike/Blank Spike Duplicate Results
	Matrix Spike/Matrix Spike Duplicate Results
*	Internal Standards
*	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.

Volatiles

The following compounds were detected in the method blanks or trip blanks:

Compound	Maximum Concentration	Blank Action Level
Acetone	2.0 ug/L	20 ug/L
1,2,4-Trichlorobenzene	0.4 ug/L	2.0 ug/L

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.

An action level of 10X the maximum contaminant concentration was established for acetone; 5X for 1,2,4-trichlorobenzene to evaluate laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. The positive results for acetone below the blank action level were qualified as non-detected, U. Field quality control blanks were not qualified due to method blank contamination.

The initial calibration and continuing calibration had a relative response factor (RRF) less than the 0.05 quality control criteria for acetone. The positive acetone results for all samples have been estimated (J) and non-detected results have been rejected (UR).

Methylene chloride was detected in the trip blank (4TB0819). No action was taken on this basis because methylene chloride was not detected in any associated samples.

The compound cyclohexane was not spiked into the LCS. No action was taken on this basis.

Semivolatile

The LCSD had recoveries for acenaphthene, 2,4-dinitrophenol, and fluorene greater than the quality control criterion. No action was taken on basis because the samples associated with this LCSD did not have detections for the aforementioned compounds.

All initial calibrations associated with this SDG, had a percent relative standard deviation (%RSD) that exceeded the 30% quality control limit for benzaldehyde. All non-detected results reported for benzaldehyde were qualified as estimated (UJ) in all samples.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde and hexachlorocyclopentadiene on 09/17/04 @ 09:10. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for sample 04GP0801.

Organochloride Pesticides

A continuing calibration %D exceeded the 15% quality control limit on 09/17/04 @ 10:15 on column RTX-CLPII for delta-BHC. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on column RTX-CLPI.

Continuing calibration %Ds exceeded the 15% quality control limit on 09/15/04 @ 19:35 on column RTX-CLPI for delta-BHC, 4,4'-DDD, 4,4'-DDT, endosulfan sulfate, methyoxychlor, and endrin ketone. The aformetioned compounds also exceeded the %D quality control limit on the RTX-CLPII column. The non-detected results for the aforementioned compounds have been qualified as estimated (UJ) in sample 04GP0901.

PCBs

The surrogate decachlorobiphenyl had recoveries less than the quality control criterion for samples 04GP0801D, 04GP1001, and 04GP0901 on both columns. The non-detected results have been qualified as estimated (UJ) for the aforementioned samples.

The surrogate decachlorobiphenyl had recoveries less than the quality control criterion for the LCSD. No action was taken on this basis because QC samples are not qualified.

The continuing calibration average percent difference exceeded the 15% quality control limit on 09/20/04 @21:24 on the column RTX-35 for Aroclor-1260. No action was taken on this basis because the RTX-5 column met average percent difference criteria.

The continuing calibration average percent difference exceeded the 15% quality control limit on 09/21/04 @07:21 on the column RTX-35 for Aroclor-1260. No action was taken on this basis because the RTX-5 column met average percent difference criteria.

Herbicides

The surrogate 2,4-dichlorophenylacetic acid had a recovery greater than the quality control criterion for sample 04GP0901 on the SPB-608 column. No qualifiers were assigned on this basis because the RTX-CLPII column was compliant.

The LCS/LCSD had surrogate recoveries greater than the quality control criterion on the SPB-608 and/or RTX-CLPII columns. No action was taken on this basis.

The LCSD had a recovery greater than the quality control criterion for 2,4-D. No action was taken on this basis because the LCS had an acceptable recovery and no herbicides were detected in the associated samples. The LCS/LCSD had recoveries greater than the quality control criterion for silvex and 2,4,5-T. No action was taken on this basis because no herbicides were detected in the associated samples.

Continuing calibration %Ds exceeded the 15% quality control limit on 09/09/04 @ 10:23 on column SPB-608 for 2,4-D and silvex. No qualifiers were assigned on this basis since the aforementioned compounds were compliant on the column RTX-CLPII. Dinoseb exceeded the 15% quality control limit on 09/09/04 @ 10:23 on column RTX-CLPII. No qualifiers were assigned on this basis since the aforementioned compound was compliant on the column SPB-608.

Organophosphorus Pesticides

The surrogate tributyl phosphate had recoveries greater than the quality control criterion for sample 04GP0901 on the RTX-OPP column. No qualifiers were assigned on this basis because the RTX-OPP2 column was compliant.

Additional Comments:

Positive results reported below the quantitation limit but above the method detection limit were qualified as estimated, J.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Several volatile compounds were detected in the method or trip blanks. Several volatile, semivolatile, organochloride pesticides, PCBs, herbicides, and organophosphorus pesticide compounds exceeded the initial and/or continuing calibration %D and/or minimum RRF criteria. Several semivolatile and herbicide compounds had LCS/LCSD percent recovery non-compliances.

Other Factors Affecting Data Quality: Surrogate non-compliance occurred in the PCBs, herbicides, and organophosphorus pesticides.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), and the NFESC guidelines IRCDQM (Sept., 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Edward Sedlmyer
Tetra Tech NUS

Edward Sedlmyer
Chemist/Data Validator

Tetra Tech 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

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0801	nsample	04GP0801	nsample	04GP0801D
samp_date	8/19/2004	samp_date	8/19/2004	samp_date	8/19/2004
lab_id	WU2585-1	lab_id	WU2585-1	lab_id	WU2585-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	13	U	A
BENZENE	0.2	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.5	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	19		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	31		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	12		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	4	J	P

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	11	U	A
BENZENE	0.2	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.4	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	19		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OV

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	31		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	11		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	4	J	P

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	0.1	J	P
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	A
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.3	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OV

nsample	04GP1001	nsample	04GP1001	nsample	04GP2401
samp_date	8/19/2004	samp_date	8/19/2004	samp_date	8/20/2004
lab_id	WU2585-3	lab_id	WU2585-3	lab_id	WU2605-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	A
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.2	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	0.2	J	P
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	8	U	A
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	54		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2401
samp_date	8/20/2004
lab_id	WU2605-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	74		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	20		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	1	J	P
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	26		

nsample	04GP2501
samp_date	8/20/2004
lab_id	WU2605-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	A
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.4	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	21		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GP2501
samp_date	8/20/2004
lab_id	WU2605-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	28		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	7		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	0.8	J	P
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	7		

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OV

nsample	4TB0819
samp_date	8/19/2004
lab_id	WU2585-5
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	4TB0819
samp_date	8/19/2004
lab_id	WU2585-5
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	0.6	J	P
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OS

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OS

nsample	04GP1001	nsample	04GP1001	nsample	04GP1001
samp_date	8/19/2004	samp_date	8/19/2004	samp_date	8/19/2004
lab_id	WU2585-3	lab_id	WU2585-3	lab_id	WU2585-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	C
AROCLOR-1221	0.5	UJ	C
AROCLOR-1232	0.5	UJ	C
AROCLOR-1242	0.5	UJ	C
AROCLOR-1248	0.5	UJ	C
AROCLOR-1254	0.5	UJ	C
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	SCWU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	UJ	C
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	UJ	C
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	C
AROCLOR-1221	0.5	UJ	C
AROCLOR-1232	0.5	UJ	C
AROCLOR-1242	0.5	UJ	C
AROCLOR-1248	0.5	UJ	C
AROCLOR-1254	0.5	UJ	C
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	UJ	C
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	UJ	C
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	UJ	C
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GP1001
samp_date	8/19/2004
lab_id	WU2585-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	C
AROCLOR-1221	0.5	UJ	C
AROCLOR-1232	0.5	UJ	C
AROCLOR-1242	0.5	UJ	C
AROCLOR-1248	0.5	UJ	C
AROCLOR-1254	0.5	UJ	C
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: HERB

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: HERB

nsample	04GP1001
samp_date	8/19/2004
lab_id	WU2585-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GP0801
samp_date	8/19/2004
lab_id	C4H200184001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.97	U	
DISULFOTON	0.97	U	
ETHYL PARATHION	0.97	U	
FAMPHUR	0.97	U	
METHYL PARATHION	0.97	U	
PHORATE	0.97	U	
SULFOTEPP	0.97	U	
THIONAZIN	0.97	U	

nsample	04GP0801D
samp_date	8/19/2004
lab_id	C4H200184002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GP0801

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GP0901
samp_date	8/19/2004
lab_id	C4H200184004
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

PRO. .O: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GP1001
samp_date	8/19/2004
lab_id	C4H200184003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.99	U	
DISULFOTON	0.99	U	
ETHYL PARATHION	0.99	U	
FAMPHUR	0.99	U	
METHYL PARATHION	0.99	U	
PHORATE	0.99	U	
SULFOTEPP	0.99	U	
THIONAZIN	0.99	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. FISHER **DATE:** NOVEMBER 12, 2002

FROM: BERNARD F. SPADA III **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – VOC/SVOC/PEST/PCB/HERB/OPPEST
CTO 283, NCBC GULFPORT
SDG 2834

SAMPLES: 14 / Aqueous

04GW0901	04GW1001	04GW1101
04GW1201	04GW1201D	04GW1501
04GW1601	04GW1701	04GW2001
04TW0908*	04TW0909*	04TW0910*
04TW0913*	04TW0914*	

OVERVIEW

The sample set for CTO 283; NCBC Gulfport, SDG 2834 consists of eight (8) environmental aqueous samples, five (5) trip blanks, and one (1) field duplicate. All samples were analyzed for volatile organic compounds (VOC). The samples denoted with an asterisk (*) were also analyzed for semivolatile organic compounds (SVOC), pesticides (PEST), polychlorinated biphenyls (PCB), herbicides (HERB), and organophosphorus pesticides (OPPEST). The field duplicate pair included in this SDG is 04GW1201 and 04GW1201D.

The samples were collected by TetraTech NUS on September 8-10th, 13th, and 14th, 2004 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using USEPA SW-846 Methods 8260B, 8270C, 8081A, 8082, 8141, and 8151A analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

- * Data completeness
- * Holding times
- * GC/MS Tuning
- Initial and continuing calibration
- Blank results
- Surrogate spike recoveries
- * Internal standard recoveries
- Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- * Compound Quantitation
- * Compound Identification
- * Field Duplicate Precision
- * Detection Limits

The symbol (*) indicates that all 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.

Volatiles

The initial calibrations performed on August 26, 2004 on the GCMS-M instrument and on August 23, 2004 on the GCMS-Z instrument were below the 0.05 relative response factor (RRF) quality control criterion for acetone. Positive and non-detected results for acetone were qualified as estimated (J) and rejected (UR) respectively, in all samples.

All continuing calibrations were below the 0.05 RRF quality control criterion for acetone. Positive and non-detected results for acetone were qualified as estimated (J) and rejected (UR) respectively, in all samples.

The continuing calibration performed on September 16 at 08:00 on the GCMS-M instrument exceeded the 25% difference quality control criterion for 1,2,4-trichlorobenzene. Non-detected results for 1,2,4-trichlorobenzene were qualified as estimated (UJ) in samples 04TW0909, 04TW0910, 04GW1001, 04GW1101, 04GW1501, and 04GW2001.

The continuing calibration performed on September 17 at 08:25 on the GCMS-M instrument exceeded the 25% difference quality control criterion for MTBE, tetrachloroethene, and 1,2,4-trichlorobenzene. Non-detected results for the aforementioned compounds were qualified as estimated (UJ) in samples 04TW0913, 04TW0914, 04GW1601, 04GW1201, and 04GW1201D.

The continuing calibration performed on September 20 at 08:48 on the GCMS-M instrument exceeded the 25% difference quality control criterion for tetrachloroethene and 1,2,4-trichlorobenzene. Non-detected results for the aforementioned compounds were qualified as estimated (UJ) in sample 04GW1701.

The continuing calibration performed on September 22 at 09:13 on the GCMS-M instrument exceeded the 25% difference quality control criterion for MTBE. No qualifications were made on this basis because no results MTBE were quantitated using this calibration.

The following compounds were detected in the aqueous method blanks:

Compound	Maximum Concentration	Blank Action Level
Methylene chloride	0.8 µg/L	8.0 µg/L
1,2,4-Trichlorobenzene	0.9 µg/L	4.5 µg/L
1,2-Dichlorobenzene	0.2 µg/L	1.0 µg/L

Sample aliquot and dilution factors were taken into consideration when applying the blank action levels. No qualifications were made on this basis because all results for the aforementioned compounds were non-detected in all samples.

The blank spike (WG10054-LCS) was below the percent recovery quality control criterion for carbon disulfide and tetrachloroethene. No qualifications were made on this basis because the percent recoveries were 68% and 76% respectively.

The blank spike (WG10127-LCS) was below the percent recovery quality control criterion for carbon disulfide and MTBE. No action was taken because the aforementioned compounds were not reported in the associated sample.

The percent recovery of dichlorodifluoromethane was below the quality control criterion in the MS/MSD of sample 04GW0901. The result for dichlorodifluoromethane was qualified as estimated (UJ) in sample 04GW0901.

The relative percent differences (RPDs) of 2-hexanone and 4-methyl-2-pentanone exceeded the quality control criterion in the MS/MSD of sample 04GW0901. No qualifications were made on this basis because all percent recoveries were compliant.

Semivolatiles

The initial calibrations performed on September 20 and 23 and October 5, 2004 all exceeded the 30% relative standard deviation (RSD) quality control criterion for benzaldehyde. Non-detected results for benzaldehyde were qualified as estimated (UJ) in all samples.

The continuing calibration performed on October 6 at 09:55 exceeded the 25% difference quality control criterion for bis(2-ethylhexyl)phthalate, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. Non-detected results for the aforementioned compounds were qualified as estimated (UJ) in samples 04GW1201 and 04GW1201D.

The surrogate 2-fluorobiphenyl exceeded the percent recovery quality control criterion in the blank (WG9971-blank) and LCS (WG10045-LCS). No qualifications were made on this basis.

The compounds 1,1-biphenyl, acetophenone, atrazine, benzaldehyde, and caprolactam were not included in the LCS/LCSD/MS/MSD spikes and could not be evaluated for recovery, accuracy, or precision. No qualifications were made on this basis.

The LCS (WG9936-LCS) exceeded the percent recovery quality control criteria for acenaphthene, fluorene, 4-chlorophenylphenylether, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. No qualifications were made on this basis because all results for the aforementioned compounds were non-detected.

The LCS (WG9971-LCS) exceeded the percent recovery quality control criteria for naphthalene, acenaphthene, fluorene, 4-chlorophenylphenylether, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene. No qualifications were made on this basis because all results for the aforementioned compounds were non-detected.

Many compounds exceeded the percent recovery quality control criteria in the LCS and/or LCSD (WG10045). No further qualifications were made on this basis because all results for the other compounds in exceedance were non-detected.

The percent recovery of diethylphthalate and dimethylphthalate were below the percent recovery quality control criterion (and dimethylphthalate was <10%) in the LCS/LCSD (WG10045). Non-detected results for diethylphthalate were qualified as estimated (UJ) and dimethylphthalate were rejected (UR) in samples 04GW1201 and 04GW1201D.

The percent recoveries of 2,2'-oxybis(1-chloropropane), hexachloroethane, naphthalene, hexachlorobutadiene, hexachlorocyclopentadiene, dimethylphthalate, and 2,4-dinitrophenol were below the quality control criteria in the MS and/or MSD of sample 04GW0901. Non-detected results for the aforementioned compounds were qualified as estimated (UJ) in sample 04GW0901.

The percent recoveries of 4-bromophenylphenylether and 3,3'-dichlorobenzidine exceeded the quality control

criteria in the MS/MSD of sample 04GW0901. No qualifications were made on this basis because all results for the aforementioned compounds were non-detected.

Pesticides

The continuing calibration performed on October 6 at 10:37 exceeded the 15% difference quality control criterion for gamma-BHC, endosulfan I, endrin ketone, and 4,4'-DDT on the RTX-CLPI column. No qualifications were made on this basis because the RTX-CLPII column was compliant and all associated results were non-detected.

The continuing calibration performed on October 6 at 22:50 exceeded the 15% difference quality control criterion for delta-BHC on both columns. Non-detected results for delta-BHC were qualified as estimated (UJ) in samples 04GW1001, 04GW1201, 04GW1201D, 04GW1601, and 04GW1701.

The continuing calibration performed on October 7 at 09:43 exceeded the 15% difference quality control criterion for gamma-BHC, heptachlor, beta-BHC, aldrin, heptachlor epoxide, 4,4'-DDE, dieldrin, 4,4'-DDD, endrin aldehyde, alpha-chlordane, gamma-chlordane, and endrin ketone on the RTX-CLPI column and for delta-BHC on the RTX-CLPII column. No qualifications were made on this basis because only the MS/MSD was associated with this calibration.

The continuing calibration performed on October 7 at 19:02 exceeded the 15% difference quality control criterion for all pesticides except endrin, 4,4'-DDD, 4,4'-DDT, endosulfan sulfate, and methoxychlor on the RTX-CLPI column and for delta-BHC, delta-BHC, and endrin ketone on the RTX-CLPII column. No qualifications were made on this basis because only the MS/MSD was associated with this calibration.

The relative percent difference (RPD) exceeded the 30% quality control criterion for endrin aldehyde in the LCS/LCSD (WG9860). No qualifications were made on this basis because both percent recoveries were compliant.

PCB

The initial calibration verification performed on September 14 at 00:33 exceeded the 15% difference quality control criterion for Aroclor 1260 on both columns. The laboratory counted a negative percent drift for one peak as a negative value in the average %D. No qualifications were made on this basis because no samples were quantitated using this calibration check.

The continuing calibration performed on October 4 at 23:10 exceeded the 15% difference quality control criterion for Aroclor 1260 on the RTX-35 column. No qualifications were made on this basis because the RTX-5 column was compliant and all Aroclor results were non-detected.

The continuing calibration performed on October 6 at 22:22 exceeded the 15% difference quality control criterion for Aroclor 1260 on the RTX-35 column. No qualifications were made on this basis because the RTX-5 column was compliant and all Aroclor results were non-detected.

The percent recovery of the surrogate decachlorobiphenyl was below the quality control criterion in sample 04GW1601 on the RTX-5 column. No qualifications were made on this basis because the recovery was compliant on the RTX-35 column and all results were non-detected in sample 04GW1601.

The percent recovery of the surrogate decachlorobiphenyl was below the quality control criterion in sample

04GW1701 on both columns. Non-detected results were qualified as estimated (UJ) in sample 04GW1701.

Herbicides

The continuing calibration performed on September 27 at 10:59 exceeded the 15% difference quality control criterion for silvex on the SPB 608 column. No qualifications were made on this basis because the RTX-CLPII column was compliant and all results for silvex were non-detected.

The continuing calibration performed on September 27 at 17:07 exceeded the 15% difference quality control criterion for 2,4-D and 2,4,5-T on the RTX-CLPII column. No qualifications were made on this basis because the SPB 608 column was compliant and all results for the aforementioned compounds were non-detected.

The continuing calibration performed on September 27 at 20:47 exceeded the 15% difference quality control criterion for 2,4-D, silvex, and 2,4,5-T on the SPB 608 column and for 2,4-D and 2,4,5-T on the RTX-CLPII column. Non-detected results for 2,4-D and 2,4,5-T were qualified as estimated (UJ) in samples 04GW1501, 04GW2001, 04GW1201, 04GW1201D, 04GW1601, and 04GW1701. No qualifications were made to silvex on this basis because the RTX-CLPII column was compliant and all results for silvex were non-detected.

The surrogate 2,4-dichlorophenylacetic acid exceeded the percent recovery quality control criterion in all LCS/LCSD and MS/MSD samples on the SPB 608 column and in the MS/MSD on the RTX-CLPII column. No qualifications were made on this basis because all results were non-detected.

The percent recovery of silvex and 2,4,5-T exceeded the quality control criterion in the MS/MSD of sample 04GW0901. No qualifications were made on this basis because all results were non-detected.

OPPEST

The laboratory reported all calibrations from one column only. No qualifications were made on this basis because all results were non-detected.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Qualifications were made based on calibration non-compliances, surrogate recovery non-compliances, LCS non-compliances. Methylene chloride, 1,2,4-trichlorobenzene, and 1,2-dichlorobenzene were detected in the method blank.

Other Factors Affecting Data Quality: Qualifications were made to the VOC and SVOC fractions based on MS/MSD non-compliances.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines "Navy IRCDQM" (Sept 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Bernard F Spada III
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	UR	D

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	UJ	D
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	11	J	C
BENZENE	0.1	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.9	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	2	J	P
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	0.2	J	P
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	0.2	J	P

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	2	J	P
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	7	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.2	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	0.9	J	P
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	2	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	C
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	3	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	C
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	2	J	CP
BENZENE	0.1	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	0.2	J	P
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	0.2	J	P
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	0.8	J	P

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	0.6	J	P
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	0.2	J	P
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	7	J	C
BENZENE	0.2	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	280		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	C
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	470		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	190		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	8		
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	150		

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	10	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.4	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	2	J	P
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	4	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0908
samp_date	9/8/2004
lab_id	WU2885-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	U	
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TW0908
samp_date	9/8/2004
lab_id	WU2885-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TW0909
samp_date	9/9/2004
lab_id	WU2934-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0909
samp_date	9/9/2004
lab_id	WU2934-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TW0910
samp_date	9/10/2004
lab_id	WU2954-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	13		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	26	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TW0910
samp_date	9/10/2004
lab_id	WU2954-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	2	J	P
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0913
samp_date	9/13/2004
lab_id	WU2974-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	14		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	27	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TW0913
samp_date	9/13/2004
lab_id	WU2974-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	C
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TW0914
samp_date	9/14/2004
lab_id	WU3000-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	14		
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	26	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0914
samp_date	9/14/2004
lab_id	WU3000-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	C
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	UJ	C
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-BIPHENYL	10	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	10	UJ	D
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	UJ	D
2,4-DINITROTOLUENE	10	U	
2,6-DINITROTOLUENE	10	U	
2-CHLORONAPHTHALENE	10	U	
2-CHLOROPHENOL	10	U	
2-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	UJ	D
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	UJ	D
HEXACHLOROCYCLOPENTADIENE	10	UJ	D
HEXACHLOROETHANE	10	UJ	D
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	UJ	D
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	5	J	P
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	8	J	P
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	38		
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2RA
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	C
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	UJ	E
DIMETHYL PHTHALATE	10	UR	E
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	UJ	C
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	UJ	C
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	UJ	C
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	UJ	E
DIMETHYL PHTHALATE	10	UR	E
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	UJ	C
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	6	J	P
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	23		
CARBAZOLE.	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OS

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	5	J	P
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	SCWU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GW1601	nsample	04GW1701	nsample	04GW2001
samp_date	9/13/2004	samp_date	9/13/2004	samp_date	9/10/2004
lab_id	WU2974-1	lab_id	WU2974-2	lab_id	WU2954-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	UJ	R
AROCLOR-1221	0.5	UJ	R
AROCLOR-1232	0.5	UJ	R
AROCLOR-1242	0.5	UJ	R
AROCLOR-1248	0.5	UJ	R
AROCLOR-1254	0.5	UJ	R
AROCLOR-1260	0.5	UJ	R
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	U	
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

EPA Region III BTAG
FRESHWATER SCREENING BENCHMARKS
10/2004

Freshwater Values for Hardness-Dependent Contaminants

Hardness (mg/l)	Cadmium*	Chromium III*	Copper*	Flouride**	Lead*	Nickel*	Silver*	Zinc*
25	0.09	23.81	2.74	602.75	0.54	16.10	0.30	36.50
50	0.15	42.01	4.95	1130.24	1.17	28.93	0.98	65.66
100	0.25	74.11	8.96	2119.35	2.52	52.01	3.22	118.14
200	0.40	130.75	16.19	3974.09	5.31	93.48	10.60	212.55

* US EPA. 2000. National Recommended Water Quality Criteria: 2002.
Criterion Continuous Concentration formula used except for silver (Criteria Maximum Concentration).
**New York. 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: HERB

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: HERB

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: HERB

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	UJ	C
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	UJ	C
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GW0901
samp_date	9/8/2004
lab_id	C4I090260001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GW1001
samp_date	9/9/2004
lab_id	C4I100248001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GW1101
samp_date	9/9/2004
lab_id	C4I100248002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GW1201	nsample	04GW1201D	nsample	04GW1501
samp_date	9/14/2004	samp_date	9/14/2004	samp_date	9/10/2004
lab_id	C4I150192001	lab_id	C4I150192002	lab_id	C4I110110001
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	04GW1201	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	1	U	
DISULFOTON	1	U	
ETHYL PARATHION	1	U	
FAMPHUR	1	U	
METHYL PARATHION	1	U	
PHORATE	1	U	
SULFOTEPP	1	U	
THIONAZIN	1	U	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.94	U	
DISULFOTON	0.94	U	
ETHYL PARATHION	0.94	U	
FAMPHUR	0.94	U	
METHYL PARATHION	0.94	U	
PHORATE	0.94	U	
SULFOTEPP	0.94	U	
THIONAZIN	0.94	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GW1601
samp_date	9/13/2004
lab_id	C4I140206001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GW1701
samp_date	9/13/2004
lab_id	C4I140206002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	C4I110110002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 12, 2004**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- VOA/SVOA/PEST/PCB/HERB/OPPEST**
CTO 283, NCBC GULFPORT
SDG 2835

SAMPLES: 8/Aqueous

04GW0801	04GW1301	04GW1401	04GW1801
04GW1901	04TW0921	04TW0922	04TW0923

OVERVIEW

The sample set for CTO 283 NCBC Gulfport, SDG 2835 consists of eight (8) aqueous environmental samples. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOC), semivolatile organic compounds, organochloride pesticides (OPEST), organophosphorus pesticides (OPPEST), polychlorinated biphenyls (PCB), and herbicides (HERB). Samples 04TW0921, 04TW0922, and 04TW0923 were analyzed for VOAs only.

The samples were collected by TetraTech NUS on September 21, 22, and 23, 2004 and analyzed by Katahdin Analytical Services. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Methods 8260B, 8081A, 8082, 8141, and 8151 analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

- * Data completeness
- * Holding times
- Initial/continuing calibrations
- Laboratory method blank results
- Surrogate Recoveries
- Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- * Internal Standards
- * 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.

Volatiles

The following compounds were detected in the method blanks or:

Compound	Maximum Concentration	Blank Action Level
Methylene chloride	1.0 ug/L	10.0 ug/L
1,2-Dichlorobenzene	0.2 ug/L	1.0 ug/L
1,2-Dibromo-3-chloropropane	0.8 ug/L	4.0 ug/L
1,2,4-Trichlorobenzene	1.0 ug/L	4.0 ug/L

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.

An action level of 10X the maximum contaminant concentration was established for methylene chloride; 5X for 1,2-dichlorobenzene, 1,2-dibromo-3-chloropropane, and 1,2,4-trichlorobenzene to evaluate laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. No qualification of the data was necessary because none of these compounds were detected in the associated samples. Field quality control blanks were not qualified due to method blank contamination.

The laboratory control sample (LCS) associated with batch WG10193 had a recovery greater than the quality control criteria for 2-butanone. The positive 2-butanone result for sample 04TW0921 has been qualified as estimated (J).

The laboratory control sample (LCS) associated with batch WG10371 had recoveries less than the quality control criterion for carbon disulfide and methyl tert-butyl ether. The non-detected results for the aforementioned compounds have been qualified as estimated (UJ) for samples04TW0923, 04TW0922, 04GW1401, 04GW1301, and 04GW0801.

The initial calibration and all continuing calibrations had a relative response factor (RRF) less than the 0.05 quality control criterion for acetone. The positive acetone results for all samples have been estimated (J) and non-detected results have been rejected (UR).

The continuing calibration had a relative percent difference (%D) greater than the 25% quality control criterion for 1,2,4-trichlorobenzene on 09/24/04 @07:57. Only non-detected results were reported for 1,2,4-trichlorobenzene and these were qualified as estimated (UJ) for samples 04TW0921, 04GW1801, and 04GW1901.

The continuing calibration had a relative percent difference (%D) greater than the 25% quality control criterion for methyl tert-butyl ether and 1,2,4-trichlorobenzene on 09/30/04 @ 07:43. Only non-detected results were reported for methyl tert-butyl ether and 1,2,4-trichlorobenzene and these were qualified as estimated (UJ) for samples 04TW0923, 04TW0922, 04GW1401, 04GW1301, and 04GW0801.

The continuing calibration had a RRF less than the 0.05 quality control criterion for 2-butanone on 09/30/04 @07:43. The positive 2-butanone results have been qualified as estimated (J) and the non-detected results have been rejected (UR), respectively, in samples 04TW0923, 04TW0922, 04GW1401, 04GW1301, and 04GW0801.

The compound cyclohexane was not spiked into the LCS. No action was taken on this basis.

Cis-1,2-dichloroethene and trans-1,2-dichloroethene do not add up to equal the total 1,2-dichloroethene result. The variance between the total 1,2-dichloroethene and the sum of the cis and trans 1,2-dichloroethene are attributed to rounding.

Semivolatile

The surrogate 2-fluorobiphenyl had recoveries greater than the quality control criteria for the method blanks associated with batches WG10138 and WG10341. No action was taken on this basis because QC samples are not qualified.

The LCS/LCSD for batch WG10138 had recoveries for 2-chlorophenol, naphthalene, 2-methylnaphthalene, acenaphthene, phenanthrene, and pyrene greater than the quality control criterion. No action was taken on this basis because the samples associated with this LCS/LCSD did not have detections for the aforementioned compounds.

The LCS/LCSD for batch WG10341 had recoveries for 2,4,5-trichlorophenol, 2,4-dinitrophenol, phenanthrene, and pyrene greater than the quality control criterion. No action was taken on this basis because the samples associated with this LCS/LCSD did not have detections for the aforementioned compounds.

The LCS/LCSD for batch WG10175 had recoveries for 2-chlorophenol, 2,4-dimethylphenol, 2,4-dichlorophenol, acenaphthylene, acenaphthene, 2,4-dinitrophenol, and 4-chlorophenyl-phenyl ether greater than the quality control criterion. The positive result for acenaphthene in sample 04GW1401 has been qualified as estimated (J). No action was taken on this basis for other samples associated with this LCS/LCSD because the aforementioned compounds were not detected.

All initial calibrations associated with this SDG, had a percent relative standard deviation (%RSD) that exceeded the 30% quality control limit for benzaldehyde. All non-detected results reported for benzaldehyde were qualified as estimated (UJ) in all samples.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde, hexachlorocyclopentadiene, 2,4-dinitrolphenol, and 4-nitrophenol on 09/28/04 @ 15:10. No qualification of the data was necessary because only QC samples were associated with this continuing calibration.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde and hexachlorocyclopentadiene on 09/29/04 @ 09:58. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04GW1801 and 04GW1901.

Calibration verification had %Ds that exceeded the 25% quality control limit for benzaldehyde on 10/04/04 @ 14:15. Only non-detected results were reported for the aforementioned compounds and these were qualified as estimated (UJ) for samples 04GW1401, 04GW1301, and 04GW0801.

Organochloride Pesticides

The LCSD associated with batch WG10141 had a recovery less than the quality control criterion for endrin aldehyde. In addition, endrin aldehyde had a high relative percent difference (RPD). No action was taken on this basis because the LCS met criteria.

A continuing calibration %D exceeded the 15% quality control limit on 10/05/04 @ 08:33 on column RTX-CLPI for alpha-chlordane. No qualifiers were assigned on this basis since alpha-chlordane was compliant on column RTX-CLPII.

Continuing calibration %Ds exceeded the 15% quality control limit on 10/06/04 @ 10:37 on column RTX-CLPI for gamma-BHC, endosulfan I, endrin aldehyde, and endrin ketone. No qualifiers were assigned on this basis because the aforementioned compounds were compliant on column RTX-CLPII.

A continuing calibration %D exceeded the 15% quality control limit on 10/06/04 @ 22:50 on column RTX-CLPI for delta-BHC. Delta-BHC also exceeded the %D quality control limit on the RTX-CLPII column. The non-detected results delta-BHC have been qualified as estimated (UJ) in samples 04GW1401 and 04GW1301.

Continuing calibration %Ds exceeded the 15% quality control limit on 10/07/04 @ 09:43 on column RTX-CLPI for gamma-BHC, heptachlor, beta-BHC, aldrin, heptachlor epoxide, 4,4'-DDE, dieldrin, 4,4'-DDD, endrin aldehyde, alpha-chlordane, gamma-chlordane, and endrin ketone. Delta-BHC exceeded the %D quality control

limit on the RTX-CLPII column. No qualifiers were assigned on this basis because all compounds were compliant on the confirmation column.

Continuing calibration %Ds exceeded the 15% quality control limit on 10/07/04 @ 19:02 on column RTX-CLPI for alpha-BHC, gamma-BHC, heptachlor, beta-BHC, aldrin, delta-BHC, heptachlor epoxide, endosulfan I, 4,4'-DDE, dieldrin, endosulfan II, endrin aldehyde, alpha-chlordane, gamma-chlordane, and endrin ketone. Beta-BHC, delta-BHC, and endrin ketone also exceeded the %D quality control limit on the RTX-CLPII column. The non-detected results for beta-BHC, delta-BHC, and endrin ketone have been qualified as estimated (UJ) in samples 04GW1901, 04GW0801, and 04GW1801. No qualification action was taken on the other compounds because they were compliant on column RTX-CLPII.

PCBs

The surrogate decachlorobiphenyl had recoveries less than the quality control criterion for sample 04GW1901 on both columns. The non-detected results have been qualified as estimated (UJ) for the aforementioned samples.

The surrogate decachlorobiphenyl had a recovery less than the quality control criterion for sample 04GW0801 on column RTX-5. No action was taken on this basis because decachlorobiphenyl met criteria on column RTX-35.

The continuing calibration average percent difference exceeded the 15% quality control limit on 10/06/04 @22:22 on the column RTX-35 for Aroclor-1260. No action was taken on this basis because the RTX-5 column met average percent difference criteria.

The continuing calibration average percent difference exceeded the 15% quality control limit on 10/07/04 @03:36 on the column RTX-35 for Aroclor-1260. No action was taken on this basis because the RTX-5 column met average percent difference criteria.

The continuing calibration average percent difference exceeded the 15% quality control limit on 10/12/04 @21:32 on both the RTX-35 and RTX-5 column for Aroclor-1260. The non-detected Aroclor-1260 results for samples 04GW1801 and 04GW1901 have been qualified as estimated (UJ).

Herbicides

A continuing calibration %D exceeded the 15% quality control limit on 09/30/04 @ 15:35 on column SPB-608 for 2,4-D. No qualifiers were assigned on this basis because 2,4-D was compliant on the column RTX-CLPII.

Organophosphorus Pesticides

The laboratory had an incorrect sample ID for 04GW1901. The sample ID was corrected on the hard copy Form I and in the database.

Additional Comments:

Positive results reported below the quantitation limit but above the method detection limit were qualified as estimated, J.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Several volatile compounds were detected in the method blanks. Several volatile, semivolatile, organochloride pesticides, PCBs, and herbicides compounds exceeded the initial and/or continuing calibration %D and/or minimum RRF criteria. Several volatile, semivolatile, and organochloride pesticides compounds had LCS/LCSD percent recovery non-compliances.

Other Factors Affecting Data Quality: Surrogate non-compliance occurred in the semivolatile and PCB fractions.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), and the NFESC guidelines IRCDQM (Sept., 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Edward Sedlmyer

Tetra Tech NUS

Edward Sedlmyer
Chemist/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

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	UR	C
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	E
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	CE
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	UR	C
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	E
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	55		
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	CE
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	84		
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	30		
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	0.8	J	P
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	25		

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	UR	C
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	3	J	CP
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	E
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	0.3	J	P
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	CE
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	0.2	J	P
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UR	C
BENZENE	0.2	J	P
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	0.7	J	P
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	0.7	J	P
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TW0921
samp_date	9/21/2004
lab_id	WU3142-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	15	J	E
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	29	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	U	
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TW0921
samp_date	9/21/2004
lab_id	WU3142-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	0.2	J	P
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	U	
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0922
samp_date	9/22/2004
lab_id	WU3165-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	13	J	C
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	27	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	E
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

nsample	04TW0922
samp_date	9/22/2004
lab_id	WU3165-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	CE
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

nsample	04TW0923
samp_date	9/23/2004
lab_id	WU3199-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	5	U	
1,1,2,2-TETRACHLOROETHANE	5	U	
1,1,2-TRICHLOROETHANE	5	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	5	U	
1,1-DICHLOROETHANE	5	U	
1,1-DICHLOROETHENE	5	U	
1,2,4-TRICHLOROBENZENE	5	UJ	C
1,2-DIBROMO-3-CHLOROPROPANE	5	U	
1,2-DIBROMOETHANE	5	U	
1,2-DICHLOROBENZENE	5	U	
1,2-DICHLOROETHANE	5	U	
1,2-DICHLOROPROPANE	5	U	
1,3-DICHLOROBENZENE	5	U	
1,4-DICHLOROBENZENE	5	U	
2-BUTANONE	11	J	C
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	25	J	C
BENZENE	5	U	
BROMODICHLOROMETHANE	5	U	
BROMOFORM	5	U	
BROMOMETHANE	5	U	
CARBON DISULFIDE	5	UJ	E
CARBON TETRACHLORIDE	5	U	
CHLOROBENZENE	5	U	
CHLORODIBROMOMETHANE	5	U	
CHLOROETHANE	5	U	
CHLOROFORM	5	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	5	U	
CIS-1,3-DICHLOROPROPENE	5	U	
CYCLOHEXANE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OV

nsample	04TW0923
samp_date	9/23/2004
lab_id	WU3199-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	5	U	
ETHYLBENZENE	5	U	
ISOPROPYLBENZENE	5	U	
M+P-XYLENES	10	U	
METHYL ACETATE	5	U	
METHYL CYCLOHEXANE	5	U	
METHYL TERT-BUTYL ETHER	5	UJ	CE
METHYLENE CHLORIDE	5	U	
O-XYLENE	5	U	
STYRENE	5	U	
TETRACHLOROETHENE	5	U	
TOLUENE	5	U	
TOTAL 1,2-DICHLOROETHENE	10	U	
TOTAL XYLENES	15	U	
TRANS-1,2-DICHLOROETHENE	5	U	
TRANS-1,3-DICHLOROPROPENE	5	U	
TRICHLOROETHENE	5	U	
TRICHLOROFLUOROMETHANE	5	U	
VINYL CHLORIDE	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OS

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1RA
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3RA
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2RA
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	25	J	E
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	7	J	P
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10		
FLUORENE	14		
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	U	
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2RA
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	8	J	P

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	10	U	
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	10	U	
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	10	U	
PHENOL	10	U	

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OS

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
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-METHYLNAPHTHALENE	10	U	
2-METHYLPHENOL	10	U	
2-NITROANILINE	25	U	
2-NITROPHENOL	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-METHYLPHENOL	10	U	
4-NITROANILINE	25	U	
4-NITROPHENOL	25	U	
ACENAPHTHENE	7	J	P
ACENAPHTHYLENE	10	U	
ACETOPHENONE	10	U	
ANTHRACENE	10	U	
ATRAZINE	10	U	
BENZALDEHYDE	10	UJ	C
BENZO(A)ANTHRACENE	10	U	

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
BENZO(A)PYRENE	10	U	
BENZO(B)FLUORANTHENE	10	U	
BENZO(G,H,I)PERYLENE	10	U	
BENZO(K)FLUORANTHENE	10	U	
BIS(2-CHLOROETHOXY)METHANE	10	U	
BIS(2-CHLOROETHYL)ETHER	10	U	
BIS(2-ETHYLHEXYL)PHTHALATE	10	U	
BUTYL BENZYL PHTHALATE	10	U	
CAPROLACTAM	10	U	
CARBAZOLE	10	U	
CHRYSENE	10	U	
DIBENZO(A,H)ANTHRACENE	10	U	
DIBENZOFURAN	10	U	
DIETHYL PHTHALATE	10	U	
DIMETHYL PHTHALATE	10	U	
DI-N-BUTYL PHTHALATE	10	U	
DI-N-OCTYL PHTHALATE	10	U	
FLUORANTHENE	10	U	
FLUORENE	4	J	P
HEXACHLOROBENZENE	10	U	
HEXACHLOROBUTADIENE	10	U	
HEXACHLOROCYCLOPENTADIENE	10	UJ	C
HEXACHLOROETHANE	10	U	
INDENO(1,2,3-CD)PYRENE	10	U	
ISOPHORONE	10	U	
NAPHTHALENE	10	U	
NITROBENZENE	10	U	
N-NITROSO-DI-N-PROPYLAMINE	10	U	
N-NITROSODIPHENYLAMINE	10	U	
PENTACHLOROPHENOL	25	U	
PHENANTHRENE	4	J	P
PHENOL	10	U	

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
PYRENE	10	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	UJ	C
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	UJ	C
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	U	
BETA-BHC	0.05	U	
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	U	
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2SC
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	UJ	C
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	UJ	C
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.1	U	
4,4'-DDE	0.1	U	
4,4'-DDT	0.1	U	
ALDRIN	0.05	U	
ALPHA-BHC	0.05	U	
ALPHA-CHLORDANE	0.05	U	
AROCLOR-1016	0.5	U	
AROCLOR-1221	0.5	U	
AROCLOR-1232	0.5	U	
AROCLOR-1242	0.5	U	
AROCLOR-1248	0.5	U	
AROCLOR-1254	0.5	U	
AROCLOR-1260	0.5	UJ	C
BETA-BHC	0.05	UJ	C
DELTA-BHC	0.05	UJ	C
DIELDRIN	0.1	U	
ENDOSULFAN I	0.05	U	
ENDOSULFAN II	0.1	U	
ENDOSULFAN SULFATE	0.1	U	
ENDRIN	0.1	U	
ENDRIN ALDEHYDE	0.1	U	
ENDRIN KETONE	0.1	UJ	C
GAMMA-BHC (LINDANE)	0.05	U	
GAMMA-CHLORDANE	0.05	U	
HEPTACHLOR	0.05	U	
HEPTACHLOR EPOXIDE	0.05	U	
METHOXYCHLOR	0.5	U	
TOXAPHENE	1	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OPEST

nsample	04GW0801
samp_date	9/23/2004
lab_id	C4I240419001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.96	U	
DISULFOTON	0.96	U	
ETHYL PARATHION	0.96	U	
FAMPHUR	0.96	U	
METHYL PARATHION	0.96	U	
PHORATE	0.96	U	
SULFOTEPP	0.96	U	
THIONAZIN	0.96	U	

nsample	4GW1801
samp_date	9/21/2004
lab_id	C4I230277001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.96	U	
DISULFOTON	0.96	U	
ETHYL PARATHION	0.96	U	
FAMPHUR	0.96	U	
METHYL PARATHION	0.96	U	
PHORATE	0.96	U	
SULFOTEPP	0.96	U	
THIONAZIN	0.96	U	

nsample	O4GW1301
samp_date	9/22/2004
lab_id	C4I230277003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: OPEST

nsample	O4GW1401
samp_date	9/22/2004
lab_id	C4I230277002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.95	U	
DISULFOTON	0.95	U	
ETHYL PARATHION	0.95	U	
FAMPHUR	0.95	U	
METHYL PARATHION	0.95	U	
PHORATE	0.95	U	
SULFOTEPP	0.95	U	
THIONAZIN	0.95	U	

nsample	O4GW1901
samp_date	9/21/2004
lab_id	C4I220180001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIMETHOATE	0.96	U	
DISULFOTON	0.96	U	
ETHYL PARATHION	0.96	U	
FAMPHUR	0.96	U	
METHYL PARATHION	0.96	U	
PHORATE	0.96	U	
SULFOTEPP	0.96	U	
THIONAZIN	0.96	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: HERB

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: HERB

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2,4,5-T	3	U	
2,4,5-TP (SILVEX)	1	U	
2,4-D	3	U	
DINOSEB	5	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 11, 2004**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND MISCELLANEOUS PARAMETERS**
NCBC GULFPORT – CTO 283
SAMPLE DELIVERY GROUP (SDG) – 2831

SAMPLES: 15/AQUEOUS/

04GP0101	04GP0201	04GP0301
04GP0401	04GP0501	04GP0601
04GP0701	04RS0815SB	04RS0815SD
04RW0815GP	04RW0815MW	04SW0101
04SW0101D	04SW0201	04SW0301

Overview

The sample set for NCBC Gulfport, CTO 283, SDG 2831 consists of eleven (11) aqueous environmental samples and four (4) aqueous rinse blanks (04RS0815SB, 04RS0815SD, 04RW0815GP, and 04RW0815MW). One (1) field duplicate pair (04SW0101D / 04SW0101) is included in this SDG.

All samples were analyzed for target analyte list (TAL) metals and cyanide. Samples 04GP0101, 04GP0301, 04GP0401, 04GP0501, 04GP0601, and 04GP0701 were also analyzed for chloride, nitrate, nitrite, sulfate, and total organic carbon (TOC). Sample 04GP0201 was also analyzed for TOC. The samples were collected by Tetra Tech NUS August 5, 12, 13, 15, 17, and 18, 2004 and analyzed by Katahdin Analytical Services. Metals analyses except mercury were conducted using SW846 method 6010B. Mercury analyses were conducted using SW846 method 7470A. Cyanide analyses were conducted using SW846 method 9012A. Chloride analyses were conducted using EPA method 325.2. Nitrate and nitrite analyses were conducted using EPA method 353.2. Sulfate Analyses were conducted using EPA method 375.4. TOC analyses were conducted using EPA method 415.1.

Metals analyses except mercury were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) methodology.

These data were evaluated based on the following parameters:

- Data Completeness
- * Holding Times
- Calibration Recoveries
- Laboratory Blank Analyses
- * ICP Interference Analyses
- Matrix Spike Recoveries
- * Laboratory Duplicate Analyses
- * Laboratory Control Sample Recoveries

- ICP Serial Dilution Analyses
- * Field Duplicate Analyses
- Detection Limits
- * Analyte Quantitation

* - All quality control criteria were met for this parameter.

Calibration Analyses

The contract required detection limit (CRDL) standard run on 9/21/04 at 21:26 had a percent recovery (%R) >130% for lead, affecting all samples except 04SW0101, 04SW0101D, 04GP0201, 04SW0201, 04GP0301, and 04GP0401. Positive results <2X the CRDL reported for lead were qualified as estimated (J) for the affected samples only.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	129.47 ug/L	647.35 ug/L
Antimony	2.47 ug/L	12.35 ug/L
Barium	0.75 ug/L	3.75 ug/L
Calcium	43.53 ug/L	217.65 ug/L
Cobalt	0.70 ug/L	3.5 ug/L
Copper	2.03 ug/L	10.15 ug/L
Iron	15.67 ug/L	78.35 ug/L
Magnesium	42.55 ug/L	212.75 ug/L
Nickel	1.0 ug/L	5.0 ug/L
Potassium	255.52 ug/L	1277.6 ug/L
Sodium[1]	151.75 ug/L	758.75 ug/L
Zinc[1]	1.51 ug/L	7.55 ug/L

[1] Maximum concentration present in laboratory preparation blank.

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the action level for aluminum, copper, nickel, potassium, and zinc were qualified as nondetected (U) due to blank contamination. The remaining analytes were not qualified for laboratory blank contamination because the results were either greater than the action level or they were nondetects. It should be noted that the rinse blanks were not qualified for laboratory blank contamination.

Matrix Spike Noncompliance

The matrix spike (MS) and matrix spike duplicate (MSD) performed on sample 04GP0101 had %Rs <75% for selenium. The MS performed on sample 04GP0101 had %Rs >125% for aluminum and iron. This affects all samples identified as GP. Positive results reported for aluminum and iron in the affected samples were qualified as estimated (J). Nondetected results reported for selenium in the affected samples were qualified as estimated (UJ).

The MS had a %R <75% for nitrate. Positive and nondetected results reported for nitrate were qualified as estimated, (J) and (UJ), respectively.

ICP Serial Dilution Analyses

The ICP serial dilution had a percent difference (%D) >10% and the initial sample concentration was >50X the instrument detection limit (IDL) for sodium. Positive results reported for sodium were qualified as estimated (J).

Detection Limits

Positive results for cyanide, nitrate, and nitrite that were reported between the laboratory practical quantitation limit (PQL) and the method detection limit (MDL) were qualified as estimated (J) due to uncertainty near the detection limit.

Notes

The sample bottles for anions for sample 04GP0101 were received by the laboratory, but were not listed on the chain of custody (COC). Analyses of anions for this sample were added per J. Bourgeois.

The raw data for the TJA Trace ICP run on 9/20/04 was not included in the data package. The laboratory was contacted and the missing data were sent by A. Colby.

The continuing calibration verification (CCV) standards run on 9/20/04 at 17:33, 18:53, 20:14, 21:35, and 22:55 and on 9/21/04 at 00:16 had %Rs >110% for magnesium. No qualification action was required because no samples that were analyzed for magnesium were associated with these standards.

The CCV standards run on 9/20/04 at 21:35, and 22:55 and on 9/21/04 at 00:16 had %Rs >110% for calcium. No qualification action was required because no samples that were analyzed for calcium were associated with these standards.

The CCV standard run on 9/8/04 at 23:10 had %Rs >110% for cobalt and nickel. No qualification action was required because no samples that were analyzed for cobalt and nickel were associated with this standard.

The interference check sample (ICS) AB standard run on 9/21/04 at 00:09 had a %R >120% for calcium. No qualification action was required because no samples that were analyzed for calcium were associated with this standard.

The MSD performed on sample 04GP0101 and the MS performed on sample 04SW0301 had %Rs <75% for calcium. No qualification action was required because the initial sample concentrations were >4X the spike added.

The laboratory reported different detection limits for two analytes (namely cobalt and nickel) in two samples. No action was taken on this basis.

Executive Summary

Laboratory Performance: Lead was qualified due to calibration noncompliance. Several analytes were present in the laboratory method/preparation blank.

Other Factors Affecting Data Quality: Several analytes were qualified due to matrix spike noncompliance. Sodium was qualified due to ICP serial dilution noncompliance. Several analytes were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the NFESC document entitled "Navy IRCDQM" (September 1999).

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 NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: M

nsample	04GP0101	nsample	04GP0201	nsample	04GP0301
samp_date	8/17/2004	samp_date	8/12/2004	samp_date	8/13/2004
lab_id	WU2544-002	lab_id	WU2493-001	lab_id	WU2509-002
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	161	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	328		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	78000		
CHROMIUM	2.3		
COBALT	0.64	U	
COPPER	1.91	U	
IRON	1910	J	D
LEAD	1.7	U	
MAGNESIUM	10100		
MANGANESE	78.9		
MERCURY	0.01	U	
NICKEL	2	U	A
POTASSIUM	5360		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	19700	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	6.3	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	353	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	142		
BERYLLIUM	0.33		
CADMIUM	3.97	U	
CALCIUM	7950		
CHROMIUM	2.2		
COBALT	4.36	U	
COPPER	1.9	U	A
IRON	6990	J	D
LEAD	1.8		
MAGNESIUM	1980		
MANGANESE	171		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	1300		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	6320	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	43.9		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	8690	J	D
ANTIMONY	2.34	U	
ARSENIC	5.1		
BARIUM	176		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	12100		
CHROMIUM	11.5		
COBALT	4.36	U	
COPPER	5.3	U	A
IRON	14400	J	D
LEAD	2.8		
MAGNESIUM	5670		
MANGANESE	155		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	2430		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	8420	J	I
THALLIUM	4.09	U	
VANADIUM	12.9		
ZINC	38.9		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: M

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	7510	J	D
ANTIMONY	2.34	U	
ARSENIC	5.7		
BARIUM	205		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	12800		
CHROMIUM	11.8		
COBALT	4.36	U	
COPPER	6	U	A
IRON	9220	J	D
LEAD	3.2		
MAGNESIUM	6440		
MANGANESE	148		
MERCURY	0.02		
NICKEL	11		
POTASSIUM	2080		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	12000	J	I
THALLIUM	4.09	U	
VANADIUM	10.9		
ZINC	24.2		

nsample	04GP0501
samp_date	8/18/2004
lab_id	WU2577-001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2560	J	D
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	203		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	13800		
CHROMIUM	2.3		
COBALT	0.64	U	
COPPER	1.91	U	
IRON	13100	J	D
LEAD	2.1	J	C
MAGNESIUM	3760		
MANGANESE	192		
MERCURY	0.01	U	
NICKEL	7.8		
POTASSIUM	1830		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	10600	J	I
THALLIUM	4.09	U	
VANADIUM	15		
ZINC	35.5		

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	418	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	597		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	93900		
CHROMIUM	0.8	U	
COBALT	0.64	U	
COPPER	11.9		
IRON	17300	J	D
LEAD	1.7	U	
MAGNESIUM	6460		
MANGANESE	176		
MERCURY	0.01	U	
NICKEL	1	U	A
POTASSIUM	1920		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	10600	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	2.3	U	A

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: M

nsample	04GP0701	nsample	04RS0815SB	nsample	04RS0815SD
samp_date	8/18/2004	samp_date	8/15/2004	samp_date	8/15/2004
lab_id	WU2577-003	lab_id	WU2524-001	lab_id	WU2524-004
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	1480	J	D
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	321		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	50000		
CHROMIUM	2.5		
COBALT	0.64	U	
COPPER	13.3		
IRON	7040	J	D
LEAD	1.7	U	
MAGNESIUM	8790		
MANGANESE	195		
MERCURY	0.01	U	
NICKEL	3.3	U	A
POTASSIUM	3320		
SELENIUM	3.71	UJ	D
SILVER	2.84	U	
SODIUM	19000	J	I
THALLIUM	4.09	U	
VANADIUM	18.1		
ZINC	16.2		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	0.53	U	
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	21.4	U	
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	5.8		
LEAD	1.7	U	
MAGNESIUM	24.7	U	
MANGANESE	1.17	U	
MERCURY	0.01		
NICKEL	10.8	U	
POTASSIUM	238	U	
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	136	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	0.53	U	
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	21.4	U	
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	6.9		
LEAD	1.7	U	
MAGNESIUM	24.7	U	
MANGANESE	1.17	U	
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	238	U	
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	164	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.8		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: M

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	1.1		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	30.9		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	17.3		
LEAD	1.7	U	
MAGNESIUM	24.7	U	
MANGANESE	1.17	U	
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	375		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	150	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	2		

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	0.53	U	
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	21.4	U	
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	5.05	U	
LEAD	1.7	U	
MAGNESIUM	24.7	U	
MANGANESE	1.17	U	
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	238	U	
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	169	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

nsample	04SW0101
samp_date	8/5/2004
lab_id	WU2396-001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	38.4	U	A
ANTIMONY	2.34	U	
ARSENIC	6.8		
BARIUM	51.7		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	21600		
CHROMIUM	1.2		
COBALT	4.36	U	
COPPER	2.4	U	A
IRON	5180		
LEAD	1.7	U	
MAGNESIUM	2870		
MANGANESE	201		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	1440		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	10700	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.7	U	A

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: M

nsample	04SW0101D
samp_date	8/5/2004
lab_id	WU2396-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04SW0101

Parameter	Result	Val Qual	Qual Code
ALUMINUM	52.7	U	A
ANTIMONY	2.34	U	
ARSENIC	5.8		
BARIUM	51.4		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	22000		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	3.2	U	A
IRON	4360		
LEAD	1.7	U	
MAGNESIUM	2870		
MANGANESE	205		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	1180	U	A
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	10000	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	3.8	U	A

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	5.2		
BARIUM	31.1		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	15500		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	2800		
LEAD	1.7	U	
MAGNESIUM	1820		
MANGANESE	101		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	1800		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	7010	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	2	U	A

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	251	U	A
ANTIMONY	2.34	U	
ARSENIC	3.6		
BARIUM	43.8		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	19200		
CHROMIUM	0.8	U	
COBALT	0.64	U	
COPPER	2.2	U	A
IRON	4650		
LEAD	3.2	J	C
MAGNESIUM	2490		
MANGANESE	75.9		
MERCURY	0.01	U	
NICKEL	0.85	U	
POTASSIUM	1690		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	9810	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	9.1		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: MISC

nsample	04GP0101
samp_date	8/17/2004
lab_id	WU2544-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	22		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.0089	J	P
SULFATE	MG/L	17		
TOTAL ORGANIC CARBON	MG/L	6.6		

nsample	04GP0201
samp_date	8/12/2004
lab_id	WU2493-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	10	U	
TOTAL ORGANIC CARBON	MG/L	15		

nsample	04GP0301
samp_date	8/13/2004
lab_id	WU2509-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	12		
CYANIDE	UG/L	4.4	J	P
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.094		
SULFATE	MG/L	16		
TOTAL ORGANIC CARBON	MG/L	4.7		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: MISC

nsample	04GP0401
samp_date	8/13/2004
lab_id	WU2509-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	15		
CYANIDE	UG/L	5.1	J	P
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.074		
SULFATE	MG/L	30		
TOTAL ORGANIC CARBON	MG/L	5.1		

nsample	04GP0501
samp_date	8/18/2004
lab_id	WU2577-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	14		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.01	J	DP
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	46		
TOTAL ORGANIC CARBON	MG/L	5.1		

nsample	04GP0601
samp_date	8/18/2004
lab_id	WU2577-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	16		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	1	U	
TOTAL ORGANIC CARBON	MG/L	5.6		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: MISC

nsample	04GP0701
samp_date	8/18/2004
lab_id	WU2577-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	16		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.02	J	DP
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	30		
TOTAL ORGANIC CARBON	MG/L	6.5		

nsample	04RS0815SB
samp_date	8/15/2004
lab_id	WU2524-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	8.6	J	P

nsample	04RS0815SD
samp_date	8/15/2004
lab_id	WU2524-4
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	12		

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: MISC

nsample	04RW0815GP
samp_date	8/15/2004
lab_id	WU2524-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	8.8	J	P

nsample	04RW0815MW
samp_date	8/15/2004
lab_id	WU2524-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	10	U	

nsample	04SW0101
samp_date	8/5/2004
lab_id	WU2396-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	10	U	

PROJ_NO: 9666

SDG: 2831 MEDIA: WATER DATA FRACTION: MISC

nsample	04SW0101D
samp_date	8/5/2004
lab_id	WU2396-2
qc_type	NM
Pct_Solids	
DUP_OF:	04SW0101

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	6.4	J	P

nsample	04SW0201
samp_date	8/12/2004
lab_id	WU2493-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	10	U	

nsample	04SW0301
samp_date	8/17/2004
lab_id	WU2544-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	UG/L	3.9	J	P

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 12, 2004**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND MISCELLANEOUS PARAMETERS**
NCBC GULFPORT – CTO 283
SAMPLE DELIVERY GROUP (SDG) – 2832

SAMPLES: 11/SOIL/

04SB0101	04SB0201	04SB0301
04SB0401	04SB0501	04SB0601
04SB0701	04SB0801	04SB0801D
04SB0901	04SB1001	

9/SEDIMENT/

04SD0101	04SD0101D	04SD0201
04SD0301	04SD0401	04SD0501
04SD0601	04SD0701	04SD0801

Overview

The sample set for NCBC Gulfport, CTO 283, SDG 2832 consists of eleven (11) soil and nine (9) sediment environmental samples. Two (2) field duplicate pairs (04SB0801D / 04SB0801; 04SD0101D / 04SD0101) are included in this SDG.

All samples were analyzed for target analyte list (TAL) metals, cyanide, total organic carbon (TOC). Samples 04SB0501, 04SB0701, and 04SB0801 were also analyzed for grain size and Atterberg Limits (liquid limit, plastic limit, and plasticity index). The samples were collected by Tetra Tech NUS on August 5, 6, 11, 12, 13, 17, 18, and 19, 2004 and analyzed by Katahdin Analytical Services. Analyses of grain size and Atterberg Limits were subcontracted to Severn Trent Laboratories-Burlington. Metals analyses except mercury were conducted using SW846 methods 6010B and 6020. Mercury analyses were conducted using SW846 method 7471A. Cyanide analyses were conducted using SW846 method 9012A. TOC analyses were conducted using the Lloyd Kahn method. Grain size analyses were conducted using Standard Method D422. Atterberg Limits analyses were conducted using Standard Method D4318.

Metals analyses except lead for several samples, arsenic and mercury were conducted using Inductively Coupled Plasma (ICP) methodologies. Arsenic analyses and lead for several samples were conducted using ICP Mass Spectrometry (ICP-MS) methodology. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) methodology.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries

- Laboratory Blank Analyses
- ICP Interference Analyses
- Matrix Spike Recoveries
- * Laboratory Duplicate Analyses
- Laboratory Control Sample Recoveries
- * ICP Serial Dilution Analyses
- Field Duplicate Analyses
- Detection Limits
- * Analyte Quantitation

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	193.75 ug/L	96.88 mg/kg
Antimony	2.82 ug/L	1.41 mg/kg
Arsenic(1)	0.063 mg/kg	0.315 mg/kg
Barium(2)	0.133 mg/kg	0.665 mg/kg
Cadmium	1.26 ug/L	0.63 mg/kg
Calcium	10.76 ug/L	5.38 mg/kg
Iron	160.62 ug/L	80.31 mg/kg
Lead(2)	0.446 mg/kg	2.23 mg/kg
Magnesium	10.28 ug/L	5.14 mg/kg
Manganese	1.38 ug/L	0.69 mg/kg
Nickel	19.68 ug/L	9.84 mg/kg
Potassium	432.98 ug/L	216.49 mg/kg
Silver	6.36 ug/L	3.18 mg/kg
Sodium	113.30 ug/L	56.65 mg/kg
Vanadium(2)	0.466 mg/kg	2.33 mg/kg
Zinc(2)	0.179 mg/kg	0.895 mg/kg

(1) Maximum concentration present in laboratory preparation blank, analyzed at a 5X dilution.
(2) Maximum concentration present in laboratory preparation blank.

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot, percent solids, and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the action level for antimony, cadmium, lead, nickel, potassium, silver, sodium, and vanadium were qualified as nondetected (U) due to blank contamination. The remaining analytes were not qualified for laboratory blank contamination because the results were either greater than the action level or they were nondetects.

ICP Interference

The interfering analyte iron was present in sample 04SB0701 at a concentration comparable to the concentration of iron in the interference check sample (ICS) solution. Several analytes, namely antimony, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, sodium, vanadium, and zinc were present in the ICS solution at concentrations that exceeded the absolute value of the instrument detection limit (IDL). Interference effects exist for antimony and

cobalt in the affected sample. The nondetected result reported for antimony was qualified as estimated (UJ). The positive result reported for cobalt was qualified as estimated (J).

The interfering analyte iron was present in sample 04SD0201 at a concentration comparable to the concentration of iron in the ICS solution. Several analytes, namely antimony, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, sodium, vanadium, and zinc were present in the ICS solution at concentrations that exceeded the absolute value of the IDL. Interference effects exist for cobalt and selenium in the affected sample. The positive results reported for cobalt and selenium were qualified as estimated (J).

Matrix Spike Analyses

The matrix spike (MS) and matrix spike duplicate (MSD) performed on sample 04SB0501 had percent recoveries (%Rs) <75% for antimony and >125% for mercury, affecting soil samples only. Nondetected results reported for antimony were qualified as estimated (UJ). Positive results reported for mercury were qualified as estimated (J).

The MS performed on sample 04SB0501 had a %R <75% for sodium, affecting soil samples only. The MSD was compliant. Positive results reported for sodium were qualified as estimated (J).

The MSD performed on sample 04SB0501 had a %R >125% for magnesium, affecting soil samples only. The MS was compliant. Positive results reported for magnesium were qualified as estimated (J).

The MS and MSD performed on sample 04SD0501 had %Rs <75% for antimony and >125% for chromium and magnesium, affecting sediment samples only. Nondetected results reported for antimony were qualified as estimated (UJ). Positive results reported for chromium and magnesium were qualified as estimated (J).

The MSD performed on sample 04SD0501 had a %R >125% for potassium and <75% for zinc, affecting sediment samples only. The MS was compliant. Positive results reported for potassium and zinc were qualified as estimated (J).

The MS and MSD performed on sample 04SD0501 had %Rs <0% and <75% for sodium, respectively, affecting sediment samples only. Positive results reported for sodium were qualified as estimated (J).

The soil and sediment MS and MSD performed on samples 04SB0501 and 04SD0501 had %Rs <75% for cyanide, affecting all soil and sediment samples. Positive and nondetected results reported for cyanide were qualified as estimated, (J) and (UJ), respectively.

Laboratory Control Sample Analyses

The laboratory control sample (LCS) performed on batch WG9416 had a %R >120% for cyanide, affecting samples 04SB0301, 04SD0301, and 04SD0401. The positive result reported for cyanide in sample 04SD0301 was qualified as estimated (J). No qualification action was required for samples 04SB0301 and 04SD0401 because the results were nondetects.

Field Duplicate Results

Field duplicate imprecision (RPD >50%) was noted for cyanide for field duplicate pair 04SB0801D / 04SB0801. Positive results reported for cyanide were qualified as estimated (J) in all soil samples.

Field duplicate imprecision (RPD >50%) was noted for aluminum, barium, calcium, iron, lead, magnesium, and manganese for field duplicate pair 04SD0101D / 04SD0101. Positive results reported for these analytes were qualified as estimated (J) in all sediment samples.

Detection Limits

Positive results for cyanide that were reported between the laboratory practical quantitation limit (PQL) and the method detection limit (MDL) were qualified as estimated (J) due to uncertainty near the detection limit.

Notes

The continuing calibration verification (CCV) standard run on 9/22/04 at 03:09 had a %R >110% for lead. No qualification action was required because no samples that were analyzed for lead were associated with this standard.

The CCV standards run on 9/28/04 at 17:10 and 18:44 had %Rs <90% for sodium. No qualification action was required because no samples that were analyzed for sodium were associated with these standards.

The CCV standard run on 9/28/04 at 17:10 had a %R <90% for potassium. No qualification action was required because no samples that were analyzed for potassium were associated with this standard.

The initial calibration verification (ICV) standard run on 8/25/04 at 10:09 had a %R <0% for mercury. The ICV was re-run at 10:12 and was compliant. No qualification action was required on this basis.

The contract required detection limit (CRDL) standard run on 9/21/04 at 21:26 had a %R >150% for lead, affecting samples 04SD0101, 04SD0101D, 04SD0201, 04SD0301, and 04SD0401. No qualification action was required because all results for lead were >2X the CRDL.

The PQL standard run on 9/29/04 at 17:00 had a %R >150% for iron. No qualification action was required on this basis.

The ICS AB solution standard run on 9/28/04 at 21:35 had %Rs <80% for potassium and sodium. No qualification action was required because no samples that were analyzed for potassium and sodium were associated with this standard.

The MS and MSD performed on sample 04SB0501 had %Rs >125% for aluminum and iron. No qualification action was required because the initial sample concentrations were >4X the spike added.

The MS and MSD performed on sample 04SD0501 had %Rs >125% for aluminum and iron and <75% for calcium. No qualification action was required because the initial sample concentrations were >4X the spike added.

Dilutions were performed for arsenic in all samples as part of the ICP-MS method.

Dilutions were performed for lead in all samples except 04SD0101, 04SD0101D, 04SD0201, 04SD0301, and 04SD0401 as part of the ICP-MS method.

The laboratory did not analyze a preparation blank for lead on the ICP-MS instrument.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method/preparation blank. Cyanide was qualified due to LCS noncompliance.

Other Factors Affecting Data Quality: Several analytes were qualified due to ICP interference. Several analytes were qualified due to matrix spike noncompliance. Several analytes were qualified due to field duplicate imprecision. Several analytes were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the NFESC document entitled "Navy IRCDQM" (September 1999).

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 NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SB0101
samp_date	8/11/2004
lab_id	WU2511-001
qc_type	NM
units	MG/KG
Pct_Solids	83.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2860		
ANTIMONY	0.18	UJ	D
ARSENIC	0.27		
BARIUM	31.2		
BERYLLIUM	0.04		
CADMIUM	0.3	U	
CALCIUM	577		
CHROMIUM	4.9		
COBALT	0.33	U	
COPPER	1.7		
IRON	1620		
LEAD	8.8		
MAGNESIUM	377	J	D
MANGANESE	16		
MERCURY	0.01	U	
NICKEL	1.3	U	A
POTASSIUM	254		
SELENIUM	0.28	U	
SILVER	0.31	U	A
SODIUM	45.2	J	D
THALLIUM	0.31	U	
VANADIUM	7.4		
ZINC	2.1		

nsample	04SB0201
samp_date	8/12/2004
lab_id	WU2494-003
qc_type	NM
units	MG/KG
Pct_Solids	86.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	5610		
ANTIMONY	0.69	U	A
ARSENIC	4.2		
BARIUM	68.7		
BERYLLIUM	0.25		
CADMIUM	0.4	U	
CALCIUM	20000		
CHROMIUM	14.6		
COBALT	1.4		
COPPER	13.9		
IRON	5600		
LEAD	80.5		
MAGNESIUM	2110	J	D
MANGANESE	131		
MERCURY	0.02	J	D
NICKEL	12.4		
POTASSIUM	370		
SELENIUM	0.38	U	
SILVER	0.46	U	A
SODIUM	116	J	D
THALLIUM	0.42	U	
VANADIUM	19.8		
ZINC	193		

nsample	04SB0301
samp_date	8/12/2004
lab_id	WU2494-004
qc_type	NM
units	MG/KG
Pct_Solids	81.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	1480		
ANTIMONY	0.22	UJ	D
ARSENIC	1.9		
BARIUM	6.1		
BERYLLIUM	0.02	U	
CADMIUM	0.37	U	
CALCIUM	240		
CHROMIUM	2.4		
COBALT	0.64		
COPPER	1.7		
IRON	1360		
LEAD	2.7	U	A
MAGNESIUM	135	J	D
MANGANESE	2.8		
MERCURY	0.01	U	
NICKEL	1.5	U	A
POTASSIUM	136	U	A
SELENIUM	0.34	U	
SILVER	0.74	U	A
SODIUM	15.8	U	A
THALLIUM	0.38	U	
VANADIUM	2.4		
ZINC	5.1		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-005
qc_type	NM
units	MG/KG
Pct_Solids	79.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2150		
ANTIMONY	0.22	UJ	D
ARSENIC	0.88		
BARIUM	11.9		
BERYLLIUM	0.04		
CADMIUM	0.38	U	
CALCIUM	69.4		
CHROMIUM	3.1		
COBALT	0.42	U	
COPPER	1.9		
IRON	1040		
LEAD	3.8	U	A
MAGNESIUM	152	J	D
MANGANESE	3.2		
MERCURY	0.01	U	
NICKEL	1.5	U	A
POTASSIUM	132	U	A
SELENIUM	0.35	U	
SILVER	0.28	U	A
SODIUM	29.5	U	A
THALLIUM	0.39	U	
VANADIUM	4.1		
ZINC	2.2		

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-002
qc_type	NM
units	MG/KG
Pct_Solids	81.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	1240		
ANTIMONY	0.2	UJ	D
ARSENIC	2.4		
BARIUM	4.3		
BERYLLIUM	0.02	U	
CADMIUM	0.03	U	
CALCIUM	96		
CHROMIUM	3.1		
COBALT	0.57		
COPPER	1.6		
IRON	1550		
LEAD	2.1	U	A
MAGNESIUM	105	J	D
MANGANESE	5.6		
MERCURY	0.01	U	
NICKEL	2	U	A
POTASSIUM	88.1	U	A
SELENIUM	0.32	U	
SILVER	0.52	U	A
SODIUM	40.4	U	A
THALLIUM	0.36	U	
VANADIUM	2.7		
ZINC	1.9		

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-003
qc_type	NM
units	MG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	7020		
ANTIMONY	0.2	UJ	D
ARSENIC	0.79		
BARIUM	11		
BERYLLIUM	0.14		
CADMIUM	0.03	U	
CALCIUM	44.9		
CHROMIUM	5.6		
COBALT	0.41		
COPPER	1.2		
IRON	4350		
LEAD	5.4	U	A
MAGNESIUM	204	J	D
MANGANESE	6.9		
MERCURY	0.03	J	D
NICKEL	1.7	U	A
POTASSIUM	156	U	A
SELENIUM	0.32	U	
SILVER	0.3	U	A
SODIUM	27.4	U	A
THALLIUM	0.36	U	
VANADIUM	8.7		
ZINC	3		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-004
qc_type	NM
units	MG/KG
Pct_Solids	75.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	7680		
ANTIMONY	0.22	UJ	DK
ARSENIC	7.6		
BARIUM	27.4		
BERYLLIUM	0.57		
CADMIUM	0.03	U	
CALCIUM	644		
CHROMIUM	15.2		
COBALT	3.9	J	K
COPPER	4.8		
IRON	10300		
LEAD	8.2	U	A
MAGNESIUM	1020	J	D
MANGANESE	35.7		
MERCURY	0.02	J	D
NICKEL	7.3	U	A
POTASSIUM	782		
SELENIUM	0.35	U	
SILVER	0.55	U	A
SODIUM	58.1	J	D
THALLIUM	0.38	U	
VANADIUM	17		
ZINC	26.8		

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-002
qc_type	NM
units	MG/KG
Pct_Solids	84.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	5600		
ANTIMONY	0.21	UJ	D
ARSENIC	1.4		
BARIUM	10.1		
BERYLLIUM	0.03		
CADMIUM	0.03	U	
CALCIUM	36.4		
CHROMIUM	4.8		
COBALT	0.39	U	
COPPER	1.3		
IRON	7290		
LEAD	4.2	U	A
MAGNESIUM	170	J	D
MANGANESE	5		
MERCURY	0.02	J	D
NICKEL	1.7	U	A
POTASSIUM	144	U	A
SELENIUM	0.33	U	
SILVER	0.52	U	A
SODIUM	34.1	U	A
THALLIUM	0.44		
VANADIUM	7.8		
ZINC	2.1		

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-003
qc_type	NM
units	MG/KG
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	Result	Val Qual	Qual Code
ALUMINUM	5650		
ANTIMONY	0.24	UJ	D
ARSENIC	0.96		
BARIUM	9.1		
BERYLLIUM	0.03		
CADMIUM	0.03	U	
CALCIUM	28.6		
CHROMIUM	4.7		
COBALT	0.46	U	
COPPER	1.5		
IRON	6030		
LEAD	4.7	U	A
MAGNESIUM	174	J	D
MANGANESE	6.1		
MERCURY	0.02	J	D
NICKEL	1.5	U	A
POTASSIUM	163	U	A
SELENIUM	0.39	U	
SILVER	0.59	U	A
SODIUM	34.9	U	A
THALLIUM	0.43	U	
VANADIUM	7.5		
ZINC	2.7		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-005
qc_type	NM
units	MG/KG
Pct_Solids	82.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2210		
ANTIMONY	0.21	UJ	D
ARSENIC	2		
BARIUM	5.1		
BERYLLIUM	0.02	U	
CADMIUM	0.03	U	
CALCIUM	237		
CHROMIUM	2.5		
COBALT	0.4	U	
COPPER	1.3		
IRON	984		
LEAD	1.1	U	A
MAGNESIUM	79.5	J	D
MANGANESE	2.6		
MERCURY	0.01	U	
NICKEL	1.7	U	A
POTASSIUM	106	U	A
SELENIUM	0.34	U	
SILVER	0.57	U	A
SODIUM	17.2	U	A
THALLIUM	0.37	U	
VANADIUM	2	U	A
ZINC	9.2		

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-001
qc_type	NM
units	MG/KG
Pct_Solids	82.2
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	3380		
ANTIMONY	0.18	UJ	D
ARSENIC	1.8		
BARIUM	4.6		
BERYLLIUM	0.02	U	
CADMIUM	0.03	U	A
CALCIUM	33.6		
CHROMIUM	4.1		
COBALT	1.1		
COPPER	1.6		
IRON	931		
LEAD	2.6	U	A
MAGNESIUM	77.9	J	D
MANGANESE	2.2		
MERCURY	0.01	J	D
NICKEL	2.8	U	A
POTASSIUM	88.7	U	A
SELENIUM	0.43		
SILVER	0.53	U	A
SODIUM	9.6	U	A
THALLIUM	0.32	U	
VANADIUM	4.2		
ZINC	1.4		

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-001
qc_type	NM
units	MG/KG
Pct_Solids	72.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	3740	J	G
ANTIMONY	0.26	U	A
ARSENIC	0.74		
BARIUM	9.3	J	G
BERYLLIUM	0.03	U	
CADMIUM	0.42	U	
CALCIUM	228	J	G
CHROMIUM	4.8	J	D
COBALT	0.47	U	
COPPER	1.8		
IRON	1640	J	G
LEAD	5.6	J	G
MAGNESIUM	134	J	DG
MANGANESE	7.2	J	G
MERCURY	0.05		
NICKEL	1.2	U	A
POTASSIUM	77.5	U	A
SELENIUM	0.4	U	
SILVER	0.64	U	A
SODIUM	16.9	U	A
THALLIUM	0.44	U	
VANADIUM	5.7		
ZINC	4.7	J	D

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SD0101D
samp_date	8/5/2004
lab_id	WU2405-002
qc_type	NM
units	MG/KG
Pct_Solids	75.2
DUP_OF:	04SD0101

Parameter	Result	Val Qual	Qual Code
ALUMINUM	9200	J	G
ANTIMONY	0.16	UJ	D
ARSENIC	1.3		
BARIUM	19	J	G
BERYLLIUM	0.07		
CADMIUM	0.27	U	
CALCIUM	472	J	G
CHROMIUM	9.5	J	D
COBALT	0.64		
COPPER	2.7		
IRON	3440	J	G
LEAD	11.1	J	G
MAGNESIUM	339	J	DG
MANGANESE	14.3	J	G
MERCURY	0.04		
NICKEL	2.5	U	A
POTASSIUM	181	J	D
SELENIUM	0.26	U	
SILVER	0.42	U	A
SODIUM	32.8	U	A
THALLIUM	0.28	U	
VANADIUM	11.8		
ZINC	12	J	D

nsample	04SD0201
samp_date	8/6/2004
lab_id	WU2414-001
qc_type	NM
units	MG/KG
Pct_Solids	61.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	16200	J	G
ANTIMONY	0.53	U	A
ARSENIC	5.4		
BARIUM	41.7	J	G
BERYLLIUM	0.14		
CADMIUM	0.46	U	
CALCIUM	1020	J	G
CHROMIUM	15.7	J	D
COBALT	2	J	K
COPPER	8.4		
IRON	12200	J	G
LEAD	24.8	J	G
MAGNESIUM	645	J	DG
MANGANESE	38	J	G
MERCURY	0.07		
NICKEL	5.7	U	A
POTASSIUM	369	J	D
SELENIUM	0.71	J	K
SILVER	0.71	U	A
SODIUM	52.4	U	A
THALLIUM	0.48	U	
VANADIUM	23.7		
ZINC	43	J	D

nsample	04SD0301
samp_date	8/12/2004
lab_id	WU2494-001
qc_type	NM
units	MG/KG
Pct_Solids	75.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	3190	J	G
ANTIMONY	0.21	UJ	D
ARSENIC	2.1		
BARIUM	9.7	J	G
BERYLLIUM	0.02	U	
CADMIUM	0.35	U	
CALCIUM	550	J	G
CHROMIUM	3.8	J	D
COBALT	0.58		
COPPER	2.8		
IRON	3090	J	G
LEAD	5.1	J	G
MAGNESIUM	135	J	DG
MANGANESE	11.4	J	G
MERCURY	0.03		
NICKEL	1.7	U	A
POTASSIUM	79.2	U	A
SELENIUM	0.33	U	
SILVER	0.42	U	A
SODIUM	17.5	U	A
THALLIUM	0.36	U	
VANADIUM	5.6		
ZINC	12	J	D

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SD0401
samp_date	8/12/2004
lab_id	WU2494-002
qc_type	NM
units	MG/KG
Pct_Solids	57.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	18600	J	G
ANTIMONY	0.35	UJ	D
ARSENIC	5.6		
BARIUM	54.1	J	G
BERYLLIUM	0.21		
CADMIUM	0.61	U	A
CALCIUM	1960	J	G
CHROMIUM	18.8	J	D
COBALT	2.4		
COPPER	10.6		
IRON	13000	J	G
LEAD	43.4	J	G
MAGNESIUM	703	J	DG
MANGANESE	37.7	J	G
MERCURY	0.09		
NICKEL	7.8	U	A
POTASSIUM	443	J	D
SELENIUM	0.78		
SILVER	0.68	U	A
SODIUM	85.4	J	D
THALLIUM	0.61	U	
VANADIUM	27.5		
ZINC	68.3	J	D

nsample	04SD0501
samp_date	8/13/2004
lab_id	WU2513-001
qc_type	NM
units	MG/KG
Pct_Solids	56.7
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	11300	J	G
ANTIMONY	0.57	U	A
ARSENIC	5		
BARIUM	41.7	J	G
BERYLLIUM	0.09		
CADMIUM	0.14	U	A
CALCIUM	2120	J	G
CHROMIUM	13.9	J	D
COBALT	1.8		
COPPER	12.6		
IRON	9180	J	G
LEAD	38.2	J	G
MAGNESIUM	523	J	DG
MANGANESE	30.1	J	G
MERCURY	0.09		
NICKEL	4.7	U	A
POTASSIUM	238	U	A
SELENIUM	0.55	U	
SILVER	0.97	U	A
SODIUM	1260	J	D
THALLIUM	0.61	U	
VANADIUM	18.6		
ZINC	87.9	J	D

nsample	04SD0601
samp_date	8/18/2004
lab_id	WU2576-001
qc_type	NM
units	MG/KG
Pct_Solids	69.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	14600	J	G
ANTIMONY	0.68	U	A
ARSENIC	5.7		
BARIUM	27.7	J	G
BERYLLIUM	0.13		
CADMIUM	0.04	U	
CALCIUM	1520	J	G
CHROMIUM	14.7	J	D
COBALT	1.4		
COPPER	7.5		
IRON	13000	J	G
LEAD	14.2	U	A
MAGNESIUM	508	J	DG
MANGANESE	20.9	J	G
MERCURY	0.06		
NICKEL	5.6	U	A
POTASSIUM	274	U	A
SELENIUM	0.48	U	
SILVER	0.47	U	A
SODIUM	52.9	U	A
THALLIUM	0.53	U	
VANADIUM	23.5		
ZINC	27.3	J	D

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: M

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-001
qc_type	NM
units	MG/KG
Pct_Solids	66.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	11100	J	G
ANTIMONY	0.27	UJ	D
ARSENIC	2.9		
BARIUM	22.9	J	G
BERYLLIUM	0.12		
CADMIUM	0.03	U	
CALCIUM	1130	J	G
CHROMIUM	11	J	D
COBALT	1.2		
COPPER	5.7		
IRON	8490	J	G
LEAD	13.4	J	G
MAGNESIUM	509	J	DG
MANGANESE	15.9	J	G
MERCURY	0.05		
NICKEL	4.7	U	A
POTASSIUM	251	U	A
SELENIUM	0.43	U	
SILVER	0.55	U	A
SODIUM	58.7	U	A
THALLIUM	0.73		
VANADIUM	17.9		
ZINC	21.8	J	D

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-002
qc_type	NM
units	MG/KG
Pct_Solids	65.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	13800	J	G
ANTIMONY	0.29	UJ	D
ARSENIC	4.8		
BARIUM	39.5	J	G
BERYLLIUM	0.1		
CADMIUM	0.05	U	A
CALCIUM	1050	J	G
CHROMIUM	14.2	J	D
COBALT	1.5		
COPPER	8.1		
IRON	9510	J	G
LEAD	15.2	J	G
MAGNESIUM	618	J	DG
MANGANESE	22.8	J	G
MERCURY	0.07		
NICKEL	5.8	U	A
POTASSIUM	291	J	D
SELENIUM	0.6		
SILVER	0.83	U	A
SODIUM	54.7	U	A
THALLIUM	0.76		
VANADIUM	23.2		
ZINC	31.4	J	D

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SB0101	nsample	04SB0201	nsample	04SB0301
samp_date	8/11/2004	samp_date	8/12/2004	samp_date	8/12/2004
lab_id	WU2511-1	lab_id	WU2494-3	lab_id	WU2494-4
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	83.5	Pct_Solids	86.4	Pct_Solids	81.9
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	DG
TOTAL ORGANIC CARBON	MG/KG	1900		
TOTAL SOLIDS	%	84		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.32	J	DGP
TOTAL ORGANIC CARBON	MG/KG	39000		
TOTAL SOLIDS	%	86		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	DG
TOTAL ORGANIC CARBON	MG/KG	1800		
TOTAL SOLIDS	%	82		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SB0401
samp_date	8/12/2004
lab_id	WU2494-5
qc_type	NM
Pct_Solids	79.4
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	DG
TOTAL ORGANIC CARBON	MG/KG	5000		
TOTAL SOLIDS	%	79		

nsample	04SB0501
samp_date	8/13/2004
lab_id	WU2513-2
qc_type	NM
Pct_Solids	81.1
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	DG
LIQUID LIMIT	%	0		
PERCENT CLAY	%	12.1		
PERCENT COARSE SAND	%	0.2		
PERCENT FINE SAND	%	73.7		
PERCENT GRAVEL	%	0		
PERCENT MEDIUM SAND	%	4.1		
PERCENT SAND	%	78		
PERCENT SILT	%	9.9		
PERCENT SOLIDS	%	80.7		
PLASTIC LIMIT	%	0		
PLASTICITY INDEX	%	0		
SIEVE 1"	%	100		
SIEVE 1-1/2"	%	100		
SIEVE 2"	%	100		
SIEVE 3"	%	100		
SIEVE 3/4"	%	100		
SIEVE 3/8"	%	100		
SIEVE NO. 004	%	100		
SIEVE NO. 010	%	99.8		
SIEVE NO. 020	%	99.3		
SIEVE NO. 040	%	95.7		
SIEVE NO. 060	%	70.8		
SIEVE NO. 080	%	41.2		
SIEVE NO. 100	%	34.2		
SIEVE NO. 200	%	22		
SPECIFIC GRAVITY	%	2.65		
TOTAL ORGANIC CARBON	MG/KG	1700		
TOTAL SOLIDS	%	81		

nsample	04SB0601
samp_date	8/18/2004
lab_id	WU2576-3
qc_type	NM
Pct_Solids	82.6
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.58	UJ	DG
TOTAL ORGANIC CARBON	MG/KG	12000		
TOTAL SOLIDS	%	82		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SB0701
samp_date	8/18/2004
lab_id	WU2576-4
qc_type	NM
Pct_Solids	75.2
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.63	UJ	DG
LIQUID LIMIT	%	32		
PERCENT CLAY	%	41.2		
PERCENT COARSE SAND	%	0.1		
PERCENT FINE SAND	%	38.8		
PERCENT GRAVEL	%	0.5		
PERCENT MEDIUM SAND	%	0.3		
PERCENT SAND	%	39.1		
PERCENT SILT	%	19.2		
PERCENT SOLIDS	%	68.2		
PLASTIC LIMIT	%	0		
PLASTICITY INDEX	%	0		
SIEVE 1"	%	100		
SIEVE 1-1/2"	%	100		
SIEVE 2"	%	100		
SIEVE 3"	%	100		
SIEVE 3/4"	%	100		
SIEVE 3/8"	%	100		
SIEVE NO. 004	%	99.5		
SIEVE NO. 010	%	99.4		
SIEVE NO. 020	%	99.4		
SIEVE NO. 040	%	99.2		
SIEVE NO. 060	%	98.5		
SIEVE NO. 080	%	95.4		
SIEVE NO. 100	%	92.2		
SIEVE NO. 200	%	60.4		
SPECIFIC GRAVITY	%	2.65		
TOTAL ORGANIC CARBON	MG/KG	4800		
TOTAL SOLIDS	%	75		

nsample	04SB0801
samp_date	8/19/2004
lab_id	WU2592-2
qc_type	NM
Pct_Solids	84.6
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.38	J	DGP
LIQUID LIMIT	%	16		
PERCENT CLAY	%	19		
PERCENT COARSE SAND	%	0		
PERCENT FINE SAND	%	48.7		
PERCENT GRAVEL	%	0		
PERCENT MEDIUM SAND	%	1.5		
PERCENT SAND	%	50.2		
PERCENT SILT	%	30.8		
PERCENT SOLIDS	%	82.2		
PLASTIC LIMIT	%	13		
PLASTICITY INDEX	%	3		
SIEVE 1"	%	100		
SIEVE 1-1/2"	%	100		
SIEVE 2"	%	100		
SIEVE 3"	%	100		
SIEVE 3/4"	%	100		
SIEVE 3/8"	%	100		
SIEVE NO. 004	%	100		
SIEVE NO. 010	%	100		
SIEVE NO. 020	%	100		
SIEVE NO. 040	%	98.5		
SIEVE NO. 060	%	83.8		
SIEVE NO. 080	%	64.9		
SIEVE NO. 100	%	59.2		
SIEVE NO. 200	%	49.8		
SPECIFIC GRAVITY	%	2.65		
TOTAL ORGANIC CARBON	MG/KG	4300		
TOTAL SOLIDS	%	84		

nsample	04SB0801D
samp_date	8/19/2004
lab_id	WU2592-3
qc_type	NM
Pct_Solids	84.0
DUP_OF:	04SB0801

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.77	J	DG
TOTAL ORGANIC CARBON	MG/KG	4300		
TOTAL SOLIDS	%	84		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SB0901
samp_date	8/18/2004
lab_id	WU2576-5
qc_type	NM
Pct_Solids	82.6
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.55	UJ	DG
TOTAL ORGANIC CARBON	MG/KG	830		
TOTAL SOLIDS	%	82		

nsample	04SB1001
samp_date	8/19/2004
lab_id	WU2592-1
qc_type	NM
Pct_Solids	82.2
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.51	J	DG
TOTAL ORGANIC CARBON	MG/KG	11000		
TOTAL SOLIDS	%	82		

nsample	04SD0101
samp_date	8/5/2004
lab_id	WU2405-1
qc_type	NM
Pct_Solids	72.1
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	D
TOTAL ORGANIC CARBON	MG/KG	14000		
TOTAL SOLIDS	%	72		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SD0101D	nsample	04SD0201	nsample	04SD0301
samp_date	8/5/2004	samp_date	8/6/2004	samp_date	8/12/2004
lab_id	WU2405-2	lab_id	WU2414-1	lab_id	WU2494-1
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	75.2	Pct_Solids	61.7	Pct_Solids	75.5
DUP_OF:	04SD0101	DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.35	J	DP
TOTAL ORGANIC CARBON	MG/KG	15000		
TOTAL SOLIDS	%	75		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	D
TOTAL ORGANIC CARBON	MG/KG	24000		
TOTAL SOLIDS	%	62		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.27	J	DEP
TOTAL ORGANIC CARBON	MG/KG	5700		
TOTAL SOLIDS	%	75		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SD0401	nsample	04SD0501	nsample	04SD0601
samp_date	8/12/2004	samp_date	8/13/2004	samp_date	8/18/2004
lab_id	WU2494-2	lab_id	WU2513-1	lab_id	WU2576-1
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	57.4	Pct_Solids	56.7	Pct_Solids	69.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.5	UJ	D
TOTAL ORGANIC CARBON	MG/KG	26000		
TOTAL SOLIDS	%	57		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.37	J	DP
TOTAL ORGANIC CARBON	MG/KG	24000		
TOTAL SOLIDS	%	57		

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.63	UJ	D
TOTAL ORGANIC CARBON	MG/KG	14000		
TOTAL SOLIDS	%	69		

PROJ_NO: 9666

SDG: 2832 MEDIA: SOIL DATA FRACTION: MISC

nsample	04SD0701
samp_date	8/17/2004
lab_id	WU2545-1
qc_type	NM
Pct_Solids	66.6
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.63	UJ	D
TOTAL ORGANIC CARBON	MG/KG	15000		
TOTAL SOLIDS	%	66		

nsample	04SD0801
samp_date	8/18/2004
lab_id	WU2576-2
qc_type	NM
Pct_Solids	65.6
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CYANIDE	MG/KG	0.69	UJ	D
TOTAL ORGANIC CARBON	MG/KG	22000		
TOTAL SOLIDS	%	66		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 11, 2004**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND MISCELLANEOUS PARAMETERS**
NCBC GULFPORT – CTO 283
SAMPLE DELIVERY GROUP (SDG) – 2833

SAMPLES: 4/AQUEOUS/

04GP0801 04GP0801D 04GP0901
04GP1001

Overview

The sample set for NCBC Gulfport, CTO 283, SDG 2833 consists of four (4) aqueous environmental samples. One (1) field duplicate pair (04GP0801D / 04GP0801) is included in this SDG.

All samples were analyzed for target analyte list (TAL) metals, chloride, cyanide, nitrate, nitrite, sulfate, and total organic carbon (TOC). The samples were collected by Tetra Tech NUS August 19, 2004 and analyzed by Katahdin Analytical Services. Metals analyses except antimony, arsenic, chromium, lead, thallium, and mercury were conducted using SW846 method 6010B. Antimony, arsenic, chromium, lead, and thallium analyses were conducted using SW846 method 6020. Mercury analyses were conducted using SW846 method 7470A. Cyanide analyses were conducted using SW846 method 9012A. Chloride analyses were conducted using EPA method 325.2. Nitrate and nitrite analyses were conducted using EPA method 353.2. Sulfate analyses were conducted using EPA method 375.4. TOC analyses were conducted using EPA method 415.1.

Metals analyses except mercury were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) methodology.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries
  • Laboratory Blank Analyses
  • ICP Interference Analyses
* • Matrix Spike Recoveries
* • Laboratory Duplicate Analyses
* • Laboratory Control Sample Recoveries
  • Field Duplicate Analyses
  • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	122.88 ug/L	614.40 ug/L
Antimony[1]	0.253 ug/L	1.27 ug/L
Arsenic[1]	2.183 ug/L	10.92 ug/L
Barium	0.74 ug/L	3.7 ug/L
Beryllium	0.54 ug/L	2.7 ug/L
Calcium	73.24 ug/L	366.2 ug/L
Chromium[1]	1.623 ug/L	8.115 ug/L
Copper	2.62 ug/L	13.1 ug/L
Iron	160.62 ug/L	803.10 ug/L
Magnesium	59.98 ug/L	299.9 ug/L
Manganese	1.29 ug/L	6.45 ug/L
Mercury[1]	0.10 ug/L	0.50 ug/L
Potassium	445.90 ug/L	2229.5 ug/L
Silver	2.93 ug/L	14.7 ug/L
Sodium	124.27 ug/L	621.35 ug/L
Thallium[1]	1.351 ug/L	6.755 ug/L
Vanadium	4.47 ug/L	22.4 ug/L
Zinc[1]	1.55 ug/L	7.75 ug/L

[1] Maximum concentration present in laboratory preparation blank.

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the action level for aluminum, antimony, arsenic, chromium, copper, mercury, potassium, thallium, and zinc were qualified as nondetected (U) due to blank contamination. The remaining analytes were not qualified for laboratory blank contamination because the results were either greater than the action level or they were nondetects.

ICP Interference

The interfering analyte calcium was present in samples 04GP0801 and 04GP0801D at concentrations comparable to the concentration of calcium in the interference check sample (ICS) solution. Several analytes, namely antimony, cadmium, chromium, cobalt, copper, lead, manganese, potassium, selenium, silver, sodium, and zinc were present in the ICS solution at concentrations that exceeded the absolute value of the instrument detection limit (IDL). Interference effects exist for cobalt, copper, lead, and silver in the affected samples. Positive results reported for lead were qualified as estimated (J). Nondetected results reported for cobalt, copper, and silver were qualified as estimated (UJ).

Field Duplicate Imprecision

Field duplicate imprecision (RPD >30%) was noted for cyanide for field duplicate pair 04GP0801D / 04GP0801. Positive and nondetected results reported for cyanide were qualified as estimated, (J) and (UJ), respectively, in all samples.

Detection Limits

Positive results for cyanide and nitrate that were reported between the laboratory practical quantitation limit (PQL) and the method detection limit (MDL) were qualified as estimated (J) due to uncertainty near the detection limit.

Notes

The continuing calibration verification (CCV) standard run on 9/28/04 at 17:10 had a percent recovery (%R) <90% for potassium. No qualification action was required because no samples that were analyzed for potassium were associated with this standard.

The CCV standards run on 9/28/04 at 17:10 and 18:44 and on 9/29/04 at 00:58 had %Rs <90% for sodium. No qualification action was required because no samples that were analyzed for sodium were associated with these standards.

The contract required detection limit (CRDL) standard run on 8/25/04 at 11:49 had a %R >130% for mercury. No qualification action was required because all results for mercury were previously qualified for laboratory blank contamination.

The PQL standard run on 9/29/04 at 17:00 had a %R >150% for iron. No qualification action is required on this basis.

The ICS AB solution run on 9/28/04 at 21:35 had %Rs <80% for aluminum, potassium, and sodium. No qualification action was required because no samples that were analyzed for aluminum, potassium, and sodium were associated with this standard.

The matrix spike (MS) and matrix spike duplicate (MSD) had %Rs <30% for sulfate. No qualification action was required because the initial sample concentrations were >4X the spike added.

Dilutions were performed for antimony, arsenic, chromium, lead, and thallium in all samples as part of the ICP-Mass Spectrometry method.

Dilutions were performed for sulfate in all samples due to high concentrations.

Matrix spike, laboratory duplicate, and ICP serial dilution analyses were not performed for ICP metals for this SDG.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method/preparation blank.

Other Factors Affecting Data Quality: Several analytes were qualified due to ICP interference. Cyanide was qualified due to field duplicate imprecision. Cyanide and nitrate were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the NFESC document entitled "Navy IRCDQM" (September 1999).

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 NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: M

nsample	04GP0801	nsample	04GP0801D	nsample	04GP0901
samp_date	8/19/2004	samp_date	8/19/2004	samp_date	8/19/2004
lab_id	WU2585-001	lab_id	WU2585-002	lab_id	WU2585-004
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	04GP0801	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	163	U	A
ANTIMONY	0.19	U	A
ARSENIC	0.75	U	
BARIUM	539		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	268000		
CHROMIUM	1.8	U	A
COBALT	4.36	UJ	K
COPPER	1.91	UJ	K
IRON	66600		
LEAD	0.18	J	K
MAGNESIUM	62500		
MANGANESE	192		
MERCURY	0.07	U	A
NICKEL	10.8	U	
POTASSIUM	19300		
SELENIUM	3.71	U	
SILVER	2.84	UJ	K
SODIUM	56900		
THALLIUM	1.5	U	A
VANADIUM	4.14	U	
ZINC	1.7	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	163	U	A
ANTIMONY	0.19	U	A
ARSENIC	3.7	U	A
BARIUM	543		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	273000		
CHROMIUM	3.4	U	A
COBALT	4.36	UJ	K
COPPER	1.91	UJ	K
IRON	69700		
LEAD	0.21	J	K
MAGNESIUM	63300		
MANGANESE	195		
MERCURY	0.06	U	A
NICKEL	10.8	U	
POTASSIUM	19000		
SELENIUM	3.71	U	
SILVER	2.84	UJ	K
SODIUM	56400		
THALLIUM	0.5	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	402	U	A
ANTIMONY	0.22	U	A
ARSENIC	2.9	U	A
BARIUM	132		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	195000		
CHROMIUM	5.4	U	A
COBALT	4.36	U	
COPPER	1.91	U	
IRON	3520		
LEAD	0.15	U	
MAGNESIUM	13100		
MANGANESE	128		
MERCURY	0.07	U	A
NICKEL	10.8	U	
POTASSIUM	4810		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	26500		
THALLIUM	0.5	U	
VANADIUM	4.14	U	
ZINC	16.8		

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: M

nsample	04GP1001
samp_date	8/19/2004
lab_id	WU2585-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2630		
ANTIMONY	0.25	U	A
ARSENIC	8.6	U	A
BARIUM	22.3		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	69000		
CHROMIUM	10.1	U	A
COBALT	4.36	U	
COPPER	12.6	U	A
IRON	6920		
LEAD	1		
MAGNESIUM	6300		
MANGANESE	401		
MERCURY	0.08	U	A
NICKEL	10.8	U	
POTASSIUM	722	U	A
SELENIUM	3.9		
SILVER	2.84	U	
SODIUM	8050		
THALLIUM	0.5	U	
VANADIUM	4.14	U	
ZINC	5.3	U	A

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: MISC

nsample	04GP0801
samp_date	8/19/2004
lab_id	WU2585-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	30		
CYANIDE	UG/L	32	J	G
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	130		
TOTAL ORGANIC CARBON	MG/L	51		

nsample	04GP0801D
samp_date	8/19/2004
lab_id	WU2585-2
qc_type	NM
Pct_Solids	
DUP_OF:	04GP0801

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	30		
CYANIDE	UG/L	53	J	G
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	130		
TOTAL ORGANIC CARBON	MG/L	51		

nsample	04GP0901
samp_date	8/19/2004
lab_id	WU2585-4
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	22		
CYANIDE	UG/L	10	UJ	G
NITRATE-N	MG/L	0.0084	J	P
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	380		
TOTAL ORGANIC CARBON	MG/L	9.7		

PROJ_NO: 9666

SDG: 2833 MEDIA: WATER DATA FRACTION: MISC

nsample	04GP1001
samp_date	8/19/2004
lab_id	WU2585-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	8.8		
CYANIDE	UG/L	7.5	J	GP
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	29		
TOTAL ORGANIC CARBON	MG/L	7.6		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 12, 2004**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND MISCELLANEOUS PARAMETERS**
NCBC GULFPORT – CTO 283
SAMPLE DELIVERY GROUP (SDG) – 2834

SAMPLES: 9/AQUEOUS/

04GW0901	04GW1001	04GW1101
04GW1201	04GW1201D	04GW1501
04GW1601	04GW1701	04GW2001

Overview

The sample set for NCBC Gulfport, CTO 283, SDG 2834 consists of nine (9) aqueous environmental samples. One (1) field duplicate pair (04GW1201D / 04GW1201) is included in this SDG.

All samples were analyzed for target analyte list (TAL) metals, chloride, cyanide, nitrate-N, nitrite-N, and sulfate. All samples except 04GW1001 and 04GW1101 were also analyzed for total organic carbon (TOC). The samples were collected by Tetra Tech NUS on September 8, 9, 10, 13, and 14, 2004 and analyzed by Katahdin Analytical Services. Metals analyses except mercury were conducted using SW846 method 6010B. Mercury analyses were conducted using SW846 method 7470A. Cyanide analyses were conducted using SW846 method 9012A. Chloride analyses were conducted using EPA method 325.2. Nitrate and nitrite analyses were conducted using EPA method 353.2. Sulfate analyses were conducted using EPA method 375.4. TOC analyses were conducted using EPA method 415.1.

Metals analyses except mercury were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) methodology.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries
  • Laboratory Blank Analyses
* • ICP Interference Analyses
  • Matrix Spike Recoveries
* • Laboratory Duplicate Analyses
* • Laboratory Control Sample Recoveries
  • ICP Serial Dilution Analyses
* • Field Duplicate Analyses
  • Detection Limits
* • Analyte Quantitation

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	295.23 ug/L	1476.2 ug/L
Antimony[1]	0.265 ug/L	1.325 ug/L
Arsenic[1]	1.865 ug/L	9.325 ug/L
Barium	1.05 ug/L	5.25 ug/L
Beryllium	0.59 ug/L	2.95 ug/L
Calcium	65.02 ug/L	325.1 ug/L
Chromium[1]	1.78 ug/L	8.90 ug/L
Chromium	0.87 ug/L	4.35 ug/L
Copper	2.06 ug/L	10.3 ug/L
Iron	77.48 ug/L	387.4 ug/L
Lead	2.28 ug/L	11.4 ug/L
Magnesium	70.56 ug/L	352.8 ug/L
Potassium	551.09 ug/L	2755.5 ug/L
Selenium	4.10 ug/L	20.5 ug/L
Silver	4.86 ug/L	24.3 ug/L
Sodium	368.35 ug/L	1841.8 ug/L
Thallium	9.76 ug/L	48.8 ug/L
Zinc[2]	0.25 ug/L	1.25 ug/L

[1] Maximum concentration present in laboratory preparation blank from batch UI16ICW1, which includes samples 04GW0901, 04GW1001, 04GW1101, 04GW1201, 04GW1201D, 04GW1601, and 04GW1701.
[2] Maximum concentration present in laboratory preparation blank from batch UI15ICW0, which includes samples 04GW1501 and 04GW2001.

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results less than the action level for aluminum, chromium, iron, potassium, selenium, silver, and thallium were qualified as nondetected (U) due to blank contamination. The remaining analytes were not qualified for laboratory blank contamination because the results were either greater than the action level or they were nondetects.

Matrix Spike Analyses

The matrix spike (MS) run on sample 04GW1501 had %Rs <75% for nitrate and nitrite. Positive results reported for nitrate and nitrite were qualified as estimated (J). Nondetected results reported for nitrate and nitrite were qualified as estimated (UJ).

ICP Serial Dilution

The ICP serial dilution had a percent difference (%D) >10% and the initial sample concentration was >50X the instrument detection limit (IDL) for sodium. Positive results reported for sodium were qualified as estimated (J).

Detection Limits

Positive results for cyanide, nitrate, and nitrite that were reported between the laboratory practical quantitation limit (PQL) and the method detection limit (MDL) were qualified as estimated (J) due to uncertainty near the detection limit.

Notes

TOC analyses were not initially listed on the chain of custody (COC) for samples 04GW0901, 04GW1201, 04GW1201D, 04GW1501, 04GW1601, 04GW1701, and 04GW2001. They were added by the laboratory per Bill Olson.

Sulfite (SO_3) was listed on the COC by field personnel, but this analyte was not required.

The continuing calibration verification (CCV) standard run on 10/1/04 at 02:43 had %Rs <1% for aluminum, antimony, calcium, chromium, iron, magnesium, selenium, and thallium. No qualification action was required because no samples were associated with this standard.

The initial calibration verification (ICV) standard run on 10/8/04 at 19:08 and the CCV standards run on 10/8/04 at 19:51, 21:18, and 22:44 had %Rs <90% for aluminum. No qualification action was required because no samples that were analyzed for aluminum were associated with these standards.

The CCV run on 10/9/04 at 03:04 had %Rs <90% for lead and selenium. No qualification action was required because no samples that were analyzed for lead and selenium were associated with this standard.

The ICV standard run on 10/12/04 at 12:55 had a %R <90% for aluminum. No qualification action was required because no samples that were analyzed for aluminum were associated with this standard.

The CCV standards run on 10/13/04 at 17:37, 18:56, 20:23, 21:50, 22:34, 23:54, and on 10/14/04 at 01:21, 02:48, and 04:16 had %Rs <90% for aluminum. No qualification action was required because no samples were associated with these standards.

The CCV standards run on 10/13/04 at 21:50 for calcium and magnesium, at 22:34 for calcium, iron, and magnesium, and at 23:54 for arsenic, calcium, iron, magnesium, and thallium had %Rs <90%. No qualification action was required because no samples were associated with these standards.

The CCV standards run on 10/14/04 at 01:21 for arsenic, calcium, iron, magnesium, and thallium and at 02:48 for arsenic, calcium, iron, and thallium had %Rs <90%. No qualification action was required because no samples were associated with these standards.

The CCV standards run on 9/17/04 at 19:07 and 23:32 had %Rs <90% for sodium. No qualification action was required because no samples were associated with these standards.

The CCV standard run on 9/17/04 at 21:22 had a %R >110% for calcium. No qualification action was required because no samples were associated with this standard.

The CCV standards run on 9/20/04 at 18:58, 19:43, and 20:51 had %Rs >110% for calcium. No qualification action was required because no samples that were analyzed for calcium were associated with these standards.

The contract required detection limit (CRDL) standard run on 9/15/04 at 14:55 had a %R >130% for selenium. No qualification action was required because no samples were associated with this standard.

The CRDL standard run on 10/8/04 at 22:22 had a %R >150% for lead. No qualification action was required because no samples were associated with this standard.

The interference check sample AB (ICS-AB) solution run on 10/13/04 at 23:47 had a %R <80% for thallium. No qualification action was required because no interfering analytes were present in any samples at levels comparable to the concentrations in the ICS solution.

The laboratory control sample (LCS) run for batch UI30HGW0 had a %R >120% for mercury, affecting all samples except 04GW1601 and 04GW1701. No qualification action was required because all results were nondetects.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method/preparation blank.

Other Factors Affecting Data Quality: Nitrate and nitrite were qualified due to matrix spike noncompliance. Sodium was qualified due to ICP serial dilution noncompliance. Several analytes were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the NFESC document entitled "Navy IRCDQM" (September 1999).

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 NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: M

nsample	04GW0901	nsample	04GW1001	nsample	04GW1101
samp_date	9/8/2004	samp_date	9/9/2004	samp_date	9/9/2004
lab_id	WU2885-001	lab_id	WU2934-001	lab_id	WU2934-002
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	382	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	84.3		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	8920		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	1220		
LEAD	1.7	U	
MAGNESIUM	1270		
MANGANESE	35.1		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	2120	U	A
SELENIUM	3.71	U	
SILVER	3.8	U	A
SODIUM	5770	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.6		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	229		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	68900		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	2250		
LEAD	1.7	U	
MAGNESIUM	11500		
MANGANESE	57.3		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	5170		
SELENIUM	4.2	U	A
SILVER	2.84	U	
SODIUM	21400	J	I
THALLIUM	11.1	U	A
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	105	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	151		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	9400		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	7860		
LEAD	1.7	U	
MAGNESIUM	5520		
MANGANESE	246		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3410		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	20100	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: M

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	1620		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	198000		
CHROMIUM	1.5	U	A
COBALT	4.36	U	
COPPER	1.91	U	
IRON	146	U	A
LEAD	1.7	U	
MAGNESIUM	58100		
MANGANESE	154		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	19600		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	73400	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04GW1201

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	1620		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	195000		
CHROMIUM	2.1	U	A
COBALT	4.36	U	
COPPER	1.91	U	
IRON	126	U	A
LEAD	1.7	U	
MAGNESIUM	57600		
MANGANESE	152		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	19500		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	73100	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	36.2	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	171		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	90500		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	7710		
LEAD	1.7	U	
MAGNESIUM	17600		
MANGANESE	289		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	6020		
SELENIUM	3.71	U	
SILVER	3.1	U	A
SODIUM	24900	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: M

nsample	04GW1601	nsample	04GW1701	nsample	04GW2001
samp_date	9/13/2004	samp_date	9/13/2004	samp_date	9/10/2004
lab_id	WU2974-001	lab_id	WU2974-002	lab_id	WU2954-002
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	197	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	405		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	115000		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	48000		
LEAD	1.7	U	
MAGNESIUM	41000		
MANGANESE	390		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	7490		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	46600	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	757	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	210		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	15600		
CHROMIUM	2.3	U	A
COBALT	4.36	U	
COPPER	12.6		
IRON	3920		
LEAD	1.7	U	
MAGNESIUM	7050		
MANGANESE	179		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3890		
SELENIUM	3.71	U	
SILVER	3	U	A
SODIUM	25400	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	3.3		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	93.7	U	A
ANTIMONY	2.34	U	
ARSENIC	3.3		
BARIUM	195		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	17100		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	10300		
LEAD	1.7	U	
MAGNESIUM	8230		
MANGANESE	312		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3720		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	26400	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	14		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	23		
TOTAL ORGANIC CARBON	MG/L	1.8		

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	23		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	73		

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	5.4		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	2	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.0055	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	68		
TOTAL ORGANIC CARBON	MG/L	29		

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
Pct_Solids	
DUP_OF:	04GW1201

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41		
CYANIDE	UG/L	4.7	J	P
NITRATE-N	MG/L	0.0055	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	69		
TOTAL ORGANIC CARBON	MG/L	28		

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	19		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.022	J	DP
SULFATE	MG/L	110		
TOTAL ORGANIC CARBON	MG/L	9.7		

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	34		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	96		
TOTAL ORGANIC CARBON	MG/L	31		

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	6.4		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.0054	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	2.4		
TOTAL ORGANIC CARBON	MG/L	5.2		

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	5.8		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	1.1		
TOTAL ORGANIC CARBON	MG/L	5.4		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**NOVEMBER 3, 2004**
FROM:	**ERIN M. FAUST**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS AND MISCELLANEOUS PARAMETERS**
CTO 283 NCBC GULFPORT
SAMPLE DELIVERY GROUP (SDG) – 2835

SAMPLES: 5/Aqueous/

04GW0801	04GW1301	04GW1401
04GW1801	04GW1901	

Overview

The sample set for CTO 283, NCBC Gulfport, SDG 2835, consists of five (5) aqueous environmental samples.

All samples were analyzed for target analyte list (TAL) metals, cyanide, chloride, nitrate, nitrite, sulfate and total organic carbon (TOC). The samples were collected by Tetra Tech NUS on September 21, 22 and 23, 2004 and analyzed by Katahdin Analytical Services. Metals analyses, with the exception of mercury, were conducted using SW-846 method 6010B. Mercury analyses were conducted using SW-846 method 7470A. Cyanide analyses were conducted using SW-846 method 9012A. Analyses for chloride, sulfate and TOC were conducted using EPA methods 325.2, 375.4 and 415.1, respectively. Analyses for nitrate and nitrite were conducted using EPA method 353.2.

Metals analyses, with the exception of mercury, were conducted using Inductively Coupled Plasma (ICP) instrumentation. Mercury analyses were conducted using Cold Vapor Atomic Absorption (CVAA) instrumentation.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
• Laboratory Blank Analyses
* • ICP Interference Check Sample Results
* • Matrix Spike Results
* • Laboratory Duplicate Results
* • Laboratory Control Sample Results
• Sample Quantitation
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method/preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Aluminum	56.37 µg/L	281.85 µg/L
Antimony[1]	0.141 µg/L	0.705 µg/L
Arsenic[1]	1.229 µg/L	6.145 µg/L
Barium	0.63 µg/L	3.15 µg/L
Beryllium	0.49 µg/L	2.45 µg/L
Calcium	57.7 µg/L	288.5 µg/L
Chromium[1]	1.398 µg/L	6.99 µg/L
Iron	19.92 µg/L	99.6 µg/L
Lead[1]	0.247 µg/L	1.235 µg/L
Magnesium	54.5 µg/L	272.5 µg/L
Mercury	0.01 µg/L	0.05 µg/L
Mercury[2]	0.08 µg/L	0.40 µg/L
Potassium	602.44 µg/L	3012.2 µg/L
Selenium[1]	2.272 µg/L	11.36 µg/L
Sodium[1]	182.39 µg/L	911.95 µg/L
Thallium[1]	0.062 µg/L	0.31 µg/L
Zinc	2.1 µg/L	10.5 µg/L

(1) Maximum concentration present in a laboratory preparation blank.
(2) Maximum concentration present in a laboratory preparation blank, affecting samples 04GW1801 and 04GW1901 only.

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results, less than the blank action level, reported for aluminum, chromium, mercury, potassium and zinc were qualified "U" as a result of laboratory blank contamination.

Sample Quantitation

The positive result reported for nitrate in sample 04GW1301 was qualified as estimated, "J", due to uncertainty near the detection limit.

Notes

The laboratory did not perform a laboratory duplicate, matrix spike or ICP serial dilution for metals.

The Contract Required Detection Limit (CRDL) percent recovery for lead on 10/15/04 at 14:22 was >120% quality control limit. No validation action was taken based on the CRDL percent recoveries.

The CRDL percent recovery for silver on 9/28/04 at 16:27 was < 80% quality control limit. No validation action was taken based on the CRDL percent recoveries.

The CRDL percent recovery for mercury on 10/15/04 at 16:21 was >120% quality control limit. No validation action was taken based on the CRDL percent recoveries.

The Practical Quantitation Limit (PQL) percent recoveries for barium and calcium on 9/28/04 were >120% quality control limit. No validation action was taken based on the PQL percent recoveries.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: Nitrate was qualified in sample 04GW1301 due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the NFESC document entitled "Navy IRCDQM" (September 1999).

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 Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Erin M. Faust
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer
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2. Appendix B - Results as reported by the Laboratory
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APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: M

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-001
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	185	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	132		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	6690		
CHROMIUM	0.82	U	A
COBALT	4.36	U	
COPPER	1.91	U	
IRON	3890		
LEAD	1.7	U	
MAGNESIUM	3740		
MANGANESE	158		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3440		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	22100		
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	90.8	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	57.1		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	127000		
CHROMIUM	0.80	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	24200		
LEAD	1.7	U	
MAGNESIUM	42300		
MANGANESE	465		
MERCURY	0.02	U	A
NICKEL	10.8	U	
POTASSIUM	9460		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	56100		
THALLIUM	4.09	U	
VANADIUM	4.2		
ZINC	2.0	U	A

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	110	U	A
ANTIMONY	26.3		
ARSENIC	11.4		
BARIUM	1060		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	242000		
CHROMIUM	1.4	U	A
COBALT	4.36	U	
COPPER	1.91	U	
IRON	2840		
LEAD	1.7	U	
MAGNESIUM	32100		
MANGANESE	212		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	14200		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	14000		
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	5.0	U	A

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: M

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-002
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	281	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	122		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	74400		
CHROMIUM	0.80	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	370		
LEAD	1.7	U	
MAGNESIUM	7760		
MANGANESE	169		
MERCURY	0.08	U	A
NICKEL	10.8	U	
POTASSIUM	2960	U	A
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	19500		
THALLIUM	4.09	U	
VANADIUM	4.2		
ZINC	2.4	U	A

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-003
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	49.7	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	525		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	96200		
CHROMIUM	0.80	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	15700		
LEAD	1.7	U	
MAGNESIUM	5830		
MANGANESE	166		
MERCURY	0.08	U	A
NICKEL	10.8	U	
POTASSIUM	2040	U	A
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	11100		
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	3.8	U	A

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW0801
samp_date	9/23/2004
lab_id	WU3199-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	5.6		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	1.0	U	
TOTAL ORGANIC CARBON	MG/L	2.6		

nsample	04GW1301
samp_date	9/22/2004
lab_id	WU3165-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	36		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.0055	J	P
SULFATE	MG/L	210		
TOTAL ORGANIC CARBON	MG/L	14		

nsample	04GW1401
samp_date	9/22/2004
lab_id	WU3165-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	7.4		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	1.0	U	
TOTAL ORGANIC CARBON	MG/L	11		

PROJ_NO: 9666

SDG: 2835 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1801
samp_date	9/21/2004
lab_id	WU3142-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	20		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	170		
TOTAL ORGANIC CARBON	MG/L	4.4		

nsample	04GW1901
samp_date	9/21/2004
lab_id	WU3142-3
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	10		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
SULFATE	MG/L	1.0	U	
TOTAL ORGANIC CARBON	MG/L	4.6		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. FISHER** **DATE: NOVEMBER 10, 2004**

FROM: **D. SCHLOER** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PCDD/PCDF**
CTO 283, NCBC GULFPORT
SDGs: G4H070127

SAMPLES: 2 / Aqueous / PCDD/PCDF

04SW0101 04SW0101D

2 / Solid / PCDD/PCDF

04SD0101 04SD0101D

Overview

The sample set for CTO 283; NCBC Gulfport; SDG G4H070127 consists of (2) aqueous environmental samples and two (2) solid environmental samples including two field duplicates. As detailed above, the environmental samples were analyzed for Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (PCDD/PCDF). Two field duplicate pairs were included in this SDG: 04SW0101/04SW0101D and 04SD0101/04SD0101D.

The samples were collected by Tetra Tech NUS on August 5th, 2004 and analyzed by Severn Trent Laboratories, Inc – Sacramento Facility. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- * Chromatographic Resolution (Window Defining Mix)
- * Initial and Continuing Calibration
- Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- * Instrument Performance
- Detection Limits
- Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

PCDD/PCDF

The hardcopy data deliverables for this SDG did not contain the peak height data associated with the calculation of the congener-specific EDLs. In addition, signal to noise ratios (S/N) for OCDD and OCDF were not provided. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The following dioxin congener was detected in the soil laboratory method blank at the concentration indicated below:

Compound	Maximum Concentration (ng/kg)	Action Level (ng/kg)
OCDD	5.5	27.5

Blank Actions:

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.
- Value > RL and > action level; report value unqualified.

A blank action level of 5X the maximum contaminant concentration was established to evaluate method blank contamination for OCDD. Sample aliquots, percent moisture and dilution factors were taken into consideration during application of the blank action level. Positive results above the blank action level were reported for OCDD in the affected soil samples; therefore, no data validation action was taken based on laboratory method blank contamination.

The laboratory prepared and analyzed a Matrix Spike/ Matrix Spike Duplicate (MS/MSD) for the solid sample 04SD0101. Recovery of the target congener OCDD fell below the 70%-140% quality control limit for the MS and MSD analysis of sample 04SD0101. OCDD was detected in the native sample at a concentration that exceeded the spiked concentration. The noncompliant OCDD recovery is attributed to the concentration of OCDD in the sample. No data validation action was taken on this basis.

The nondetected results reported for various congeners in the aqueous and solid samples exceeded the required detection limits as specified in the SOW. No data validation action was taken on this basis.

Additional Comments

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as nondetected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

Positive results less than the lowest calibration concentration and greater than the laboratory established TDLs were qualified as estimated (J), due to uncertainty near the detection limit.

Field duplicate precision was evaluated for the field duplicate pair 04SW0101/04SW0101D and 04SD0101/04SD0101D. Field duplicate precision was measured by calculating the Relative Percent Difference between positive results in the field duplicate pair. Precision is evaluated by calculating comparing the calculated RPD against the quality control limits of 30% for aqueous matricies and 50% for solid matricies. No PCDD/PCDF were positively identified in the aqueous field duplicate pair 04SW0101/04SW0101D. The target dioxin congeners 1,2,3,4,6,7,8,9-OCDD, 1,2,3,4,6,7,8,9-OCDF, 1,2,3,4,6,7,8-HPCDD, 1,2,3,4,6,7,8-HPCDF, 1,2,3,7,8,9-HXCDD, 2,3,7,8-TCDD were detected in the sediment field duplicate pair 04SD0101/04SD0101D with acceptable RPDs. The target dioxin congener 1,2,3,6,7,8-HXCDD was detected in the duplicate sample 04SD0101D, but not in the original sample 04SD0101, resulting in an RPD (200%) that exceeded the 50% quality control limit. However, the difference between results was < 2X the Detection Limit; therefore, no data validation action was taken.

The sample-specific Total Toxicity Equivalence (TEQ) were calculated and reported by the laboratory on the sample Form Is. The TEQs reported by the laboratory were calculated using positive compound results only. The Toxicity Equivalence Factor (TEFs) used by the laboratory are based on those derived by the World Health Organization (WHO) June 1997.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\,(pg_{is})(Df)\,(V_t)]}{[(A_{is})\,(RRF)\,(W_s)(V_i)(\%S)]}$$

where: A_x = Area of the quantitation ion of the analyte of interest.

pg_{is} = Amount of internal standard in picograms.

Df = Sample dilution factor.

V_t = Final sample volume in microliters.

A_{is} = Area of the labeled internal standard.

RRF = Mean relative response factor initial calibration standard.

W_s = For solid samples - dry weight in grams; for aqueous samples - volume in liters.

V_i = Volume of extract injected in microliters.

%S = Sample-specific percent solid content.

Verification for concentration of 1,2,3,4,6,7,8-HpCDF in sample 04SD0101= 7.5 ng/kg

$$\text{Conc. 1,2,3,4,6,7,8-HpCDF} = \frac{[(1314590^{Area})(100\text{ pg})(1)(20\text{ uL})]}{[(503934000^{Area})(1.24)\,(10\text{g})(1\text{ uL})(0.56)]}$$

Conc. 1,2,3,4,6,7,8-HpCDF = 7.5 pg/g or 7.5 ng/kg.

EXECUTIVE SUMMARY

Laboratory Performance Issues: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request the laboratory was unable to provide the missing information. Nondetected results for all target congeners exceeded the required detection limits for the aqueous samples reported in this SDG. One target compound was detected in the laboratory method blank; however, no sample results were qualified for blank contamination.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4H070127 MEDIA: SOIL DATA FRACTION: DIOX

nsample	04SD0101
samp_date	8/5/2004
lab_id	G4H070127003
qc_type	NM
units	NG/KG
Pct_Solids	56.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	500		
1,2,3,4,6,7,8,9-OCDF	18	J	P
1,2,3,4,6,7,8-HPCDD	63		
1,2,3,4,6,7,8-HPCDF	7.5	J	P
1,2,3,4,7,8,9-HPCDF	0.95	U	
1,2,3,4,7,8-HXCDD	0.59	U	
1,2,3,4,7,8-HXCDF	0.95	U	
1,2,3,6,7,8-HXCDD	2.8	U	
1,2,3,6,7,8-HXCDF	1.1	U	
1,2,3,7,8,9-HXCDD	6.5	J	P
1,2,3,7,8,9-HXCDF	0.47	U	
1,2,3,7,8-PECDD	0.47	U	
1,2,3,7,8-PECDF	0.34	U	
2,3,4,6,7,8-HXCDF	0.55	U	
2,3,4,7,8-PECDF	0.32	U	
2,3,7,8-TCDD	1.3	J	P
2,3,7,8-TCDF	0.59	U	
TOTAL HPCDD	120		
TOTAL HPCDF	23		
TOTAL HXCDD	40		
TOTAL HXCDF	10		
TOTAL PECDD	5.2		
TOTAL PECDF	2.2	U	
TOTAL TCDD	33		
TOTAL TCDF	100		

nsample	04SD0101D
samp_date	8/5/2004
lab_id	G4H070127004
qc_type	NM
units	NG/KG
Pct_Solids	62.0
DUP_OF:	04SD0101

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	650		
1,2,3,4,6,7,8,9-OCDF	24		
1,2,3,4,6,7,8-HPCDD	86		
1,2,3,4,6,7,8-HPCDF	8.6		
1,2,3,4,7,8,9-HPCDF	1.2	U	
1,2,3,4,7,8-HXCDD	0.63	U	
1,2,3,4,7,8-HXCDF	1.3	U	
1,2,3,6,7,8-HXCDD	4.1		
1,2,3,6,7,8-HXCDF	1.2	U	
1,2,3,7,8,9-HXCDD	9.3		
1,2,3,7,8,9-HXCDF	0.5	U	
1,2,3,7,8-PECDD	0.6	U	
1,2,3,7,8-PECDF	0.42	U	
2,3,4,6,7,8-HXCDF	0.73	U	
2,3,4,7,8-PECDF	0.32	U	
2,3,7,8-TCDD	1.4	J	P
2,3,7,8-TCDF	0.65	U	
TOTAL HPCDD	170		
TOTAL HPCDF	31		
TOTAL HXCDD	51		
TOTAL HXCDF	13		
TOTAL PECDD	3.7	U	
TOTAL PECDF	2.1	U	
TOTAL TCDD	25		
TOTAL TCDF	60		

PROJ_NO: 9666

SDG: G4H070127 MEDIA: WATER DATA FRACTION: DIOX

nsample	04SW0101	nsample	04SW0101D
samp_date	8/5/2004	samp_date	8/5/2004
lab_id	G4H070127001	lab_id	G4H070127002
qc_type	NM	qc_type	NM
units	PG/L	units	PG/L
Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:	04SW0101

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	18	U	
1,2,3,4,6,7,8,9-OCDF	4.5	U	
1,2,3,4,6,7,8-HPCDD	4	U	
1,2,3,4,6,7,8-HPCDF	3.5	U	
1,2,3,4,7,8,9-HPCDF	0.87	U	
1,2,3,4,7,8-HXCDD	1.6	U	
1,2,3,4,7,8-HXCDF	1.3	U	
1,2,3,6,7,8-HXCDD	1.2	U	
1,2,3,6,7,8-HXCDF	0.87	U	
1,2,3,7,8,9-HXCDD	1.2	U	
1,2,3,7,8,9-HXCDF	1.2	U	
1,2,3,7,8-PECDD	1.7	U	
1,2,3,7,8-PECDF	1.1	U	
2,3,4,6,7,8-HXCDF	1.1	U	
2,3,4,7,8-PECDF	1.1	U	
2,3,7,8-TCDD	0.87	U	
2,3,7,8-TCDF	1.5	U	
TOTAL HPCDD	4	U	
TOTAL HPCDF	3.5	U	
TOTAL HXCDD	1.6	U	
TOTAL HXCDF	1.3	U	
TOTAL PECDD	1.7	U	
TOTAL PECDF	1.6	U	
TOTAL TCDD	1.3	U	
TOTAL TCDF	1.5	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	16	U	
1,2,3,4,6,7,8,9-OCDF	3.5	U	
1,2,3,4,6,7,8-HPCDD	3.7	U	
1,2,3,4,6,7,8-HPCDF	2.6	U	
1,2,3,4,7,8,9-HPCDF	0.88	U	
1,2,3,4,7,8-HXCDD	1.6	U	
1,2,3,4,7,8-HXCDF	1.1	U	
1,2,3,6,7,8-HXCDD	1.1	U	
1,2,3,6,7,8-HXCDF	0.86	U	
1,2,3,7,8,9-HXCDD	1.2	U	
1,2,3,7,8,9-HXCDF	1.2	U	
1,2,3,7,8-PECDD	2	U	
1,2,3,7,8-PECDF	0.9	U	
2,3,4,6,7,8-HXCDF	1	U	
2,3,4,7,8-PECDF	0.86	U	
2,3,7,8-TCDD	1	U	
2,3,7,8-TCDF	1.7	U	
TOTAL HPCDD	3.7	U	
TOTAL HPCDF	2.6	U	
TOTAL HXCDD	1.8	U	
TOTAL HXCDF	1.2	U	
TOTAL PECDD	2	U	
TOTAL PECDF	1.9	U	
TOTAL TCDD	1.1	U	
TOTAL TCDF	1.7	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. FISHER** **DATE: NOVEMBER 10, 2004**

FROM: **D. SCHLOER** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PCDD/PCDF**
CTO 283, NCBC GULFPORT
SDGs: G4H170261

SAMPLES: 2 / Aqueous / PCDD/PCDF

04RS0815SD 04RW0815MW

1 / Solid / PCDD/PCDF

04SB0501

Overview

The sample set for CTO 283; NCBC Gulfport; SDG G4H170261 consists of (2) aqueous environmental samples and one (1) solid environmental sample. As detailed above, the environmental samples were analyzed for Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (PCDD/PCDF). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech NUS on August 13th and 15th, 2004 and analyzed by Severn Trent Laboratories, Inc – Sacramento Facility. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- Chromatographic Resolution (Window Defining Mix)
- Initial and Continuing Calibration
- * Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- Matrix Spike/Matrix Spike Duplicate Results
- * Instrument Performance
- Detection Limits
- Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

PCDD/PCDF

The hardcopy data deliverables for this SDG did not contain the peak height data associated with the calculation of the congener-specific EDLs. In addition, signal to noise ratios (S/N) for OCDD and OCDF were not provided. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The percent resolution for the target PCDD congener 2,3,7,8-TCDD exceeded the 25% quality control limit for analysis of the aqueous Window Defining Mixture (WDM) analyzed on instrument 1D5, on 08/24/04, at 02:43. Only nondetected results were reported for 2,3,7,8-TCDD and these were not qualified on this basis.

A calibration verification percent Difference (%D) exceeded the 35% quality control limit for the labeled congener $13C^{12}$-OCDD on instrument 5D5, on 08/24/04, at 01:25. The positive and nondetected results for the affected unlabeled target congeners (OCDD and OCDF) were qualified as estimated (J) and (UJ), respectively in the solid sample 04SB0501.

The laboratory prepared and analyzed a Matrix Spike/ Matrix Spike Duplicate (MS/MSD) for the aqueous sample 04RW0815MW. Recovery of the target congener OCDD exceeded the 78%-127% quality control limit for the MSD analysis of sample 04RW0815MW. No data validation action was taken based on this noncompliance.

The laboratory prepared and analyzed a MS/MSD for the solid sample 04SB0501. Recovery of the target congener OCDD exceeded the 78%-127% quality control limit for the MS and MSD analysis of sample 04SB0501. No data validation action was taken based on this noncompliance.

The nondetected results reported for the aqueous samples 04RS0815SD and 04RW0815MW exceeded the required detection limits as specified in the SOW. No data validation action was taken on this basis.

Additional Comments

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as nondetected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

The sample-specific Total Toxicity Equivalence (TEQ) were calculated and reported by the laboratory on the sample Form Is. The TEQs reported by the laboratory were calculated using positive compound results only. The Toxicity Equivalence Factor (TEFs) used by the laboratory are based on those derived by the World Health Organization (WHO) June 1997.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\,(pg_{is})(Df)\,(V_t)]}{[(A_{is})\,(RRF)\,(W_s)(V_i)(\%S)]}$$

where: A_x = Area of the quantitation ion of the analyte of interest.

pg_{is} = Amount of internal standard in picograms.

Df = Sample dilution factor.

V_t = Final sample volume in microliters.

A_{is} = Area of the labeled internal standard.

RRF = Mean relative response factor initial calibration standard.

W_s = For solid samples - dry weight in grams; for aqueous samples - volume in liters.

V_i = Volume of extract injected in microliters.

%S = Sample-specific percent solid content.

Verification for concentration of 1,2,3,4,6,7,8-HpCDD in sample 04BS0501= 12 ng/kg

$$\text{Conc. 1,2,3,4,6,7,8-HpCDD} = \frac{[(15470350^{Area})(100\text{ pg})(1)(20\text{ uL})]}{[(359192000^{Area})(0.880)\,(10\text{g})(1\text{ uL})(0.84)]}$$

Conc. 1,2,3,4,6,7,8-HpCDD = 11.65 pg/g or approximately 12 ng/kg.

EXECUTIVE SUMMARY

Laboratory Performance Issues: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request the laboratory was unable to provide the missing information. Nondetected results for all target congeners exceeded the required detection limits for the aqueous samples reported in this SDG. The percent resolution criterion was not met for the opening WDM. One $^{13}C_{12}$-labeled internal standard failed continuing calibration %D criteria, resulting in the qualification of data as estimated.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4H170261 MEDIA: WATER DATA FRACTION: DIOX

nsample	04RS0815SD	nsample	04RW0815MW
samp_date	8/15/2004	samp_date	8/15/2004
lab_id	G4H170261002	lab_id	G4H170261001
qc_type	NM	qc_type	NM
units	PG/L	units	PG/L
Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	8	U	
1,2,3,4,6,7,8,9-OCDF	6.3	U	
1,2,3,4,6,7,8-HPCDD	4.4	U	
1,2,3,4,6,7,8-HPCDF	2.7	U	
1,2,3,4,7,8,9-HPCDF	3.3	U	
1,2,3,4,7,8-HXCDD	4.2	U	
1,2,3,4,7,8-HXCDF	3.9	U	
1,2,3,6,7,8-HXCDD	3.8	U	
1,2,3,6,7,8-HXCDF	3.7	U	
1,2,3,7,8,9-HXCDD	3.9	U	
1,2,3,7,8,9-HXCDF	4.6	U	
1,2,3,7,8-PECDD	6.1	U	
1,2,3,7,8-PECDF	3.9	U	
2,3,4,6,7,8-HXCDF	4.1	U	
2,3,4,7,8-PECDF	3.8	U	
2,3,7,8-TCDD	2.9	U	
2,3,7,8-TCDF	2.4	U	
TOTAL HPCDD	4.4	U	
TOTAL HPCDF	3.3	U	
TOTAL HXCDD	4.2	U	
TOTAL HXCDF	4.6	U	
TOTAL PECDD	6.1	U	
TOTAL PECDF	3.9	U	
TOTAL TCDD	2.9	U	
TOTAL TCDF	2.4	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	12	U	
1,2,3,4,6,7,8,9-OCDF	8.7	U	
1,2,3,4,6,7,8-HPCDD	5.1	U	
1,2,3,4,6,7,8-HPCDF	3	U	
1,2,3,4,7,8,9-HPCDF	3.7	U	
1,2,3,4,7,8-HXCDD	4.8	U	
1,2,3,4,7,8-HXCDF	4	U	
1,2,3,6,7,8-HXCDD	4.3	U	
1,2,3,6,7,8-HXCDF	3.8	U	
1,2,3,7,8,9-HXCDD	4.4	U	
1,2,3,7,8,9-HXCDF	4.8	U	
1,2,3,7,8-PECDD	5.6	U	
1,2,3,7,8-PECDF	4.3	U	
2,3,4,6,7,8-HXCDF	4.2	U	
2,3,4,7,8-PECDF	4.2	U	
2,3,7,8-TCDD	3.2	U	
2,3,7,8-TCDF	2.7	U	
TOTAL HPCDD	5.1	U	
TOTAL HPCDF	3.7	U	
TOTAL HXCDD	4.8	U	
TOTAL HXCDF	4.8	U	
TOTAL PECDD	5.6	U	
TOTAL PECDF	4.3	U	
TOTAL TCDD	3.2	U	
TOTAL TCDF	2.7	U	

PROJ_NO: 9666

SDG: G4H170261 MEDIA: SOIL DATA FRACTION: DIOX

nsample	04SB0501
samp_date	8/13/2004
lab_id	G4H170261003
qc_type	NM
units	NG/KG
Pct_Solids	84.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	120	J	C
1,2,3,4,6,7,8,9-OCDF	0.19	UJ	C
1,2,3,4,6,7,8-HPCDD	12		
1,2,3,4,6,7,8-HPCDF	0.13	U	
1,2,3,4,7,8,9-HPCDF	0.14	U	
1,2,3,4,7,8-HXCDD	0.19	U	
1,2,3,4,7,8-HXCDF	0.12	U	
1,2,3,6,7,8-HXCDD	0.28	U	
1,2,3,6,7,8-HXCDF	0.11	U	
1,2,3,7,8,9-HXCDD	2	U	
1,2,3,7,8,9-HXCDF	0.13	U	
1,2,3,7,8-PECDD	0.44	U	
1,2,3,7,8-PECDF	0.22	U	
2,3,4,6,7,8-HXCDF	0.12	U	
2,3,4,7,8-PECDF	0.23	U	
2,3,7,8-TCDD	0.2	U	
2,3,7,8-TCDF	0.17	U	
TOTAL HPCDD	27		
TOTAL HPCDF	0.14	U	
TOTAL HXCDD	15		
TOTAL HXCDF	0.13	U	
TOTAL PECDD	1.7	U	
TOTAL PECDF	0.3	U	
TOTAL TCDD	1.6		
TOTAL TCDF	0.17	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. FISHER **DATE:** NOVEMBER 10, 2004

FROM: D. SCHLOER **CC:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PCDD/PCDF
CTO 283, NCBC GULFPORT
SDGs: G4I150322

SAMPLES: 6 / Aqueous / PCDD/PCDF

04GW2001	04GW1701	04GW1601
04GW1501	04GW1201D	04GW1201

Overview

The sample set for CTO 283; NCBC Gulfport; SDG G4I150322 consists of six (6) aqueous environmental samples including one (1) field duplicate. As detailed above, the environmental samples were analyzed for Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (PCDD/PCDF). One field duplicate pair was included in this SDG: 04GW1201 and 04GW1201D.

The samples were collected by Tetra Tech NUS on September 13th and 14th, 2004 and analyzed by Severn Trent Laboratories, Inc – Sacramento Facility. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- * Chromatographic Resolution (Window Defining Mix)
- * Initial and Continuing Calibration
- * Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- * Field Duplicate Precision
- * Instrument Performance
- Detection Limits
- Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

PCDD/PCDF

The hardcopy data deliverables for this SDG did not contain the peak height data associated with the calculation of the congener-specific EDLs. In addition, signal to noise ratios (S/N) for OCDD and OCDF were not provided. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The nondetected results reported for all congeners in the aqueous samples exceeded the required detection limits specified in the analytical SOW. No data validation action was taken on this basis.

Additional Comments

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as nondetected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

Positive results less than the lowest calibration concentration and greater than the laboratory established TDLs were qualified as estimated (J), due to uncertainty near the detection limit.

Field duplicate precision was evaluated for the field duplicate pair 04GW1201 and 04GW1201D. Field duplicate precision was measured by calculating the Relative Percent Difference (RPD) between positive results in the field duplicate pair. Precision is evaluated by comparing the calculated RPD against the quality control limit of 30% for aqueous matricies. No PCDD/PCDF were positively identified in the aqueous field duplicate pair.

The sample-specific Total Toxicity Equivalence (TEQ) were calculated and reported by the laboratory on the sample Form Is. The TEQs reported by the laboratory were calculated using positive compound results only. The Toxicity Equivalence Factor (TEFs) used by the laboratory are based on those derived by the World Health Organization (WHO) June 1997.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\,(pg_{is})(Df)\,(V_t)\;]}{[(A_{is})\,(RRF)\,(V_0)(V_i)]}$$

where: A_x = Area of the quantitation ion of the analyte of interest.

pg_{is} = Amount of internal standard in picograms.

Df = Sample dilution factor.

V_t = Final sample volume in microliters.

A_{is} = Area of the labeled internal standard.

RRF = Mean relative response factor initial calibration standard.

V_0 = For solid samples - dry weight in grams; for aqueous samples - volume in microliters.

V_i = Volume of extract injected in microliters.

Verification for concentration of 1,2,3,4,6,7,8,9-OCDD in sample 04GW1701= 210 pg/L

$$\text{Conc. 1,2,3,4,6,7,8,9-OCDD} = \frac{[(1350322^{Area})(200\ pg)(1)(20\ uL)]}{[(31117000^{Area})(0.86)\ (972.4\ ml)(1\ uL)]}$$

Conc. 1,2,3,4,6,7,8, 9-OCDD = 208 pg/L or approximately 210 pg/L.

EXECUTIVE SUMMARY

Laboratory Performance Issues: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request the laboratory was unable to provide the missing information. Nondetected results for all target congeners exceeded the required detection limits for the aqueous samples reported in this SDG.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
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APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
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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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4I150322 MEDIA: WATER DATA FRACTION: DIOX

nsample	04GW1201	nsample	04GW1201D	nsample	04GW1501
samp_date	9/14/2004	samp_date	9/14/2004	samp_date	9/10/2004
lab_id	G4I150322005	lab_id	G4I150322006	lab_id	G4I150322001
qc_type	NM	qc_type	NM	qc_type	NM
units	PG/L	units	PG/L	units	PG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	04GW1201	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	21	U	
1,2,3,4,6,7,8,9-OCDF	1.3	U	
1,2,3,4,6,7,8-HPCDD	2.1	U	
1,2,3,4,6,7,8-HPCDF	0.69	U	
1,2,3,4,7,8,9-HPCDF	0.6	U	
1,2,3,4,7,8-HXCDD	0.97	U	
1,2,3,4,7,8-HXCDF	0.85	U	
1,2,3,6,7,8-HXCDD	0.78	U	
1,2,3,6,7,8-HXCDF	0.41	U	
1,2,3,7,8,9-HXCDD	0.81	U	
1,2,3,7,8,9-HXCDF	0.51	U	
1,2,3,7,8-PECDD	1.4	U	
1,2,3,7,8-PECDF	1.1	U	
2,3,4,6,7,8-HXCDF	0.46	U	
2,3,4,7,8-PECDF	1.1	U	
2,3,7,8-TCDD	0.72	U	
2,3,7,8-TCDF	1.1	U	
TOTAL HPCDD	3.6	U	
TOTAL HPCDF	0.69	U	
TOTAL HXCDD	0.97	U	
TOTAL HXCDF	0.85	U	
TOTAL PECDD	1.4	U	
TOTAL PECDF	1.1	U	
TOTAL TCDD	0.72	U	
TOTAL TCDF	1.1	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	13	U	
1,2,3,4,6,7,8,9-OCDF	1.8	U	
1,2,3,4,6,7,8-HPCDD	1.7	U	
1,2,3,4,6,7,8-HPCDF	0.76	U	
1,2,3,4,7,8,9-HPCDF	0.42	U	
1,2,3,4,7,8-HXCDD	0.92	U	
1,2,3,4,7,8-HXCDF	0.89	U	
1,2,3,6,7,8-HXCDD	0.74	U	
1,2,3,6,7,8-HXCDF	0.47	U	
1,2,3,7,8,9-HXCDD	0.77	U	
1,2,3,7,8,9-HXCDF	0.58	U	
1,2,3,7,8-PECDD	1.6	U	
1,2,3,7,8-PECDF	0.95	U	
2,3,4,6,7,8-HXCDF	0.52	U	
2,3,4,7,8-PECDF	0.95	U	
2,3,7,8-TCDD	0.83	U	
2,3,7,8-TCDF	0.99	U	
TOTAL HPCDD	1.7	U	
TOTAL HPCDF	0.76	U	
TOTAL HXCDD	0.92	U	
TOTAL HXCDF	0.89	U	
TOTAL PECDD	1.6	U	
TOTAL PECDF	0.97	U	
TOTAL TCDD	0.83	U	
TOTAL TCDF	0.99	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	1.6	U	
1,2,3,4,6,7,8,9-OCDF	2.3	U	
1,2,3,4,6,7,8-HPCDD	1.5	U	
1,2,3,4,6,7,8-HPCDF	0.62	U	
1,2,3,4,7,8,9-HPCDF	0.77	U	
1,2,3,4,7,8-HXCDD	1.6	U	
1,2,3,4,7,8-HXCDF	0.66	U	
1,2,3,6,7,8-HXCDD	1.3	U	
1,2,3,6,7,8-HXCDF	0.39	U	
1,2,3,7,8,9-HXCDD	1.3	U	
1,2,3,7,8,9-HXCDF	0.48	U	
1,2,3,7,8-PECDD	1.7	U	
1,2,3,7,8-PECDF	1.1	U	
2,3,4,6,7,8-HXCDF	0.43	U	
2,3,4,7,8-PECDF	1.1	U	
2,3,7,8-TCDD	0.92	U	
2,3,7,8-TCDF	1.5	U	
TOTAL HPCDD	1.5	U	
TOTAL HPCDF	0.77	U	
TOTAL HXCDD	1.6	U	
TOTAL HXCDF	0.66	U	
TOTAL PECDD	1.7	U	
TOTAL PECDF	1.3	U	
TOTAL TCDD	0.92	U	
TOTAL TCDF	1.5	U	

PROJ_NO: 9666

SDG: G4I150322 MEDIA: WATER DATA FRACTION: DIOX

nsample	04GW1601
samp_date	9/13/2004
lab_id	G4I150322003
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	4.9	U	
1,2,3,4,6,7,8,9-OCDF	2.3	U	
1,2,3,4,6,7,8-HPCDD	1	U	
1,2,3,4,6,7,8-HPCDF	0.76	U	
1,2,3,4,7,8,9-HPCDF	0.42	U	
1,2,3,4,7,8-HXCDD	1	U	
1,2,3,4,7,8-HXCDF	0.62	U	
1,2,3,6,7,8-HXCDD	0.84	U	
1,2,3,6,7,8-HXCDF	0.55	U	
1,2,3,7,8,9-HXCDD	0.88	U	
1,2,3,7,8,9-HXCDF	0.68	U	
1,2,3,7,8-PECDD	1.4	U	
1,2,3,7,8-PECDF	0.96	U	
2,3,4,6,7,8-HXCDF	0.61	U	
2,3,4,7,8-PECDF	0.95	U	
2,3,7,8-TCDD	0.92	U	
2,3,7,8-TCDF	1.1	U	
TOTAL HPCDD	1	U	
TOTAL HPCDF	0.76	U	
TOTAL HXCDD	1	U	
TOTAL HXCDF	0.68	U	
TOTAL PECDD	1.4	U	
TOTAL PECDF	1.3	U	
TOTAL TCDD	0.92	U	
TOTAL TCDF	1.1	U	

nsample	04GW1701
samp_date	9/13/2004
lab_id	G4I150322004
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	210		
1,2,3,4,6,7,8,9-OCDF	1.6	U	
1,2,3,4,6,7,8-HPCDD	16	U	
1,2,3,4,6,7,8-HPCDF	0.59	U	
1,2,3,4,7,8,9-HPCDF	0.73	U	
1,2,3,4,7,8-HXCDD	1.4	U	
1,2,3,4,7,8-HXCDF	0.55	U	
1,2,3,6,7,8-HXCDD	1.2	U	
1,2,3,6,7,8-HXCDF	0.49	U	
1,2,3,7,8,9-HXCDD	1.8	U	
1,2,3,7,8,9-HXCDF	0.6	U	
1,2,3,7,8-PECDD	1.6	U	
1,2,3,7,8-PECDF	1.1	U	
2,3,4,6,7,8-HXCDF	0.54	U	
2,3,4,7,8-PECDF	1.1	U	
2,3,7,8-TCDD	1.1	U	
2,3,7,8-TCDF	1.1	U	
TOTAL HPCDD	40		
TOTAL HPCDF	0.73	U	
TOTAL HXCDD	20	U	
TOTAL HXCDF	0.6	U	
TOTAL PECDD	3.6	U	
TOTAL PECDF	1.2	U	
TOTAL TCDD	4	U	
TOTAL TCDF	1.1	U	

nsample	04GW2001
samp_date	9/10/2004
lab_id	G4I150322002
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	2	U	
1,2,3,4,6,7,8,9-OCDF	1.7	U	
1,2,3,4,6,7,8-HPCDD	0.81	U	
1,2,3,4,6,7,8-HPCDF	0.43	U	
1,2,3,4,7,8,9-HPCDF	0.54	U	
1,2,3,4,7,8-HXCDD	1.2	U	
1,2,3,4,7,8-HXCDF	0.47	U	
1,2,3,6,7,8-HXCDD	0.98	U	
1,2,3,6,7,8-HXCDF	0.42	U	
1,2,3,7,8,9-HXCDD	1	U	
1,2,3,7,8,9-HXCDF	0.51	U	
1,2,3,7,8-PECDD	1.6	U	
1,2,3,7,8-PECDF	1.2	U	
2,3,4,6,7,8-HXCDF	0.46	U	
2,3,4,7,8-PECDF	1.2	U	
2,3,7,8-TCDD	0.81	U	
2,3,7,8-TCDF	1.5	U	
TOTAL HPCDD	0.81	U	
TOTAL HPCDF	0.54	U	
TOTAL HXCDD	1.2	U	
TOTAL HXCDF	0.51	U	
TOTAL PECDD	1.6	U	
TOTAL PECDF	1.2	U	
TOTAL TCDD	0.81	U	
TOTAL TCDF	1.5	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. FISHER **DATE:** NOVEMBER 10, 2004

FROM: EDWARD SEDLMYER **CC:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PCDD / PCDF
CTO 283, NCBC GULFPORT
SDG: G4I280183

SAMPLES: 4 / Aqueous / PCDD / PCDF

04GW0801 04GW1301 04GW1401 04GW1801
04GW1901

Overview

The sample set for the CTO 283; NCBC Gulfport; SDG G4I280183 consists of four (4) aqueous environmental samples. The samples were analyzed for polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech NUS on September 21, 22, and 23, 2004 and analyzed by Severn Trent Laboratories Inc. (Sacramento). All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- * Chromatographic Resolution (Window Defining Mix)
- * Initial and Continuing Calibration
- * Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- * Field Duplicate Precision
- * Instrument Performance
- Detection Limits
- * Compound Identification
- Compound Quantitation

The symbol (*) indicates that all 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.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\ (pg_{is})\ (V_t)]}{[(A_{is})\ (RRF)\ (V_i)\ (V_o)]}$$

where: A_x = sum of the area of the quantitation ions of the analyte of interest.

pg_{is} = amount of internal standard in picograms.

A_{is} = sum of the area of internal standard peaks.

RRF = mean relative response factor of initial calibration standard.

V_o = volume of sample extracted; for solid samples dry weight in grams; for aqueous samples volume in L

V_i = volume of sample aliquot injected into instrument for analysis.

V_t = Final sample volume.

Verification for concentration of OCDD in sample 04GW1401 = 160 pg/L

$$\text{pg/L OCDD} = \frac{[(1685539^{area})\ (200_{pg})\ (20_{ul})]}{[(50041000^{area})\ (0.863)\ (.9913L)\ (1.0_{ul})]}$$

pg/L OCDD = 157.49 pg/L

ADDITIONAL COMMENTS

The hardcopy data deliverable did not contain the peak height data associated with the calculation of the congener-specific EDLs. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as non-detected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

The laboratory calculated the Toxicity Equivalence (TEQs) using all positive PCDD/PCDF results. The TEQs are reported on each sample result summary form. No corrections were made to the TEQs.

Positive results less than the lowest calibration concentration and greater than the laboratory established TDLs were qualified as estimated (J), due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request the laboratory was unable to provide the missing information.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Chlorinated Dioxin/Furan Data Review Final (August, 2002) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999).

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Edward Sedlmyer
Tetra Tech NUS

Edward Sedlmyer
Chemist/Data Validator

Tetra Tech NUS

Joseph A. Samchuck
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

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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 $r < 0.995$
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4I280183 MEDIA: WATER DATA FRACTION: DIOX

nsample	04GW0801
samp_date	9/23/2004
lab_id	G4I280183005
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	3.1	U	
1,2,3,4,6,7,8,9-OCDF	3.1	U	
1,2,3,4,6,7,8-HPCDD	2.5	U	
1,2,3,4,6,7,8-HPCDF	1.8	U	
1,2,3,4,7,8,9-HPCDF	2.2	U	
1,2,3,4,7,8-HXCDD	2.5	U	
1,2,3,4,7,8-HXCDF	2	U	
1,2,3,6,7,8-HXCDD	2.3	U	
1,2,3,6,7,8-HXCDF	1.9	U	
1,2,3,7,8,9-HXCDD	2.3	U	
1,2,3,7,8,9-HXCDF	2.4	U	
1,2,3,7,8-PECDD	4.6	U	
1,2,3,7,8-PECDF	3	U	
2,3,4,6,7,8-HXCDF	2.1	U	
2,3,4,7,8-PECDF	2.8	U	
2,3,7,8-TCDD	3.1	U	
2,3,7,8-TCDF	2.6	U	
TOTAL HPCDD	2.5	U	
TOTAL HPCDF	2.2	U	
TOTAL HXCDD	2.5	U	
TOTAL HXCDF	2.4	U	
TOTAL PECDD	4.6	U	
TOTAL PECDF	3	U	
TOTAL TCDD	3.1	U	
TOTAL TCDF	2.6	U	

nsample	04GW1301
samp_date	9/22/2004
lab_id	G4I280183004
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	87	J	P
1,2,3,4,6,7,8,9-OCDF	8.4	U	
1,2,3,4,6,7,8-HPCDD	8	U	
1,2,3,4,6,7,8-HPCDF	3.2	U	
1,2,3,4,7,8,9-HPCDF	2.1	U	
1,2,3,4,7,8-HXCDD	2.4	U	
1,2,3,4,7,8-HXCDF	2.2	U	
1,2,3,6,7,8-HXCDD	2.2	U	
1,2,3,6,7,8-HXCDF	2.1	U	
1,2,3,7,8,9-HXCDD	2.2	U	
1,2,3,7,8,9-HXCDF	2.6	U	
1,2,3,7,8-PECDD	4.4	U	
1,2,3,7,8-PECDF	2.9	U	
2,3,4,6,7,8-HXCDF	2.3	U	
2,3,4,7,8-PECDF	2.8	U	
2,3,7,8-TCDD	2.8	U	
2,3,7,8-TCDF	2.3	U	
TOTAL HPCDD	8	U	
TOTAL HPCDF	7.7	U	
TOTAL HXCDD	2.4	U	
TOTAL HXCDF	2.6	U	
TOTAL PECDD	4.4	U	
TOTAL PECDF	2.9	U	
TOTAL TCDD	5	U	
TOTAL TCDF	2.3	U	

nsample	04GW1401
samp_date	9/22/2004
lab_id	G4I280183003
qc_type	NM
units	PG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	160		
1,2,3,4,6,7,8,9-OCDF	8.7	U	
1,2,3,4,6,7,8-HPCDD	31	J	P
1,2,3,4,6,7,8-HPCDF	2.9	U	
1,2,3,4,7,8,9-HPCDF	3.6	U	
1,2,3,4,7,8-HXCDD	7.2	U	
1,2,3,4,7,8-HXCDF	5.6	U	
1,2,3,6,7,8-HXCDD	5.8	U	
1,2,3,6,7,8-HXCDF	4.9	U	
1,2,3,7,8,9-HXCDD	6	U	
1,2,3,7,8,9-HXCDF	6.1	U	
1,2,3,7,8-PECDD	8.3	U	
1,2,3,7,8-PECDF	4.2	U	
2,3,4,6,7,8-HXCDF	5.4	U	
2,3,4,7,8-PECDF	4.2	U	
2,3,7,8-TCDD	4.3	U	
2,3,7,8-TCDF	4.5	U	
TOTAL HPCDD	62		
TOTAL HPCDF	3.6	U	
TOTAL HXCDD	7.2	U	
TOTAL HXCDF	6.1	U	
TOTAL PECDD	8.3	U	
TOTAL PECDF	5.6	U	
TOTAL TCDD	4.3	U	
TOTAL TCDF	4.5	U	

PROJ_NO: 9666

SDG: G4I280183 MEDIA: WATER DATA FRACTION: DIOX

nsample	04GW1801	nsample	04GW1901
samp_date	9/21/2004	samp_date	9/21/2004
lab_id	G4I280183001	lab_Id	G4I280183002
qc_type	NM	qc_type	NM
units	PG/L	units	PG/L
Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	12	U	
1,2,3,4,6,7,8,9-OCDF	10	U	
1,2,3,4,6,7,8-HPCDD	12	U	
1,2,3,4,6,7,8-HPCDF	6.3	U	
1,2,3,4,7,8,9-HPCDF	7.9	U	
1,2,3,4,7,8-HXCDD	13	U	
1,2,3,4,7,8-HXCDF	13	U	
1,2,3,6,7,8-HXCDD	10	U	
1,2,3,6,7,8-HXCDF	11	U	
1,2,3,7,8,9-HXCDD	11	U	
1,2,3,7,8,9-HXCDF	14	U	
1,2,3,7,8-PECDD	16	U	
1,2,3,7,8-PECDF	9.3	U	
2,3,4,6,7,8-HXCDF	13	U	
2,3,4,7,8-PECDF	9.3	U	
2,3,7,8-TCDD	4	U	
2,3,7,8-TCDF	4.8	U	
TOTAL HPCDD	12	U	
TOTAL HPCDF	7.9	U	
TOTAL HXCDD	13	U	
TOTAL HXCDF	14	U	
TOTAL PECDD	16	U	
TOTAL PECDF	11	U	
TOTAL TCDD	9.7	U	
TOTAL TCDF	9.4	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	25	U	
1,2,3,4,6,7,8,9-OCDF	20	U	
1,2,3,4,6,7,8-HPCDD	9.7	U	
1,2,3,4,6,7,8-HPCDF	4.2	U	
1,2,3,4,7,8,9-HPCDF	5.3	U	
1,2,3,4,7,8-HXCDD	10	U	
1,2,3,4,7,8-HXCDF	7.7	U	
1,2,3,6,7,8-HXCDD	8.3	U	
1,2,3,6,7,8-HXCDF	6.8	U	
1,2,3,7,8,9-HXCDD	8.6	U	
1,2,3,7,8,9-HXCDF	8.3	U	
1,2,3,7,8-PECDD	15	U	
1,2,3,7,8-PECDF	6.8	U	
2,3,4,6,7,8-HXCDF	7.5	U	
2,3,4,7,8-PECDF	6.8	U	
2,3,7,8-TCDD	3.6	U	
2,3,7,8-TCDF	3.2	U	
TOTAL HPCDD	9.7	U	
TOTAL HPCDF	5.3	U	
TOTAL HXCDD	10	U	
TOTAL HXCDF	8.3	U	
TOTAL PECDD	15	U	
TOTAL PECDF	9.2	U	
TOTAL TCDD	6.3	U	
TOTAL TCDF	6.2	U	

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: R. FISHER

DATE: NOVEMBER 10, 2004

FROM: D. SCHLOER

CC: DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PCDD/PCDF
CTO 283, NCBC GULFPORT
SDGs: G4H130477 and G4H180290

SAMPLES: 2 / Aqueous / PCDD/PCDF

04SW0201 04SW0301

Overview

The sample set for CTO 283; NCBC Gulfport; SDGs G4H130477 and G4H180290 consist of (2) aqueous environmental samples. As detailed above, the environmental samples were analyzed for Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans (PCDD/PCDF). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech NUS on August 12th and 17th, 2004 and analyzed by Severn Trent Laboratories, Inc – Sacramento Facility. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- Chromatographic Resolution (Window Defining Mix)
- * Initial and Continuing Calibration
- * Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- * Matrix Spike/Matrix Spike Duplicate Results
- * Instrument Performance
- Detection Limits
- Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

PCDD/PCDF

The hardcopy data deliverable for SDG G4H180290 did not contain the recovery summary form for the Matrix Spike/Matrix Spike Duplicate as requested in the analytical Statement of Work (SOW). A voice mail message was made with the laboratory project manager on 09/27/04. As per the follow up phone call on 09/28/04, the laboratory acknowledged the oversight and implemented corrective action. The laboratory provided the missing data on 10/0904. The details of the requests from the laboratory are provided in Appendix C of this memorandum.

The hardcopy data deliverables for both SDGs did not contain the peak height data associated with the calculation of the congener-specific EDLs. In addition, signal to noise ratios (S/N) for OCDD and OCDF were not provided. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The percent resolution for the target PCDD congener 2,3,7,8-TCDD exceeded the 25% quality control limit for analysis of the Window Defining Mixture (WDM) analyzed on instrument 1D5, on 08/24/04, at 02:43. Only nondetected results were reported for 2,3,7,8-TCDD and these were not qualified on this basis.

As specified on the Chain of Custody (COC) documentation, the laboratory prepared and analyzed a Matrix Spike/ Matrix Spike Duplicate (MS/MSD) for sample 04SW0301. Recovery of the target congener OCDD exceeded the 78%-127% quality control limit for the MSD analysis of sample 04SW0301. No data validation action was taken based on this noncompliance.

The nondetected results reported for samples 04SW0201 and 04SW0301 exceeded the required detection limits as specified in the SOW. No data validation action was taken on this basis.

Additional Comments

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as nondetected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

Positive results less than the lowest calibration concentration and greater than the laboratory established TDLs were qualified as estimated (J), due to uncertainty near the detection limit.

The sample-specific Total Toxicity Equivalence (TEQ) were calculated and reported by the laboratory on the sample Form Is. The TEQs reported by the laboratory were calculated using positive compound results only. The Toxicity Equivalence Factor (TEFs) used by the laboratory are based on those derived by the World Health Organization (WHO) June 1997.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\,(pg_{is})(V_t)]}{[(A_{is})\,(RRF)\,(V_o)(V_i)]}$$

where: A_x = Area of the quantitation ion of the analyte of interest.

pg_{is} = Amount of internal standard in picograms.

V_t = Final sample volume
A_{is} = Area of internal standard peak.

RRF = Mean relative response factor from initial calibration.

V_o = Final extraction volume; for solid samples-dry weight in grams; for aqueous samples volume in liters or milliliters.

V_i = Volume of extract injected.

Verification for concentration of 1,2,3,4,6,7,8-HpCDD in sample 04SW0301 = 120 pg/l

$$\text{Conc. 1,2,3,4,6,7,8-HpCDD} = \frac{[(33602900^{Area})(100\text{ pg})(20\text{ uL})]}{[(606405000^{Area})\,(0.925)\,(998\text{mL})\,(1\text{ uL})]}$$

Conc. 1,2,3,4,6,7,8-HpCDD = 0.120 pg/mL = 120 pg/L.

EXECUTIVE SUMMARY

Laboratory Performance Issues: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request, the laboratory was unable to provide the missing information. The MS/MSD recovery summary form was not provided in the original hardcopy data package. Upon request the, laboratory provided the missing information. Nondetected results for all target congeners exceeded the required detection limits for the aqueous samples reported in this SDG.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4H130477 MEDIA: WATER DATA FRACTION: DIOX

nsample	04SW0201
samp_date	8/12/2004
lab_id	G4H130477001
qc_type	NM
units	PG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	19	U	
1,2,3,4,6,7,8,9-OCDF	1.9	U	
1,2,3,4,6,7,8-HPCDD	2.8	U	
1,2,3,4,6,7,8-HPCDF	1.4	U	
1,2,3,4,7,8,9-HPCDF	1	U	
1,2,3,4,7,8-HXCDD	1.7	U	
1,2,3,4,7,8-HXCDF	1.1	U	
1,2,3,6,7,8-HXCDD	1.2	U	
1,2,3,6,7,8-HXCDF	0.83	U	
1,2,3,7,8,9-HXCDD	1.3	U	
1,2,3,7,8,9-HXCDF	1.2	U	
1,2,3,7,8-PECDD	1.9	U	
1,2,3,7,8-PECDF	1	U	
2,3,4,6,7,8-HXCDF	1	U	
2,3,4,7,8-PECDF	0.98	U	
2,3,7,8-TCDD	0.86	U	
2,3,7,8-TCDF	1.6	U	
TOTAL HPCDD	3.4	U	
TOTAL HPCDF	1.7	U	
TOTAL HXCDD	2	U	
TOTAL HXCDF	1.2	U	
TOTAL PECDD	1.9	U	
TOTAL PECDF	1.7	U	
TOTAL TCDD	1.4	U	
TOTAL TCDF	1.6	U	

PROJ_NO: 9666

SDG: G4H180290 MEDIA: WATER DATA FRACTION: DIOX

nsample	04SW0301
samp_date	8/17/2004
lab_id	G4H180290001
qc_type	NM
units	PG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	1200		
1,2,3,4,6,7,8,9-OCDF	51	J	P
1,2,3,4,6,7,8-HPCDD	120		
1,2,3,4,6,7,8-HPCDF	22	U	
1,2,3,4,7,8,9-HPCDF	2.1	U	
1,2,3,4,7,8-HXCDD	2.5	U	
1,2,3,4,7,8-HXCDF	2.3	U	
1,2,3,6,7,8-HXCDD	4.6	U	
1,2,3,6,7,8-HXCDF	2.7	U	
1,2,3,7,8,9-HXCDD	3.3	U	
1,2,3,7,8,9-HXCDF	2.7	U	
1,2,3,7,8-PECDD	2.4	U	
1,2,3,7,8-PECDF	1.4	U	
2,3,4,6,7,8-HXCDF	2.4	U	
2,3,4,7,8-PECDF	1.4	U	
2,3,7,8-TCDD	1.5	U	
2,3,7,8-TCDF	1.2	U	
TOTAL HPCDD	260		
TOTAL HPCDF	37		
TOTAL HXCDD	9	U	
TOTAL HXCDF	9	U	
TOTAL PECDD	2.4	U	
TOTAL PECDF	4.2	U	
TOTAL TCDD	1.5	U	
TOTAL TCDF	1.8	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. FISHER** **DATE: NOVEMBER 10, 2004**

FROM: **EDWARD SEDLMYER** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PCDD / PCDF**
CTO 283, NCBC GULFPORT
SDG: G4H200436 and G4I100320

SAMPLES: 1 / Soil / PCDD / PCDF

04SB0701

1 / Sediment / PCDD / PCDF

04SD0801

3 / Aqueous / PCDD / PCDF

04GW0901 04GW1001 04GW1101

Overview

The sample set for the CTO 283; NCBC Gulfport; SDG G4H200436 and G4I100320 consists of one (1) soil, one (1) sediment, and three (3) aqueous environmental samples. The samples were analyzed for polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF). No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech NUS on August 18th, September 8th and 9th, 2004 and analyzed by Severn Trent Laboratories Inc. (Sacramento). All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using U.S. EPA Test Methods for Evaluating Solid Waste (SW-846) Method 8290 analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * HRGC/HRMS Tuning and System Performance
- * Chromatographic Resolution (Window Defining Mix)
- * Initial and Continuing Calibration
- * Blank Contamination
- * Labeled Internal Standard/ Surrogate Spike Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- * Field Duplicate Precision
- * Instrument Performance
- Detection Limits

- Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

The 2,3,7,8-TCDF result for sample 04SD0801 was confirmed and the confirmation 2,3,7,8-TCDF result is the result reported.

Sample calculations of positive results were calculated using the following equation:

$$\text{Concentration} = \frac{[(A_x)\ (pg_{is})\ (V_t)]}{[(A_{is})\ (RRF)\ (V_i)\ (V_o)]}$$

where: A_x = sum of the area of the quantitation ions of the analyte of interest.

pg_{is} = amount of internal standard in picograms.

A_{is} = sum of the area of internal standard peaks.

RRF = mean relative response factor of initial calibration standard.

V_o = volume of sample extracted; for solid samples dry weight in grams; for aqueous samples volume in L

V_i = volume of sample aliquot injected into instrument for analysis.

V_t = Final sample volume.

Verification for concentration of 2,3,7,8-TCDD in sample 04SD0801 = 8.0 ng/kg

$$\text{ng/kg 2,3,7,8-TCDD} = \frac{[(5881880^{area})\ (100_{pg})\ (20_{ul})]}{[(246787000^{area})\ (0.991)\ (10_g)\ (1.0_{ul})\ (0.6019)]}$$

ng/kg 2,3,7,8-TCDD = 8.0 ng/kg

ADDITIONAL COMMENTS

The hardcopy data deliverable did not contain the peak height data associated with the calculation of the congener-specific EDLs. The reviewer requested the missing data from the laboratory. However, the laboratory was unable to provide the requested EDL data, because EDLs were calculated via a computer program and the relevant data was not available to the reviewer. Consequently, the EDL verification was not possible.

The laboratory protocol of reporting dioxin congeners consists of establishing a Threshold Detection Limit (TDL) which the laboratory defines as ½ of the lowest calibration concentration. Positively identified dioxin congeners and congeners determined to be estimated maximum possible concentrations (EMPCs) that are below the TDL were reported as non-detected at a concentration equivalent to the EMPC or EDL, whichever is higher. The laboratory was contacted for clarification regarding their reporting protocol and the deviation from Method 8290. The response provided by the laboratory is provided in Appendix C.

The laboratory calculated the Toxicity Equivalence (TEQs) using all positive PCDD/PCDF results. The TEQs are reported on each sample result summary form. No corrections were made to the TEQs.

Positive results less than the lowest calibration concentration and greater than the laboratory established TDLs were qualified as estimated (J), due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance: EDLs were not verified because the relevant data were not provided in the original hardcopy data package and upon request the laboratory was unable to provide the missing information.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Chlorinated Dioxin/Furan Data Review Final (August, 2002) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999).

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Edward Sedlmyer
Tetra Tech NUS

Edward Sedlmyer
Chemist/Data Validator

Tetra Tech NUS

Joseph A. Samchuck
Quality Assurance Officer

Attachments:

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I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
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M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
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N03 = Clean-up Standard Noncompliance Dioxins
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R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: G4I100320 MEDIA: WATER DATA FRACTION: DIOX

nsample	04GW0901	nsample	04GW1001	nsample	04GW1101
samp_date	9/8/2004	samp_date	9/9/2004	samp_date	9/9/2004
lab_id	G4I100320001	lab_id	G4I100320002	lab_id	G4I100320003
qc_type	NM	qc_type	NM	qc_type	NM
units	PG/L	units	PG/L	units	PG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	4	U	
1,2,3,4,6,7,8,9-OCDF	1.4	U	
1,2,3,4,6,7,8-HPCDD	0.89	U	
1,2,3,4,6,7,8-HPCDF	0.41	U	
1,2,3,4,7,8,9-HPCDF	0.47	U	
1,2,3,4,7,8-HXCDD	1	U	
1,2,3,4,7,8-HXCDF	0.39	U	
1,2,3,6,7,8-HXCDD	0.8	U	
1,2,3,6,7,8-HXCDF	0.34	U	
1,2,3,7,8,9-HXCDD	0.84	U	
1,2,3,7,8,9-HXCDF	0.42	U	
1,2,3,7,8-PECDD	1.6	U	
1,2,3,7,8-PECDF	0.68	U	
2,3,4,6,7,8-HXCDF	0.38	U	
2,3,4,7,8-PECDF	0.68	U	
2,3,7,8-TCDD	0.84	U	
2,3,7,8-TCDF	0.83	U	
TOTAL HPCDD	0.89	U	
TOTAL HPCDF	0.47	U	
TOTAL HXCDD	1	U	
TOTAL HXCDF	0.42	U	
TOTAL PECDD	1.6	U	
TOTAL PECDF	0.98	U	
TOTAL TCDD	0.84	U	
TOTAL TCDF	0.83	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	8.8	U	
1,2,3,4,6,7,8,9-OCDF	6.6	U	
1,2,3,4,6,7,8-HPCDD	3.1	U	
1,2,3,4,6,7,8-HPCDF	2.8	U	
1,2,3,4,7,8,9-HPCDF	3.7	U	
1,2,3,4,7,8-HXCDD	3.4	U	
1,2,3,4,7,8-HXCDF	2	U	
1,2,3,6,7,8-HXCDD	2.6	U	
1,2,3,6,7,8-HXCDF	1.7	U	
1,2,3,7,8,9-HXCDD	3.4	U	
1,2,3,7,8,9-HXCDF	2.2	U	
1,2,3,7,8-PECDD	1.3	U	
1,2,3,7,8-PECDF	1.1	U	
2,3,4,6,7,8-HXCDF	3.4	U	
2,3,4,7,8-PECDF	1.1	U	
2,3,7,8-TCDD	1.1	U	
2,3,7,8-TCDF	0.88	U	
TOTAL HPCDD	3.1	U	
TOTAL HPCDF	3.7	U	
TOTAL HXCDD	3.4	U	
TOTAL HXCDF	3.4	U	
TOTAL PECDD	2.1	U	
TOTAL PECDF	1.1	U	
TOTAL TCDD	1.1	U	
TOTAL TCDF	0.88	U	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	23	U	
1,2,3,4,6,7,8,9-OCDF	2	U	
1,2,3,4,6,7,8-HPCDD	3.6	U	
1,2,3,4,6,7,8-HPCDF	0.59	U	
1,2,3,4,7,8,9-HPCDF	0.53	U	
1,2,3,4,7,8-HXCDD	1	U	
1,2,3,4,7,8-HXCDF	0.91	U	
1,2,3,6,7,8-HXCDD	0.82	U	
1,2,3,6,7,8-HXCDF	0.4	U	
1,2,3,7,8,9-HXCDD	0.86	U	
1,2,3,7,8,9-HXCDF	0.49	U	
1,2,3,7,8-PECDD	1.4	U	
1,2,3,7,8-PECDF	0.83	U	
2,3,4,6,7,8-HXCDF	0.44	U	
2,3,4,7,8-PECDF	0.83	U	
2,3,7,8-TCDD	1.1	U	
2,3,7,8-TCDF	0.87	U	
TOTAL HPCDD	3.6	U	
TOTAL HPCDF	0.59	U	
TOTAL HXCDD	1	U	
TOTAL HXCDF	0.91	U	
TOTAL PECDD	1.4	U	
TOTAL PECDF	0.95	U	
TOTAL TCDD	1.1	U	
TOTAL TCDF	0.87	U	

PROJ_NO: 9666

SDG: G4H200436 MEDIA: SOIL DATA FRACTION: DIOX

nsample	04SB0701
samp_date	8/18/2004
lab_id	G4H200436002
qc_type	NM
units	NG/KG
Pct_Solids	74.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	320		
1,2,3,4,6,7,8,9-OCDF	0.33	U	
1,2,3,4,6,7,8-HPCDD	33		
1,2,3,4,6,7,8-HPCDF	0.26	U	
1,2,3,4,7,8,9-HPCDF	0.31	U	
1,2,3,4,7,8-HXCDD	0.58	U	
1,2,3,4,7,8-HXCDF	0.3	U	
1,2,3,6,7,8-HXCDD	1	U	
1,2,3,6,7,8-HXCDF	0.28	U	
1,2,3,7,8,9-HXCDD	4.3	J	P
1,2,3,7,8,9-HXCDF	0.35	U	
1,2,3,7,8-PECDD	0.41	U	
1,2,3,7,8-PECDF	0.26	U	
2,3,4,6,7,8-HXCDF	0.31	U	
2,3,4,7,8-PECDF	0.24	U	
2,3,7,8-TCDD	1.4		
2,3,7,8-TCDF	0.16	U	
TOTAL HPCDD	180		
TOTAL HPCDF	0.31	U	
TOTAL HXCDD	200		
TOTAL HXCDF	0.35	U	
TOTAL PECDD	86		
TOTAL PECDF	0.26	U	
TOTAL TCDD	95		
TOTAL TCDF	0.16	U	

nsample	04SD0801
samp_date	8/18/2004
lab_id	G4H200436001
qc_type	NM
units	NG/KG
Pct_Solids	60.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,3,4,6,7,8,9-OCDD	6000		
1,2,3,4,6,7,8,9-OCDF	250		
1,2,3,4,6,7,8-HPCDD	670		
1,2,3,4,6,7,8-HPCDF	98		
1,2,3,4,7,8,9-HPCDF	9.2		
1,2,3,4,7,8-HXCDD	8.7		
1,2,3,4,7,8-HXCDF	7.1	J	P
1,2,3,6,7,8-HXCDD	25		
1,2,3,6,7,8-HXCDF	8.3	J	P
1,2,3,7,8,9-HXCDD	19		
1,2,3,7,8,9-HXCDF	1.3	U	
1,2,3,7,8-PECDD	6	J	P
1,2,3,7,8-PECDF	1.6	U	
2,3,4,6,7,8-HXCDF	5.9	J	P
2,3,4,7,8-PECDF	1.7	U	
2,3,7,8-TCDD	8		
2,3,7,8-TCDF	1.6		
TOTAL HPCDD	1400		
TOTAL HPCDF	330		
TOTAL HXCDD	170		
TOTAL HXCDF	150		
TOTAL PECDD	6		
TOTAL PECDF	22		
TOTAL TCDD	10		
TOTAL TCDF	11		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. FISHER** **DATE: NOVEMBER 10, 2004**

FROM: **D. SCHLOER** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – OVG / MISC**
CTO 283, NCBC GULFPORT
SDG: P0409181

SAMPLES: 5 / Aqueous / OVG / MISC

04GW0901	04GW1001	04GW1101
04GW1501	04GW2001	

Overview

The sample set for CTO 283; NCBC Gulfport; SDG P0409181 consists of (5) aqueous environmental samples. As detailed above, the environmental samples were analyzed for the dissolved gases (OVG) ethene ethane and methane and the miscellaneous parameter (MISC) hydrogen. No field duplicate pairs were included in this SDG.

The samples were collected by Tetra Tech NUS on October 8th, 9th and 10th, 2004 and analyzed by Microseeps Inc. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using Microseeps' analytical methods AM20GAX analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * GC System Performance
- * Chromatographic Resolution
- * Initial and Continuing Calibration
- * Blank Contamination
- * Surrogate Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- * Detection Limits
- * Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

OVG/MISC

The hardcopy data deliverables for SDG P0409181 did not contain an analytical instrument run log and calibration verification percent drift were not summarized. This is noted as a data completeness issue.

Additional Comments

Positive results reported between the sample-specific Reporting Limit (RL) and the Method Detection Limit (MDL) were qualified as estimated (J), due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: The data package was poorly documented.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
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W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

PROJ_NO: 9666

SDG: P0409181 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW0901	nsample	04GW1001	nsample	04GW1101
samp_date	9/8/2004	samp_date	9/9/2004	samp_date	9/9/2004
lab_id	P0409181-01A	lab_id	P0409181-02A	lab_id	P0409181-03A
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	110		
ETHENE	NG/L	4.6	J	P
METHANE	UG/L	58		

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	8600		
ETHENE	NG/L	9.3		
METHANE	UG/L	2200		

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	59		
ETHENE	NG/L	33		
METHANE	UG/L	2900		

PROJ_NO: 9666

SDG: P0409181 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1501
samp_date	9/10/2004
lab_id	P0409181-04A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	6400		
ETHENE	NG/L	69		
METHANE	UG/L	2100		

nsample	04GW2001
samp_date	9/10/2004
lab_id	P0409181-05A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	43		
ETHENE	NG/L	32		
METHANE	UG/L	3400		

PROJ_NO: 9666

SDG: P0409181 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW0901	nsample	04GW1001	nsample	04GW1101
samp_date	9/8/2004	samp_date	9/9/2004	samp_date	9/9/2004
lab_id	P0409181-01A	lab_id	P0409181-02A	lab_id	P0409181-03A
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	0.9		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	6.1		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	14		

PROJ_NO: 9666

SDG: P0409181 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1501	nsample	04GW2001
samp_date	9/10/2004	samp_date	9/10/2004
lab_id	P0409181-04A	lab_id	P0409181-05A
qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	1.2		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	23		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: **R. FISHER** **DATE: NOVEMBER 10, 2004**

FROM: **D. SCHLOER** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – OVG / MISC**
CTO 283, NCBC GULFPORT
SDGs: P0409223 and P0409453

SAMPLES: 9 / Aqueous / OVG / MISC

04GW1201	04GW1201D	04GW1601	04GW1701
04GW0801	04GW1301	04GW1401	04GW1801
04GW1901			

Overview

The sample set for CTO 283; NCBC Gulfport; SDGs: P0409223 and P0409453 consists of nine (9) aqueous environmental samples including one field duplicate. As detailed above, the environmental samples were analyzed for the dissolved gases (OVG) ethene ethane and methane and the miscellaneous parameter (MISC) hydrogen. One field duplicate pair was included in this SDG: 04GW1201 and 04GW1201D.

The samples were collected by Tetra Tech NUS on September 13th, 14th, 21st, 22nd, and 23rd, 2004 and analyzed by Microseeps Inc. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using Microseeps' analytical methods AM20GAX analytical and reporting protocol.

The data contained in this SDG were validated with regard to the following parameters:

- Data Completeness
- * Holding Times
- * GC System Performance
- * Chromatographic Resolution
- * Initial and Continuing Calibration
- * Blank Contamination
- * Surrogate Recoveries
- * Blank Spike/Blank Spike Duplicate Results
- Field Duplicate Precision
- * Detection Limits
- * Compound Identification
- * Compound Quantitation

The symbol (*) indicates that all 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.

OVG/MISC

The hardcopy data deliverables for SDGs P0409223 and P0409453 did not contain an analytical instrument run logs and calibration verification percent drift were not summarized. This is noted as a data completeness issue.

Additional Comments

Positive results reported between the sample-specific Reporting Limit (RL) and the Method Detection Limit (MDL) were qualified as estimated (J), due to uncertainty near the detection limit.

Field duplicate precision was evaluated for the field duplicate pair 04GW1201 and 04GW1201D. Field duplicate precision is measured by calculating the Relative Percent Difference (RPD) between positive results in the field duplicate pair. Precision is evaluated by comparing the calculated RPD against the quality control limit of 30% for aqueous matricies. The target compounds ethane and methane were identified in the field duplicate pair, resulting in RPDs that exceeded the 30% quality control limit. The positive results for methane and ethane were qualified as estimated (J) in the field duplicate pair 04GW1201 and 04GW1201D due to field duplicate imprecision. Positive results were reported for hydrogen resulting in an acceptable RPD.

EXECUTIVE SUMMARY

Laboratory Performance Issues: The overall data package was poorly presented.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for methane and ethane.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines entitled "Navy IRCDQM" (September, 1999). 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 NFESC guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS

Douglas Schloer
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % 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
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 (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT 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 less than sample activity

PROJ_NO: 9666

SDG: P0409223 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1201
samp_date	9/14/2004
lab_id	P0409223-03A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	180	J	G
ETHENE	NG/L	5	U	
METHANE	UG/L	1200	J	G

nsample	04GW1201D
samp_date	9/14/2004
lab_id	P0409223-04A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	04GW1201

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	1.9	J	GP
ETHENE	NG/L	6		
METHANE	UG/L	4.7	J	G

nsample	04GW1601
samp_date	9/13/2004
lab_id	P0409223-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	3400		
ETHENE	NG/L	20000		
METHANE	UG/L	3000		

PROJ_NO: 9666

SDG: P0409223 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1701
samp_date	9/13/2004
lab_id	P0409223-02A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	43		
ETHENE	NG/L	130		
METHANE	UG/L	3600		

PROJ_NO: 9666

SDG: P0409223 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1201	nsample	04GW1201D	nsample	04GW1601
samp_date	9/14/2004	samp_date	9/14/2004	samp_date	9/13/2004
lab_id	P0409223-03A	lab_id	P0409223-04A	lab_id	P0409223-01A
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:	04GW1201	DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	2.6		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	2.6		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	1.1		

PROJ_NO: 9666

SDG: P0409223 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1701
samp_date	9/13/2004
lab_id	P0409223-02A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	2		

PROJ_NO: 9666

SDG: P0409453 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW0801
samp_date	9/23/2004
lab_id	P0409453-05A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	60		
ETHENE	NG/L	5	U	
METHANE	UG/L	2300		

nsample	04GW1301
samp_date	9/22/2004
lab_id	P0409453-04A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	1400		
ETHENE	NG/L	2900		
METHANE	UG/L	790		

nsample	04GW1401
samp_date	9/22/2004
lab_id	P0409453-03A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	160		
ETHENE	NG/L	5.7		
METHANE	UG/L	3800		

PROJ_NO: 9666

SDG: P0409453 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1801
samp_date	9/21/2004
lab_id	P0409453-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	3900		
ETHENE	NG/L	5.4		
METHANE	UG/L	1200		

nsample	04GW1901
samp_date	9/21/2004
lab_id	P0409453-02A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ETHANE	NG/L	1300		
ETHENE	NG/L	17		
METHANE	UG/L	8500		

PROJ_NO: 9666

SDG: P0409453 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW0801
samp_date	9/23/2004
lab_id	P0409453-05A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	3.6		

nsample	04GW1301
samp_date	9/22/2004
lab_id	P0409453-04A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	1.1		

nsample	04GW1401
samp_date	9/22/2004
lab_id	P0409453-03A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	2		

PROJ_NO: 9666

SDG: P0409453 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1801
samp_date	9/21/2004
lab_id	P0409453-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	3.5		

nsample	04GW1901
samp_date	9/21/2004
lab_id	P0409453-02A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	8.6		

MICRO-METHODS LABORATORY, INC.

ANALYTICAL SERVICE COMPANY

DCN: 24788/08111428
LELAP Certification # 01960

August 18, 2004

SITE 4

CTO 283

Lab data

Tetra Tech NUS, Inc.
1401 Oven Park Drive Suite 201
Tallahassee, FL 32312

ATTN: Mr. Bob Fisher
Ref: PO# N9666-P4323(ss)

REPORT OF ANALYSES

The results of the analyses of the samples received 08/11/04, description as shown, lab file #08111428, are as attached.

If we can be of further assistance, please contact the office.

Copy & give Bill a set

Sincerely,

Harry P. Howell

Harry P. Howell
President

DISCLAIMER

The results only relate to the items tested or the sample and/or samples received by the laboratory. This report shall not be reproduced except in full, without the approval of the laboratory.

6500 Sunplex Drive • Ocean Springs, MS 39564 (228) 875-6420 • FAX (228) 875-6423

Micro-Methods Laboratory, Inc.
6500 Sunplex Drive
Ocean Springs, MS 39564
(228) 875-6420

CASE NARRATIVE

CLIENT: Tetra Tech NUS, Inc. **Lab File No:** 08111428

ORGANIC QUALITY CONTROL CRITERIA

Holding Times:	The sample/samples were analyzed within the required holding time. 8260
Method Blanks:	All target compounds were below the MDL. 8260
Instrument Calibration:	The instrument calibration met the acceptance criteria. 8260
Surrogate Spike:	All surrogates were within the acceptance criteria range. 8260
Matrix Spike/ Matrix Spike Duplicate:	Lab Control Sample/Samples within the acceptance criteria range. 8260 Matrix Spike Sample/Samples within acceptance criteria range. 8260
Anaylsis Comments:	None. 8260
Qualifiers:	None : No qualifiers indicated. 8260
Shipping Comments:	See attached sample receipt form

Micro-Methods Laboratory, Inc.

6500 Sunplex Drive
Ocean Springs, MS 39564
(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1401

Sample ID: AA47298
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 09:35:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: ***ORGANIC***

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 16:33:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-71-8	Dichlorodifluoromethane	<5	ug/L	5	
SW 8260B	74-87-3	Chloromethane	<5	ug/L	5	
SW 8260B	75-01-4	Vinyl chloride	<5	ug/L	5	
SW 8260B	74-83-9	Bromomethane	<5	ug/L	5	
SW 8260B	75-00-3	Chloroethane	<5	ug/L	5	
SW 8260B	75-69-4	Trichlorofluoromethane	<5	ug/L	5	
SW 8260B	75-35-4	1,1-Dichloroethene	<5	ug/L	5	
SW 8260B	75-15-0	Carbon Disulfide	<5	ug/L	5	
SW 8260B	75-09-2	Methylene chloride	<5	ug/L	5	
SW 8260B	156-60-5	trans-1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	75-09-2	Acetone	<50	ug/L	50	
SW 8260B	75-34-3	1,1-Dichloroethane	<5	ug/L	5	
SW 8260B	78-93-3	2-Butanone	<20	ug/L	20	
SW 8260B	590-20-7	2,2-Dichloropropane	<5	ug/L	5	
SW 8260B	156-59-2	cis -1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	74-97-5	Bromochloromethane	<5	ug/L	5	
SW 8260B	67-66-3	Chloroform	<5	ug/L	5	
SW 8260B	71-55-6	1,1,1-Trichloroethane	<5	ug/L	5	
SW 8260B	56-23-5	Carbon tetrachloride	<5	ug/L	5	
SW 8260B	563-58-6	1,1-Dichloropropene	<5	ug/L	5	
SW 8260B	71-43-2	Benzene	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1401

Sample ID: AA47298
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 09:35:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 16:33:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	107-06-2	1,2-Dichloroethane	<5	ug/L	5	
SW 8260B	79-01-6	Trichloroethene	<5	ug/L	5	
SW 8260B	78-87-5	1,2-Dichloropropane	<5	ug/L	5	
SW 8260B	106-93-4	Dibromomethane	<5	ug/L	5	
SW 8260B	75-27-4	Bromodichloromethane	<5	ug/L	5	
SW 8260B	10061-01-5	cis-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	108-10-1	4-Methyl-2-Pentanone	<20	ug/L	20	
SW 8260B	108-88-3	Toluene	<5	ug/L	5	
SW 8260B	10061-02-6	trans-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	79-00-5	1,1,2-Trichloroethane	<5	ug/L	5	
SW 8260B	127-18-4	Tetrachloroethene	<5	ug/L	5	
SW 8260B	142-28-9	1,3-Dichloropropane	<5	ug/L	5	
SW 8260B	591-78-6	2-Hexanone	<20	ug/L	20	
SW 8260B	124-48-1	Dibromochloromethane	<5	ug/L	5	
SW 8260B	106-93-4	1,2-Dibromoethane	<5	ug/L	5	
SW 8260B	630-20-6	1,1,1,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	108-90-7	Chlorobenzene	<5	ug/L	5	
SW 8260B	100-41-4	Ethylbenzene	<5	ug/L	5	
SW 8260B	NA	m&p-Xylene	<5	ug/L	5	
SW 8260B	95-47-6	o-Xylene	<5	ug/L	5	
SW 8260B	100-42-5	Styrene	<5	ug/L	5	
SW 8260B	75-25-2	Bromoform	<5	ug/L	5	
SW 8260B	98-82-8	Isopropylbenzene	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

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(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1401

Sample ID: AA47298
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 09:35:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 16:33:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	108-86-1	Bromobenzene	<5	ug/L	5	
SW 8260B	79-34-5	1,1,2,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	130-65-1	Propylbenzene	<5	ug/L	5	
SW 8260B	95-49-8	2-Chlorotoluene	<5	ug/L	5	
SW 8260B	106-43-4	4-Chlorotoluene	<5	ug/L	5	
SW 8260B	108-67-8	1,3,5-Trimethylbenzene	<5	ug/L	5	
SW 8260B	98-06-6	tert-Butylbenzene	<5	ug/L	5	
SW 8260B	95-63-6	1,2,4-Trimethylbenzene	<5	ug/L	5	
SW 8260B	135-98-8	sec-Butylbenzene	<5	ug/L	5	
SW 8260B	541-73-1	1,3-Dichlorobenzene	<5	ug/L	5	
SW 8260B	106-46-7	1,4-Dichlorobenzene	<5	ug/L	5	
SW 8260B	99-87-6	p-Isopropyltoluene	<5	ug/L	5	
SW 8260B	95-50-1	1,2-Dichlorobenzene	<5	ug/L	5	
SW 8260B	104-51-8	n-Butylbenzene	<5	ug/L	5	
SW 8260B	96-12-8	1,2-Dibromo-3-chloropropane	<20	ug/L	20	
SW 8260B	120-82-1	1,2,4-Trichlorobenzene	<5	ug/L	5	
SW 8260B	87-68-3	Hexachlorobutadiene	<5	ug/L	5	
SW 8260B	91-20-3	Naphthalene	<10	ug/L	10	
SW 8260B	87-61-6	1,2,3-Trichlorobenzene	<5	ug/L	5	
SW 8260B		1,2,3-Trichlorpropane	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

6500 Sunplex Drive
Ocean Springs, MS 39564
(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1401

Sample ID: AA47298
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 09:35:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: *QAQC*

SW-846 VOA Surrogate Recovery: Water

Analyst: LLS Date/Time: 8/11/2004 16:33:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-61-6	Dibromofluoromethane (Surr.)	101	% Recovery		
SW 8260B	17060-07-0	1,2-Dichloroethane-d4 (Surr.)	104	% Recovery		
SW 8260B	2037-26-5	Toluene-d8 (Surr.)	101	% Recovery		
SW 8260B	460-00-4	4-Bromofluorobenzene (Surr.)	94.0	% Recovery		

Micro-Methods Laboratory, Inc.

6500 Sunplex Drive
Ocean Springs, MS 39564
(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1501

Sample ID: AA47299
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 10:30:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: ***ORGANIC***

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-71-8	Dichlorodifluoromethane	<5	ug/L	5	
SW 8260B	74-87-3	Chloromethane	<5	ug/L	5	
SW 8260B	75-01-4	Vinyl chloride	<5	ug/L	5	
SW 8260B	74-83-9	Bromomethane	<5	ug/L	5	
SW 8260B	75-00-3	Chloroethane	<5	ug/L	5	
SW 8260B	75-69-4	Trichlorofluoromethane	<5	ug/L	5	
SW 8260B	75-35-4	1,1-Dichloroethene	<5	ug/L	5	
SW 8260B	75-15-0	Carbon Disulfide	<5	ug/L	5	
SW 8260B	75-09-2	Methylene chloride	<5	ug/L	5	
SW 8260B	156-60-5	trans-1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	75-09-2	Acetone	<50	ug/L	50	
SW 8260B	75-34-3	1,1-Dichloroethane	<5	ug/L	5	
SW 8260B	78-93-3	2-Butanone	<20	ug/L	20	
SW 8260B	590-20-7	2,2-Dichloropropane	<5	ug/L	5	
SW 8260B	156-59-2	cis -1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	74-97-5	Bromochloromethane	<5	ug/L	5	
SW 8260B	67-66-3	Chloroform	<5	ug/L	5	
SW 8260B	71-55-6	1,1,1-Trichloroethane	<5	ug/L	5	
SW 8260B	56-23-5	Carbon tetrachloride	<5	ug/L	5	
SW 8260B	563-58-6	1,1-Dichloropropene	<5	ug/L	5	
SW 8260B	71-43-2	Benzene	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

6500 Sunplex Drive
Ocean Springs, MS 39564
(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1501

Sample ID: AA47299
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 10:30:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	107-06-2	1,2-Dichloroethane	<5	ug/L	5	
SW 8260B	79-01-6	Trichloroethene	<5	ug/L	5	
SW 8260B	78-87-5	1,2-Dichloropropane	<5	ug/L	5	
SW 8260B	106-93-4	Dibromomethane	<5	ug/L	5	
SW 8260B	75-27-4	Bromodichloromethane	<5	ug/L	5	
SW 8260B	10061-01-5	cis-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	108-10-1	4-Methyl-2-Pentanone	<20	ug/L	20	
SW 8260B	108-88-3	Toluene	<5	ug/L	5	
SW 8260B	10061-02-6	trans-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	79-00-5	1,1,2-Trichloroethane	<5	ug/L	5	
SW 8260B	127-18-4	Tetrachloroethene	<5	ug/L	5	
SW 8260B	142-28-9	1,3-Dichloropropane	<5	ug/L	5	
SW 8260B	591-78-6	2-Hexanone	<20	ug/L	20	
SW 8260B	124-48-1	Dibromochloromethane	<5	ug/L	5	
SW 8260B	106-93-4	1,2-Dibromoethane	<5	ug/L	5	
SW 8260B	630-20-6	1,1,1,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	108-90-7	Chlorobenzene	<5	ug/L	5	
SW 8260B	100-41-4	Ethylbenzene	<5	ug/L	5	
SW 8260B	NA	m&p-Xylene	<5	ug/L	5	
SW 8260B	95-47-6	o-Xylene	<5	ug/L	5	
SW 8260B	100-42-5	Styrene	<5	ug/L	5	
SW 8260B	75-25-2	Bromoform	<5	ug/L	5	
SW 8260B	98-82-8	Isopropylbenzene	<5	ug/L	5	

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1501

Sample ID: AA47299
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 10:30:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	108-86-1	Bromobenzene	<5	ug/L	5	
SW 8260B	79-34-5	1,1,2,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	130-65-1	Propylbenzene	<5	ug/L	5	
SW 8260B	95-49-8	2-Chlorotoluene	<5	ug/L	5	
SW 8260B	106-43-4	4-Chlorotoluene	<5	ug/L	5	
SW 8260B	108-67-8	1,3,5-Trimethylbenzene	<5	ug/L	5	
SW 8260B	98-06-6	tert-Butylbenzene	<5	ug/L	5	
SW 8260B	95-63-6	1,2,4-Trimethylbenzene	<5	ug/L	5	
SW 8260B	135-98-8	sec-Butylbenzene	<5	ug/L	5	
SW 8260B	541-73-1	1,3-Dichlorobenzene	<5	ug/L	5	
SW 8260B	106-46-7	1,4-Dichlorobenzene	<5	ug/L	5	
SW 8260B	99-87-6	p-Isopropyltoluene	<5	ug/L	5	
SW 8260B	95-50-1	1,2-Dichlorobenzene	<5	ug/L	5	
SW 8260B	104-51-8	n-Butylbenzene	<5	ug/L	5	
SW 8260B	96-12-8	1,2-Dibromo-3-chloropropane	<20	ug/L	20	
SW 8260B	120-82-1	1,2,4-Trichlorobenzene	<5	ug/L	5	
SW 8260B	87-68-3	Hexachlorobutadiene	<5	ug/L	5	
SW 8260B	91-20-3	Naphthalene	<10	ug/L	10	
SW 8260B	87-61-6	1,2,3-Trichlorobenzene	<5	ug/L	5	
SW 8260B		1,2,3-Trichlorpropane	<5	ug/L	5	

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1501

Sample ID: AA47299
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 10:30:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: *QAQC*

SW-846 VOA Surrogate Recovery: Water

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-61-6	Dibromofluoromethane (Surr.)	104	% Recovery		
SW 8260B	17060-07-0	1,2-Dichloroethane-d4 (Surr.)	103	% Recovery		
SW 8260B	2037-26-5	Toluene-d8 (Surr.)	102	% Recovery		
SW 8260B	460-00-4	4-Bromofluorobenzene (Surr.)	96.7	% Recovery		

Micro-Methods Laboratory, Inc.

6500 Sunplex Drive
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(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1601

Sample ID: AA47300
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:10:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: ***ORGANIC***

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-71-8	Dichlorodifluoromethane	<5	ug/L	5	
SW 8260B	74-87-3	Chloromethane	<5	ug/L	5	
SW 8260B	75-01-4	Vinyl chloride	<5	ug/L	5	
SW 8260B	74-83-9	Bromomethane	<5	ug/L	5	
SW 8260B	75-00-3	Chloroethane	<5	ug/L	5	
SW 8260B	75-69-4	Trichlorofluoromethane	<5	ug/L	5	
SW 8260B	75-35-4	1,1-Dichloroethene	<5	ug/L	5	
SW 8260B	75-15-0	Carbon Disulfide	<5	ug/L	5	
SW 8260B	75-09-2	Methylene chloride	<5	ug/L	5	
SW 8260B	156-60-5	trans-1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	75-09-2	Acetone	<50	ug/L	50	
SW 8260B	75-34-3	1,1-Dichloroethane	<5	ug/L	5	
SW 8260B	78-93-3	2-Butanone	<20	ug/L	20	
SW 8260B	590-20-7	2,2-Dichloropropane	<5	ug/L	5	
SW 8260B	156-59-2	cis -1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	74-97-5	Bromochloromethane	<5	ug/L	5	
SW 8260B	67-66-3	Chloroform	<5	ug/L	5	
SW 8260B	71-55-6	1,1,1-Trichloroethane	<5	ug/L	5	
SW 8260B	56-23-5	Carbon tetrachloride	<5	ug/L	5	
SW 8260B	563-58-6	1,1-Dichloropropene	<5	ug/L	5	
SW 8260B	71-43-2	Benzene	<5	ug/L	5	

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1601

Sample ID: AA47300
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:10:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	107-06-2	1,2-Dichloroethane	<5	ug/L	5	
SW 8260B	79-01-6	Trichloroethene	<5	ug/L	5	
SW 8260B	78-87-5	1,2-Dichloropropane	<5	ug/L	5	
SW 8260B	106-93-4	Dibromomethane	<5	ug/L	5	
SW 8260B	75-27-4	Bromodichloromethane	<5	ug/L	5	
SW 8260B	10061-01-5	cis-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	108-10-1	4-Methyl-2-Pentanone	<20	ug/L	20	
SW 8260B	108-88-3	Toluene	<5	ug/L	5	
SW 8260B	10061-02-6	trans-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	79-00-5	1,1,2-Trichloroethane	<5	ug/L	5	
SW 8260B	127-18-4	Tetrachloroethene	<5	ug/L	5	
SW 8260B	142-28-9	1,3-Dichloropropane	<5	ug/L	5	
SW 8260B	591-78-6	2-Hexanone	<20	ug/L	20	
SW 8260B	124-48-1	Dibromochloromethane	<5	ug/L	5	
SW 8260B	106-93-4	1,2-Dibromoethane	<5	ug/L	5	
SW 8260B	630-20-6	1,1,1,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	108-90-7	Chlorobenzene	<5	ug/L	5	
SW 8260B	100-41-4	Ethylbenzene	<5	ug/L	5	
SW 8260B	NA	m&p-Xylene	<5	ug/L	5	
SW 8260B	95-47-6	o-Xylene	<5	ug/L	5	
SW 8260B	100-42-5	Styrene	<5	ug/L	5	
SW 8260B	75-25-2	Bromoform	<5	ug/L	5	
SW 8260B	98-82-8	Isopropylbenzene	<5	ug/L	5	

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Sample ID: AA47300
Lab File #: 08111428

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1601

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:10:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	108-86-1	Bromobenzene	<5	ug/L	5	
SW 8260B	79-34-5	1,1,2,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	130-65-1	Propylbenzene	<5	ug/L	5	
SW 8260B	95-49-8	2-Chlorotoluene	<5	ug/L	5	
SW 8260B	106-43-4	4-Chlorotoluene	<5	ug/L	5	
SW 8260B	108-67-8	1,3,5-Trimethylbenzene	<5	ug/L	5	
SW 8260B	98-06-6	tert-Butylbenzene	<5	ug/L	5	
SW 8260B	95-63-6	1,2,4-Trimethylbenzene	<5	ug/L	5	
SW 8260B	135-98-8	sec-Butylbenzene	<5	ug/L	5	
SW 8260B	541-73-1	1,3-Dichlorobenzene	<5	ug/L	5	
SW 8260B	106-46-7	1,4-Dichlorobenzene	<5	ug/L	5	
SW 8260B	99-87-6	p-Isopropyltoluene	<5	ug/L	5	
SW 8260B	95-50-1	1,2-Dichlorobenzene	<5	ug/L	5	
SW 8260B	104-51-8	n-Butylbenzene	<20	ug/L	20	
SW 8260B	96-12-8	1,2-Dibromo-3-chloropropane	<5	ug/L	5	
SW 8260B	120-82-1	1,2,4-Trichlorobenzene	<5	ug/L	5	
SW 8260B	87-68-3	Hexachlorobutadiene	<10	ug/L	10	
SW 8260B	91-20-3	Naphthalene	<5	ug/L	5	
SW 8260B	87-61-6	1,2,3-Trichlorobenzene	<5	ug/L	5	
SW 8260B		1,2,3-Trichlorpropane				

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1601

Sample ID: AA47300
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004 Matrix: water Date Validated: 8/17/04 Validated by: HPH	DateCollected: 8/11/2004 TimeCollected: 11:10:00 Collected By: CLIENT	

Department: ***QAQC***

SW-846 VOA Surrogate Recovery: Water

Analyst: LLS Date/Time: 8/11/2004 17:00:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-61-6	Dibromofluoromethane (Surr.)	104	% Recovery		
SW 8260B	17060-07-0	1,2-Dichloroethane-d4 (Surr.)	103	% Recovery		
SW 8260B	2037-26-5	Toluene-d8 (Surr.)	102	% Recovery		
SW 8260B	460-00-4	4-Bromofluorobenzene (Surr.)	96.7	% Recovery		

Micro-Methods Laboratory, Inc.

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(228) 875-6420

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1701

Sample ID: AA47301
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:50:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: ***ORGANIC***

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 18:47:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-71-8	Dichlorodifluoromethane	<5	ug/L	5	
SW 8260B	74-87-3	Chloromethane	<5	ug/L	5	
SW 8260B	75-01-4	Vinyl chloride	<5	ug/L	5	
SW 8260B	74-83-9	Bromomethane	<5	ug/L	5	
SW 8260B	75-00-3	Chloroethane	<5	ug/L	5	
SW 8260B	75-69-4	Trichlorofluoromethane	<5	ug/L	5	
SW 8260B	75-35-4	1,1-Dichloroethene	<5	ug/L	5	
SW 8260B	75-15-0	Carbon Disulfide	<5	ug/L	5	
SW 8260B	75-09-2	Methylene chloride	<5	ug/L	5	
SW 8260B	156-60-5	trans-1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	75-09-2	Acetone	<50	ug/L	50	
SW 8260B	75-34-3	1,1-Dichloroethane	<5	ug/L	5	
SW 8260B	78-93-3	2-Butanone	<20	ug/L	20	
SW 8260B	590-20-7	2,2-Dichloropropane	<5	ug/L	5	
SW 8260B	156-59-2	cis -1,2-Dichloroethene	<5	ug/L	5	
SW 8260B	74-97-5	Bromochloromethane	<5	ug/L	5	
SW 8260B	67-66-3	Chloroform	<5	ug/L	5	
SW 8260B	71-55-6	1,1,1-Trichloroethane	<5	ug/L	5	
SW 8260B	56-23-5	Carbon tetrachloride	<5	ug/L	5	
SW 8260B	563-58-6	1,1-Dichloropropene	<5	ug/L	5	
SW 8260B	71-43-2	Benzene	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1701

Sample ID: AA47301
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:50:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis

Analyst: LLS Date/Time: 8/11/2004 18:47:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	107-06-2	1,2-Dichloroethane	<5	ug/L	5	
SW 8260B	79-01-6	Trichloroethene	<5	ug/L	5	
SW 8260B	78-87-5	1,2-Dichloropropane	<5	ug/L	5	
SW 8260B	106-93-4	Dibromomethane	<5	ug/L	5	
SW 8260B	75-27-4	Bromodichloromethane	<5	ug/L	5	
SW 8260B	10061-01-5	cis-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	108-10-1	4-Methyl-2-Pentanone	<20	ug/L	20	
SW 8260B	108-88-3	Toluene	<5	ug/L	5	
SW 8260B	10061-02-6	trans-1,3-Dichloropropene	<5	ug/L	5	
SW 8260B	79-00-5	1,1,2-Trichloroethane	<5	ug/L	5	
SW 8260B	127-18-4	Tetrachloroethene	<5	ug/L	5	
SW 8260B	142-28-9	1,3-Dichloropropane	<5	ug/L	5	
SW 8260B	591-78-6	2-Hexanone	<20	ug/L	20	
SW 8260B	124-48-1	Dibromochloromethane	<5	ug/L	5	
SW 8260B	106-93-4	1,2-Dibromoethane	<5	ug/L	5	
SW 8260B	630-20-6	1,1,1,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	108-90-7	Chlorobenzene	<5	ug/L	5	
SW 8260B	100-41-4	Ethylbenzene	<5	ug/L	5	
SW 8260B	NA	m&p-Xylene	<5	ug/L	5	
SW 8260B	95-47-6	o-Xylene	<5	ug/L	5	
SW 8260B	100-42-5	Styrene	<5	ug/L	5	
SW 8260B	75-25-2	Bromoform	<5	ug/L	5	
SW 8260B	98-82-8	Isopropylbenzene	<5	ug/L	5	

Micro-Methods Laboratory, Inc.

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Sample ID: AA47301
Lab File #: 08111428

Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1701

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:50:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Volatile Analysis Analyst: LLS Date/Time: 8/11/2004 18:47:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	108-86-1	Bromobenzene	<5	ug/L	5	
SW 8260B	79-34-5	1,1,2,2-Tetrachloroethane	<5	ug/L	5	
SW 8260B	130-65-1	Propylbenzene	<5	ug/L	5	
SW 8260B	95-49-8	2-Chlorotoluene	<5	ug/L	5	
SW 8260B	106-43-4	4-Chlorotoluene	<5	ug/L	5	
SW 8260B	108-67-8	1,3,5-Trimethylbenzene	<5	ug/L	5	
SW 8260B	98-06-6	tert-Butylbenzene	<5	ug/L	5	
SW 8260B	95-63-6	1,2,4-Trimethylbenzene	<5	ug/L	5	
SW 8260B	135-98-8	sec-Butylbenzene	<5	ug/L	5	
SW 8260B	541-73-1	1,3-Dichlorobenzene	<5	ug/L	5	
SW 8260B	106-46-7	1,4-Dichlorobenzene	<5	ug/L	5	
SW 8260B	99-87-6	p-Isopropyltoluene	<5	ug/L	5	
SW 8260B	95-50-1	1,2-Dichlorobenzene	<5	ug/L	5	
SW 8260B	104-51-8	n-Butylbenzene	<20	ug/L	20	
SW 8260B	96-12-8	1,2-Dibromo-3-chloropropane	<5	ug/L	5	
SW 8260B	120-82-1	1,2,4-Trichlorobenzene	<5	ug/L	5	
SW 8260B	87-68-3	Hexachlorobutadiene	<10	ug/L	10	
SW 8260B	91-20-3	Naphthalene	<5	ug/L	5	
SW 8260B	87-61-6	1,2,3-Trichlorobenzene	<5	ug/L	5	
SW 8260B		1,2,3-Trichlorpropane				

Micro-Methods Laboratory, Inc.

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Client: Tetra Tech NUS, Inc.
Client Code: TTECH1
Sample Description: Tetra Tech, NCBC Gulfport
Client Sample Description: 04GP1701

Sample ID: AA47301
Lab File #: 08111428

General Information	Collection Data	Remarks
Sample Received : 8/11/2004	DateCollected: 8/11/2004	
Matrix: water	TimeCollected: 11:50:00	
Date Validated: 8/17/04	Collected By: CLIENT	
Validated by: HPH		

Department: ***QAQC***

SW-846 VOA Surrogate Recovery: Water

Analyst: LLS Date/Time: 8/11/2004 18:47:00

Method Ref	CAS#	Parameter	Value	Units	MDL	Qualifiers
SW 8260B	75-61-6	Dibromofluoromethane (Surr.)	98.9	% Recovery		
SW 8260B	17060-07-0	1,2-Dichloroethane-d4 (Surr.)	103	% Recovery		
SW 8260B	2037-26-5	Toluene-d8 (Surr.)	102	% Recovery		
SW 8260B	460-00-4	4-Bromofluorobenzene (Surr.)	95.7	% Recovery		

Friday, August 20, 2004

Micro-Methods Laboratory, Inc.
QA/QC Report

Associated Samples: AA47298 AA47299 AA47300 AA47301

QA Sample # : [illegible]

Analysis Name : Volatile Analysis

Batch Name : $8260W-22425

Unit of Measure : ug/L

Analyte	Lab Blank	LCS % Rec	LCSD % Rec	LCS/LCSD RPD	Sample Result	Sample Duplicate Result	MS/MSD Spike Conc.	Matrix Spike % Rec	Matrix Spike Duplicate % Rec	MS/MSD RPD	Analyst
1,1,1,2-Tetrachloroethane	<5	98.5			<5		20.0	99.5	95.5	4.1	LLS
1,1,1-Trichloroethane	<5	100			<5		20.0	104	100	3.9	LLS
1,1,2,2-Tetrachloroethane	<5	102			<5		20.0	108	106	2.3	LLS
1,1,2-Trichloroethane	<5	99.0			<5		20.0	110	102	6.6	LLS
1,1-Dichloroethane	<5	95.5			<5		20.0	104	97.5	6.0	LLS
1,1-Dichloroethene	<5	91.5			<5		20.0	94.5	91.5	3.2	LLS
1,1-Dichloropropene	<5	103			<5		20.0	96.0	90.0	6.5	LLS
1,2,3-Trichlorobenzene	<5	120			<5		20.0	104	104	0.0	LLS
1,2,3-Trichlorpropane	<20	100			<5		20.0	92.5	91.5	1.1	LLS
1,2,4-Trichlorobenzene	<5	112			<5		20.0	100	99.0	1.5	LLS
1,2,4-Trimethylbenzene	<5	97.0			<5		20.0	99.0	94.5	4.7	LLS
1,2-Dibromo-3-chloropropane	<20	116			<20		20.0	97.0	98.0	1.0	LLS
1,2-Dibromoethane	<5	103			<5		20.0	108	101	6.2	LLS
1,2-Dichlorobenzene	<5	102			<5		20.0	100	96.5	3.6	LLS
1,2-Dichloroethane	<5	103			<5		20.0	105	99.5	5.4	LLS
1,2-Dichloropropane	<5	102			<5		20.0	104	98.5	5.4	LLS
1,3,5-Trimethylbenzene	<5	96.5			<5		20.0	94.0	90.5	3.8	LLS
1,3-Dichlorobenzene	<5	94.5			<5		20.0	98.5	95.5	3.1	LLS
1,3-Dichloropropane	<5	106			<5		20.0	106	104	1.9	LLS
1,4-Dichlorobenzene	<5	101			<5		20.0	101	100	1.0	LLS
2,2-Dichloropropane	<5	99.5			<5		20.0	103	91.5	12	LLS

Micro-Methods oratory, Inc.
QA/QC Report

QA Sample # : AA47300

Associated Samples: AA47298 AA47299 AA47300 AA47301

Analysis Name : Volatile Analysis

Batch Name : $8260W-22425

Unit of Measure : ug/L

Analyte	Lab Blank	LCS % Rec	LCSD % Rec	LCS/LCSD RPD	Sample Result	Sample Duplicate Result	MS/MSD Spike Conc.	Matrix Spike % Rec	Matrix Spike Duplicate % Rec	MS/MSD RPD	Analyst
2-Butanone	<20	108			<20		20.0	105	104	0.48	LLS
2-Chlorotoluene	<5	97.0			<5		20.0	101	96.0	5.1	LLS
2-Hexanone	<20	111			<20		20.0	112	106	4.6	LLS
4-Chlorotoluene	<5	97.0			<5		20.0	97.0	94.0	3.1	LLS
4-Methyl-2-Pentanone	<20	110			<20		20.0	106	101	5.8	LLS
Acetone	<50	118			<50		20.0	113	104	8.3	LLS
Benzene	<5	99.5			<5		20.0	102	100	2.0	LLS
Bromobenzene	<5	99.0			<5		20.0	102	99.0	3.0	LLS
Bromochloromethane	<5	98.0			<5		20.0	103	98.5	4.5	LLS
Bromodichloromethane	<5	99.5			<5		20.0	104	100	3.4	LLS
Bromoform	<5	110			<5		20.0	105	105	0.0	LLS
Bromomethane	<5	88.5			<5		20.0	97.0	89.0	8.6	LLS
Carbon Disulfide	<5	89.5			<5		20.0	98.5	92.0	6.8	LLS
Carbon tetrachloride	<5	102			<5		20.0	102	98.0	3.5	LLS
Chlorobenzene	<5	99.0			<5		20.0	105	102	2.9	LLS
Chloroethane	<5	89.0			<5		20.0	94.5	90.5	4.3	LLS
Chloroform	<5	99.5			<5		20.0	104	100	3.4	LLS
Chloromethane	<5	90.0			<5		20.0	84.5	79.5	6.1	LLS
cis -1,2-Dichloroethene	<5	97.0			<5		20.0	99.5	96.5	3.1	LLS
cis-1,3-Dichloropropene	<5	103			<5		20.0	96.0	90.0	6.5	LLS
Dibromochloromethane	<5	99.5			<5		20.0	100	94.0	6.2	LLS

Friday, August 20, 2004

Micro-Methods Laboratory, Inc.
QA/QC Report

Associated Samples: AA47298 AA47299 AA47300 AA47301

QA Sample # : AA47300

Analysis Name : Volatile Analysis

Batch Name : $8260W-22425

Unit of Measure : ug/L

Analyte	Lab Blank	LCS % Rec	LCSD % Rec	LCS/LCSD RPD	Sample Result	Sample Duplicate Result	MS/MSD Spike Conc.	Matrix Spike % Rec	Matrix Spike Duplicate % Rec	MS/MSD RPD	Analyst
Dibromomethane	<5	101			<5		20.0	106	102	3.8	LLS
Dichlorodifluoromethane	<5	80.0			<5		20.0	68.0	62.5	8.4	LLS
Ethylbenzene	<5	100			<5		20.0	99.5	98.0	1.5	LLS
Hexachlorobutadiene	<5	114			<5		20.0	102	97.5	4.0	LLS
Isopropylbenzene	<5	100			<5		20.0	97.5	96.5	1.0	LLS
m&p-Xylene	<5	102			<5		40.0	104	99.5	3.9	LLS
Methylene chloride	<5	92.0			<5		20.0	98.5	94.0	4.7	LLS
Naphthalene	<5	128			<10		20.0	104	106	1.9	LLS
n-Butylbenzene	<5	104			<5		20.0	98.5	94.5	4.1	LLS
o-Xylene	<5	100			<5		20.0	97.0	96.5	0.52	LLS
p-Isopropyltoluene	<5	104			<5		20.0	98.5	95.5	3.1	LLS
Propylbenzene	<5	98.5			<5		20.0	98.0	96.5	1.5	LLS
sec-Butylbenzene	<5	97.5			<5		20.0	98.5	94.5	4.1	LLS
Styrene	<5	96.5			<5		20.0	97.0	94.0	3.1	LLS
tert-Butylbenzene	<5	98.0			<5		20.0	99.5	94.0	5.7	LLS
Tetrachloroethene	<5	104			<5		20.0	108	103	4.3	LLS
Toluene	<5	100			<5		20.0	106	100	4.9	LLS
trans-1,2-Dichloroethene	<5	96.0			<5		20.0	98.0	97.0	1.0	LLS
trans-1,3-Dichloropropene	<5	104			<5		20.0	96.5	94.5	2.1	LLS
Trichloroethene	<5	99.0			<5		20.0	106	100	5.4	LLS
Trichlorofluoromethane	<5	93.5			<5		20.0	102	92.5	10	LLS

Friday, 20, 2004

Micro-Methods Laboratory, Inc.
QA/QC Report

Associated Samples: AA47298 AA47299 AA47300 AA47301

QA Sample # : AA47300

Analysis Name : Volatile Analysis

Batch Name : $8260W-22425

Unit of Measure : ug/L

Analyte	Lab Blank	LCS % Rec	LCSD % Rec	LCS/LCSD RPD	Sample Result	Sample Duplicate Result	MS/MSD Spike Conc.	Matrix Spike % Rec	Matrix Spike Duplicate % Rec	MS/MSD RPD	Analyst
Vinyl chloride	<5	89.0			<5		20.0	91.5	86.0	6.2	LLS

Sample Receipt

8/11/2004

Lab File #: **08111428**

Custody Information

Custody Seals on Transport Container (Yes) ☐
Custody Seals on Transport Container (No) ☑

Custody Seals Intact (Yes) ☐
Custody Seals Intact (No) ☑

Chain of Custody (COC) Conditions Upon Receip

COC (Yes) ☑
COC (No) ☐

COC in Plastic (Yes) ☐
COC in Plastic (No) ☑

COC Filled Out (Yes) ☑
COC Filled Out (No) ☐

Thermal Preservation

Temp Receipt 2-6C (Yes) ☑
Temp Receipt 2-6C (No) ☐

If not,evidence of Chilling (ice ☐
If not, evidence of Chilling (ice water ☐
If not, evidence of Chilling (blue ice ☐

Sample Condition

Sample Containers Intact (Yes) ☑
Sample Containers Intact (No) ☐

Containers Acceptable (Yes) ☑
Containers Acceptable (No) ☐

Custody Seal on Containers (Yes) ☐
Custody Seal on Containers (No) ☑

Custody Seals on Containers Intact (Yes) ☐
Custody Seals on Containers Intact (No) ☑

Labels Complete/Good (Yes) ☑
Labels Complete/Good (No) ☐

Labels Agree with COC (Yes) ☑
Labels Agree with COC (No) ☐

All Samples in Plastic (Yes ☑
All Samples in Plastic (No ☐

VOC Containers in Plastic (Yes) ☑
VOC Containers in Plastic (No) ☐

Others in Plastic (Yes) ☐
Others in Plastic (No) ☐

SV Containers in Plastic (Yes) ☐
SV Containers in Plastic (No) ☐

Adequate Sample Amount (Yes) ☑
Adequate Sample Amount (No) ☐

Obvious Damage (Yes) ☐
Obvious Damage (No) ☑

Improper Preservation (Yes) ☐
Improper Preservation (No) ☑

Obvious Sample Contamination (Yes ☐
Obvious Sample Contamination (No ☑

VOC Container Inspection

VOC: Bubbles Present (Yes) ☐
VOC: Bubbles Present (No) ☑

VOC: Bubbles <5mm(Yes) ☐
VOC: Bubbles <5mm (No) ☐

VOC in soil Headspace (Yes) ☐
VOC in soil Headspace (No) ☐

VOC: Bubbles >5mm (Yes) ☐
VOC: Bubbles >5mm (No) ☐

Sample Receipt

8/11/2004

Lab File #: **08111428**

Sample Holding Times

Samples Received within Holding Times (Yes ☑

Samples Received within Holding Times (No ☐

Sample submitted for rush analysis to meet holding tim ☐

Data Qualified: 8/11/2004

Qualified By:: ckd

Comments:

Micro-Methods Lab, Inc.
6500 Sunplex Drive, Ocean Springs, MS 39564
Ph: 228-875-6420 • Fax: 228-875-6423

Chain of Custody / Analysis Request Form

Print ALL Information. Put N/A in blanks not applicable

Field pH: Tech: Time:
Field Temperature:
Iced: (Yes) No
Sample Receipt Temperature: 4°C

REPORT RESULTS TO:	SEND INVOICE TO: SAME	TURNAROUND TIME
Name: Bob Fisher	Name: PO#:	Date Results needed by:
Company Tetra Tech NUS, Inc.	Company	Standard turnaround time is 10 working days ☐
Address 1401 Oven Park Dr. #201	Address	The following turnaround times require lab approval:
City Tallahassee	City	☐ 7-10 days ☐ 72 Hrs ☒ 48 Hrs
State FL ZIP 32308	State ZIP	☐ 24 Hrs Approved by
TEL: 8503859899 FAX: 8503859860	TEL: FAX:	
Sampled by: (Signature) (Print) Jason Bourgeois	Project Name:	Date of Sample Shipment: Hand Delivered 8/11/4

Failure to complete shaded areas will hinder processing of samples.

	For Lab Use Only Sample Number	Station Location / Sample ID	DATE 8-11-4	TIME	Sampling COMP	Sampling GRAB	VOC (8260B)										# CONTAINERS
1.	47298	046P1401	~~8-11-4~~	0955		X	4										4
2.	47299	046P1501	8-11-4	1030		X	4										4
3.	47300	046P1601	8-11-4	1110		X	4										4
4.	47301	046P1701	8-11-4	1150		X	4										4
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

List Test Needed

Report completed 8-17-04 J. Jones

Released By Signature	Date & Time Released 8/11/4 1416	Received By Signature	Date & Time Received 8/11/04 1416
Printed Name		Printed Name CKDuffee	
Released By Signature	Date & Time Released	Received By Signature	Date & Time Received
Printed Name		Printed Name	

Please indicate reporting requirements:
☐ 1. Results Only (EPA Level I)
☐ 2. Results & QC (EPA Level II)
☐ 3. Results, QC and Raw Data (EPA Level III)

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**MAY 2, 2006**
FROM:	**ERIN M. FAUST**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC AND INORGANIC DATA VALIDATION – TCL VOCs, IRON AND MISCELLANEOUS PARAMETERS**
CTO-283 NCBC GULFPORT
SAMPLE DELIVERY GROUP (SDG) – 0603432

SAMPLES: 1/Aqueous/

04GW1602

Overview

The sample set for CTO 283, NCBC Gulfport, SDG 0603432, consists of one (1) aqueous environmental sample.

The sample was analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), total and dissolved iron, chloride, nitrate, nitrite, orthophosphate, sulfate and sulfide. The samples were collected by Tetra Tech NUS on March 20, 2006 and analyzed by Empirical Laboratories under Department of Defense (DoD) Quality Assurance/Quality Control (QA/QC) criteria. VOC analyses were conducted using SW-846 method 8260B. Analyses for and total and dissolved iron were conducted using SW-846 method 6010B. Analyses for chloride, nitrate, nitrite and sulfate were conducted using EPA method 300.0. Analyses for orthophosphate and sulfate were conducted using EPA methods 365.2 and 376.1, respectively.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibrations
* • Laboratory Blank Results
* • Detection Limits

* - All quality control criteria were met for this parameter.

Notes

The sample for dissolved iron analysis was filtered in the laboratory.

All VOCs were reported from a 2X dilution.

Executive Summary

Laboratory Performance: No laboratory-related issues affected data quality.

Other Factors Affecting Data Quality: None.

TO: R. FISHER – PAGE 2
DATE: MAY 2, 2006

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), "National Functional Guidelines for Inorganic Review", July 2002 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 Guidelines and the Quality Assurance Project Plan (QAPP)."

Erin M Faust

Tetra Tech NUS
Erin M. Faust
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. 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 DDT 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: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1602	nsample	04GW1602
samp_date	3/30/2006	samp_date	3/30/2006
lab_id	0603432-01	lab_id	0603432-01
qc_type	NM	qc_type	NM
units	UG/L	units	UG/L
Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	2	U	
1,1,2,2-TETRACHLOROETHANE	2	U	
1,1,2-TRICHLOROETHANE	2	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	2	U	
1,1-DICHLOROETHANE	2	U	
1,1-DICHLOROETHENE	2	U	
1,2,4-TRICHLOROBENZENE	2	U	
1,2-DIBROMO-3-CHLOROPROPANE	4	U	
1,2-DIBROMOETHANE	2	U	
1,2-DICHLOROBENZENE	2	U	
1,2-DICHLOROETHANE	2	U	
1,2-DICHLOROPROPANE	2	U	
1,3-DICHLOROBENZENE	2	U	
1,4-DICHLOROBENZENE	2	U	
2-BUTANONE	20	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	20	U	
BENZENE	2	U	
BROMODICHLOROMETHANE	2	U	
BROMOFORM	2	U	
BROMOMETHANE	4	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	2	U	
CHLOROBENZENE	2	U	
CHLORODIBROMOMETHANE	2	U	
CHLOROETHANE	4	U	
CHLOROFORM	2	U	
CHLOROMETHANE	4	U	
CIS-1,2-DICHLOROETHENE	170		
CIS-1,3-DICHLOROPROPENE	2	U	
CYCLOHEXANE	4	U	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	4	U	
ETHYLBENZENE	2	U	
ISOPROPYLBENZENE	2	U	
METHYL ACETATE	2	U	
METHYL CYCLOHEXANE	2	U	
METHYL TERT-BUTYL ETHER	2	U	
METHYLENE CHLORIDE	4	U	
STYRENE	2	U	
TETRACHLOROETHENE	2	U	
TOLUENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,2-DICHLOROETHENE	89		
TRANS-1,3-DICHLOROPROPENE	2	U	
TRICHLOROETHENE	4.1		
TRICHLOROFLUOROMETHANE	4	U	
VINYL CHLORIDE	84		

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: M

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	38600			

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: MF

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	6890			

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	30.1			
NITRATE-N	MG/L	0.05	U	U	
NITRITE-N	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.01	U	U	
SULFATE	MG/L	69.2			
SULFIDE	MG/L	0.75	U	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**SEPTEMBER 26, 2006**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION- VOA CTO 283, NCBC GULFPORT SDG 0607248**		
SAMPLES:	2/Aqueous		
	04GW2301 TRIP BLANK		

OVERVIEW

The sample set for CTO 283 NCBC Gulfport, SDG 0607248 consists of one (1) trip blank and one (1) aqueous environmental sample. The sample was analyzed for select volatile organic compounds (VOC), carbon tetrachloride, chloroform, chloromethane, 1,2-dichloroethane, 1,1-dichloroethene, trans-1,2-dichloroethene, methylene chloride, tetrachlchloroethene, trichloroethene, and vinyl chloride.

The samples were collected by TetraTech NUS on July 28, 2006 and analyzed by ELAB of Tennessee, LLC. All analyses were conducted in accordance with DoD QSM for Environmental Laboratories Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Method 8260B analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
* • Initial/continuing calibrations
* • Trip/Laboratory method blank results
* • 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.

Volatiles

No qualification of the data was necessary.

Additional Comments:

None.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), 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

Edward Sedlmyer
Chemist/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:

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B = Field Blank Contamination
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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 DDT 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: 9666

SDG: 0607248 MEDIA: WATER DATA FRACTION: OV

nsample	04GW2301	nsample	TRIP BLANK
samp_date	7/28/2006	samp_date	7/28/2006
lab_id	0607248-01	lab_id	0607248-02
qc_type	NM	qc_type	NM
units	UG/L	units	UG/L
Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	1	U	
CIS-1,2-DICHLOROETHENE	1	U	
METHYLENE CHLORIDE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	1	U	
CIS-1,2-DICHLOROETHENE	1	U	
METHYLENE CHLORIDE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**JUNE 15, 2006**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC AND INORGANIC DATA VALIDATION – VOC, IRON AND MISCELLANEOUS PARAMETERS**
CTO 283 NCBC GULFPORT
SAMPLE DELIVERY GROUP (SDG) – GULFPORT4-001

SAMPLES: 20/Aqueous

04MP0101-A	04MP0201-A	04MP0301-A
04MW1202	04MW1302	04MW1402
04MW1502	04MW1702	04MW2002
04MW2101	04MW2201	04MW2401
04MW2501	04MW2601	04MW2701
04MW2801	04MW2901	04MW2901D
04MW3001	TRIP BLANK	

3/Solid

04MP0101	04MP0201	04MP0301

Overview

The sample set for CTO 283, NCBC Gulfport, SDG GULFPORT4-001, consists of one (1) trip blank, three (3) solid environmental samples and nineteen (19) aqueous environmental samples, including one (1) field duplicate. The field duplicate pair included in this SDG is 04MW2901 / 04MW2901D.

All samples were analyzed for select volatile organic compounds (VOCs), carbon tetrachloride, chloroform, chloromethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride. Samples 04MP0101, 04MP0201, and 04MP0301 were analyzed for total and dissolved iron, chloride, nitrate, nitrite, orthophosphate, sulfate and sulfide. The samples were collected by Tetra Tech NUS on April 11, 13, 20, and 21, 2006 and analyzed by Empirical Laboratories. VOC analyses were conducted using SW-846 method 8260B. Analyses for and total and dissolved iron were conducted using SW-846 method 6010B. Analyses for chloride, nitrate, nitrite and sulfate were conducted using EPA method 300.0. Analyses for orthophosphate and sulfide were conducted using EPA methods 365.2 and 376.1, respectively.

The data contained in this SDG were validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
• Laboratory Blank Analyses
* • Initial/continuing calibrations
* • Field Duplicate Results
* • 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.

Volatiles

The following compounds were detected in the method blanks or trip blanks:

Compound	Maximum Concentration	Blank Action Level
Methylene chloride	1.5 ug/L	15 ug/L
Chloromethane	0.28 ug/L	1.4 ug/L
Methylene chloride	10 ug/kg	100 ug/kg
Chloromethane	0.46 ug/kg	2.3 ug/kg

- Value < Reporting Limit (RL); report RL followed by a U.
- Value > RL and < Action level; report value followed by a U.

An action level of 10X the maximum contaminant concentration was established for methylene chloride; 5X for chloromethane to evaluate laboratory contamination. Dilution factors, percent moisture, and sample aliquots were taken into consideration during the application of all action levels. The positive results for chloromethane and methlyene chloride below the blank action level were qualified as non-detected, U. Trip blanks were not qualified due to method blank contamination.

The soil samples were submitted to the laboratory in preserved vials for 5035 analysis without additional volume for percent moisture determination. The laboratory evaporated off the methanol from one aliquot then determined the percent moisture by the conventional method. The laboratory corrected the VOA results for percent moisture but did not provide the percent moisture result in the EDD. The data validator included the percent moisture result in the EDD. No qualification action was taken on the VOA results for how the percent moisture was determined.

Sample 04MW2201 required a 5X dilution because of high concentrations of cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride. The diluted analyses was used to report the aforementioned compounds. All other compounds were reported from the undiluted analyses.

Metals

No qualification of the data was necessary.

Miscellanous

The laboratory flagged a sulfide result with a "B" qualifier indicating that the result was associated with a method blank containing that analyte. Upon review of the data the did not contain sulfide and blank qualification was un-necessary.

Notes

The samples for dissolved iron analyses were filtered in the laboratory.

Samples 04MP0101, 04MP0201, and 04MP0301 had identical sample IDs for the aqueous and soil samples submitted to the laboratory. A "-A" was added to the aqueous sample IDs to make them unique in the database.

Positive results reported below the quantitation limit but above the method detection limit were qualified as estimated, J.

Executive Summary

Laboratory Performance: Qualification of the data resulted from laboratory contamination.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), "National Functional Guidelines for Inorganic Review", July 2002 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 Guidelines and the Quality Assurance Project Plan (QAPP)."

Ed Sedlmyer

Tetra Tech NUS
Edward Sedlmyer
Chemist/Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. 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 DDT 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: 9666

SDG: GULFPORT4-001 MEDIA: SOIL DATA FRACTION: OV

nsample	04MP0101
samp_date	4/13/2006
lab_id	0604175-03
qc_type	NM
units	UG/KG
Pct_Solids	87.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	5	U	U	
1,2-DICHLOROETHANE	5	U	U	
CARBON TETRACHLORIDE	5	U	U	
CHLOROFORM	5	U	U	
CHLOROMETHANE	0.55	JB	U	A
CIS-1,2-DICHLOROETHENE	5	U	U	
METHYLENE CHLORIDE	13	B	U	A
TETRACHLOROETHENE	5	U	U	
TRANS-1,2-DICHLOROETHENE	5	U	U	
TRICHLOROETHENE	5	U	U	
VINYL CHLORIDE	5	U	U	

nsample	04MP0201
samp_date	4/13/2006
lab_id	0604175-04
qc_type	NM
units	UG/KG
Pct_Solids	83.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	5.6	U	U	
1,2-DICHLOROETHANE	5.6	U	U	
CARBON TETRACHLORIDE	5.6	U	U	
CHLOROFORM	5.6	U	U	
CHLOROMETHANE	0.45	JB	U	A
CIS-1,2-DICHLOROETHENE	5.6	U	U	
METHYLENE CHLORIDE	13	B	U	A
TETRACHLOROETHENE	5.6	U	U	
TRANS-1,2-DICHLOROETHENE	5.6	U	U	
TRICHLOROETHENE	5.6	U	U	
VINYL CHLORIDE	5.6	U	U	

nsample	04MP0301
samp_date	4/13/2006
lab_id	0604175-05
qc_type	NM
units	UG/KG
Pct_Solids	85.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	6.6	U	U	
1,2-DICHLOROETHANE	6.6	U	U	
CARBON TETRACHLORIDE	6.6	U	U	
CHLOROFORM	6.6	U	U	
CHLOROMETHANE	0.74	JB	U	A
CIS-1,2-DICHLOROETHENE	6.6	U	U	
METHYLENE CHLORIDE	17	B	U	A
TETRACHLOROETHENE	6.6	U	U	
TRANS-1,2-DICHLOROETHENE	6.6	U	U	
TRICHLOROETHENE	6.6	U	U	
VINYL CHLORIDE	6.6	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MP0101-A
samp_date	4/20/2006
lab_id	0604242-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.48	JB	U	A
CIS-1,2-DICHLOROETHENE	1.6			
METHYLENE CHLORIDE	0.71	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1.8			
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	0.64	J	J	P

nsample	04MP0201-A
samp_date	4/20/2006
lab_id	0604242-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.43	JB	U	A
CIS-1,2-DICHLOROETHENE	0.37	J	J	P
METHYLENE CHLORIDE	0.8	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	0.38	J	J	P
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MP0301-A
samp_date	4/20/2006
lab_id	0604242-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.45	JB	U	A
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.68	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW1202
samp_date	4/11/2006
lab_id	0604165-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.56	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW1302
samp_date	4/11/2006
lab_id	0604165-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.58	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW1402
samp_date	4/13/2006
lab_id	0604175-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	47			
METHYLENE CHLORIDE	0.58	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	22			
TRICHLOROETHENE	0.55	J	J	P
VINYL CHLORIDE	14			

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW1502
samp_date	4/11/2006
lab_id	0604165-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.5	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW1702
samp_date	4/13/2006
lab_id	0604175-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.68	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW2002
samp_date	4/11/2006
lab_id	0604165-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.6	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW2101
samp_date	4/21/2006
lab_id	0604248-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.56	JB	U	A
CIS-1,2-DICHLOROETHENE	5.9			
METHYLENE CHLORIDE	1	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	6.4			
TRICHLOROETHENE	1			
VINYL CHLORIDE	18			

nsample	04MW2201
samp_date	4/21/2006
lab_id	0604248-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1.2			
1,2-DICHLOROETHANE	0.24	J	J	P
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	470	D		
METHYLENE CHLORIDE	1	U	U	
TETRACHLOROETHENE	0.72	J	J	P
TRANS-1,2-DICHLOROETHENE	310	D		
TRICHLOROETHENE	110			
VINYL CHLORIDE	190	D		

nsample	04MW2401
samp_date	4/20/2006
lab_id	0604242-08
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	1	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW2501
samp_date	4/21/2006
lab_id	0604248-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1.4			
METHYLENE CHLORIDE	0.7	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	0.77	J	J	P
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	0.67	J	J	P

nsample	04MW2601
samp_date	4/21/2006
lab_id	0604248-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.68	JB	U	A
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.68	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW2701
samp_date	4/21/2006
lab_id	0604248-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.58	JB	U	A
CIS-1,2-DICHLOROETHENE	25			
METHYLENE CHLORIDE	1	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	11			
TRICHLOROETHENE	1	J	J	P
VINYL CHLORIDE	11			

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW2801
samp_date	4/20/2006
lab_id	0604242-07
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.47	JB	U	A
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.7	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	0.37	J	J	P

nsample	04MW2901
samp_date	4/20/2006
lab_id	0604242-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.63	JB	U	A
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.76	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	04MW2901D
samp_date	4/20/2006
lab_id	0604242-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	04MW2901

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.44	JB	U	A
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	0.67	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: OV

nsample	04MW3001
samp_date	4/20/2006
lab_id	0604242-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	0.98	J	J	P
METHYLENE CHLORIDE	0.71	JB	U	A
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	0.36	J	J	P
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

nsample	TRIP BLANK
samp_date	4/21/2006
lab_id	0604248-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	1	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
METHYLENE CHLORIDE	1.1	B		
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRICHLOROETHENE	1	U	U	
VINYL CHLORIDE	1	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: M

nsample	04MP0101	nsample	04MP0201	nsample	04MP0301
samp_date	4/20/2006	samp_date	4/20/2006	samp_date	4/20/2006
lab_id	0604242-03	lab_id	0604242-04	lab_id	0604242-05
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	23200			

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	1720			

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	9440			

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: MF

nsample	04MP0101
samp_date	4/20/2006
lab_id	0604242-03Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	20400			

nsample	04MP0201
samp_date	4/20/2006
lab_id	0604242-04Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	1200			

nsample	04MP0301
samp_date	4/20/2006
lab_id	0604242-05Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	5120			

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0101
samp_date	4/20/2006
lab_id	0604242-03
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	28.2			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.076			
SULFATE	MG/L	106			
SULFIDE	MG/L	0.75	U	U	

nsample	04MP0201
samp_date	4/20/2006
lab_id	0604242-04
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	17.3			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.059			
SULFATE	MG/L	222			
SULFIDE	MG/L	1.3			

nsample	04MP0301
samp_date	4/20/2006
lab_id	0604242-05
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	17.5			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.041			
SULFATE	MG/L	348			
SULFIDE	MG/L	0.8	B	J	P

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO: R. FISHER **DATE:** JUNE 5, 2006

FROM: EDWARD SEDLMYER **COPIES:** DV FILE

SUBJECT: ORGANIC DATA VALIDATION- VOA
CTO 283, NCBC GULFPORT
SDG NAL06

SAMPLES: 64/Aqueous

04GP2501	04GP2502	04GP2503	04GP2601	04GP2602
04GP2603	04GP2604	04GP2701	04GP2702	04GP2703
04GP2704	04GP2801	04GP2802	04GP2803	04GP2804
04GP2901	04GP2902	04GP2903	04GP3001	04GP3002
04GP3003	04GP3101	04GP3102	04GP3201	04GP3202
04GP3301	04GP3302	04GP3401	04GP3402	04GP3501
04GP3502	04GP3503	04GP3504	04GP3601	04GP3602
04GP3603	04GP3604	04GP3701	04GP3702	04GP3703
04GP3801	04GP3802	04GP3803	04GP3901	04GP3902
04GP3903	04GP4001	04GP4002	04GP4003	04GP4004
04GP4101	04GP4102	04GP4103	04GP4104	04GP4201
04GP4202	04GP4203	04GP4301	04GP4302	04GP4303
04GP4304	04GP4401	04GP4402	04GP4403	

OVERVIEW

The sample set for CTO 283 NCBC Gulfport, SDG NAL06 consists of sixty-four (64) aqueous environmental samples. The samples were analyzed for select volatile organic compounds (VOC), 1,1-dichloroethene, 1,2-dichloroethane, carbon tetrachloride, chloroform, chloromethane, cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride.

The samples were collected by TetraTech NUS on March 28, 29, 30, and 31, 2006 and analyzed by New Age/Landmark. All analyses were conducted in accordance with SW-846 Method 8260B analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

- Data completeness
- * Holding times
- * Initial/continuing calibrations
- * Laboratory method blank results
- * 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.

Volatiles

No qualification of the data was necessary.

Additional Comments:

The data was generated on site by a mobile laboratory.

Initial calibrations and GC/MS tunes were not provided in the initial data deliverable. The information was provided upon request.

The electronic data deliverable (EDD) did not contain a populated field for laboratory qualifiers. All non-detected results were qualified with a "U" qualifier by the data reviewer.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Data package and EDD were incomplete.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), 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 for Environmental Laboratories".

Edward Sedlmyer
Tetra Tech NUS

Edward Sedlmyer
Chemist/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 DDT 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: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2501	nsample	04GP2502	nsample	04GP2503
samp_date	3/28/2006	samp_date	3/28/2006	samp_date	3/28/2006
lab_id	06039-003	lab_id	06039-002	lab_id	06039-001
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2601
samp_date	3/28/2006
lab_id	06039-007
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2602
samp_date	3/28/2006
lab_id	06039-006
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2603
samp_date	3/28/2006
lab_id	06039-005
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2604
samp_date	3/28/2006
lab_id	06039-004
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2701
samp_date	3/28/2006
lab_id	06039-011
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2702
samp_date	3/28/2006
lab_id	06039-010
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2703
samp_date	3/28/2006
lab_id	06039-009
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2704
samp_date	3/28/2006
lab_id	06039-008
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP2801
samp_date	3/28/2006
lab_id	06039-015RR
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	2	U	
1,2-DICHLOROETHANE	2	U	
CARBON TETRACHLORIDE	2	U	
CHLOROFORM	2	U	
CHLOROMETHANE	10	U	
CIS-1,2-DICHLOROETHENE	120		
TETRACHLOROETHENE	2	U	
TRANS-1,2-DICHLOROETHENE	82		
TRICHLOROETHENE	9.3		
VINYL CHLORIDE	130		

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2802
samp_date	3/28/2006
lab_id	06039-014RR
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	10	U	
1,2-DICHLOROETHANE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	50	U	
CIS-1,2-DICHLOROETHENE	450		
TETRACHLOROETHENE	10	U	
TRANS-1,2-DICHLOROETHENE	420		
TRICHLOROETHENE	39		
VINYL CHLORIDE	1000		

nsample	04GP2803
samp_date	3/28/2006
lab_id	06039-013RR
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	10	U	
1,2-DICHLOROETHANE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	50	U	
CIS-1,2-DICHLOROETHENE	970		
TETRACHLOROETHENE	10	U	
TRANS-1,2-DICHLOROETHENE	800		
TRICHLOROETHENE	120		
VINYL CHLORIDE	1500		

nsample	04GP2804
samp_date	3/28/2006
lab_id	06039-012RR
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	10	U	
1,2-DICHLOROETHANE	10	U	
CARBON TETRACHLORIDE	10	U	
CHLOROFORM	10	U	
CHLOROMETHANE	50	U	
CIS-1,2-DICHLOROETHENE	560		
TETRACHLOROETHENE	10	U	
TRANS-1,2-DICHLOROETHENE	630		
TRICHLOROETHENE	34		
VINYL CHLORIDE	1600		

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP2901
samp_date	3/29/2006
lab_id	06039-018
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	52		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	15		
TRICHLOROETHENE	2.6		
VINYL CHLORIDE	8.9		

nsample	04GP2902
samp_date	3/29/2006
lab_id	06039-017
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	44		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	13		
TRICHLOROETHENE	2.8		
VINYL CHLORIDE	7.9		

nsample	04GP2903
samp_date	3/29/2006
lab_id	06039-016
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	63		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	18		
TRICHLOROETHENE	4.9		
VINYL CHLORIDE	8.5		

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3001	nsample	04GP3002	nsample	04GP3003
samp_date	3/29/2006	samp_date	3/29/2006	samp_date	3/29/2006
lab_id	06039-021	lab_id	06039-020	lab_id	06039-019
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3101
samp_date	3/29/2006
lab_id	06039-023
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3102
samp_date	3/29/2006
lab_id	06039-022
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3201
samp_date	3/29/2006
lab_id	06039-025
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3202	nsample	04GP3301	nsample	04GP3302
samp_date	3/29/2006	samp_date	3/29/2006	samp_date	3/29/2006
lab_id	06039-024	lab_id	06039-027RR	lab_id	06039-026RR
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3401
samp_date	3/29/2006
lab_id	06039-029
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	120		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	67		
TRICHLOROETHENE	8.2		
VINYL CHLORIDE	15		

nsample	04GP3402
samp_date	3/29/2006
lab_id	06039-028
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	86		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	36		
TRICHLOROETHENE	5.5		
VINYL CHLORIDE	12		

nsample	04GP3501
samp_date	3/30/2006
lab_id	06039-033
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3502
samp_date	3/30/2006
lab_id	06039-032
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3503
samp_date	3/30/2006
lab_id	06039-031
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3504
samp_date	3/30/2006
lab_id	06039-030
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3601	nsample	04GP3602	nsample	04GP3603
samp_date	3/30/2006	samp_date	3/30/2006	samp_date	3/30/2006
lab_id	06039-037	lab_id	06039-036	lab_id	06039-035
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3604
samp_date	3/30/2006
lab_id	06039-034
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3701
samp_date	3/30/2006
lab_id	06039-040
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3702
samp_date	3/30/2006
lab_id	06039-039
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3703
samp_date	3/30/2006
lab_id	06039-038
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3801
samp_date	3/30/2006
lab_id	06039-043
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3802
samp_date	3/30/2006
lab_id	06039-042
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3803
samp_date	3/30/2006
lab_id	06039-041
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP3901
samp_date	3/30/2006
lab_id	06039-046
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	31		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	10		
TRICHLOROETHENE	2.8		
VINYL CHLORIDE	4		

nsample	04GP3902
samp_date	3/30/2006
lab_id	06039-045
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	110		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	42		
TRICHLOROETHENE	12		
VINYL CHLORIDE	16		

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP3903
samp_date	3/30/2006
lab_id	06039-044
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	130		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	49		
TRICHLOROETHENE	15		
VINYL CHLORIDE	19		

nsample	04GP4001
samp_date	3/31/2006
lab_id	06039-050
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4002
samp_date	3/31/2006
lab_id	06039-049
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4003
samp_date	3/31/2006
lab_id	06039-048
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4004
samp_date	3/31/2006
lab_id	06039-047
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4101
samp_date	3/31/2006
lab_id	06039-054
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4102
samp_date	3/31/2006
lab_id	06039-053
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4103
samp_date	3/31/2006
lab_id	06039-052
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4104
samp_date	3/31/2006
lab_id	06039-051
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4201	nsample	04GP4202	nsample	04GP4203
samp_date	3/31/2006	samp_date	3/31/2006	samp_date	3/31/2006
lab_id	06039-057	lab_id	06039-056	lab_id	06039-055
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4301
samp_date	3/31/2006
lab_id	06039-061
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	24		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	9.6		
TRICHLOROETHENE	1.1		
VINYL CHLORIDE	4.5		

nsample	04GP4302
samp_date	3/31/2006
lab_id	06039-060
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	110		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	53		
TRICHLOROETHENE	6.8		
VINYL CHLORIDE	38		

nsample	04GP4303
samp_date	3/31/2006
lab_id	06039-059
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	63		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	32		
TRICHLOROETHENE	3.8		
VINYL CHLORIDE	22		

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4304
samp_date	3/31/2006
lab_id	06039-058
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	100		
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	49		
TRICHLOROETHENE	4.8		
VINYL CHLORIDE	39		

nsample	04GP4401
samp_date	3/31/2006
lab_id	06039-064
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

nsample	04GP4402
samp_date	3/31/2006
lab_id	06039-063
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

PROJ_NO: 9666

SDG: NAL06 MEDIA: WATER DATA FRACTION: OV

nsample	04GP4403
samp_date	3/31/2006
lab_id	06039-062
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	5	U	
CIS-1,2-DICHLOROETHENE	1	U	
TETRACHLOROETHENE	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	1	U	

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**APRIL 27, 2006**
FROM:	**ERIN M. FAUST**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – DISSOLVED GASES, VOLATILE FATTY ACIDS, HYDROGEN & TOC**
CTO-283 NCBC GULFPORT
SAMPLE DELIVERY GROUP (SDG) – P0603551

SAMPLES: 1/Aqueous/

04GW1602

Overview

The sample set for CTO 283, NCBC Gulfport, SDG P0603551, consists of one (1) aqueous environmental sample.

The sample was analyzed for dissolved gases (ethane, ethene, methane, acetylene, isobutane, butane, propane and propylene), total organic carbon (TOC), hydrogen and the Volatile Fatty Acids (VFAs) acetic acid, butanoic acid, hexanoic acid, l-hexanoic acid, l-pentanoic acid, lactic acid, pentanoic acid, propionic acid and pyruvic acid. The samples were collected by Tetra Tech NUS on March 30, 2006 and analyzed by Microseeps under Department of Defense (DoD) Quality Assurance/Quality Control (QA/QC) criteria. TOC analyses were conducted using SW-846 method 9060. Analyses for and dissolved gases and hydrogen were conducted following Microseeps' Standard Operating Procedure (SOP) AM20GAX. Analyses for volatile fatty acids were conducted following Microseeps' SOP AM23G.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibrations
* • Laboratory Blank Results
  • Detection Limits

* - All quality control criteria were met for this parameter.

Detection Limits

The laboratory reported positive results between the Method Detection Limit (MDL) and the Required Detection Limit (RDL) for butane and isobutane. These results were qualified as estimated, "J", due to uncertainty near the detection limit.

TO: R. FISHER – PAGE 2
DATE: APRIL 27, 2006

Executive Summary

Laboratory Performance: No laboratory-related issues affected data quality.

Other Factors Affecting Data Quality: Butane and isobutane results were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) 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.

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 Guidelines and the Quality Assurance Project Plan (QAPP)."

for Tetra Tech NUS
Erin M. Faust
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. 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 DDT 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: 9666

SDG: P0603551 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01B
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ETHANE	2.5		
ETHENE	14		
METHANE	1600		

PROJ_NO: 9666

SDG: P0603551 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ACETIC ACID	MG/L	0.11		
ACETYLENE	UG/L	1.0	U	
BUTANE	UG/L	0.017	J	P
BUTANOIC ACID	MG/L	0.07	U	
HEXANOIC ACID	MG/L	0.10	U	
I-HEXANOIC ACID	MG/L	0.10	U	
I-PENTANOIC ACID	MG/L	0.07	U	
ISOBUTANE	UG/L	0.014	J	P
LACTIC ACID	MG/L	0.10	U	
PENTANOIC ACID	MG/L	0.07	U	
PROPANE	UG/L	0.22		
PROPIONIC ACID	MG/L	0.07	U	
PROPYLENE	UG/L	0.10		
PYRUVIC ACID	MG/L	0.07	U	
TOTAL ORGANIC CARBON	MG/L	31.0		

PROJ_NO: 9666

SDG: P0603551 MEDIA: AIR DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01B
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	3.5		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. FISHER**	**DATE:**	**MAY 24, 2006**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**
SUBJECT:	**INORGANIC DATA VALIDATION – ESTIMATED TOC** **NCBC GULFPORT – CTO 283** **SAMPLE DELIVERY GROUP (SDG) – P0604269**		
SAMPLES:	3/SOIL/		
	04MP0101	04MP0201	04MP0301

Overview

The sample set for NCBC Gulfport, CTO 283, SDG P0604269, consists of three (3) soil environmental samples.

All samples were analyzed for estimated total organic carbon (TOC). The samples were collected by Tetra Tech NUS on April 13, 2006 and analyzed by Microseeps, Inc. TOC analyses were conducted using the Walkley-Black method.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Analyses
* • Laboratory Method/Preparation Blank Analyses
* • Detection Limits

* - All quality control criteria were met for this parameter.

Notes

The samples included in this SDG have an "S" character appended to the field sample id. This was done to differentiate these samples from aqueous samples collected on 4/20/06 with the same sample id.

Executive Summary

Laboratory Performance: No quality control issues were noted for this SDG.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", July 2002 and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (January 2006).

TO: **FISHER, R. – PAGE 2**
DATE: **MAY 24, 2006**

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the DoD QSM and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. 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 $r < 0.995$
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 DDT 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: 9666

SDG: P0604269 MEDIA: SOIL DATA FRACTION: MISC

nsample	04MP0101
samp_date	4/13/2006
lab_id	P0604269-01A
qc_type	NM
Pct_Solids	86.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
PERCENT SOLIDS	%	86		

nsample	04MP0101S
samp_date	4/13/2006
lab_id	P0604269-01A
qc_type	NM
Pct_Solids	86.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
TOTAL ORGANIC CARBON	MG/KG	2700		

nsample	04MP0201
samp_date	4/13/2006
lab_id	P0604269-02A
qc_type	NM
Pct_Solids	83.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
PERCENT SOLIDS	%	83		

PROJ_NO: 9666

SDG: P0604269 MEDIA: SOIL DATA FRACTION: MISC

nsample	04MP0201S	nsample	04MP0301	nsample	04MP0301S
samp_date	4/13/2006	samp_date	4/13/2006	samp_date	4/13/2006
lab_id	P0604269-02A	lab_id	P0604269-03A	lab_id	P0604269-03A
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	83.0	Pct_Solids	82.0	Pct_Solids	82.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
TOTAL ORGANIC CARBON	MG/KG	2600		

Parameter	units	Result	Val Qual	Qual Code
PERCENT SOLIDS	%	82		

Parameter	units	Result	Val Qual	Qual Code
TOTAL ORGANIC CARBON	MG/KG	5000		

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**B. FISHER**	**DATE:**	**JUNE 2, 2006**
FROM:	**EDWARD SEDLMYER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- OVG/VFA/TOC**
CTO 283, NCBC GULFPORT
SDG P0604379

SAMPLES: 3 Aqueous

04MP0101 04MP0201 04MP0301

OVERVIEW

The sample set for CTO 283, NCBC Gulfport, SDG P0604379 consists of three (3) environmental aqueous samples. All samples were analyzed for methane, ethene, and ethane organic volatile gases (OVG), light hydrocarbons, and total organic carbon (TOC). In addition, samples 04MP0101 and 04MP0301 were analyzed for volatile fatty acids (VFA).

The samples were collected by TetraTech NUS on April 20, 2006 and analyzed by Microseeps. All analyses were conducted in accordance with SW-846 Method 9060 and Microseeps Methods AM20GAX and AM23G analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
* • Initial and continuing calibration
* • Laboratory method and field quality control blank results
* • Detection Limits

The symbol (*) indicates that all 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.

VFA

Lactic acid and HIBA were detected in the method blank at a concentration of 0.099 mg/L. No action was taken on the basis because lactic acid and HIBA were not detected in any samples.

The matrix spike and matrix spike duplicate performed on sample P0604337-01 had recoveries less than the quality control limit for lactic acid and HIBA (66% & 65%, respectively versus 70%). No action was taken on this basis because the MS/MSD was not performed on a sample contained with in this SDG.

OVG

No qualifications were assigned to this fraction.

TOC

No qualifications were assigned to this fraction.

Notes

Fatty acids were originally marked on the COC to be analyzed on sample 04MP0201. However, the lab did not receive a sample bottle marked for fatty acids. Jason Bourgeois was contacted about the discrepancy and he confirmed that the COC was incorrectly marked. Fatty acids were not intended to be analyzed for sample 04MP0201. No action was taken on basis.

Positive results below the reporting limit were qualified as estimated (J) due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) 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
Edward Sedlmyer
Chemist/Data Validator

TetraTech NUS
Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

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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 DDT 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: 9666

SDG: P0604379 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0101
samp_date	4/20/2006
lab_id	P0604379-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETIC ACID	MG/L	0.667	M		
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.037			
BUTANOIC ACID	MG/L	0.282			
HEXANOIC ACID	MG/L	0.1	U	U	
HYDROGEN	NM	3.9			
I-HEXANOIC ACID	MG/L	0.1	U	U	
I-PENTANOIC ACID	MG/L	0.07	U	U	
ISOBUTANE	UG/L	0.022	J	J	P
LACTIC ACID	MG/L	0.1	U	U	
PENTANOIC ACID	MG/L	0.07	U	U	
PROPANE	UG/L	0.38			
PROPIONIC ACID	MG/L	0.07	U	U	
PROPYLENE	UG/L	0.022	J	J	P
PYRUVIC ACID	MG/L	0.07	U	U	
TOTAL ORGANIC CARBON	MG/L	45			

nsample	04MP0201
samp_date	4/20/2006
lab_id	P0604379-02B
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.044			
HYDROGEN	NM	2.6			
ISOBUTANE	UG/L	0.022	J	J	P
PROPANE	UG/L	0.27			
PROPYLENE	UG/L	0.025	U	U	
TOTAL ORGANIC CARBON	MG/L	25			

nsample	04MP0301
samp_date	4/20/2006
lab_id	P0604379-03A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETIC ACID	MG/L	0.125	M		
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.059			
BUTANOIC ACID	MG/L	0.07	U	U	
HEXANOIC ACID	MG/L	0.1	U	U	
HYDROGEN	NM	2.5			
I-HEXANOIC ACID	MG/L	0.1	U	U	
I-PENTANOIC ACID	MG/L	0.07	U	U	
ISOBUTANE	UG/L	0.037			
LACTIC ACID	MG/L	0.1	U	U	
PENTANOIC ACID	MG/L	0.07	U	U	
PROPANE	UG/L	0.39			
PROPIONIC ACID	MG/L	0.07	U	U	
PROPYLENE	UG/L	0.014	J	J	P
PYRUVIC ACID	MG/L	0.07	U	U	
TOTAL ORGANIC CARBON	MG/L	35			

PROJ_NO: 9666

SDG: P0604379 MEDIA: WATER DATA FRACTION: OVG

nsample	04MP0101	nsample	04MP0201	nsample	04MP0301
samp_date	4/20/2006	samp_date	4/20/2006	samp_date	4/20/2006
lab_id	P0604379-01B	lab_id	P0604379-02B	lab_id	P0604379-03B
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	5.8			
ETHENE	0.038			
METHANE	3600			

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	0.27			
ETHENE	0.009	J	J	P
METHANE	1600			

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	2.7			
ETHENE	0.013			
METHANE	1900			

APPENDIX D

HUMAN HEALTH RISK ASSESSMENT SUPPORTING DATA

Appendix D-1 – RAGS-PART D Tables and Risk Assessment Calculations

Appendix D-2 – Example Risk Assessment Calculations

Appendix D-3 – 95 Percent UCLs and Distributions of Data Sets

APPENDIX D-1

RAGS-PART D TABLES
AND
RISK ASSESSMENT CALCULATIONS

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL/SEDIMENT FUTURE CONSTURCTION WORKER		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of subsurface soil by the future construction worker for the Reasonable Maximum Exposure (RME).

EQUATION:

$$IEX = \frac{Cs \times IR \times EF \times ED \times FI \times CF}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil/sediment (mg/kg)
IR	=	incidental soil ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1.0E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cs	=	4.1	mg/kg	Arsenic
IR	=	330	mg/day	
EF	=	30	days/year	
ED	=	1	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	365	days	
CSFo	=	1.5	$(mg/kg/day)^{-1}$	
RfDo	=	3.00E-04	(mg/kg/day)	

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL/SEDIMENT FUTURE CONSTURCTION WORKER		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 07/13/06

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{4.1 \text{ mg/kg} \times 330 \text{ mg/day} \times 30 \text{ days/year} \times 1 \text{ years} \times 0.000001 \text{ kg/mg}}{70 \text{ kg} \times 25550 \text{ days}}$$

IEXc = 2.27E-08 mg/kg/day

ICLR = 2.27E-08 mg/kg/day x 1.5 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 3.4E-08

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{4.1 \text{ mg/kg} \times 330 \text{ mg/day} \times 30 \text{ days/year} \times 1 \text{ years} \times 0.000001 \text{ kg/mg}}{70 \text{ kg} \times 365 \text{ days}}$$

IEXnc = 1.59E-06 mg/kg/day

HQ = 1.59E-06 mg/kg/day / 0.0003 (mg/kg/day) = Hazard Quotient

HQ = 0.005

CALCULATION WORKSHEET

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL/SEDIMENT FUTURE CONSTURCTION WORKER		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with subsurface soil by the future construction worker for the Reasonable Maximum Exposure (RME).

EQUATION:

$$DEX = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:

DEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil/sediment (mg/kg)
CF	=	conversion factor (1.0E-6 kg/mg)
SA	=	skin surface available for contact (cm^2/day)
ABS	=	absorption factor (unitless)
AF	=	adherence factor (mg/cm^2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDd (mg/kg/day)

ASSUMPTIONS:

Cs	=	4.1	mg/kg	Arsenic
CF	=	1.0E-06	kg/mg	
SA	=	3,300	cm^2/day	
AF	=	0.3	mg/cm^2	
ABS	=	0.03		
EF	=	30	days/year	
ED	=	1	years	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	365	days	
CSFd	=	1.5	(mg/kg/day)$^{-1}$	
RfDd	=	3.00E-04	(mg/kg/day)	

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH SOIL/SEDIMENT FUTURE CONSTURCTION WORKER		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T. JACKMAN	CHECKED BY:	DATE: 07/13/06

EXAMPLE CARCINOGENIC CALCULATION

$$DEXc = \frac{4.1\ mg/kg \times 0.000001\ kg/mg \times 3300cm2/day \times 0.3mg/cm2 \times 0.03 \times 30\ days/year \times 1\ years}{70\ kg \times 25550\ days}$$

DEXc = 2.04E-09 mg/kg/day

ICLR = 2.04E-09 mg/kg/day x 1.5 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 3.1E-09

EXAMPLE NONCARCINOGENIC CALCULATION

$$DEXnc = \frac{4.1\ mg/kg \times 0.000001\ kg/mg \times 3300cm2/day \times 0.3mg/cm2 \times 0.03 \times 30\ days/year \times 1\ years}{70\ kg \times 365\ days}$$

DEXnc = 1.43E-07 mg/kg/day

HQ = 1.43E-07 mg/kg/day / 0.0003 (mg/kg/day) = Hazard Quotient

HQ = 0.0005

CALCULATION WORKSHEET

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater by the future adult resident (RME).

EQUATION:

$$IEX = \frac{Cgw \times CF \times IRgw \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (µg/L)
CF	=	conversion factor (1.0E-3 mg/µg)
IRgw	=	ingestion rate (L/hour)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1	µg/L	Benzene
IRgw	=	2	L/day	
CF	=	1.0E-03	mg/µg	
EF	=	350	days/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	8,760	days	
CSFo	=	5.50E-02	$(mg/kg/day)^{-1}$	
RfDo	=	4.00E-03	(mg/kg/day)	

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DECEMBER 1989		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{1\ mg/L \times 0.001\ mg/mg \times 2\ L/day \times 350\ days/year \times 24\ years}{70\ kg \times 25550\ days}$$

IEXc = 9.39E-06 mg/kg/day

ICLR = 9.39E-06 mg/kg/day x 0.055 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 5.2E-07

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{1\ mg/L \times 0.001\ mg/mg \times 2\ L/day \times 350\ days/year \times 24\ years}{70\ kg \times 8760\ days}$$

IEXnc = 2.74E-05 mg/kg/day

HQ = 2.74E-05 mg/kg/day / 0.004 (mg/kg/day) = Hazard Quotient

HQ = 0.007

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater by the future adult resident.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed does per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFd	=	dermal carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDd	=	dermal noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

$$DA_{event} = (K_p)(C_{gw})(t_{event})$$

For Organics:

$$If\ t_{event} < t^*, then\ :\ DA_{event} = FA(2\ K_p)(C_{gw})(CF)\left(\sqrt{\frac{6\ \tau\ t_{event}}{\pi}}\right)$$

$$If\ t_{event} > t^*, then\ :\ DA_{event} = FA(K_p)(C_{gw})(CF)\left(\frac{t_{event}}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	CHECKED BY:	DATE: 07/13/06

Where:

FA	=	fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	0.001	mg/L	Benzene
Kp	=	1.49E-02	cm/hr	
tevent	=	0.33	hr/event	
CF	=	0.001	L/cm^3	
t*	=	7.00E-01	hr/event	
τ	=	2.92E-01	hr/event	
B	=	5.05E-02		
FA	=	1		

tevent < t*, therefore,

$$DAevent = 1 \times (2 \times 0.01487\ cm/hr)\ (0.001\ mg/L)\ (0.001\ L/cm3) \times \sqrt{\frac{6 \times 0.292\ hr/event \times 0.33\ hr/event}{\pi}}$$

DAevent = 1.28E-08 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	18,000	cm^2/day
EV	=	1	event/day
ED	=	24	years
EF	=	350	days/year
BW	=	70	kg
ATc	=	25550	days
ATnc	=	8760	days

CSFd = 5.50E-02 $(mg/kg/day)^{-1}$
RfDd = 4.00E-03 (mg/kg/day)

CALCULATION WORKSHEET

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: U.S. EPA, DECEMBER 1989 AND JULY 2004		
BY: T.JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{1.28E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 25550 \text{ days}}$$

DADc = 1.1E-06 mg/kg/day

DADc = 1.08E-06 mg/kg/day x 0.055 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 5.9E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{1.28E\text{-}08 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 8760 \text{ days}}$$

DADnc = 3.1E-06 mg/kg/day

HQ = 3.15E-06 mg/kg/day / 0.004 (mg/kg/day) = Hazard Quotient

HQ = 0.0008

CALCULATION WORKSHEET

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles while showering by an adult resident.

EQUATIONS:

$$\text{Intake} = \frac{S \times IRsh \times K \times EF \times ED}{BW \times AT \times Ra \times CF}$$

Where:

$$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$$

$S = Cwd \times FR/SV$ $\qquad$ $Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$ $\qquad$ $Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$ $\qquad$ $kg = 3000\ cm/hr \times (18/MW)^{0.5}$

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFi $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDi (mg/kg/day)

Where:

Intake	=	estimated exposure intake (mg/kg/day)
S	=	volatile chemical generation rate (mg/m^3-min - shower)
IRsh	=	inhalation rate (m^3/hr)
EF	=	exposure frequency (showers/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
Ra	=	air exchange rate (1/min)
Ds	=	shower duration (min)
Dt	=	total time in bathroom (min)
FR	=	shower water flow rate (L/min)
SV	=	shower room air volume (m^3)
ts	=	shower droplet drop time (sec)
d	=	shower droplet diameter (mm)
MW	=	molecular weight of compound (g/mole)
H	=	Henry's Law constant ($atm\text{-}m^3/mole$)
T1	=	calibration water temperature (K)
Ts	=	shower water temperature (K)
U1	=	water viscosity at T1 (cp)
Us	=	water viscosity at Ts (cp)
CSFi	=	inhalation carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDi	=	inhalation noncarcinogenic reference dose (mg/kg/day)

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. JACKMAN	CHECKED BY:	DATE: 07/13/06

ASSUMPTIONS:

IRsh	=	0.6	m^3/hr	
EF	=	350	showers/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25550	days	
Atn	=	8760	days	
Ra	=	0.025	1/min	
CF	=	60	min/hr	
Ds	=	15	min	
Dt	=	20	min	
FR	=	10	L/min	
SV	=	12	m^3	
Cw	=	0.001	mg/L	Benzene
ts	=	2	sec	
d	=	1	mm	
MW	=	78	g/mole	
H	=	5.56E-03	atm-m^3/mole	
RT	=	2.40E-02	atm-m^3/mole	
T1	=	293	K	
Ts	=	318	K	
U1	=	0.982	cp	
Us	=	0.616	cp	
CSFi	=	2.70E-02	$(mg/kg/day)^{-1}$	
RfDi	=	8.60E-03	(mg/kg/day)	

EXAMPLE CALCULATION:

k1 = 20 cm/hr x (44 g/mole / 78 g/mole)^0.5

k1 = **15.0 cm/hr**

kg = 3000 cm/hr x (18 g/mole / 78 g/mole)^0.5

kg = **1441.2 cm/hr**

Kl = 1/[1/15.0 cm/hr + 2.40E-02 atm-m3/mole/(5.56E-03 atm-m3/mole x 1441.2 cm/hr)]

Kl = **1.44E+01 cm/hr**

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

Kal = 1.44E+01 cm/hr x [(293 K x 0.616 cp)/(318 K x 0.982 cp)]^-0.5

Kal = **18.9 cm/hr**

Cwd = 0.001 mg/L x [1 - exp((-18.9 cm/hr x 2 sec)/(60 x 1 mm))]

Cwd = **4.68E-04 mg/L**

S = 4.68E-04 mg/L x 10 L/min / 12 m3

S = **3.90E-04 mg/m3-min-shower**

$$K = 15\text{ min} + \frac{\exp(-0.025\text{ 1/min} \times 20\text{ min}) - \exp[0.025\text{ 1/min} \times (15\text{ min} - 20\text{ min})]}{0.025\text{ 1/min}}$$

K = **3.96 min**

CARCINOGENIC INTAKE:

$$\text{Intake} = \frac{3.90\text{E-04 mg/m3-min-shower} \times 0.6\text{ m3/hr} \times 3.96\text{ min} \times 350\text{ showers/year} \times 24\text{ years}}{70\text{ kg} \times 25550\text{ days} \times 0.025\text{ 1/min} \times 60\text{ min/hr}}$$

intake = **2.9E-06 mg/kg-day**

Risk = 0.027 (mg/kg/day)-1 x 2.90E-06 mg/kg-day

Risk = **7.8E-08**

NONCARCINOGENIC INTAKE:

$$\text{Intake} = \frac{3.90\text{E-04 mg/m3-min-shower} \times 0.6\text{ m3/hr} \times 3.96\text{ min} \times 350\text{ showers/year} \times 24\text{ years}}{70\text{ kg} \times 8760\text{ days} \times 0.025\text{ 1/min} \times 60\text{ min/hr}}$$

intake = **8.5E-06 mg/kg-day**

HQ = 8.46E-06 mg/kg-day / 8.60E-03 (mg/kg/day)

HQ = **9.8E-04**

CALCULATION WORKSHEET

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES IN A TRENCH BY FUTURE CONTRUCTION WORKERS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles in a tench by future construction workers.

EQUATION:

$$IEX = \frac{Ca \times IR \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg-day)
Ca	=	exposure point concentration in air (mg/m3)
IR	=	inhlation rate (m3/hr)
ET	=	exposure time (hrs/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFi	=	inhalation carcinogenic slope factor (kg-day/mg)
RfDi	=	inhalation noncarcinogenic reference dose (mg/kg-day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFi (kg-day/mg)
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDi (mg/kg-day)

ASSUMPTIONS:

Ca	=	4.2E-05	mg/m3	Benzene
IR	=	2.5	m3/hr	
ET	=	4	hr/day	
EF	=	30	days/year	
ED	=	1	years	
BW	=	70	kg	
ATc	=	25550	days	
ATnc	=	365	days	
CSFi	=	2.70E-02	(kg-day/mg)	
RfDi	=	8.60E-03	mg/kg-day	

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		**JOB NUMBER:** 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES IN A TRENCH BY FUTURE CONTRUCTION WORKERS		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 7/13/2006

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{4.2E\text{-}05\ mg/m3 \times 2.5\ m3/hr \times 4\ hr/day \times 30\ days/year \times 1\ years}{70\ kg \times 25550\ days}$$

IEXc = 6.96E-09 mg/kg-day

ICLR = 6.96E-09 mg/kg-day x 0.027 (kg-day/mg) = Incremental Lifetime Cancer Risk

ICLR = 1.9E-10

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{4.2E\text{-}05\ mg/m3 \times 2.5\ m3/hr \times 4\ hr/day \times 30\ days/year \times 1\ years}{70\ kg \times 365\ days}$$

IEXnc = 4.87E-07 mg/kg-day

HQ = 4.87E-07 mg/kg-day / 8.6E-03 mg/kg-day

HQ = **5.7E-05**

EXAMPLE CALCULATION
AIR CONCENTRATION OF VOCS IN A TRENCH - CONSTRUCTION WORKER SCENARIO
SITE 4 - GOLF COURSE LANDFILL

Ctrench = CGW x VF

Where:

Ctrench = concentration of contaminant in the trench $\mu g/m^3$
CGW = concentration of contaminant in groundwater µg/L
VF = volatilization factor L/m^3

1. Calculate kiG (gas-phase mass transfer coefficient of component i)

$kiG = (MWH2O/MWi)^{0.335} \times (T/298)^{1.005} \times kG, H2O$

Where:

kiG = gas-phase mass transfer coefficient of component i cm/s
MW_{H2O} = molecular weight of water = 18 g/mol
$MW_{benzene}$ = molecular weight of benzene = **78.11** g/mol
kG,H_2O = gas-phase mass transfer coefficient of water vapor at 25°C cm/s = 0.833 cm/s
T = average system absolute temperature = **298**
The value of kG, H_2O is 0.833 cm/s (Superfund Exposure Assessment Manual, U. S. EPA, April 1988)

$kiG = (18/131.39)^{0.335} \times (298/298)^{1.005} \times 0.833$ cm/s = **5.09E-01** cm/s

2. Calculate kiL (liquid-phase mass transfer coefficient of component i)

$kiL = (MWO_2/MWi)^{0.5} \times (T/298) \times kL, O_2$

Where:
kiL = liquid-phase mass transfer coefficient of component i cm/s
MW_{O2} = molecular weight of O_2 = 32 g/mol
$MW_{benzene}$ = molecular weight of benzene = **78.11** g/mol
T = average system absolute temperature = **298**
kL, O_2 = liquid-phase mass transfer coefficient of oxygen at 25°C cm/s = 0.002 cm/s

$kiL = (32/131.39)^{0.5} \times (298/298) \times 0.002$ cm/s = **1.28E-03 cm/s**

EXAMPLE CALCULATION
AIR CONCENTRATION OF VOCS IN A TRENCH - CONSTRUCTION WORKER SCENARIO
SITE 4 - GOLF COURSE LANDFILL

3. Calculate Ki (overall mass transfer coefficient of contaminant)

Ki = 1 / {(1/kiL) + [(RT) / (Hi x kiG)]}

Where:

kiL = liquid-phase mass transfer coefficient of i cm/s =	**1.28E-03**
R = ideal gas constant atm-m^3/mole-°K =	8.20E-05
T = average system absolute temperature =	**298**
Hi = Henry's Law constant of benzene (atm-m^3/mol) =	**5.55E-03**
KiG = gas-phase mass transfer coefficient of i cm/s	**5.09E-01**

Ki = 1 / {(1/9.78E-4) + [(298 x 8.2E-5) / (1.03E-2 x 0.428]} = 1.27E-03 cm/s

4. Calculation of VF (Volatilization Factor)

VF = (Ki x A x F x 10^{-3} x 10^4 x 3,600) / (ACH x V)

Where:

VF = volatilization factor (L/m^3)		
Ki = overall mass transfer coefficient of contaminant =		**1.27E-03** cm/s
A = area of the trench =		**8.18** m^2
F = fraction of floor through which contaminant can enter (unitless) =		**1**
ACH = air changes per hour =		**360** h^{-1}
V = volume of trench =		**24.92** m^3
10^{-3} = conversion factor L/cm^3	0.001	
10^4 = conversion factor cm^2/m^2	10000	
3,600 = conversion factor seconds/hr	3600	

VF = (9.82E-4 x 8.18 x 1 x 10^{-3} x 10^4 x 3,600) / (360 x 24.92) = 4.15E-02 L/m^3

5. Calculation of C_{trench} (concentration of contaminant in the trench)

C_{trench} = C_{GW} x VF

Where:

C_{trench} = concentration of contaminant in the trench (µg/m^3)	
C_{GW} = concentration of benzene in groundwater =	**1** µg/L
VF = volatilization factor =	**4.15E-02** L/m^3

C_{trench} = 1 ug/L x 4.15E-2 L/m^3 = 4.15E-02 µg/m^3

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 07/13/06

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface water by an adolescent trespasser.

EQUATION:

$$IEX = \frac{Csw \times CF \times CRsw \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Csw	=	exposure point concentration in surface water (ug/L)
CF	=	conversion factor (1.0E-6 kg/mg)
CRsw	=	contact rate (L/hour)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Csw	=	3	ug/L	Tetrachloroethene
CRsw	=	0.01	L/day	
CF	=	1.0E-03	mg/ug	
ET	=	1	hours	
EF	=	30	days/year	
ED	=	11	years	
BW	=	45	kg	
ATc	=	25,550	days	
ATnc	=	4,015	days	
CSFo	=	5.40E-01	(mg/kg/day)$^{-1}$	
RfDo	=	1.00E-02	(mg/kg/day)	

CLIENT: NCBC, GULFPORT, MISSISSIPPI - SITE 4		JOB NUMBER: 9666
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 07/13/06

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{3\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 1\ hours \times 30\ days/year \times 11\ years}{45\ kg \times 25550\ days}$$

IEXc = 8.61E-09 mg/kg/day

ICLR = 8.61E-09 mg/kg/day x 0.54 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 4.6E-09

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{3\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 1\ hours \times 30\ days/year \times 11\ years}{45\ kg \times 4015\ days}$$

IEXnc = 5.48E-08 mg/kg/day

HQ = 5.48E-08 mg/kg/day / 0.01 (mg/kg/day) = Hazard Quotient

HQ = 5.5E-06

Version 1.49.1

Chemical	Raw Statistics														Data Distribution	EPA's ProUCL Recommended UCL to Use		Comments
	Frequency of Detection		Number of Unique Results	Mininum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Mean of All Samples	Mean of Positive Detects	Median	Standard Deviation	Variance	Coefficient of Variation	Skewness				
	Number	Percent																
ALUMINUM	10/10	100%	10	-	-	1240	7680	3926	3926	3120	2360	5568736	0.601	0.489	Normal	5293	Student-t	- -
ARSENIC	10/10	100%	10	-	-	0.27	7.6	2.30	2.30	1.85	2.16	4.65	0.937	1.93	Gamma	4.05	Approximate Gamma 95% UCL	- -
IRON	10/10	100%	10	-	-	931	10300	3440	3440	1585	3201	10246624	0.931	1.27	Gamma	6132	Approximate Gamma 95% UCL	- -
VANADIUM	9/10	90%	10	2	2	2.4	19.8	7.50	8.22	5.80	6.30	39.6	0.840	1.19	Normal	11.1	Student-t	- -
BENZO(A)ANTHRACENE	**1/10**	**10%**	**6**	**390**	**440**	**760 J**	**760 J**	**259**	**760**	**200**	**176**	**31038**	**0.680**	**3.15**	**Non-parametric**	**361; 370**	**Student-t or Modified-t UCL**	**- -**
DIBENZO(A,H)ANTHRACENE	**1/10**	**10%**	**6**	**390**	**440**	**210 J**	**210 J**	**204**	**210**	**200**	**7.38**	**54.4**	**0.036**	**1.20**	**Normal**	**208**	**Student-t**	**Min ND & Max ND > Max & UCL**

Bolded shaded values indicate that frequency of detection is less than 50 percent.
For non-detects, 1/2 sample quantitation limit was used as a proxy concentration.
1/2 the detection limit was used for B qualified data.

APPENDIX D-2

EXAMPLE RISK ASSESSMENT CALCULATIONS

APPENDIX D-3

95 PERCENT UCLS AND DISTRIBUTIONS OF DATA SETS FOR SUBSURFACE SOIL.

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) --- FUTURE ADULT RESIDENTS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/05/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = 2FA x Kp x C x CF x $(6T \times tevent/3.1416)^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x $((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	3.33E-01	3.82E-01	4.20E-03	1.61E-02	4.14E-09	1	4.14E-09
Benzene	1.00E-03	o	7.00E-01	3.33E-01	2.92E-01	1.49E-02	5.05E-02	1.28E-08	1	1.28E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	3.33E-01	3.72E-01	7.71E-03	2.92E-02	1.28E-06	1	1.28E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	3.33E-01	3.72E-01	7.71E-03	2.92E-02	8.26E-07	1	8.26E-07
Trichloroethylene	4.00E-03	o	1.39E+00	3.33E-01	5.81E-01	1.16E-02	5.13E-02	5.66E-08	1	5.66E-08
Vinyl chloride	8.80E-02	o	5.73E-01	3.33E-01	2.39E-01	5.60E-03	1.70E-02	3.84E-07	1	3.84E-07
Dibenzofuran	6.00E-03	o	2.21E+00	3.33E-01	9.20E-01	9.49E-02	4.73E-01	8.72E-07	1	8.72E-07
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	3.33E-01	6.82E+00	8.07E-01	5.57E+00	2.02E-11	0.5	1.01E-11
Aluminum	NA	i		3.33E-01		1.00E-03			1	
Antimony	4.80E-03	i		3.33E-01		1.00E-03		1.60E-09	1	1.60E-09
Arsenic	3.20E-03	i		3.33E-01		1.00E-03		1.07E-09	1	1.07E-09
Barium	3.17E-01	i		3.33E-01		1.00E-03		1.06E-07	1	1.06E-07
Chromium	NA	i		3.33E-01		2.00E-03			1	
Iron	1.39E+01	i		3.33E-01		1.00E-03		4.63E-06	1	4.63E-06
Manganese	2.88E-01	i		3.33E-01		1.00E-03		9.60E-08	1	9.60E-08
Vanadium	2.70E-03	i		3.33E-01		1.00E-03		9.00E-10	1	9.00E-10

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: USEPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) --- FUTURE CHILD RESIDENTS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 07/13/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	3.33E-01	3.82E-01	4.20E-03	1.61E-02	4.14E-09	1	4.14E-09
Benzene	1.00E-03	o	7.00E-01	3.33E-01	2.92E-01	1.49E-02	5.05E-02	1.28E-08	1	1.28E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	3.33E-01	3.72E-01	7.71E-03	2.92E-02	1.28E-06	1	1.28E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	3.33E-01	3.72E-01	7.71E-03	2.92E-02	8.26E-07	1	8.26E-07
Trichloroethylene	4.00E-03	o	1.39E+00	3.33E-01	5.81E-01	1.16E-02	5.13E-02	5.66E-08	1	5.66E-08
Vinyl chloride	8.80E-02	o	5.73E-01	3.33E-01	2.39E-01	5.60E-03	1.70E-02	3.84E-07	1	3.84E-07
Dibenzofuran	6.00E-03	o	2.21E+00	3.33E-01	9.20E-01	9.49E-02	4.73E-01	8.72E-07	1	8.72E-07
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	3.33E-01	6.82E+00	8.07E-01	5.57E+00	2.02E-11	0.5	1.01E-11
Aluminum	NA	i		3.33E-01		1.00E-03			1	
Antimony	4.80E-03	i		3.33E-01		1.00E-03		1.60E-09	1	1.60E-09
Arsenic	3.20E-03	i		3.33E-01		1.00E-03		1.07E-09	1	1.07E-09
Barium	3.17E-01	i		3.33E-01		1.00E-03		1.06E-07	1	1.06E-07
Chromium	NA	i		3.33E-01		2.00E-03			1	
Iron	1.39E+01	i		3.33E-01		1.00E-03		4.63E-06	1	4.63E-06
Manganese	2.88E-01	i		3.33E-01		1.00E-03		9.60E-08	1	9.60E-08
Vanadium	2.70E-03	i		3.33E-01		1.00E-03		9.00E-10	1	9.00E-10

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE CHILD RESIDENTS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: **SITE 4 - GOLF COURSE LANDFILL**
LOCATION: **NCBC, GULFPORT, MISSISSIPPI**
DATE: **06/06/06**

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT ($MG/CM^2/EVENT$)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = $2FA \times Kp \times C \times CF \times (6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = $FA \times Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) --- CONSTRUCTION WORKERS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 07/13/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = 2FA x Kp x C x CF x $(6T \times tevent/3.1416)^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x $((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	4.00E+00	3.82E-01	4.20E-03	1.61E-02	1.98E-08	1	1.98E-08
Benzene	1.00E-03	o	7.00E-01	4.00E+00	2.92E-01	1.49E-02	5.05E-02	6.57E-08	1	6.57E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	4.00E+00	3.72E-01	7.71E-03	2.92E-02	6.10E-06	1	6.10E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	4.00E+00	3.72E-01	7.71E-03	2.92E-02	3.95E-06	1	3.95E-06
Trichloroethylene	4.00E-03	o	1.39E+00	4.00E+00	5.81E-01	1.16E-02	5.13E-02	2.34E-07	1	2.34E-07
Vinyl chloride	8.80E-02	o	5.73E-01	4.00E+00	2.39E-01	5.60E-03	1.70E-02	2.18E-06	1	2.18E-06
Dibenzofuran	6.00E-03	o	2.21E+00	4.00E+00	9.20E-01	9.49E-02	4.73E-01	3.04E-06	1	3.04E-06
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	4.00E+00	6.82E+00	8.07E-01	5.57E+00	7.00E-11	0.5	3.50E-11
Aluminum	NA	i		4.00E+00		1.00E-03			1	
Antimony	4.80E-03	i		4.00E+00		1.00E-03		1.92E-08	1	1.92E-08
Arsenic	3.20E-03	i		4.00E+00		1.00E-03		1.28E-08	1	1.28E-08
Barium	3.17E-01	i		4.00E+00		1.00E-03		1.27E-06	1	1.27E-06
Chromium	NA	i		4.00E+00		2.00E-03			1	
Iron	1.39E+01	i		4.00E+00		1.00E-03		5.56E-05	1	5.56E-05
Manganese	2.88E-01	i		4.00E+00		1.00E-03		1.15E-06	1	1.15E-06
Vanadium	2.70E-03	i		4.00E+00		1.00E-03		1.08E-08	1	1.08E-08

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CONSTRUCTION WORKERS - REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 07/13/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT ($MG/CM^2/EVENT$)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = $2FA \times Kp \times C \times CF \times (6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = $FA \times Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
SITE WORKERS - REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
OCCUPATIONAL WORKERS - REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADULT TRESPASSERS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: USEPA, July 2004

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) --- FUTURE ADULT RESIDENTS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/05/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = $2FA \times Kp \times C \times CF \times (6T \times tevent/3.1416)^{0.5}$
IF tevent > t*, DAevent = $FA \times Kp \times C \times CF \times ((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	2.50E-01	3.82E-01	4.20E-03	1.61E-02	3.59E-09	1	3.59E-09
Benzene	1.00E-03	o	7.00E-01	2.50E-01	2.92E-01	1.49E-02	5.05E-02	1.11E-08	1	1.11E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.11E-06	1	1.11E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	7.15E-07	1	7.15E-07
Trichloroethylene	4.00E-03	o	1.39E+00	2.50E-01	5.81E-01	1.16E-02	5.13E-02	4.90E-08	1	4.90E-08
Vinyl chloride	8.80E-02	o	5.73E-01	2.50E-01	2.39E-01	5.60E-03	1.70E-02	3.33E-07	1	3.33E-07
Dibenzofuran	6.00E-03	o	2.21E+00	2.50E-01	9.20E-01	9.49E-02	4.73E-01	7.55E-07	1	7.55E-07
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	2.50E-01	6.82E+00	8.07E-01	5.57E+00	1.75E-11	0.5	8.74E-12
Aluminum	NA	i		2.50E-01		1.00E-03			1	
Antimony	4.80E-03	i		2.50E-01		1.00E-03		1.20E-09	1	1.20E-09
Arsenic	3.20E-03	i		2.50E-01		1.00E-03		8.00E-10	1	8.00E-10
Barium	3.17E-01	i		2.50E-01		1.00E-03		7.93E-08	1	7.93E-08
Chromium	NA	i		2.50E-01		2.00E-03			1	
Iron	1.39E+01	i		2.50E-01		1.00E-03		3.48E-06	1	3.48E-06
Manganese	2.88E-01	i		2.50E-01		1.00E-03		7.20E-08	1	7.20E-08
Vanadium	2.70E-03	i		2.50E-01		1.00E-03		6.75E-10	1	6.75E-10

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: **SITE 4 - GOLF COURSE LANDFILL**
LOCATION: **NCBC, GULFPORT, MISSISSIPPI**
DATE: **06/06/06**

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) --- FUTURE CHILD RESIDENTS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/05/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	2.50E-01	3.82E-01	4.20E-03	1.61E-02	3.59E-09	1	3.59E-09
Benzene	1.00E-03	o	7.00E-01	2.50E-01	2.92E-01	1.49E-02	5.05E-02	1.11E-08	1	1.11E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	1.11E-06	1	1.11E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	2.50E-01	3.72E-01	7.71E-03	2.92E-02	7.15E-07	1	7.15E-07
Trichloroethylene	4.00E-03	o	1.39E+00	2.50E-01	5.81E-01	1.16E-02	5.13E-02	4.90E-08	1	4.90E-08
Vinyl chloride	8.80E-02	o	5.73E-01	2.50E-01	2.39E-01	5.60E-03	1.70E-02	3.33E-07	1	3.33E-07
Dibenzofuran	6.00E-03	o	2.21E+00	2.50E-01	9.20E-01	9.49E-02	4.73E-01	7.55E-07	1	7.55E-07
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	2.50E-01	6.82E+00	8.07E-01	5.57E+00	1.75E-11	0.5	8.74E-12
Aluminum	NA	i		2.50E-01		1.00E-03			1	
Antimony	4.80E-03	i		2.50E-01		1.00E-03		1.20E-09	1	1.20E-09
Arsenic	3.20E-03	i		2.50E-01		1.00E-03		8.00E-10	1	8.00E-10
Barium	3.17E-01	i		2.50E-01		1.00E-03		7.93E-08	1	7.93E-08
Chromium	NA	i		2.50E-01		2.00E-03			1	
Iron	1.39E+01	i		2.50E-01		1.00E-03		3.48E-06	1	3.48E-06
Manganese	2.88E-01	i		2.50E-01		1.00E-03		7.20E-08	1	7.20E-08
Vanadium	2.70E-03	i		2.50E-01		1.00E-03		6.75E-10	1	6.75E-10

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE CHILD RESIDENTS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
CENTRAL TENDENCY EXPOSURE (CTE) --- CONSTRUCTION WORKERS

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/05/06

REFERENCES: USEPA, JULY 2004

DERMAL CONTACT: **DAD = (DAevent x EV x ED x EF x A)/(BW x AT)**

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

For Inorganics: DAevent = Kp x C x tevent x CF
For Organics: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	DAevent	FA	DAevent
1,2-Dichloroethane	1.00E-03	o	9.18E-01	2.00E+00	3.82E-01	4.20E-03	1.61E-02	1.15E-08	1	1.15E-08
Benzene	1.00E-03	o	7.00E-01	2.00E+00	2.92E-01	1.49E-02	5.05E-02	3.74E-08	1	3.74E-08
cis-1,2-Dichloroethene	1.70E-01	o	8.93E-01	2.00E+00	3.72E-01	7.71E-03	2.92E-02	3.55E-06	1	3.55E-06
trans-1,2-Dichloroethene	1.10E-01	o	8.93E-01	2.00E+00	3.72E-01	7.71E-03	2.92E-02	2.30E-06	1	2.30E-06
Trichloroethylene	4.00E-03	o	1.39E+00	2.00E+00	5.81E-01	1.16E-02	5.13E-02	1.45E-07	1	1.45E-07
Vinyl chloride	8.80E-02	o	5.73E-01	2.00E+00	2.39E-01	5.60E-03	1.70E-02	1.21E-06	1	1.21E-06
Dibenzofuran	6.00E-03	o	2.21E+00	2.00E+00	9.20E-01	9.49E-02	4.73E-01	2.13E-06	1	2.13E-06
2,3,7,8-TCDD TEF	6.00E-09	o	3.01E+01	2.00E+00	6.82E+00	8.07E-01	5.57E+00	4.95E-11	0.5	2.47E-11
Aluminum	NA	i		2.00E+00		1.00E-03			1	
Antimony	4.80E-03	i		2.00E+00		1.00E-03		9.60E-09	1	9.60E-09
Arsenic	3.20E-03	i		2.00E+00		1.00E-03		6.40E-09	1	6.40E-09
Barium	3.17E-01	i		2.00E+00		1.00E-03		6.34E-07	1	6.34E-07
Chromium	NA	i		2.00E+00		2.00E-03			1	
Iron	1.39E+01	i		2.00E+00		1.00E-03		2.78E-05	1	2.78E-05
Manganese	2.88E-01	i		2.00E+00		1.00E-03		5.76E-07	1	5.76E-07
Vanadium	2.70E-03	i		2.00E+00		1.00E-03		5.40E-09	1	5.40E-09

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
CONSTRUCTION WORKERS - CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
SITE WORKERS - CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
OCCUPATIONAL WORKERS - CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE:
DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE:
FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADULT TRESPASSERS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT ($MG/CM^2/EVENT$)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x $(6T \times tevent/3.1416)^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x $((tevent/(1 + B)) + (2T \times ((1+3B+3B^2)/(1 + B)^2)))$

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSERS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
DATE: 06/06/06

REFERENCES: **USEPA, July 2004**

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$

IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)	ORGANIC OR INORGANIC?	t* (HR)	tevent	T (HR)	Kp (CM/HR)	B	FA	DAevent
Tetrachloroethene	3.00E-03	o	2.18E+00	1.00	9.06E-01	3.34E-02	1.66E-01	1	2.64E-07
2,3,7,8-TCDD TEQ	4.90E-09	o	3.01E+01	1.00	6.82E+00	8.07E-01	5.57E+00	0.5	1.43E-11
Arsenic	6.80E-03	i		1.00		1.00E-03		1	6.80E-09
Iron	5.18E+00	i		1.00		1.00E-03		1	5.18E-06
Manganese	2.05E-01	i		1.00		1.00E-03		1	2.05E-07

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	On-site Soil	All potential receptors	Adult, Child, and Adolescent	Ingestion, Dermal, and Inhalation	On-site	None	Exposure to surface soil is not a complete exposure pathway under current land use because contamination is in the subsurface and the site is covered with clean fill.
	Subsurface Soil(1)	Subsurface Soil	Entire Site	All potential receptors	Adult, Child, and Adolescent	Ingestion Dermal	On-site On-site	None None	Exposure to subusrface soil is not a complete exposure pathway under current land use.
		Air	Vapors and Particulates in Air - Entire Site	All potential receptors	Adult, Child, and Adolescent	Inhalation	On-site	None	Exposure to subusrface soil is not a complete exposure pathway under current land use.
	Groundwater	Groundwater/Air	Surficial Aquifer	All potential receptors	Adult, Child, and Adolescent	Ingestion Dermal Inhalation	On-site and off-site	None None None	Exposure to groundwater is not a complete exposure pathway under current land use.
	Surface Water	Surface Water	Canal No. 1	Site Workers	Adult	Ingestion Dermal	On-site On-site	Quant(2) Quant	NCBC Gulfport is an active facility. Current site workers may be exposed to COPCs in surface water while performing work related duites at the site.
				Construction/Excavation Workers	Adult	Ingestion Dermal	On-site On-site	None None	Construction/excavation workers are not potential receptors at Site 4 under current land use.
				Occupational Workers	Adult	Ingestion Dermal	On-site On-site	None None	Occupational workers are not potential receptors at Site 4 under current land use.
				Trespassers	Adolescent and Adult	Ingestion Dermal	On-site On-site	Quant Quant	Access to the site is not restricted. Trespassers may contact surface water while playing on the site.
				On-site Residents	Child and Adult	Ingestion Dermal	On-site On-site	None None	On-site residents are not potential receptors at Site 4 under current land use.
		Air	Canal No. 1	Sie Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	Canal No. 1	Site Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	NCBC Gulfport is an active facility. Current site workers may be exposed to COPCs in sediment while performing work related duites at the site.
				Construction/Excavation Workers	Adult	Ingestion Dermal	On-site On-site	None None	Construction/excavation workers are not potential receptors at Site 4 under current land use.
				Occupational Workers	Adult	Ingestion Dermal	On-site On-site	None None	Occupational workers are not potential receptors at Site 4 under current land use.
				Trespassers	Adult and Adolescent	Ingestion Dermal	On-site On-site	Quant Quant	Access to the site is not restricted. Trespassers may contact sediment while playing on the site.
				On-site Residents	Child and Adult	Ingestion Dermal	On-site On-site	None None	On-site residents are not potential receptors at Site 4 under current land use.
		Air	Canal No. 1	Site Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from sediment is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Soil	Surface Soil	On-site Soil	All potential receptors	Adult, Child, and Adolescent	Ingestion, Dermal, and Inhalation	On-site	None	Exposure to surface soil is not a complete exposure pathway under current land use because contamination is in the subsurface and the site is covered with clean fill.
	Subsurface Soil	Subsurface Soil	Entire Site	All potential receptors	Adult, Child, and Adolescent	Ingestion Dermal	On-site On-site	Quant Quant	Under future land use, exposure to chemicals in subsurface soil could occur if the soil were to be uncovered (e.g., during excavation).
		Air	Vapors and Particulates in Air - Entire Site	All potential receptors	Adult, Child, and Adolescent	Inhalation	On-site	Qual(3)	Under future land use, exposure to chemicals in subsurface soil could occur if the soil were to be uncovered (e.g., during excavation). Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs(4) for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction Worker	Adult	Ingestion Dermal Inhalation	On-site	None Quant Quant	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying). Excavation/construction activities may occur at the site. Inahalation of vapors in a trench could occur during excavation.
				Site workers, Occupational Workers, and trespassers	Adults and Adolescent	Ingestion Dermal	On-site and off-site	None None	Direct contact with groundwater is not expected to occur for these receptors. Shallow groundwater is not expected to be used as a source of potable water.
				On-site Residents	Child and Adult	Ingestion Dermal Inhalation	On-site and off-site	Quant Quant Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
	Surface Water	Surface Water	Canal No. 1	Site Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	NCBC Gulfport is an active facility. Future site workers may be exposed to COPCs in surface water while performing work related duties at the site.
				Construction/Excavation Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	Future excavation/construction workers may be exposed to COPCs in surface water while working at the site.
				Occupational Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	Although this scenario is unlikely, it is evaluated to account for the fact that the site may be developed for commercial purposes in the future and to aid in risk management decisions.
				Trespassers	Adult and Adolescent	Ingestion Dermal	On-site On-site	Quant Quant	Access to the site is not restricted. Trespassers may contact surface water while playing on the site.
				On-site Residents	Child and Adult	Ingestion Dermal	On-site On-site	Quant Quant	Although this scenario is unlikely, it is evaluated to account for the fact that the site may be developed for residential purposes in the future and to aid in risk management decisions.
		Air	Canal No. 1	All potential receptors	Adult, Child, and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Sediment	Sediment	Canal No. 1	Site Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	NCBC Gulfport is an active facility. Site workers may be exposed to COPCs in sediment while performing work related duties at the site.
				Construction/Excavation Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	Future excavation/construction workers may be exposed to COPCs in sediment while working at the site.
				Occupational Workers	Adult	Ingestion Dermal	On-site On-site	Quant Quant	Although this scenario is unlikely, it is evaluated to account for the fact that the site may be developed for commercial purposes in the future and to aid in risk management decisions.
				Trespassers	Adolescent and Adult	Ingestion Dermal	On-site On-site	Quant Quant	Access to the site is not restricted. Trespassers may contact COPCs in sediment while playing on the site.
				On-site Residents	Child and Adult	Ingestion Dermal	On-site On-site	Quant Quant	Although this scenario is unlikely, it is evaluated to account for the fact that the site may be developed for residential purposes in the future and to aid in risk management decisions.
		Air	Canal No. 1	All potential receptors	Adult, Child, and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from sediment is anticipated (i.e., so low such that it is not worth quantifying).

Footnotes:
1 Subsurface soil samples were collected from 10 - 12 feet bgs.
2 Quantitative.
3 Qualitative.
4 Soil Screening Levels (USEPA, May 1996).

TABLE 3.1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Onsite

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	mg/kg	0.26	0.36	0.76	J	mg/kg	0.76	Maximum	FOD (1)	0.76	Maximum	FOD (1)
Dibenzo(a,h)anthracene	mg/kg	0.2	0.21	0.21	J	mg/kg	0.21	Maximum	FOD (1)	0.21	Maximum	FOD (1)
Aluminum	mg/kg	3930	5290	7680		mg/kg	5290	Student-t	ProUCL (2)	5290	Student-t	ProUCL (2)
Arsenic	mg/kg	2.3	3.6	7.6		mg/kg	4.1	Gamma	ProUCL (3)	4.1	Gamma	ProUCL (3)
Iron	mg/kg	3440	5300	10300		mg/kg	6130	Gamma	ProUCL (3)	6130	Gamma	ProUCL (3)
Vanadium	mg/kg	7.5	11.1	19.8		mg/kg	11.1	Student-t	ProUCL (2)	11.1	Student-t	ProUCL (2)

Definitions:

Gamma = Approximate Gamma 95% UCL.

Footnotes:

1 - FOD - Less than 50 percent positive detections. Maximum concentration is used as the EPC.

2 - ProUCL indicates data are normally distributed.

3 - EPC statistic is recommended by U.S. EPA's ProUCL guidance.

TABLE 3.2

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean of All Samples	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,2-Dichloroethane	mg/L	0.002	NA	0.0002	J	mg/L	0.001	Average	(1)	1.00E-03	Average	(1)
Benzene	mg/L	0.002	NA	0.0004	J	mg/L	0.001	Average	(1)	1.00E-03	Average	(1)
cis-1,2-Dichloroethene	mg/L	0.03	NA	0.28	J	mg/L	0.17	Average	(1)	1.70E-01	Average	(1)
trans-1,2-Dichloroethene	mg/L	0.02	NA	0.19		mg/L	0.11	Average	(1)	1.10E-01	Average	(1)
Trichloroethylene	mg/L	0.004	NA	0.0204	J	mg/L	0.004	Average	(1)	4.00E-03	Average	(1)
Vinyl chloride	mg/L	0.02	NA	0.172	J	mg/L	0.088	Average	(1)	8.80E-02	Average	(1)
Dibenzofuran	mg/L	0.005	NA	0.007	J	mg/L	0.006	Average	(1)	6.00E-03	Average	(1)
2,3,7,8-TCDD TEF	mg/L	5.00E-09	NA	1.00E-08		mg/L	6.E-09	Average	(1)	6.00E-09	Average	(1)
Aluminum	mg/L	1.1	NA	8.69	J	mg/L	NA			NA		
Antimony	mg/L	0.0021	NA	0.0263		mg/L	0.0048	Average	(1)	4.80E-03	Average	(1)
Arsenic	mg/L	0.0025	NA	0.0114		mg/L	0.0032	Average	(1)	3.20E-03	Average	(1)
Barium	mg/L	0.33	NA	1.62		mg/L	0.317	Average	(1)	3.17E-01	Average	(1)
Chromium	mg/L	0.0021	NA	0.0118		mg/L	NA			NA		
Iron	mg/L	12	NA	69.7		mg/L	13.9	Average	(1)	1.39E+01	Average	(1)
Manganese	mg/L	0.2	NA	0.465		mg/L	0.288	Average	(1)	2.88E-01	Average	(1)
Vanadium	mg/L	0.0044	NA	0.0181		mg/L	0.0027	Average	(1)	2.70E-03	Average	(1)

1 - The EPC for groundwater is the arithmetic average of samples in the most highly contaminated area of the plume (See Section 7.3.3 of text).
For VOCs, the EPC is the average of permanent monitoring wells 04GW1301 and 04GW1601.
For dioxins and dibenzofuran, the EPC is the average of permanent monitoring wells 04GW1301, 04GW1401, and 04GW1701.
For metals, the EPC is the average of permanent monitoring wells 04GW1301, 04GW1401, 04GW1501, 04GW1601, 04GW1701, 04GW1801, and 04GW2001.

NA - Aluminum and chromium were not detected in an permanent wmonitoring well samples (only detected in temporary wells).

TABLE 3.3

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Tetrachloroethene	mg/L	0.0027	NA	0.003	J	mg/L	0.003	Maximum	N<10(1)	0.003	Maximum	N<10(1)
2,3,7,8-TCDD TEQ	mg/L	3E-09	NA	4.9E-09		mg/L	4.9E-09	Maximum	N<10(1)	4.9E-09	Maximum	N<10(1)
Arsenic	mg/L	0.005	NA	0.0068		mg/L	0.0068	Maximum	N<10(1)	0.0068	Maximum	N<10(1)
Iron	mg/L	4.1	NA	5.18		mg/L	5.18	Maximum	N<10(1)	5.18	Maximum	N<10(1)
Manganese	mg/L	0.13	NA	0.205		mg/L	0.205	Maximum	N<10(1)	0.205	Maximum	N<10(1)

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 3.4

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Canal No. 1

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	mg/kg	0.35	NA	1.6		mg/kg	1.6	Maximum	N < 10	1.6	Maximum	N < 10
Benzo(a)pyrene	mg/kg	0.4	NA	1.8		mg/kg	1.8	Maximum	N < 10	1.8	Maximum	N < 10
Benzo(b)fluoranthene	mg/kg	0.53	NA	2.5		mg/kg	2.5	Maximum	N < 10	2.5	Maximum	N < 10
Dibenzo(a,h)anthracene	mg/kg	0.29	NA	0.54	J	mg/kg	0.54	Maximum	N < 10	0.54	Maximum	N < 10
Indeno(1,2,3-cd)pyrene	mg/kg	0.34	NA	0.98		mg/kg	0.98	Maximum	N < 10	0.98	Maximum	N < 10
Aroclor-1260	mg/kg	0.08	NA	0.24	J	mg/kg	0.24	Maximum	N < 10	0.24	Maximum	N < 10
2,3,7,8-TCDD TEQ	mg/kg	1.70E-05	NA	3.05E-05		mg/kg	3.05E-05	Maximum	N < 10	3.05E-05	Maximum	N < 10
Aluminum	mg/kg	11900	NA	18600	J	mg/kg	18600	Maximum	N < 10	18600	Maximum	N < 10
Arsenic	mg/kg	4.1	NA	5.7		mg/kg	5.7	Maximum	N < 10	5.7	Maximum	N < 10
Iron	mg/kg	8880	NA	13000	J	mg/kg	13000	Maximum	N < 10	13000	Maximum	N < 10
Thallium	mg/kg	0.37	NA	0.76		mg/kg	0.76	Maximum	N < 10	0.76	Maximum	N < 10
Vanadium	mg/kg	18.6	NA	27.5		mg/kg	27.5	Maximum	N < 10	27.5	Maximum	N < 10

Footnotes:

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 4.1

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	165	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 2.77E-09
Noncancer Ingestion Intake - CTE = 1.94E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 4.2

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF SITE WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	50	USEPA, March 2001	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.02	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA, July 2004	chemical -specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	24	USEPA, May 1993	12	Professional Judgment	
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.68E-08
Noncancer Ingestion Intake - RME = 4.70E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

TABLE 4.3

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF OCCUPATIONAL WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, March 2001	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	250	USEPA, May 1993	219	USEPA, May 1993	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA July 2004	3,300	USEPA July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA July 2004	0.02	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA July 2004	chemical -specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	250	USEPA, May 1993	219	USEPA, May 1993	
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

TABLE 4.4

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	100	Professional Judgment	50	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	11	6 to 16 years of age	11	6 to 16 years of age	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	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	4,015	USEPA, December 1989	4,015	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,250	USEPA August 1997	3,250	USEPA August 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.4	USEPA July 2004	0.04	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA July 2004	chemical -specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	100	Professional Judgment	50	Professional Judgment	
	ED	Exposure Duration	years	11	6 to 16 years of age	11	6 to 16 years of age	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	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	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 9.57E-08
Noncancer Ingestion Intake - RME = 6.09E-07

Cancer Ingestion Intake - CTE = 2.39E-08
Noncancer Ingestion Intake - CTE = 1.52E-07

Cancer Dermal Intake - RME = 1.24E-06
Noncancer Dermal Intake - RME = 7.91E-06

Cancer Dermal Intake - CTE = 6.22E-08
Noncancer Dermal Intake - CTE = 3.96E-07

TABLE 4.5

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADULT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	50	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	19	USEPA, May 1993	19	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	6,935	USEPA, December 1989	6,935	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,700	USEPA July 2004	5,700	USEPA July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA July 2004	0.01	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA July 2004	chemical -specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	
	ED	Exposure Duration	years	19	USEPA, May 1993	19	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	6,935	USEPA, December 1989	6,935	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.27E-08
Noncancer Ingestion Intake - RME = 4.70E-08

Cancer Ingestion Intake - CTE = 6.37E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 1.02E-07
Noncancer Dermal Intake - RME = 3.75E-07

Cancer Dermal Intake - CTE = 7.27E-09
Noncancer Dermal Intake - CTE = 2.68E-08

TABLE 4.6

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE CHILD RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA, May 1993	100	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA, May 1993	2	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,800	USEPA July 2004	2,800	USEPA July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA July 2004	0.04	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA July 2004	chemical specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	
	ED	Exposure Duration	years	6	USEPA, December 1989	2	USEPA, December 1989	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 3.07E-06
Noncancer Dermal Intake - RME = 3.58E-05

Cancer Dermal Intake - CTE = 1.37E-07
Noncancer Dermal Intake - CTE = 4.79E-06

TABLE 4.7

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA, May 1993	7	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,700	USEPA July 2004	5,700	USEPA July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA July 2004	0.01	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA July 2004	chemical specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	
	ED	Exposure Duration	years	24	USEPA, December 1989	7	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.87E-06
Noncancer Dermal Intake - RME = 5.47E-06

Cancer Dermal Intake - CTE = 5.22E-08
Noncancer Dermal Intake - CTE = 5.22E-07

TABLE 4.8

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Average	USEPA Region 4, May 2000	Average	USEPA Region 4, May 2000	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 7.3.4.3 of the text.
	A	Skin Surface Area	cm^2	4,500	1/4 total surface area	4,500	1/4 total surface area	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	t_{event}	Duration of Event	hour/event	4	Professional Judgement	2	Professional Judgement	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 7.55E-02
Noncancer Dermal Intake(RME) = 5.28E+00

Cancer Dermal Intake(CTE) = 7.55E-02
Noncancer Dermal Intake(CTE) = 5.28E+00

TABLE 4.8
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.0E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.2E-06
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	3.5E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	8.7E-05
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	3.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.2E-03
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	2.1E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-03
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.1E-03
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.8E-03
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	1.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-03
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	6.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-04
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	6.7E-06	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	4.8E-04
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	2.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.8E-04
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	6.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.3E-03
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	5.7E-08	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	2.2E-03
	(total)												2.4E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-02**

TABLE 4.9

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Average	USEPA Region 4, May 2000	Average	USEPA Region 4, May 2000	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1	USEPA, August 1997	1	USEPA, August 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	BW x AT
	ED	Exposure Duration	years	6	USEPA, May 1993	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	U.S. EPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Average	USEPA Region 4, May 2000	Average	USEPA Region 4, May 2000	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, July 2004	6,600	USEPA, July 2004	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 7.3.4.3
	ED	Exposure Duration	years	6	USEPA, May 1993	2	USEPA, May 1993	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	
	t_{event}	Duration of Event	hour/event	0.33	USEPA, July 2004	0.25	USEPA, July 2004	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 5.48E-03
Noncancer Ingestion Intake(RME) = 6.39E-02

Cancer Ingestion Intake(CTE) = 1.22E-03
Noncancer Ingestion Intake(CTE) = 4.27E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 8.06E+00
Noncancer Dermal Intake(CTE) = 2.82E+02

TABLE 4.9
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	6.4E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.2E-03
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	6.4E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.6E-02
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.1E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E+00
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	7.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-01
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	2.6E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.5E-01
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	5.6E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E+00
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	3.8E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	3.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	3.1E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	7.7E-01
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	2.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.8E-01
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	2.0E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	1.0E-01
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	8.9E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E+00
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	1.8E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	7.7E-01
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.7E-04	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.7E-01
	(total)												**9.6E+00**
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.7E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.7E-05
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	5.4E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.4E-03
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	5.4E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.4E-02
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.5E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-02
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	2.4E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.0E-02
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.6E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.4E-02
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	3.7E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	4.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	6.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-02
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	4.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-03
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	4.5E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	3.2E-03
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	2.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.5E-03
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	4.1E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.2E-02
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	3.8E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	1.5E-02
	(total)												**2.9E-01**

Total Hazard Index Across All Exposure Routes/Pathways **9.9E+00**

TABLE 4.10

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER SITE 4 - GOLF COURSE LANDFILL NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Average	USEPA Region 4, May 2000	Average	USEPA Region 4, May 2000	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, May 1993	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	BW x AT
	ED	Exposure Duration	years	24	USEPA, May 1993	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	U.S. EPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Average	USEPA Region 4, May 2000	Average	USEPA Region 4, May 2000	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, July 2004	18,000	USEPA, July 2004	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 7.3.4.3
	ED	Exposure Duration	years	24	USEPA, May 1993	7	USEPA, May 1993	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, May 1993	234	USEPA, May 1993	
	t_{event}	Duration of Event	hour/event	0.33	USEPA, July 2004	0.25	USEPA, July 2004	USEPA, July 2004
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.28E-03
Noncancer Ingestion Intake(CTE) = 1.28E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 1.65E+01
Noncancer Dermal Intake(CTE) = 1.65E+02

TABLE 4.10
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	2.7E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-03
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	2.7E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	6.8E-03
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	4.7E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.7E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-01
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.7E-01
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	2.4E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.0E-01
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.6E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	1.3E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.3E-01
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	8.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-01
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	8.7E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	4.3E-02
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	3.8E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E+00
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	7.9E-03	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.3E-01
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	7.4E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	7.4E-02
	(total)												**4.1E+00**
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.0E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.1E-05
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	3.2E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.9E-04
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	3.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.1E-02
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-02
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.4E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.7E-02
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	9.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.2E-02
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	2.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	2.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	3.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.6E-03
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	2.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.8E-04
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	2.6E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	1.9E-03
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.8E-03
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	2.4E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.5E-02
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	2.2E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	8.5E-03
	(total)												1.7E-01

Total Hazard Index Across All Exposure Routes/Pathways **4.3E+00**

TABLE 4.11

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF CONSTRUCTION WORKERS TO AMBIENT AIR IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in a Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Cair	Chemical Concentration in Air	(mg/m^3)	Derived	VDEQ, August 2002	Derived	VDEQ, August 2002	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRa	Inhalation Rate of volatiles	(m^3/hr)	2.5	USEPA, December 1989	2.5	USEPA, December 1989	Cair x IRa x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	(years)	1	USEPA, May 1993	1	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Inhalation Intake = (IRa x ET x EF x ED) / (BW x AT)

Cancer Inhalation Intake(RME) = 1.68E-04
Noncancer Inhalation Intake(RME) = 1.17E-02

Cancer Inhalation Intake(CTE) = 8.39E-05
Noncancer Inhalation Intake(CTE) = 5.87E-03

TABLE 4.12

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHLD RESIDENTS TO VAPORS FROM INTERMEDIATE ZONE GROUNDWATER WHILE SHOWERING
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster & Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	U.S. EPA, December 1989	10	U.S. EPA, December 1989	$\frac{S \times IRsh \times K \times EF \times ED}{BW \times AT \times Ra \times CF}$
	EF	Exposure Frequency	(days/year)	350	U.S. EPA, May 1993	234	U.S. EPA, May 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster & Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	6	U.S. EPA, May 1993	2	U.S. EPA, May 1993	
	BW	Body Weight	(kg)	15	U.S. EPA, December 1989	15	U.S. EPA, December 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster & Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	Professional Judgement	10	Professional Judgement	
	Dt	Total Time in Bathroom	(min)	20	Professional Judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	U.S. EPA, December 1989	25550	U.S. EPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	U.S. EPA, December 1989	730	U.S. EPA, December 1989	

TABLE 4.13

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SITE 4- GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster & Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	U.S. EPA, December 1989	10	U.S. EPA, December 1989	$\frac{S \times IRsh \times K \times EF \times ED}{BW \times AT \times Ra \times CF}$
	EF	Exposure Frequency	(days/year)	350	U.S. EPA, May 1993	234	U.S. EPA, May 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster & Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	24	U.S. EPA, May 1993	7	U.S. EPA, May 1993	
	BW	Body Weight	(kg)	70	U.S. EPA, December 1989	70	U.S. EPA, December 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster & Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	Professional Judgement	10	Professional Judgement	
	Dt	Total Time in Bathroom	(min)	20	Professional Judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	U.S. EPA, December 1989	25550	U.S. EPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	U.S. EPA, December 1989	2,555	U.S. EPA, December 1989	

TABLE 4.14

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional judgement	30	Professional judgement	
	ED	Exposure Duration	(years)	1	Professional judgement	1	Professional judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	4,500	1/4 of total body area assume	4,500	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	1	Professional judgement	1	Professional judgement	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.68E-07
Noncancer Ingestion Intake(RME) = 1.17E-05

Cancer Ingestion Intake(CTE) = 1.68E-07
Noncancer Ingestion Intake(CTE) = 1.17E-05

Cancer Dermal Intake(RME) = 7.55E-02
Noncancer Dermal Intake(RME) = 5.28E+00

Cancer Dermal Intake(CTE) = 7.55E-02
Noncancer Dermal Intake(CTE) = 5.28E+00

ConstructionWorkerSite4_SW_RME.xls

TABLE 4.15

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
SITE WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	24	Professional judgement	12	Professional judgement	BW x AT
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	4,500	1/4 of total body area assume	4,500	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	EF	Exposure Frequency	days/year	24	Professional judgement	12	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 3.35E-06
Noncancer Ingestion Intake(RME) = 9.39E-06

Cancer Ingestion Intake(CTE) = 6.04E-07
Noncancer Ingestion Intake(CTE) = 4.70E-06

Cancer Dermal Intake(RME) = 1.51E+00
Noncancer Dermal Intake(RME) = 4.23E+00

Cancer Dermal Intake(CTE) = 2.72E-01
Noncancer Dermal Intake(CTE) = 2.11E+00

SiteWorkerSite4_SW_RME.xls

TABLE 4.16

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
OCCUPATIONAL WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	30	Professional judgement	30	Professional judgement	BW x AT
	ED	Exposure Duration	(years)	25	USEPA, May 1993	9	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	9125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	4,500	1/4 of total body area assume	4,500	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.19E-06
Noncancer Ingestion Intake(RME) = 1.17E-05

Cancer Ingestion Intake(CTE) = 1.51E-06
Noncancer Ingestion Intake(CTE) = 1.17E-05

Cancer Dermal Intake(RME) = 1.89E+00
Noncancer Dermal Intake(RME) = 5.28E+00

Cancer Dermal Intake(CTE) = 6.79E-01
Noncancer Dermal Intake(CTE) = 5.28E+00

OccupationalWorkerSite4_SW_RME.xls

TABLE 4.17

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER SITE 4 - GOLF COURSE LANDFILL NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration In Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional judgement	15	Professional judgement	
	ED	Exposure Duration	(years)	11	Professional judgement	11	Professional judgement	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	45	USEPA Region 4, May 2000	45	USEPA Region 4, May 2000	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	USEPA, December 1989	4,015	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	3,250	1/4 of total body area assume	3,250	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	11	Professional judgement	11	Professional judgement	
	EF	Exposure Frequency	days/year	30	Professional judgement	15	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	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	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.87E-06
Noncancer Ingestion Intake(RME) = 1.83E-05

Cancer Ingestion Intake(CTE) = 1.44E-06
Noncancer Ingestion Intake(CTE) = 9.13E-06

Cancer Dermal Intake(RME) = 9.33E-01
Noncancer Dermal Intake(RME) = 5.94E+00

Cancer Dermal Intake(CTE) = 4.66E-01
Noncancer Dermal Intake(CTE) = 2.97E+00

AdolescentTrespSite4_SW_RME.xls

TABLE 4.18

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	24	Professional judgement	24	Professional judgement	BW x AT
	ED	Exposure Duration	(years)	19	USEPA, May 1993	19	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	6935	USEPA, December 1989	6,935	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	4,500	1/4 of total body area assume	4,500	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	19	USEPA, May 1993	19	USEPA, May 1993	
	EF	Exposure Frequency	days/year	24	Professional judgement	12	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	T	Lag Time	hour/event	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, September 2001	chemical-specific	USEPA, September 2001	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	6,935	USEPA, December 1989	6,935	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.55E-06
Noncancer Ingestion Intake(RME) = 9.39E-06

Cancer Ingestion Intake(CTE) = 2.55E-06
Noncancer Ingestion Intake(CTE) = 9.39E-06

Cancer Dermal Intake(RME) = 1.15E+00
Noncancer Dermal Intake(RME) = 4.23E+00

Cancer Dermal Intake(CTE) = 5.74E-01
Noncancer Dermal Intake(CTE) = 2.11E+00

TABLE 4.19

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	USEPA Region 4, May 2000	0.05	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	30	Professional judgement	30	Professional judgement	BW x AT
	ED	Exposure Duration	(years)	6	USEPA, May 1993	2	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	15	USEPA, December 1989	15	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	1,650	1/4 of total body area assume	1,650	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	6	USEPA, May 1993	2	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.35E-05
Noncancer Ingestion Intake(RME) = 2.74E-04

Cancer Ingestion Intake(CTE) = 7.83E-06
Noncancer Ingestion Intake(CTE) = 2.74E-04

Cancer Dermal Intake(RME) = 7.75E-01
Noncancer Dermal Intake(RME) = 9.04E+00

Cancer Dermal Intake(CTE) = 2.58E-01
Noncancer Dermal Intake(CTE) = 9.04E+00

ChildResSite4_SW_RME.xls

TABLE 4.20

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER SITE 4 - GOLF COURSE LANDFILL NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	USEPA Region 4, May 2000	0.01	USEPA Region 4, May 2000	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	30	Professional judgement	30	Professional judgement	
	ED	Exposure Duration	(years)	24	USEPA, May 1993	7	USEPA, May 1993	
	ET	Exposure Time	(hr/day)	1	Professional judgement	1	Professional Judgement	
	BW	Body Weight	(kg)	70	USEPA, December 1989	70	USEPA, December 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	USEPA, December 1989	25550	USEPA, December 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	The equations and parameters for
	A	Skin Surface Area	cm^2	4,500	1/4 of total body area assume	4,500	1/4 of total body area assume	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided USEPA
	ED	Exposure Duration	years	24	USEPA, May 1993	7	USEPA, May 1993	
	EF	Exposure Frequency	days/year	30	Professional judgement	30	Professional judgement	
	t_{event}	Duration of Event	hour/event	1	Professional judgement	1	Professional judgement	
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	T	Lag Time	hour/event	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, July 2004	chemical-specific	USEPA, July 2004	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 4.03E-06
Noncancer Ingestion Intake(RME) = 1.17E-05

Cancer Ingestion Intake(CTE) = 1.17E-06
Noncancer Ingestion Intake(CTE) = 1.17E-05

Cancer Dermal Intake(RME) = 1.81E+00
Noncancer Dermal Intake(RME) = 5.28E+00

Cancer Dermal Intake(CTE) = 5.28E-01
Noncancer Dermal Intake(CTE) = 5.28E+00

AdultResSite4_SW_RME.xls

TABLE 4.21

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	330	USEPA, December 2002	330	USEPA, March 2001	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1	Professional Judgement	1	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA, July 2004	0.1	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgement	30	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 5.54E-09
Noncancer Ingestion Intake - RME = 3.87E-07

Cancer Ingestion Intake - CTE = 5.54E-09
Noncancer Ingestion Intake - CTE = 3.87E-07

Cancer Dermal Intake - RME = 1.66E-08
Noncancer Dermal Intake - RME = 1.16E-06

Cancer Dermal Intake - CTE = 5.54E-09
Noncancer Dermal Intake - CTE = 3.87E-07

TABLE 4.22

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	50	USEPA, March 2001	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.02	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA, July 2004	chemical -specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	24	USEPA, May 1993	12	Professional Judgment	
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.68E-08
Noncancer Ingestion Intake - RME = 4.70E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

TABLE 4.23

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, March 2001	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA, July 2004	3,300	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.02	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA, July 2004	chemical -specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	25	USEPA, May 1993	9	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA, December 1989	3,285	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.19E-08
Noncancer Ingestion Intake - RME = 1.17E-07

Cancer Ingestion Intake - CTE = 7.55E-09
Noncancer Ingestion Intake - CTE = 5.87E-08

Cancer Dermal Intake - RME = 2.77E-07
Noncancer Dermal Intake - RME = 7.75E-07

Cancer Dermal Intake - CTE = 9.96E-09
Noncancer Dermal Intake - CTE = 7.75E-08

TABLE 4.24

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adolescent (6 - 16 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1	USEPA, May 1993	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	15	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	11	6 to 16 years of age	11	6 to 16 years of age	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	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	4,015	USEPA, December 1989	4,015	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,250	USEPA, August 1997	3,250	USEPA, August 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.4	USEPA, July 2004	0.04	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA, July 2004	chemical -specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	15	Professional Judgment	
	ED	Exposure Duration	years	11	6 to 16 years of age	11	6 to 16 years of age	
	BW	Body Weight	kg	45	USEPA Region 4, May 2000	45	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	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.87E-08
Noncancer Ingestion Intake - RME = 1.83E-07

Cancer Ingestion Intake - CTE = 7.18E-09
Noncancer Ingestion Intake - CTE = 4.57E-08

Cancer Dermal Intake - RME = 3.73E-07
Noncancer Dermal Intake - RME = 2.37E-06

Cancer Dermal Intake - CTE = 1.87E-08
Noncancer Dermal Intake - CTE = 1.19E-07

TABLE 4.25

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF ADULT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	50	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1	USEPA, May 1993	1	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	19	USEPA, May 1993	19	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	6,935	USEPA, December 1989	6,935	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,700	USEPA, July 2004	5,700	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA, July 2004	0.01	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA, July 2004	chemical -specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	Professional Judgment	
	ED	Exposure Duration	years	19	USEPA, May 1993	19	USEPA, May 1993	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	6,935	USEPA, December 1989	6,935	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.27E-08
Noncancer Ingestion Intake - RME = 4.70E-08

Cancer Ingestion Intake - CTE = 6.37E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 1.02E-07
Noncancer Dermal Intake - RME = 3.75E-07

Cancer Dermal Intake - CTE = 7.27E-09
Noncancer Dermal Intake - CTE = 2.68E-08

TABLE 4.26

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA, May 1993	100	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA, May 1993	2	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	Maximum	USEPA, May 1993	Maximum	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,800	USEPA, July 2004	2,800	USEPA, July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA, July 2004	0.04	USEPA, July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA, July 2004	chemical specific	USEPA, July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	6	USEPA, December 1989	2	USEPA, December 1989	
	BW	Body Weight	kg	15	USEPA, May 1993	15	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 9.39E-08
Noncancer Ingestion Intake - RME = 1.10E-06

Cancer Ingestion Intake - CTE = 1.57E-08
Noncancer Ingestion Intake - CTE = 5.48E-07

Cancer Dermal Intake - RME = 2.63E-07
Noncancer Dermal Intake - RME = 3.07E-06

Cancer Dermal Intake - CTE = 1.75E-08
Noncancer Dermal Intake - CTE = 6.14E-07

TABLE 4.27

VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA, May 1993	50	USEPA, May 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[2]	1.0	USEPA, May 1993	1.0	USEPA, May 1993	BW x AT
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA, May 1993	7	USEPA, May 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL or Max	USEPA, May 1993	95% UCL or Max	USEPA, May 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA, December 1989	1.0E-06	USEPA, December 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,700	USEPA July 2004	5,700	USEPA July 2004	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA July 2004	0.01	USEPA July 2004	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA July 2004	chemical specific	USEPA July 2004	
	EF	Exposure Frequency	days/year	30	Professional Judgment	30	Professional Judgment	
	ED	Exposure Duration	years	24	USEPA, December 1989	7	USEPA, December 1989	
	BW	Body Weight	kg	70	USEPA, May 1993	70	USEPA, May 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

1. CDI = Chronic Daily Intake
2. Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 1.17E-07

Cancer Ingestion Intake - CTE = 5.87E-09
Noncancer Ingestion Intake - CTE = 5.87E-08

Cancer Dermal Intake - RME = 1.61E-07
Noncancer Dermal Intake - RME = 4.68E-07

Cancer Dermal Intake - CTE = 6.69E-09
Noncancer Dermal Intake - CTE = 6.69E-08

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Volatile Organic Compounds										
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	NA	NA	EPA PPRV	10/19/2004
Benzene	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Blood	300/1	IRIS	5/5/2006
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Blood	NA	EPA 9	10/2004
trans-1,2-Dichloroethene	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Blood	1000/1	IRIS	5/5/2006
Tetrachloroethene	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Liver, Body Weight	1000/1	IRIS	5/5/2006
Trichloroethene	Chronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Liver	30/1	IRIS	5/5/2006
Semivolatile Organic Compounds										
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
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)										
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans										
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals										
Aluminum	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Immunological, Nails	100	EPA 9	10/2004
Antimony	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Blood	1000/1	IRIS	5/5/2006
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Skin, CVS	3/1	IRIS	5/5/2006
Barium	Chronic	2.0E-01	mg/kg/day	0.07	1.4E-02	mg/kg/day	Kidney	300/1	IRIS	5/5/2006
Chromium VI	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	Fetotoxicity/GS/Bone	300/3	IRIS	5/5/2006
Iron	Chronic	3.0E-01	mg/kg/day	1	3.0E-01	mg/kg/day	NA	1	NCEA	4/7/2006
Manganese (Soil)	Chronic	7.0E-02	mg/kg/day	0.04	2.8E-03	mg/kg/day	CNS	1/1	IRIS	5/5/2006
Manganese (Water)	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	CNS	3/1	IRIS	5/5/2006
Thallium	Chronic	7.0E-05	mg/kg/day	0.04	2.8E-06	mg/kg/day	Liver	3000	EPA 3	4/7/2006
Vanadium	Chronic	1.0E-03	mg/kg/day	0.026	2.6E-05	mg/kg/day	Kidney	300	NCEA	4/7/2006

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.

Definitions:

CNS = Central Nervous System
CVS = Cardiovascular system
EPA 3 = U.S. EPA Region 3 Risk-Based Concentration Table, April 7, 2005.
EPA 9 = U.S. EPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.
EPA PPRV - U.S. EPA provisional peer reviewed value, value from U.S. EPA Region 3 RBC Table, April 7, 2006.
GS = Gastrointestinal System
IRIS = Integrated Risk Information System
NA = Not Applicable
NCEA = National Center for Environmental Assessment, value from U.S. EPA Region 3 RBC Table, April 7, 2006.
CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds									
1,2-Dichloroethane	Chronic	2.5E+00	mg/m^3	7.0E-01	(mg/kg/day)	NA	NA	ATSDR MRL	4/7/2006
Benzene	Chronic	3.0E-02	mg/m^3	8.6E-03	(mg/kg/day)	Blood	300/1	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	Chronic	6.0E-02	mg/m^3	1.7E-02	(mg/kg/day)	Blood	NA	EPA PPRV	10/25/2005
Tetrachloroethene	Chronic	2.8E-01	mg/m^3	8.0E-02	(mg/kg/day)	Liver	NA	ATSDR MRL	4/7/2006
Trichloroethene	Chronic	6.0E-01	mg/m^3	1.7E-01	(mg/kg/day)	Liver	NA	CA EPA	12/2002
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	2.9E-02	(mg/kg/day)	Liver	30/1	IRIS	5/5/2006
Semivolatile Organic Compounds									
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
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)									
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans									
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	Chronic	5.0E-04	mg/m^3	1.4E-04	(mg/kg/day)	Fetus	1000/1	HEAST	7/1997
Chromium VI	Chronic	1.0E-04	mg/m^3	2.9E-05	(mg/kg/day)	Lungs	300/1	IRIS	5/5/2006
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	5/5/2006
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 MRL = Agency for Toxic Substances and Disease Registry Minimal Risk Levels, value from U.S. EPA Region 3 RBC Table, October 25, 2005.

CNS = Central Nervous System

HEAST= Health Effects Assessment Summary Tables

IRIS = Integrated Risk Information System

NA = Not Applicable

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds								
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	5.4E-01	$(mg/kg/day)^{-1}$	1	5.4E-01	$(mg/kg/day)^{-1}$	NA	EPA 3	4/7/2006
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1	1.3E-02	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Vinyl Chloride (Lifetime)	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Semivolatile Organic Compounds								
Benzo(a)anthracene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzo(a)pyrene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzo(b)fluoranthene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzo(a,h)anthracene	7.3E+00	$(mg/kg/day)^{-1}$	1	7.3E+00	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Indeno(1,2,3-cd)pyrene	7.3E-01	$(mg/kg/day)^{-1}$	1	7.3E-01	$(mg/kg/day)^{-1}$	B2	EPA(1)	7/1993
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)								
Aroclor-1260	2.0E+00	$(mg/kg/day)^{-1}$	1	2.0E+00	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Dioxins/Furans								
2,3,7,8-TCDD TEQ	1.5E+05	$(mg/kg/day)^{-1}$	1	1.5E+05	$(mg/kg/day)^{-1}$	B2	HEAST	7/1997
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	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	IRIS	5/5/2006
Barium	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Chromium VI	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	D	IRIS	5/5/2006
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA

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 cancer slope factor for dermal = Oral cancer slope factor / Oral Absorption Efficiency for Dermal.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Definitions:

EPA 3 = U.S. EPA Region 3 RBC Table, April 7, 2006.

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

IRIS = Integrated Risk Information System.

NA = Not Available.

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

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)
Volatile Organic Compounds							
1,2-Dichloroethane	2.6E-02	$(mg/m^3)^{-1}$	9.1E-02	$(mg/kg/day)^{-1}$	B2	IRIS	5/5/2006
Benzene	7.8E-03	$(mg/m^3)^{-1}$	2.7E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
cis-1,2-Dichloroethene	NA	NA	NA	NA	D	IRIS	5/5/2006
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	5.7E-03	$(mg/m^3)^{-1}$	2.0E-02	$(mg/kg/day)^{-1}$	NA	EPA 3	4/7/2006
Trichloroethene	2.0E-03	$(mg/m^3)^{-1}$	7.0E-03	$(mg/kg/day)^{-1}$	C	CA EPA	12/2002
Vinyl Chloride (Adult)	4.4E-03	$(mg/m^3)^{-1}$	1.5E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Vinyl Chloride (Lifetime)	8.8E-03	$(mg/m^3)^{-1}$	3.1E-02	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Semivolatile Organic Compounds							
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	8.9E-01	$(mg/m^3)^{-1}$	3.1E+00	$(mg/kg/day)^{-1}$	B2	NCEA	4/7/2006
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)							
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans							
2,3,7,8-TCDD TEQ	NA	NA	NA	NA	NA	NA	NA
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E+00	$(mg/m^3)^{-1}$	1.5E+01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Barium	NA	NA	NA	NA	D	IRIS	5/5/2006
Chromium VI	1.2E+01	$(mg/m^3)^{-1}$	4.2E+01	$(mg/kg/day)^{-1}$	A	IRIS	5/5/2006
Iron	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	D	IRIS	5/5/2006
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Notes:

1 - Inhalation CSF = Unit Risk * 70 kg / 20m^3/day.

EPA Group:

A - Human carcinogen.

B1 - Probable human carcinogen - indicates that limited human data are available.

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans .

C - Possible human carcinogen.

D - Not classifiable as a human carcinogen.

E - Evidence of noncarcinogenicity.

Definitions:

IRIS = Integrated Risk Information System.

NA = Not Available.

EPA 3 = U.S. EPA Region 3 RBC Table, April 7, 2006.

EPA 9 = U.S. EPA Region 9 Preliminary Remediation Goal Table, October 2004, Updated December 28, 2004.

NCEA = National Center for Environmental Assessment, value from U.S. EPA Region 3 RBC Table, April 7, 2006.

CA EPA = California EPA, Technical Support Document for Describing Available Cancer Potency Factors, December 2002.

TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	8.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.0E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.3E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.9E-03
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	4.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.3E-03
	(total)												**2.0E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.4E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.8E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**4.8E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	4.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.0E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	7.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.2E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.0E-03
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	2.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.2E-03
	(total)												**9.8E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.8E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.6E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.4E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	9.6E-04
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	5.2E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.2E-04
	(total)												**2.4E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	6.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	7.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.5E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.5E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	4.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-04
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	9.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.8E-04
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	2.6E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.6E-04
	(total)												**1.2E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	8.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	3.8E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-05
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.3E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	5.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	5.2E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.3E-02
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	6.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-02
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.1E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-02
	(total)												**4.9E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	6.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	7.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.6E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.6E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.3E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.3E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.9E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.6E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.8E-03
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	4.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.8E-03
	(total)												**2.2E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	7.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.3E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	3.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.2E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.3E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	3.7E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.2E-02
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	6.8E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.8E-03
	(total)												**3.1E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**3.2E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	8.1E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.1E-04
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	9.3E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	3.1E-03
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.7E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.7E-03
	(total)												**7.7E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.9E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.6E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.4E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	9.6E-04
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	5.2E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.2E-04
	(total)												**2.4E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.5E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.5a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	4.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.2E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.2E-04
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	9.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.2E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.4E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.8E-04
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	2.6E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	2.6E-04
	(total)												**1.2E-03**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	7.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	3.3E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-05
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.1E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	9.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	6.8E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	6.8E-02
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	5.2E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-01
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	7.8E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.6E-01
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.4E-04	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.4E-01
	(total)												**6.5E-01**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.4E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-02
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.5E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.3E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.3E-02
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	5.8E-02
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.6E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	8.7E-02
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	4.7E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	4.7E-02
	(total)												**2.2E-01**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.0E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	7.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.2E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	5.6E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.9E-02
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	8.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.8E-02
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-02
	(total)												**6.9E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.2E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.4E-03
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.3E-03
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.8E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	9.4E-03
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	5.1E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.1E-03
	(total)												**2.3E-02**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.4E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.1E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	4.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-03
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	4.3E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	1.1E-02
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	7.3E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.3E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	4.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E-01
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.7E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.7E-01
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	3.8E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E+00
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	2.6E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	2.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	2.1E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	5.1E-01
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	1.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.6E-01
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	1.4E-02	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	6.8E-02
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	5.9E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E+00
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	1.2E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	5.1E-01
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.2E-04	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.2E-01
	(total)												**6.4E+00**
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.0E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.1E-05
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	3.1E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	7.8E-04
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	3.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.1E-02
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-02
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.4E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.6E-02
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	9.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.1E-02
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	2.1E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	2.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	3.4E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.6E-03
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	2.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.5E-04
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	2.2E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	1.6E-03
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	9.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.3E-03
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	2.0E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.1E-02
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.9E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	7.3E-03
	(total)												**1.6E-01**

Total Hazard Index Across All Exposure Routes/Pathways **6.6E+00**

TABLE 7.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.4E-04
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-05	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	3.2E-03
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	2.2E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.2E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.4E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.1E-02
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	5.1E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-01
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.1E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.8E-01
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	7.7E-05	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	7.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	6.2E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.5E-01
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	4.1E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-01
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	4.1E-03	mg/kg-day	2.00E-01	mg/kg-day	NA	NA	2.0E-02
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.8E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.9E-01
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	3.7E-03	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.5E-01
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	3.5E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	3.5E-02
	(total)												**1.9E+00**
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	5.9E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-05
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.8E-06	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.6E-04
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.8E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.8E-02
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.9E-03
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	8.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-02
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	5.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.8E-02
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.2E-04	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	2.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.3E-03
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.4E-04
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	1.3E-05	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	9.3E-04
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	5.7E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-03
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	1.2E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.2E-02
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.1E-07	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	4.3E-03
	(total)												**9.3E-02**

Total Hazard Index Across All Exposure Routes/Pathways **2.0E+00**

TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	6.1E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-06
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	2.0E-07	mg/kg-day	4.00E-03	mg/kg-day	NA	NA	4.9E-05
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-03
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.1E-04
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	7.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	6.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-03
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	5.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.5E-04
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	3.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-04
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	3.3E-06	mg/kg-day	1.40E-02	mg/kg-day	NA	NA	2.4E-04
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.9E-04
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	3.0E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.2E-03
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	2.9E-08	mg/kg-day	2.60E-05	mg/kg-day	NA	NA	1.1E-03
	(total)												1.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-02**

TABLE 7.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO AMBIENT AIR IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in a Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.52E-05	mg/m^3	R	4.1E-07	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	5.9E-07
	Benzene	1.00E-03	mg/L	4.15E-05	mg/m^3	R	4.9E-07	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	5.7E-05
	cis-1,2-Dichloroethene	1.70E-01	mg/L	6.32E-03	mg/m^3	R	7.4E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.4E-03
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.12E-03	mg/m^3	R	4.8E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.8E-03
	Trichloroethylene	4.00E-03	mg/L	1.29E-04	mg/m^3	R	1.5E-06	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	8.9E-06
	Vinyl chloride	8.80E-02	mg/L	4.12E-03	mg/m^3	R	4.8E-05	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	1.7E-03
	(total)												1.2E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF CONSTRUCTION WORKERS TO AMBIENT AIR IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in a Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.52E-05	mg/m^3	R	2.1E-07	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	3.0E-07
	Benzene	1.00E-03	mg/L	4.15E-05	mg/m^3	R	2.4E-07	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	2.8E-05
	cis-1,2-Dichloroethene	1.70E-01	mg/L	6.32E-03	mg/m^3	R	3.7E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.7E-03
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.12E-03	mg/m^3	R	2.4E-05	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.4E-03
	Trichloroethylene	4.00E-03	mg/L	1.29E-04	mg/m^3	R	7.6E-07	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	4.4E-06
	Vinyl chloride	8.80E-02	mg/L	4.12E-03	mg/m^3	R	2.4E-05	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	8.3E-04
	(total)												6.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHLD RESIDENTS TO VAPORS FROM INTERMEDIATE ZONE GROUNDWATER WHILE SHOWERING
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	3.1E-05	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	4.5E-05
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	3.9E-05	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	4.6E-03
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	7.3E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.3E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	4.1E-03	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.4E-01
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	1.3E-04	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	7.8E-04
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	3.8E-03	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	1.3E-01
													1.1E+00
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM INTERMEDIATE ZONE GROUNDWATER WHILE SHOWERING
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	1.7E-05	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	2.5E-05
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	2.2E-05	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	2.5E-03
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	4.0E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.0E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	2.2E-03	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	1.3E-01
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	7.3E-05	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	4.3E-04
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	2.1E-03	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	7.3E-02
													6.1E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**6.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SITE 4- GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3-min)	R	6.7E-06	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	9.6E-06
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	8.5E-06	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	9.8E-04
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	1.6E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-01
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	8.7E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	5.1E-02
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	2.8E-05	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	1.7E-04
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	8.2E-04	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	2.8E-02
													2.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SITE 4- GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	3.7E-06	mg/kg-day	7.00E-01	mg/kg-day	NA	NA	5.3E-06
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	4.7E-06	mg/kg-day	8.60E-03	mg/kg-day	NA	NA	5.4E-04
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	8.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.6E-02
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	4.8E-04	mg/kg-day	1.70E-02	mg/kg-day	NA	NA	2.8E-02
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	1.6E-05	mg/kg-day	1.70E-01	mg/kg-day	NA	NA	9.2E-05
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	4.5E-04	mg/kg-day	2.90E-02	mg/kg-day	NA	NA	1.6E-02
													1.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.8E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.8E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	4.6E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.9E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.0E-05
	(total)												**4.6E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	6.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.6E-05
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.3E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	8.7E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	9.0E-04
	(total)												**1.2E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.3E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.4E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	9.6E-07	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.0E-05
	(total)												**2.3E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.6E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.6E-05
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.8E-05
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	4.3E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.5E-04
	(total)												**5.9E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**8.2E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	8.9E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	9.5E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.2E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.7E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.6E-04
	(total)												**8.9E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.6E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	8.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	4.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.2E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-03
	(total)												**1.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.7E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.7E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	4.5E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	7.8E-05
	(total)												**4.5E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.8E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.8E-05
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	4.2E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.7E-05
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.5E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	6.1E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.3E-04
	(total)												**8.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.8E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.8E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	4.6E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.9E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.0E-05
	(total)												**4.6E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	6.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.6E-05
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.3E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	8.7E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	9.0E-04
	(total)												**1.2E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.8E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.8E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	4.6E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.9E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.0E-05
	(total)												**4.6E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.6E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.6E-05
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.8E-05
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.6E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	4.3E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.5E-04
	(total)												**5.9E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.19 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	8.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.2E-05
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.3E-12	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.2E-03
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E-03
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.6E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.3E-03
	(total)												**1.3E-02**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.9E-03
	(total)												**2.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.19a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	8.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.2E-05
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.3E-12	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.2E-03
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E-03
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.6E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.3E-03
	(total)												**1.3E-02**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.9E-03
	(total)												**2.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.20 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.20a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-06
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.0E-04
	(total)												**5.7E-04**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-04
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.1E-05
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

TABLE 7.21 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	9.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	9.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.2E-11	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	7.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.2E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.4E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	5.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-02
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.9E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	4.2E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.1E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-02
	(total)												**4.6E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	8.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	3.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.1E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.6E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**6.6E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.21a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	9.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	9.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.2E-11	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	7.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	7.2E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	7.4E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	5.0E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.7E-02
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.9E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	4.2E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.1E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.1E-02
	(total)												**4.6E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	8.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	9.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.5E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.6E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.2E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.22 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	7.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	8.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.4E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	8.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.7E-04
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.9E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	6.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.6E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	5.1E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-03
	(total)												**5.6E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	4.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	7.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	5.7E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**3.5E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.22a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	5.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	7.2E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	4.4E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-04
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	3.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.0E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.8E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	2.5E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	6.5E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.5E-04
	(total)												**2.8E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.8E-14	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	5.3E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.8E-05
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.8E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.23 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	6.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	2.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.2E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	8.9E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	1.3E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.2E-03
	(total)												**1.4E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	5.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	9.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	7.1E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**4.4E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.23a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	9.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.8E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.5E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.5E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	6.4E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.6E-03
	(total)												**7.0E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	5.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	9.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	7.1E-14	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.3E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.4E-05
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**4.4E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.24 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adolescent (6 - 16 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	3.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	9.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	4.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	5.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	3.4E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	3.4E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.5E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	2.4E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	7.9E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.4E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	2.0E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	5.0E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	5.0E-03
	(total)												**2.2E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	4.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	7.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	8.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.2E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.4E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.24a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adolescent (6 - 16 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	7.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	8.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.4E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	8.5E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.5E-04
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.7E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	5.9E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.5E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	5.0E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-03
	(total)												**5.4E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	8.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	4.0E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.1E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	6.8E-05
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**6.8E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.25 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	7.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	8.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.4E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	8.7E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	8.7E-04
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	8.9E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	6.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.0E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.6E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	5.1E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.3E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.3E-03
	(total)												**5.6E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	7.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	8.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.4E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.4E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.1E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.25a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	5.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	5.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	7.2E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	4.4E-04	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	4.4E-04
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	4.5E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	3.1E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	1.0E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.8E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	2.5E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	6.5E-07	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	6.5E-04
	(total)												**2.8E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	5.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	6.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	8.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	9.0E-10	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.4E-14	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.6E-09	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.5E-05
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.5E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.26 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	5.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.3E-11	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	2.0E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.0E-02
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.2E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.1E-02
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	1.4E-02	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	4.7E-02
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	8.3E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	1.2E-02
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	3.0E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.0E-02
	(total)												**1.3E-01**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.8E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	5.2E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**1.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.26a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	8.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	9.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.0E-02	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.0E-02
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.0E-02
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.1E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.4E-02
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.2E-07	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	5.9E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.5E-02
	(total)												**6.5E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	4.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	7.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	5.6E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**3.5E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.27 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	6.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	2.2E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	2.2E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	5.1E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	8.9E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	1.3E-03
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	3.2E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	3.2E-03
	(total)												**1.4E-02**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	9.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	6.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	4.3E-13	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	8.0E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	2.7E-04
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**2.7E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 7.27a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	9.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.8E-12	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.1E-03	mg/kg-day	1.0E+00	mg/kg-day	NA	NA	1.1E-03
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.3E-07	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.6E-04	mg/kg-day	3.0E-01	mg/kg-day	NA	NA	2.5E-03
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.5E-08	mg/kg-day	7.0E-05	mg/kg-day	NA	NA	6.4E-04
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.6E-06	mg/kg-day	1.0E-03	mg/kg-day	NA	NA	1.6E-03
	(total)												**7.0E-03**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	4.7E-09	mg/kg-day		mg/kg-day	NA	NA	
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	8.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	6.1E-14	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day	1.0E+00	mg/kg-day	NA	NA	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.1E-08	mg/kg-day	3.0E-04	mg/kg-day	NA	NA	3.8E-05
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day	3.0E-01	mg/kg-day	NA	NA	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day	7.0E-05	mg/kg-day	NA	NA	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day	2.6E-05	mg/kg-day	NA	NA	
	(total)												**3.8E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03

PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.2E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	3.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	6.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-08**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.6E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	4.5E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.0E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-09**
										Total Risk Across All Exposure Routes/Pathways	**5.3E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.1E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	5.8E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.1E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	3.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-08**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.5E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.5E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.8E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-09**
										Total Risk Across All Exposure Routes/Pathways	**2.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.3E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	9.3E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	3.5E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	8.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.9E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.2E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	6.0E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**2.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.3E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	6.3E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.2E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	3.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-08**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.9E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-10
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.1E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.9E-10
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.9E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.4E-10
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-09**
										Total Risk Across All Exposure Routes/Pathways	**2.7E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.7E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	7.3E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.4E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.9E-06**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	6.3E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.8E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-06**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	3.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	6.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.5E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.2E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.0E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	8.9E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**4.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.3E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.0E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	5.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	3.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	5.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.9E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.0E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	3.4E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.5E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.7E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.8E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	5.0E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	9.8E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	1.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	6.1E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.7E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	7.6E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.8E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	9.7E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	7.1E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.7E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	6.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	5.2E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.8E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	7.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.0E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.3E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.8E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.5a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT TRESPASSERS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Trepasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.8E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.3E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	9.8E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	3.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.6E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	7.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.3E-08**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.2E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-10
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.0E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	8.9E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-09**
										Total Risk Across All Exposure Routes/Pathways	**5.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	8.3E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.3E-07	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	5.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	4.5E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-06
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	6.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.0E-06**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.0E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	8.4E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	3.8E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	9.3E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	2.6E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	6.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	5.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	7.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-06**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	3.7E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.6E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.9E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.9E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	5.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.9E-06**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	5.1E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-07
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	2.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.5E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: On-site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	9.6E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.0E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M	2.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	1.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-07
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M	5.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.8E-07**
Dermal	Benzo(a)anthracene	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Dibenzo(a,h)anthracene	2.1E-01	mg/kg	2.1E-01	mg/kg	M	1.4E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Aluminum	5.3E+03	mg/kg	5.3E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	4.1E+00	mg/kg	4.1E+00	mg/kg	M	6.4E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-09
	Iron	6.1E+03	mg/kg	6.1E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	1.1E+01	mg/kg	1.1E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.4E-08**
										Total Risk Across All Exposure Routes/Pathways	**4.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Arsenic - 0.03

Other Metals - not evaluated

TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	5.5E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	5.0E-07
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	5.5E-06	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	3.0E-07
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	9.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	6.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	2.2E-05	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	2.8E-07
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	4.8E-04	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	3.6E-04
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	3.3E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	3.3E-11	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	4.9E-06
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	2.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	1.8E-05	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	2.6E-05
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	1.7E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	7.6E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	1.6E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
											3.9E-04
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.5E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.4E-08
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	4.6E-07	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	2.5E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	4.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	2.0E-06	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	2.7E-08
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.4E-05	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	1.0E-05
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	3.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	3.7E-10	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	5.5E-05
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	5.8E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	3.9E-08	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	5.8E-08
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	3.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.7E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	3.5E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	3.3E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
											6.5E-05
										Total Risk Across All Exposure Routes/Pathways	**4.6E-04**

TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.2E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.1E-07
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.2E-06	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	6.7E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	2.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	4.9E-06	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	6.3E-08
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.1E-04	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	8.1E-05
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	7.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	7.3E-12	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	1.1E-06
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	5.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	3.9E-06	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	5.9E-06
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	3.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.7E-02	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	3.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	3.3E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
											8.8E-05
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	2.9E-08	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	2.6E-09
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	8.9E-08	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	4.9E-09
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	8.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	5.8E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	4.0E-07	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	5.1E-09
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	2.7E-06	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	2.0E-06
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	6.1E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	7.0E-11	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	1.1E-05
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	9.7E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	6.4E-09	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	9.7E-09
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	6.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	2.8E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	5.8E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	5.4E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.3E-05
										Total Risk Across All Exposure Routes/Pathways	**1.0E-04**

TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	9.4E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	8.5E-07
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	9.4E-06	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	5.2E-07
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.6E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.0E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	3.8E-05	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	4.9E-07
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	8.3E-04	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	6.2E-04
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	5.6E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	5.6E-11	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	8.5E-06
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	4.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	3.0E-05	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	4.5E-05
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	3.0E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.3E-01	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	2.7E-03	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	2.5E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
											6.8E-04
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	3.5E-07	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	3.2E-08
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.1E-06	mg/kg-day	5.50E-02	(mg/kg-day)$^{-1}$	6.0E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.1E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	7.0E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	4.8E-06	mg/kg-day	1.30E-02	(mg/kg-day)$^{-1}$	6.2E-08
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	3.2E-05	mg/kg-day	7.50E-01	(mg/kg-day)$^{-1}$	2.4E-05
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	7.4E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	8.5E-10	mg/kg-day	1.50E+05	(mg/kg-day)$^{-1}$	1.3E-04
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	1.4E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	9.0E-08	mg/kg-day	1.50E+00	(mg/kg-day)$^{-1}$	1.4E-07
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	8.9E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	3.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	8.1E-06	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	7.6E-08	mg/kg-day		(mg/kg-day)$^{-1}$	
											1.5E-04
										Total Risk Across All Exposure Routes/Pathways	**8.3E-04**

TABLE 8.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.3E-06	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	2.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	5.1E-06	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-08
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.1E-04	mg/kg-day	7.50E-01	$(mg/kg\text{-}day)^{-1}$	8.5E-05
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	7.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	7.7E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	6.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	4.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-06
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	4.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	1.8E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	3.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											9.2E-05
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	5.9E-08	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	1.8E-07	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	8.1E-07	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	5.5E-06	mg/kg-day	7.50E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-06
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.4E-10	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.2E-05
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	2.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	1.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	5.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											2.6E-05
										Total Risk Across All Exposure Routes/Pathways	**1.2E-04**

TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	1.5E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	5.0E-09	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	4.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	3.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.8E-08	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-10
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	1.6E-07	mg/kg-day	7.50E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	2.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	2.6E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	1.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	9.7E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	9.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	4.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	8.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	8.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											5.2E-07
										Total Risk Across All Exposure Routes/Pathways	**5.2E-07**

TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,2-Dichloroethane	1.00E-03	mg/L	1.00E-03	mg/L	M	8.7E-10	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-11
	Benzene	1.00E-03	mg/L	1.00E-03	mg/L	M	2.8E-09	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	cis-1,2-Dichloroethene	1.70E-01	mg/L	1.70E-01	mg/L	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	1.10E-01	mg/L	M	1.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	4.00E-03	mg/L	M	1.1E-08	mg/kg-day	1.30E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Vinyl chloride	8.80E-02	mg/L	8.80E-02	mg/L	M	9.1E-08	mg/kg-day	7.50E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-08
	Dibenzofuran	6.00E-03	mg/L	6.00E-03	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,3,7,8-TCDD TEF	6.00E-09	mg/L	6.00E-09	mg/L	M	1.9E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.8E-07
	Aluminum	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Antimony	4.80E-03	mg/L	4.80E-03	mg/L	M	7.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.20E-03	mg/L	3.20E-03	mg/L	M	4.8E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-10
	Barium	3.17E-01	mg/L	3.17E-01	mg/L	M	4.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Chromium	NA	mg/L	NA	mg/L	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	1.39E+01	mg/L	1.39E+01	mg/L	M	2.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.88E-01	mg/L	2.88E-01	mg/L	M	4.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.70E-03	mg/L	2.70E-03	mg/L	M	4.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
											3.5E-07
										Total Risk Across All Exposure Routes/Pathways	**3.5E-07**

TABLE 8.11. REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO AMBIENT AIR IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in a Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.52E-05	mg/m^3	R	5.9E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-10
	Benzene	1.00E-03	mg/L	4.15E-05	mg/m^3	R	7.0E-09	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-10
	cis-1,2-Dichloroethene	1.70E-01	mg/L	6.32E-03	mg/m^3	R	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.12E-03	mg/m^3	R	6.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	1.29E-04	mg/m^3	R	2.2E-08	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-10
	Vinyl chloride	8.80E-02	mg/L	4.12E-03	mg/m^3	R	6.9E-07	mg/kg-day	1.50E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	(total)										1.1E-08
										Total Risk Across All Exposure Routes/Pathways	**1.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.11a. CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF CONSTRUCTION WORKERS TO AMBIENT AIR IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Ambient Air in a Trench
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.52E-05	mg/m^3	R	3.0E-09	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Benzene	1.00E-03	mg/L	4.15E-05	mg/m^3	R	3.5E-09	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-11
	cis-1,2-Dichloroethene	1.70E-01	mg/L	6.32E-03	mg/m^3	R	5.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.12E-03	mg/m^3	R	3.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethylene	4.00E-03	mg/L	1.29E-04	mg/m^3	R	1.1E-08	mg/kg-day	7.00E-03	$(mg/kg\text{-}day)^{-1}$	7.6E-11
	Vinyl chloride	8.80E-02	mg/L	4.12E-03	mg/m^3	R	3.5E-07	mg/kg-day	1.50E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	(total)										5.6E-09
										Total Risk Across All Exposure Routes/Pathways	**5.6E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHLD RESIDENTS TO VAPORS FROM INTERMEDIATE ZONE GROUNDWATER WHILE SHOWERING
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	2.7E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	2.5E-07
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	3.4E-06	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	9.1E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	6.2E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	3.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	1.1E-05	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	7.9E-08
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	3.3E-04	mg/kg-day	3.00E-02	(mg/kg-day)$^{-1}$	9.9E-06
											1.0E-05
										Total Risk Across All Exposure Routes/Pathways	**1.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM INTERMEDIATE ZONE GROUNDWATER WHILE SHOWERING
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	1.5E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.4E-07
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	1.9E-06	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	5.1E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	3.5E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	1.9E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	6.3E-06	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	4.4E-08
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	1.8E-04	mg/kg-day	3.00E-02	(mg/kg-day)$^{-1}$	5.5E-06
											5.7E-06
										Total Risk Across All Exposure Routes/Pathways	**5.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SITE 4- GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	2.3E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	2.1E-07
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	2.9E-06	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	7.8E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	5.3E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	3.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	9.7E-06	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	6.8E-08
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	2.8E-04	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	4.2E-06
											4.6E-06
										Total Risk Across All Exposure Routes/Pathways	**4.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SITE 4- GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,2-Dichloroethane	1.00E-03	mg/L	3.10E-04	(mg/m^3- min)	R	1.3E-06	mg/kg-day	9.10E-02	(mg/kg-day)$^{-1}$	1.2E-07
	Benzene	1.00E-03	mg/L	3.90E-04	(mg/m^3- min)	R	1.6E-06	mg/kg-day	2.70E-02	(mg/kg-day)$^{-1}$	4.3E-08
	cis-1,2-Dichloroethene	1.70E-01	mg/L	7.19E-02	(mg/m^3- min)	R	3.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	trans-1,2-Dichloroethene	1.10E-01	mg/L	4.01E-02	(mg/m^3- min)	R	1.7E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Trichloroethene	4.00E-03	mg/L	1.30E-03	(mg/m^3- min)	R	5.4E-06	mg/kg-day	7.00E-03	(mg/kg-day)$^{-1}$	3.8E-08
	Vinyl chloride	8.80E-02	mg/L	3.79E-02	(mg/m^3- min)	R	1.6E-04	mg/kg-day	1.50E-02	(mg/kg-day)$^{-1}$	2.3E-06
											2.5E-06
										Total Risk Across All Exposure Routes/Pathways	**2.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.0E-10	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	8.2E-16	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	8.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-09**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.0E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.1E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	5.1E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-10
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.0E-10	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	8.2E-16	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	8.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-09**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.0E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.1E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	5.1E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-10
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.8E-07**

TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.0E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.6E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	6.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.2E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.0E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.2E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	7.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.5E-06**
										Total Risk Across All Exposure Routes/Pathways	**3.5E-06**

TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.8E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	9.8E-10
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.0E-15	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	4.4E-10
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	4.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-09**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.2E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.9E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	5.8E-07
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.2E-07**
										Total Risk Across All Exposure Routes/Pathways	**6.3E-07**

TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.3E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.1E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	8.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.3E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	5.0E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.7E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	4.0E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	9.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.3E-06**
										Total Risk Across All Exposure Routes/Pathways	**4.4E-06**

TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.5E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.4E-15	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	7.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.8E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	9.7E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	4.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.6E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-06**

TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	8.6E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.4E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.6E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.5E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.3E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.0E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	6.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.5E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.2E-06**

TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADOLESCENT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.3E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.0E-15	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	9.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	7.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.2E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	6.7E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.2E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	9.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.1E-06**

TABLE 8.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.6E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.2E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.0E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.6E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.5E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	7.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	5.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.7E-06**

TABLE 8.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT TRESPASSERS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Trespassers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.6E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.2E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.5E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	8.2E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	8.2E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.9E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.3E-06**

TABLE 8.19 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	7.0E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.2E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	4.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.9E-07**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.0E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	1.1E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	5.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.9E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-06**

TABLE 8.19a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	2.3E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.8E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	5.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	4.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.8E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	6.8E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	3.7E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	5.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.9E-07**
										Total Risk Across All Exposure Routes/Pathways	**6.9E-07**

TABLE 8.20 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.2E-08	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	6.5E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.0E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	2.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	8.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.1E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	4.8E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	2.6E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.9E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	1.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	9.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	3.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**4.2E-06**

TABLE 8.20a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	3.5E-09	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	5.8E-15	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	8.6E-10
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	8.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.5E-08**
Dermal	Tetrachloroethene	3.00E-03	mg/L	3.00E-03	mg/L	M	1.4E-07	mg/kg-day	5.40E-01	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	2,3,7,8-TCDD TEQ	4.90E-09	mg/L	4.90E-09	mg/L	M	7.5E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Arsenic	6.80E-03	mg/L	6.80E-03	mg/L	M	3.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Iron	5.18E+00	mg/L	5.18E+00	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.05E-01	mg/L	2.05E-01	mg/L	M	1.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.2E-06**

TABLE 8.21 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	8.9E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	6.5E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.0E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	7.3E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.4E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.0E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.0E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	4.0E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	2.7E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.7E-13	mg/kg-day	1.5E+05	(mg/kg-day)$^{-1}$	2.5E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.0E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.2E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.7E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.2E-05	mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.2E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										**1.9E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.5E-09	mg/kg-day	7.30E-01	(mg/kg-day)$^{-1}$	2.5E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	3.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	2.8E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	5.4E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	3.9E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.2E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	8.5E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.1E-09	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.5E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	5.6E-10	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.1E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.5E-14	mg/kg-day	1.5E+05	(mg/kg-day)$^{-1}$	2.3E-09
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.8E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	4.3E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										**5.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.21a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	8.9E-09	mg/kg-day	7.3E-01	$(mg/kg-day)^{-1}$	6.5E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.0E-08	mg/kg-day	7.3E+00	$(mg/kg-day)^{-1}$	7.3E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.4E-08	mg/kg-day	7.3E-01	$(mg/kg-day)^{-1}$	1.0E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.0E-09	mg/kg-day	7.3E+00	$(mg/kg-day)^{-1}$	2.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.4E-09	mg/kg-day	7.3E-01	$(mg/kg-day)^{-1}$	4.0E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-09	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.7E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.7E-13	mg/kg-day	1.5E+05	$(mg/kg-day)^{-1}$	2.5E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.0E-04	mg/kg-day		$(mg/kg-day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.2E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	4.7E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.2E-05	mg/kg-day		$(mg/kg-day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.2E-09	mg/kg-day		$(mg/kg-day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.5E-07	mg/kg-day		$(mg/kg-day)^{-1}$	
	(total)										1.9E-07
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.2E-09	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	8.4E-10
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.3E-09	mg/kg-day	7.3E+00	$(mg/kg-day)^{-1}$	9.5E-09
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.8E-09	mg/kg-day	7.3E-01	$(mg/kg-day)^{-1}$	1.3E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.9E-10	mg/kg-day	7.3E+00	$(mg/kg-day)^{-1}$	2.8E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	7.1E-10	mg/kg-day	7.3E-01	$(mg/kg-day)^{-1}$	5.1E-10
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.9E-10	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.7E-10
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	5.1E-15	mg/kg-day	1.5E+05	$(mg/kg-day)^{-1}$	7.6E-10
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg-day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	9.5E-10	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	1.4E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg-day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg-day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg-day)^{-1}$	
	(total)										1.8E-08
										Total Risk Across All Exposure Routes/Pathways	2.1E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.22 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.7E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	3.0E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	4.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	9.1E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.6E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	4.0E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	5.1E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	3.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	9.6E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	2.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	4.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.8E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	4.6E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	5.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	7.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.6E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.8E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	7.4E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.0E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.8E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.22a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF SITE WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	4.8E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	5.4E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	7.5E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.6E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.0E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	7.2E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	9.2E-14	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	5.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	3.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	8.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.0E-07
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	8.3E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	6.1E-10
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	9.3E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	6.8E-09
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.3E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	9.5E-10
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.8E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.1E-10	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.6E-15	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	5.5E-10
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.8E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										1.3E-08
										Total Risk Across All Exposure Routes/Pathways	1.2E-07

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.23 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.7E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.5E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.0E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.3E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.1E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.3E-12	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	7.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	5.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	5.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	6.5E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	9.0E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.9E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	9.3E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.5E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.8E-07**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.23a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	8.8E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.4E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	9.9E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.9E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	4.1E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	7.4E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.8E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.3E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	9.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	2.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.1E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.3E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	7.0E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.3E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	9.3E-10
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	3.3E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-10
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	9.1E-15	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.7E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.24 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adolescent (6 - 16 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	4.6E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	5.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	7.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.5E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.8E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	6.9E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	8.8E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	5.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	3.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	2.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	7.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.9E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	7.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.7E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	8.7E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.2E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	8.9E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.6E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	4.8E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.3E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.4E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	6.4E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.24a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adolescent (6 - 16 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.1E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.3E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	9.4E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.8E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.9E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	7.0E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.7E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.2E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.1E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	9.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.9E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	4.4E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	6.1E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.3E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	9.6E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.4E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	6.3E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.7E-14	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.2E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.8E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.9E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.25 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.0E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	1.5E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.3E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.7E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.3E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	6.9E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.0E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.2E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	9.1E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	3.1E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.1E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	3.9E-13	mg/kg-day	1.5E+05	(mg/kg-day)$^{-1}$	5.8E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	2.4E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	7.3E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.1E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	1.7E-04	mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	9.7E-09	mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	3.5E-07	mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										**4.4E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.1E-08	mg/kg-day	7.30E-01	(mg/kg-day)$^{-1}$	1.5E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.4E-08	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	1.7E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	2.4E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	7.1E-09	mg/kg-day	7.3E+00	(mg/kg-day)$^{-1}$	5.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.3E-08	mg/kg-day	7.3E-01	(mg/kg-day)$^{-1}$	9.5E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	3.4E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	6.8E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	9.3E-14	mg/kg-day	1.5E+05	(mg/kg-day)$^{-1}$	1.4E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.7E-08	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	2.6E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		(mg/kg-day)$^{-1}$	
	(total)										**3.2E-07**
										Total Risk Across All Exposure Routes/Pathways	**7.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.25a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT TRESPASSERS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.0E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	7.4E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.1E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.6E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.4E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	6.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.5E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.9E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.6E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	8.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.2E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.5E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.7E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.4E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	5.1E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	9.3E-10	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.8E-10
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.4E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-10
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	6.6E-15	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.2E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.26 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.5E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.7E-07	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.3E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	5.1E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.7E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	9.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.7E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.3E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.9E-12	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	5.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	1.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-06**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	5.5E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	6.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	8.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.2E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.8E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.4E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	8.8E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	2.4E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	4.5E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.7E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.26a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Child (0 - 6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	2.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	2.8E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	3.9E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	8.5E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	1.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	3.8E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	4.8E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	8.9E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	2.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	4.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.4E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.6E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	4.1E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	5.7E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.2E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	9.0E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	5.9E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.6E-14	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	2.4E-09
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.0E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**5.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.27 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	6.4E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.7E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	7.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.0E-07	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	7.3E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	2.2E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	3.9E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	9.7E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.2E-12	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	7.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-07
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	5.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	3.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	3.8E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	5.2E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	1.1E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	2.0E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	5.4E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.5E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	2.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.1E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 8.27a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	9.4E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.1E-08	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	1.5E-08	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	3.2E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	5.8E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	1.4E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	1.8E-13	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	3.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M	7.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M	4.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-07**
Dermal	Benzo(a)anthracene	1.6E+00	mg/kg	1.6E+00	mg/kg	M	1.4E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Benzo(a)pyrene	1.8E+00	mg/kg	1.8E+00	mg/kg	M	1.6E-09	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Benzo(b)fluoranthene	2.5E+00	mg/kg	2.5E+00	mg/kg	M	2.2E-09	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Dibenzo(a,h)anthracene	5.4E-01	mg/kg	5.4E-01	mg/kg	M	4.7E-10	mg/kg-day	7.3E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Indeno(1,2,3-cd)pyrene	9.8E-01	mg/kg	9.8E-01	mg/kg	M	8.5E-10	mg/kg-day	7.3E-01	$(mg/kg\text{-}day)^{-1}$	6.2E-10
	Aroclor-1260	2.4E-01	mg/kg	2.4E-01	mg/kg	M	2.2E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	2,3,7,8-TCDD TEQ	3.1E-05	mg/kg	3.1E-05	mg/kg	M	6.1E-15	mg/kg-day	1.5E+05	$(mg/kg\text{-}day)^{-1}$	9.2E-10
	Aluminum	1.9E+04	mg/kg	1.9E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	5.7E+00	mg/kg	5.7E+00	mg/kg	M	1.1E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Iron	1.3E+04	mg/kg	1.3E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	7.6E-01	mg/kg	7.6E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Vanadium	2.8E+01	mg/kg	2.8E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA, July 2004):

PAHs - 0.13 Dioxins - 0.03
PCBs - 0.14 Arsenic - 0.03 Other Metals - not evaluated

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	3.1E-09		1.2E-09	4.3E-09	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	8.5E-09		3.3E-09	1.2E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.0E-03			2.0E-03
			Arsenic	3.4E-08		3.1E-09	3.7E-08	Arsenic	Skin, Vascular	5.3E-03		4.8E-04	5.8E-03
			Iron					Iron	Liver, Blood, GI Tract	7.9E-03			7.9E-03
			Vanadium					Vanadium	Kidney	4.3E-03			4.3E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	6.5E-09		2.5E-09	9.0E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	7.3E-08		2.8E-08	1.0E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.0E-08		3.9E-09	1.4E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	2.2E-08		8.5E-09	3.0E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	4.0E-09		1.5E-09	5.5E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	2.7E-09		1.1E-09	3.8E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	2.5E-08		2.3E-09	2.8E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	7.2E-03			7.2E-03
			Arsenic	4.7E-08		4.3E-09	5.2E-08	Arsenic	Skin, Vascular	7.4E-03		6.6E-04	8.0E-03
			Iron					Iron	Liver, Blood, GI Tract	1.7E-02			1.7E-02
			Thallium					Thallium	Liver	4.2E-03			4.2E-03
			Vanadium					Vanadium	Kidney	1.1E-02			1.1E-02
Surface Water	Surface Water	Surface Water	Tetrachloroethene	2.7E-10		1.1E-08	1.1E-08	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	1.2E-10		1.6E-07	1.6E-07	2,3,7,8-TCDD TEQ					
			Arsenic	1.7E-09		7.7E-10	2.5E-09	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03
						Total Risk Across Subsurface Soil	5.3E-08					Total Hazard Index Across Subsurface Soil	2.0E-02
						Total Risk Across Sediment	2.4E-07					Total Hazard Index Across Sediment	4.7E-02
						Total Risk Across Surface Water	1.8E-07					Total Hazard Index Across Surface Water	2.1E-03

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane		5.4E-10	1.4E-10	6.7E-10	1,2-Dichloroethane	NA		5.9E-07	5.2E-06	5.8E-06
			Benzene		1.9E-10	2.7E-10	4.6E-10	Benzene	Blood		5.7E-05	8.7E-05	1.4E-04
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		7.4E-03	3.2E-03	1.1E-02
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		2.8E-03	1.0E-03	3.9E-03
			Trichloroethylene		1.5E-10	2.3E-10	3.8E-10	Trichloroethylene	Liver		8.9E-06	4.1E-03	4.1E-03
			Vinyl chloride		1.0E-08	1.2E-07	1.3E-07	Vinyl chloride	Liver		1.7E-03	3.8E-03	5.5E-03
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF			4.0E-07	4.0E-07	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan			1.7E-03	1.7E-03
			Arsenic			1.4E-09	1.4E-09	Arsenic	Skin, Vascular			2.3E-04	2.3E-04
			Barium					Barium	Kidney			4.8E-04	4.8E-04
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract			9.8E-04	9.8E-04
			Manganese					Manganese	CNS			6.3E-03	6.3E-03
			Vanadium					Vanadium	Kidney			2.2E-03	2.2E-03
						Total Risk Across Groundwater	5.3E-07					Total Hazard Index Across Groundwater	3.6E-02

Total Risk Across All Media and All Exposure Routes	1.0E-06

Total Hazard Index Across All Media and All Exposure Routes	1.1E-01

Total Blood HI =	3.7E-02
Total Liver HI =	4.4E-02
Total CNS HI =	7.6E-03
Total Kidney HI =	1.8E-02
Total Immune System HI =	9.3E-03

Total Kidney HI =	2.3E-04
Total Vascular HI =	1.4E-02
Total Skin HI =	1.4E-02
Total Nails HI =	9.3E-03
Total Gastrointestinal HI =	2.6E-02

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	1.5E-09		4.0E-10	1.9E-09	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	4.2E-09		1.1E-09	5.3E-09	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	1.0E-03			1.0E-03
			Arsenic	1.7E-08		1.0E-09	1.8E-08	Arsenic	Skin, Vascular	2.6E-03		1.6E-04	2.8E-03
			Iron					Iron	Liver, Blood, GI Tract	4.0E-03			4.0E-03
			Vanadium					Vanadium	Kidney	2.2E-03			2.2E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	6.5E-09		8.4E-10	7.3E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	7.3E-08		9.5E-09	8.2E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.0E-08		1.3E-09	1.1E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	2.2E-08		2.8E-09	2.5E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	4.0E-09		5.1E-10	4.5E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	2.7E-09		3.7E-10	3.0E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	2.5E-08		7.6E-10	2.6E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	7.2E-03			7.2E-03
			Arsenic	4.7E-08		1.4E-09	4.9E-08	Arsenic	Skin, Vascular	7.4E-03		2.2E-04	7.6E-03
			Iron					Iron	Liver, Blood, GI Tract	1.7E-02			1.7E-02
			Thallium					Thallium	Liver	4.2E-03			4.2E-03
			Vanadium					Vanadium	Kidney	1.1E-02			1.1E-02
Surface Water	Surface Water	Surface Water	Tetrachloroethene	2.7E-10		1.1E-08	1.1E-08	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	1.2E-10		1.6E-07	1.6E-07	2,3,7,8-TCDD TEQ					
			Arsenic	1.7E-09		7.7E-10	2.5E-09	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03
						Total Risk Across Subsurface Soil	2.5E-08					Total Hazard Index Across Subsurface Soil	9.9E-03
						Total Risk Across Sediment	2.1E-07					Total Hazard Index Across Sediment	4.6E-02
						Total Risk Across Surface Water	1.8E-07					Total Hazard Index Across Surface Water	2.1E-03

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane		2.7E-10	7.9E-11	3.5E-10	1,2-Dichloroethane	NA		3.0E-07	3.0E-06	3.3E-06
			Benzene		9.4E-11	1.6E-10	2.5E-10	Benzene	Blood		2.8E-05	4.9E-05	7.8E-05
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood		3.7E-03	1.9E-03	5.6E-03
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver		1.4E-03	6.1E-04	2.0E-03
			Trichloroethylene		7.6E-11	1.4E-10	2.2E-10	Trichloroethylene	Liver		4.4E-06	2.6E-03	2.6E-03
			Vinyl chloride		5.2E-09	6.8E-08	7.4E-08	Vinyl chloride	Liver		8.3E-04	2.1E-03	3.0E-03
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF			2.8E-07	2.8E-07	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan			8.5E-04	8.5E-04
			Arsenic			7.2E-10	7.2E-10	Arsenic	Skin, Vascular			1.1E-04	1.1E-04
			Barium					Barium	Kidney			2.4E-04	2.4E-04
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract			4.9E-04	4.9E-04
			Manganese					Manganese	CNS			3.2E-03	3.2E-03
			Vanadium					Vanadium	Kidney			1.1E-03	1.1E-03
						Total Risk Across Groundwater	3.6E-07					Total Hazard Index Across Groundwater	1.9E-02

Total Risk Across All Media and All Exposure Routes	7.6E-07

Total Hazard Index Across All Media and All Exposure Routes	7.8E-02

Total Blood HI =	2.7E-02
Total Liver HI =	3.3E-02
Total CNS HI =	4.4E-03
Total Kidney HI =	1.4E-02
Total Immune System HI =	8.2E-03

Total Kidney HI =	1.1E-04
Total Vascular HI =	1.1E-02
Total Skin HI =	1.1E-02
Total Nails HI =	8.2E-03
Total Gastrointestinal HI =	2.2E-02

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SITE WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	9.3E-09		1.6E-08	2.5E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	2.6E-08		4.4E-08	7.0E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.5E-04			2.5E-04
			Arsenic	1.0E-07		4.1E-08	1.4E-07	Arsenic	Skin, Vascular	6.4E-04		2.5E-04	9.0E-04
			Iron					Iron	Liver, Blood, GI Tract	9.6E-04			9.6E-04
			Vanadium					Vanadium	Kidney	5.2E-04			5.2E-04
Sediment	Sediment	Sediment	Benzo(a)anthracene	2.0E-08		3.4E-08	5.3E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	2.2E-07		3.8E-07	6.0E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	3.1E-08		5.3E-08	8.3E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	6.6E-08		1.1E-07	1.8E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	1.2E-08		2.1E-08	3.3E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	8.1E-09		1.5E-08	2.3E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	7.7E-08		3.0E-08	1.1E-07	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	8.7E-04			8.7E-04
			Arsenic	1.4E-07		5.7E-08	2.0E-07	Arsenic	Skin, Vascular	8.9E-04		3.5E-04	1.2E-03
			Iron					Iron	Liver, Blood, GI Tract	2.0E-03			2.0E-03
			Thallium					Thallium	Liver	5.1E-04			5.1E-04
			Vanadium					Vanadium	Kidney	1.3E-03			1.3E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	5.4E-09		2.2E-07	2.2E-07	Tetrachloroethene	Liver	2.8E-06		1.1E-04	1.1E-04
			2,3,7,8-TCDD TEQ	2.5E-09		3.2E-06	3.2E-06	2,3,7,8-TCDD TEQ					
			Arsenic	3.4E-08		1.5E-08	5.0E-08	Arsenic	Skin, Vascular	2.1E-04		9.6E-05	3.1E-04
			Iron					Iron	Liver, Blood, GI Tract	1.6E-04		7.3E-05	2.4E-04
			Manganese					Manganese	CNS	8.0E-05		9.0E-04	9.8E-04

Total Risk Across Subsurface Soil	2.4E-07	Total Hazard Index Across Subsurface Soil	2.6E-03
Total Risk Across Sediment	1.3E-06	Total Hazard Index Across Sediment	6.0E-03
Total Risk Across Surface Water	3.5E-06	Total Hazard Index Across Surface Water	1.6E-03
Total Risk Across All Media and All Exposure Routes	5.0E-06	Total Hazard Index Across All Media and All Exposure Routes	1.0E-02

Total Blood HI =	3.2E-03	Total Vascular HI =	2.5E-03
Total Liver HI =	3.9E-03	Total Skin HI =	2.5E-03
Total CNS HI =	9.8E-04	Total Nails HI =	1.1E-03
Total Kidney HI =	1.8E-03	Total Gastrointestinal HI =	3.2E-03
Total Immune System HI =	1.1E-03		

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - SITE WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	1.7E-09		2.9E-10	2.0E-09	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	4.6E-09		7.9E-10	5.4E-09	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	1.2E-04			1.2E-04
			Arsenic	1.9E-08		7.4E-10	1.9E-08	Arsenic	Skin, Vascular	3.2E-04		1.3E-05	3.3E-04
			Iron					Iron	Liver, Blood, GI Tract	4.8E-04			4.8E-04
			Vanadium					Vanadium	Kidney	2.6E-04		-	2.6E-04
Sediment	Sediment	Sediment	Benzo(a)anthracene	3.5E-09		6.1E-10	4.1E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	4.0E-08		6.8E-09	4.6E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	5.5E-09		9.5E-10	6.5E-09	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	1.2E-08		2.0E-09	1.4E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	2.2E-09		3.7E-10	2.5E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	1.4E-09		2.7E-10	1.7E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	1.4E-08		5.5E-10	1.4E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	4.4E-04			4.4E-04
			Arsenic	2.6E-08		1.0E-09	2.7E-08	Arsenic	Skin, Vascular	4.5E-04		1.8E-05	4.6E-04
			Iron					Iron	Liver, Blood, GI Tract	1.0E-03			1.0E-03
			Thallium					Thallium	Liver	2.5E-04			2.5E-04
			Vanadium					Vanadium	Kidney	6.5E-04			6.5E-04
Surface Water	Surface Water	Surface Water	Tetrachloroethene	9.8E-10		3.9E-08	4.0E-08	Tetrachloroethene	Liver	1.4E-06		5.6E-05	5.7E-05
			2,3,7,8-TCDD TEQ	4.4E-10		5.8E-07	5.8E-07	2,3,7,8-TCDD TEQ					
			Arsenic	6.2E-09		2.8E-09	8.9E-09	Arsenic	Skin, Vascular	1.1E-04		4.8E-05	1.5E-04
			Iron					Iron	Liver, Blood, GI Tract	8.1E-05		3.6E-05	1.2E-04
			Manganese					Manganese	CNS	4.0E-05		4.5E-04	4.9E-04

Total Risk Across Subsurface Soil	2.7E-08	Total Hazard Index Across Subsurface Soil	1.2E-03
Total Risk Across Sediment	1.2E-07	Total Hazard Index Across Sediment	2.8E-03
Total Risk Across Surface Water	6.3E-07	Total Hazard Index Across Surface Water	8.2E-04
Total Risk Across All Media and All Exposure Routes	7.7E-07	Total Hazard Index Across All Media and All Exposure Routes	4.8E-03

Total Blood HI =	1.6E-03	Total Vascular HI =	9.5E-04
Total Liver HI =	1.9E-03	Total Skin HI =	9.5E-04
Total CNS HI =	4.9E-04	Total Nails HI =	5.6E-04
Total Kidney HI =	9.1E-04	Total Gastrointestinal HI =	1.6E-03
Total Immune System HI =	5.6E-04		

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	1.9E-07		1.7E-07	3.6E-07	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	5.4E-07		4.6E-07	1.0E-06	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	5.2E-03			5.2E-03
			Arsenic	2.1E-06		4.3E-07	2.6E-06	Arsenic	Skin, Vascular	1.3E-02		2.6E-03	1.6E-02
			Iron					Iron	Liver, Blood, GI Tract	2.0E-02			2.0E-02
			Vanadium					Vanadium	Kidney	1.1E-02			1.1E-02
Sediment	Sediment	Sediment	Benzo(a)anthracene	4.9E-08		4.2E-08	9.1E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	5.5E-07		4.7E-07	1.0E-06	Benzo(a)pyrene					
			Benzo(b)fluoranthene	7.7E-08		6.6E-08	1.4E-07	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	1.7E-07		1.4E-07	3.1E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	3.0E-08		2.6E-08	5.6E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	2.0E-08		1.9E-08	3.9E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	1.9E-07		3.8E-08	2.3E-07	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	2.2E-03			2.2E-03
			Arsenic	3.6E-07		7.1E-08	4.3E-07	Arsenic	Skin, Vascular	2.2E-03		4.4E-04	2.7E-03
			Iron					Iron	Liver, Blood, GI Tract	5.1E-03			5.1E-03
			Thallium					Thallium	Liver	1.3E-03			1.3E-03
			Vanadium					Vanadium	Kidney	3.2E-03			3.2E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	6.8E-09		2.7E-07	2.8E-07	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	3.1E-09		4.0E-06	4.0E-06	2,3,7,8-TCDD TEQ					
			Arsenic	4.3E-08		1.9E-08	6.2E-08	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03

Total Risk Across Subsurface Soil	3.9E-06	Total Hazard Index Across Subsurface Soil	5.2E-02
Total Risk Across Sediment	2.3E-06	Total Hazard Index Across Sediment	1.4E-02
Total Risk Across Surface Water	4.4E-06	Total Hazard Index Across Surface Water	2.1E-03
Total Risk Across All Media and All Exposure Routes	1.1E-05	Total Hazard Index Across All Media and All Exposure Routes	6.9E-02

Total Blood HI =	2.5E-02	Total Vascular HI =	1.9E-02
Total Liver HI =	2.7E-02	Total Skin HI =	1.9E-02
Total CNS HI =	1.2E-03	Total Nails HI =	7.4E-03
Total Kidney HI =	1.4E-02	Total Gastrointestinal HI =	2.5E-02
Total Immune System HI =	7.4E-03		

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	3.1E-08		5.2E-09	3.6E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	8.4E-08		1.4E-08	9.9E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.3E-03			2.3E-03
			Arsenic	3.4E-07		1.3E-08	3.5E-07	Arsenic	Skin, Vascular	5.9E-03		2.3E-04	6.1E-03
			Iron					Iron	Liver, Blood, GI Tract	8.8E-03			8.8E-03
			Vanadium					Vanadium	Kidney	4.8E-03			4.8E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	8.8E-09		1.5E-09	1.0E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	9.9E-08		1.7E-08	1.2E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.4E-08		2.4E-09	1.6E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	3.0E-08		5.1E-09	3.5E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	5.4E-09		9.3E-10	6.3E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	3.6E-09		6.7E-10	4.3E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	3.5E-08		1.4E-09	3.6E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	1.1E-03			1.1E-03
			Arsenic	6.5E-08		2.6E-09	6.7E-08	Arsenic	Skin, Vascular	1.1E-03		4.4E-05	1.2E-03
			Iron					Iron	Liver, Blood, GI Tract	2.5E-03			2.5E-03
			Thallium					Thallium	Liver	6.4E-04			6.4E-04
			Vanadium					Vanadium	Kidney	1.6E-03			1.6E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	2.4E-09		9.7E-08	9.9E-08	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	1.1E-09		1.5E-06	1.5E-06	2,3,7,8-TCDD TEQ					
			Arsenic	1.5E-08		6.9E-09	2.2E-08	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03

Total Risk Across Subsurface Soil	4.9E-07	Total Hazard Index Across Subsurface Soil	2.2E-02
Total Risk Across Sediment	2.9E-07	Total Hazard Index Across Sediment	7.0E-03
Total Risk Across Surface Water	1.6E-06	Total Hazard Index Across Surface Water	2.1E-03
Total Risk Across All Media and All Exposure Routes	2.4E-06	Total Hazard Index Across All Media and All Exposure Routes	3.1E-02

Total Blood HI =	1.2E-02	Total Vascular HI =	7.6E-03
Total Liver HI =	1.2E-02	Total Skin HI =	7.6E-03
Total CNS HI =	1.2E-03	Total Nails HI =	3.4E-03
Total Kidney HI =	6.4E-03	Total Gastrointestinal HI =	1.2E-02
Total Immune System HI =	3.4E-03		

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years old)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	5.3E-08		9.0E-08	1.4E-07	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	1.5E-07		2.5E-07	3.9E-07	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	3.2E-03			3.2E-03
			Arsenic	5.9E-07		2.3E-07	8.2E-07	Arsenic	Skin, Vascular	8.3E-03		3.2E-03	1.2E-02
			Iron					Iron	Liver, Blood, GI Tract	1.2E-02			1.2E-02
			Vanadium					Vanadium	Kidney	6.8E-03			6.8E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	3.4E-08		5.7E-08	9.0E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	3.8E-07		6.4E-07	1.0E-06	Benzo(a)pyrene					
			Benzo(b)fluoranthene	5.2E-08		8.9E-08	1.4E-07	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	1.1E-07		1.9E-07	3.0E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	2.1E-08		3.5E-08	5.5E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	1.4E-08		2.5E-08	3.9E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	1.3E-07		5.1E-08	1.8E-07	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	3.4E-03			3.4E-03
			Arsenic	2.5E-07		9.6E-08	3.4E-07	Arsenic	Skin, Vascular	3.5E-03		1.4E-03	4.8E-03
			Iron					Iron	Liver, Blood, GI Tract	7.9E-03			7.9E-03
			Thallium					Thallium	Liver	2.0E-03			2.0E-03
			Vanadium					Vanadium	Kidney	5.0E-03			5.0E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	4.6E-09		1.3E-07	1.4E-07	Tetrachloroethene	Liver	5.5E-06		1.6E-04	1.6E-04
			2,3,7,8-TCDD TEQ	2.1E-09		2.0E-06	2.0E-06	2,3,7,8-TCDD TEQ					
			Arsenic	2.9E-08		9.5E-09	3.9E-08	Arsenic	Skin, Vascular	4.1E-04		1.3E-04	5.5E-04
			Iron					Iron	Liver, Blood, GI Tract	3.2E-04		1.0E-04	4.2E-04
			Manganese					Manganese	CNS	1.6E-04		1.3E-03	1.4E-03

Total Risk Across Subsurface Soil	1.4E-06	Total Hazard Index Across Subsurface Soil	3.4E-02
Total Risk Across Sediment	2.2E-06	Total Hazard Index Across Sediment	2.3E-02
Total Risk Across Surface Water	2.2E-06	Total Hazard Index Across Surface Water	2.6E-03
Total Risk Across All Media and All Exposure Routes	5.7E-06	Total Hazard Index Across All Media and All Exposure Routes	6.0E-02

Total Blood HI =	2.1E-02	Total Vascular HI =	1.7E-02
Total Liver HI =	2.3E-02	Total Skin HI =	1.7E-02
Total CNS HI =	1.4E-03	Total Nails HI =	6.6E-03
Total Kidney HI =	1.2E-02	Total Gastrointestinal HI =	2.1E-02
Total Immune System HI =	6.6E-03		

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 - 16 years old)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	1.3E-08		4.5E-09	1.8E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	3.7E-08		1.2E-08	4.9E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	8.1E-04			8.1E-04
			Arsenic	1.5E-07		1.1E-08	1.6E-07	Arsenic	Skin, Vascular	2.1E-03		1.6E-04	2.2E-03
			Iron					Iron	Liver, Blood, GI Tract	3.1E-03			3.1E-03
			Vanadium					Vanadium	Kidney	1.7E-03			1.7E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	8.4E-09		2.8E-09	1.1E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	9.4E-08		3.2E-08	1.3E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.3E-08		4.4E-09	1.8E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	2.8E-08		9.6E-09	3.8E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	5.1E-09		1.7E-09	6.9E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	3.4E-09		1.3E-09	4.7E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	3.3E-08		2.6E-09	3.5E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	8.5E-04			8.5E-04
			Arsenic	6.1E-08		4.8E-09	6.6E-08	Arsenic	Skin, Vascular	8.7E-04		6.8E-05	9.4E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-03			2.0E-03
			Thallium					Thallium	Liver	5.0E-04			5.0E-04
			Vanadium					Vanadium	Kidney	1.3E-03			1.3E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	2.3E-09		6.6E-08	6.9E-08	Tetrachloroethene	Liver	2.7E-06		7.8E-05	8.1E-05
			2,3,7,8-TCDD TEQ	1.1E-09		1.0E-06	1.0E-06	2,3,7,8-TCDD TEQ					
			Arsenic	1.5E-08		4.8E-09	1.9E-08	Arsenic	Skin, Vascular	2.1E-04		6.7E-05	2.7E-04
			Iron					Iron	Liver, Blood, GI Tract	1.6E-04		5.1E-05	2.1E-04
			Manganese					Manganese	CNS	7.8E-05		6.3E-04	7.1E-04

Total Risk Across Subsurface Soil	2.3E-07	Total Hazard Index Across Subsurface Soil	7.8E-03
Total Risk Across Sediment	3.1E-07	Total Hazard Index Across Sediment	5.5E-03
Total Risk Across Surface Water	1.1E-06	Total Hazard Index Across Surface Water	1.3E-03
Total Risk Across All Media and All Exposure Routes	1.6E-06	Total Hazard Index Across All Media and All Exposure Routes	1.5E-02

Total Blood HI =	5.3E-03	Total Vascular HI =	3.5E-03
Total Liver HI =	5.9E-03	Total Skin HI =	3.5E-03
Total CNS HI =	7.1E-04	Total Nails HI =	1.7E-03
Total Kidney HI =	2.9E-03	Total Gastrointestinal HI =	5.3E-03
Total Immune System HI =	1.7E-03		

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)

SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	7.1E-09		7.3E-09	1.4E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	2.0E-08		2.0E-08	4.0E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.5E-04			2.5E-04
			Arsenic	7.8E-08		1.9E-08	9.7E-08	Arsenic	Skin, Vascular	6.4E-04		1.5E-04	8.0E-04
			Iron					Iron	Liver, Blood, GI Tract	9.6E-04			9.6E-04
			Vanadium					Vanadium	Kidney	5.2E-04			5.2E-04
Sediment	Sediment	Sediment	Benzo(a)anthracene	1.5E-08		1.5E-08	3.0E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	1.7E-07		1.7E-07	3.4E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	2.3E-08		2.4E-08	4.7E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	5.0E-08		5.2E-08	1.0E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	9.1E-09		9.5E-09	1.9E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	6.1E-09		6.8E-09	1.3E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	5.8E-08		1.4E-08	7.2E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	8.7E-04			8.7E-04
			Arsenic	1.1E-07		2.6E-08	1.4E-07	Arsenic	Skin, Vascular	8.9E-04		2.1E-04	1.1E-03
			Iron					Iron	Liver, Blood, GI Tract	2.0E-03			2.0E-03
			Thallium					Thallium	Liver	5.1E-04			5.1E-04
			Vanadium					Vanadium	Kidney	1.3E-03			1.3E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	4.1E-09		1.6E-07	1.7E-07	Tetrachloroethene	Liver	2.8E-06		1.1E-04	1.1E-04
			2,3,7,8-TCDD TEQ	1.9E-09		2.5E-06	2.5E-06	2,3,7,8-TCDD TEQ					
			Arsenic	2.6E-08		1.2E-08	3.8E-08	Arsenic	Skin, Vascular	2.1E-04		9.6E-05	3.1E-04
			Iron					Iron	Liver, Blood, GI Tract	1.6E-04		7.3E-05	2.4E-04
			Manganese					Manganese	CNS	8.0E-05		9.0E-04	9.8E-04

Total Risk Across Subsurface Soil	1.5E-07	Total Hazard Index Across Subsurface Soil	2.5E-03
Total Risk Across Sediment	7.6E-07	Total Hazard Index Across Sediment	5.8E-03
Total Risk Across Surface Water	2.7E-06	Total Hazard Index Across Surface Water	1.6E-03
Total Risk Across All Media and All Exposure Routes	3.6E-06	Total Hazard Index Across All Media and All Exposure Routes	1.0E-02

Total Blood HI =	3.2E-03	Total Vascular HI =	2.2E-03
Total Liver HI =	3.9E-03	Total Skin HI =	2.2E-03
Total CNS HI =	9.8E-04	Total Nails HI =	1.1E-03
Total Kidney HI =	1.8E-03	Total Gastrointestinal HI =	3.2E-03
Total Immune System HI =	1.1E-03		

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT TRESPASSERS
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	3.5E-09		5.2E-10	4.1E-09	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	9.8E-09		1.4E-09	1.1E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	1.2E-04			1.2E-04
			Arsenic	3.9E-08		1.3E-09	4.1E-08	Arsenic	Skin, Vascular	3.2E-04		1.1E-05	3.3E-04
			Iron					Iron	Liver, Blood, GI Tract	4.8E-04			4.8E-04
			Vanadium					Vanadium	Kidney	2.6E-04			2.6E-04
Sediment	Sediment	Sediment	Benzo(a)anthracene	7.4E-09		1.1E-09	8.5E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	8.4E-08		1.2E-08	9.6E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.2E-08		1.7E-09	1.3E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	2.5E-08		3.7E-09	2.9E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	4.6E-09		6.8E-10	5.2E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	3.1E-09		4.9E-10	3.5E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	2.9E-08		1.0E-09	3.0E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	4.4E-04			4.4E-04
			Arsenic	5.4E-08		1.9E-09	5.6E-08	Arsenic	Skin, Vascular	4.5E-04		1.5E-05	4.6E-04
			Iron					Iron	Liver, Blood, GI Tract	1.0E-03			1.0E-03
			Thallium					Thallium	Liver	2.5E-04			2.5E-04
			Vanadium					Vanadium	Kidney	6.5E-04			6.5E-04
Surface Water	Surface Water	Surface Water	Tetrachloroethene	4.1E-09		8.2E-08	8.6E-08	Tetrachloroethene	Liver	2.8E-06		5.6E-05	5.9E-05
			2,3,7,8-TCDD TEQ	1.9E-09		1.2E-06	1.2E-06	2,3,7,8-TCDD TEQ					
			Arsenic	2.6E-08		5.9E-09	3.2E-08	Arsenic	Skin, Vascular	2.1E-04		4.8E-05	2.6E-04
			Iron					Iron	Liver, Blood, GI Tract	1.6E-04		3.6E-05	2.0E-04
			Manganese					Manganese	CNS	8.0E-05		4.5E-04	5.3E-04

Total Risk Across Subsurface Soil	5.6E-08	Total Hazard Index Across Subsurface Soil	1.2E-03
Total Risk Across Sediment	2.4E-07	Total Hazard Index Across Sediment	2.8E-03
Total Risk Across Surface Water	1.3E-06	Total Hazard Index Across Surface Water	1.0E-03
Total Risk Across All Media and All Exposure Routes	1.6E-06	Total Hazard Index Across All Media and All Exposure Routes	5.1E-03

Total Blood HI =	1.7E-03	Total Vascular HI =	1.1E-03
Total Liver HI =	2.0E-03	Total Skin HI =	1.1E-03
Total CNS HI =	5.3E-04	Total Nails HI =	5.6E-04
Total Kidney HI =	9.1E-04	Total Gastrointestinal HI =	1.7E-03
Total Immune System HI =	5.6E-04		

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL TRESPASSERS (ADOLESCENT + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adolescent + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	6.0E-08		9.7E-08	1.6E-07
			Dibenzo(a,h)anthracene	1.7E-07		2.7E-07	4.3E-07
			Aluminum				
			Arsenic	6.7E-07		2.5E-07	9.2E-07
			Iron				
			Vanadium				
Sediment	Sediment	Sediment	Benzo(a)anthracene	4.8E-08		7.2E-08	1.2E-07
			Benzo(a)pyrene	5.4E-07		8.1E-07	1.4E-06
			Benzo(b)fluoranthene	7.6E-08		1.1E-07	1.9E-07
			Dibenzo(a,h)anthracene	1.6E-07		2.4E-07	4.1E-07
			Indeno(1,2,3-cd)pyrene	3.0E-08		4.4E-08	7.4E-08
			Aroclor-1260	2.0E-08		3.2E-08	5.2E-08
			2,3,7,8-TCDD TEQ	1.9E-07		6.5E-08	2.5E-07
			Aluminum				
			Arsenic	3.5E-07		1.2E-07	4.8E-07
			Iron				
			Thallium				
			Vanadium				
Surface Water	Surface Water	Surface Water	Tetrachloroethene	8.8E-09		3.0E-07	3.1E-07
			2,3,7,8-TCDD TEQ	4.0E-09		4.5E-06	4.5E-06
			Arsenic	5.5E-08		2.1E-08	7.6E-08
			Iron				
			Manganese				
						Total Risk Across Subsurface Soil	1.5E-06
						Total Risk Across Sediment	2.9E-06
						Total Risk Across Surface Water	4.8E-06
						Total Risk Across All Media and All Exposure Routes	9.3E-06

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL TRESPASSERS (ADOLESCENT + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Trespassers
Receptor Age: Adolescent + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	1.7E-08		5.0E-09	2.2E-08
			Dibenzo(a,h)anthracene	4.6E-08		1.4E-08	6.0E-08
			Aluminum				
			Arsenic	1.9E-07		1.3E-08	2.0E-07
			Iron				
			Vanadium				
Sediment	Sediment	Sediment	Benzo(a)anthracene	1.6E-08		3.9E-09	2.0E-08
			Benzo(a)pyrene	1.8E-07		4.4E-08	2.2E-07
			Benzo(b)fluoranthene	2.5E-08		6.2E-09	3.1E-08
			Dibenzo(a,h)anthracene	5.3E-08		1.3E-08	6.7E-08
			Indeno(1,2,3-cd)pyrene	9.7E-09		2.4E-09	1.2E-08
			Aroclor-1260	6.5E-09		1.7E-09	8.2E-09
			2,3,7,8-TCDD TEQ	6.2E-08		3.6E-09	6.6E-08
			Aluminum				
			Arsenic	1.2E-07		6.6E-09	1.2E-07
			Iron				
			Thallium				
			Vanadium				
Surface Water	Surface Water	Surface Water	Tetrachloroethene	6.5E-09		1.5E-07	1.5E-07
			2,3,7,8-TCDD TEQ	2.9E-09		2.2E-06	2.2E-06
			Arsenic	4.1E-08		1.1E-08	5.1E-08
			Iron				
			Manganese				
						Total Risk Across Subsurface Soil	2.8E-07
						Total Risk Across Sediment	5.5E-07
						Total Risk Across Surface Water	2.4E-06
						Total Risk Across All Media and All Exposure Routes	3.3E-06

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	6.1E-07		2.2E-07	8.3E-07	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	1.7E-06		6.1E-07	2.3E-06	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	6.8E-02			6.8E-02
			Arsenic	6.7E-06		5.7E-07	7.3E-06	Arsenic	Skin, Vascular	1.7E-01		1.5E-02	1.9E-01
			Iron					Iron	Liver, Blood, GI Tract	2.6E-01			2.6E-01
			Vanadium					Vanadium	Kidney	1.4E-01			1.4E-01
Sediment	Sediment	Sediment	Benzo(a)anthracene	1.1E-07		4.0E-08	1.5E-07	Benzo(a)anthracene					
			Benzo(a)pyrene	1.2E-06		4.5E-07	1.7E-06	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.7E-07		6.2E-08	2.3E-07	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	3.7E-07		1.3E-07	5.1E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	6.7E-08		2.4E-08	9.2E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	4.5E-08		1.8E-08	6.3E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	4.3E-07		3.6E-08	4.7E-07	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	2.0E-02			2.0E-02
			Arsenic	8.0E-07		6.7E-08	8.7E-07	Arsenic	Skin, Vascular	2.1E-02		1.7E-03	2.3E-02
			Iron					Iron	Liver, Blood, GI Tract	4.7E-02			4.7E-02
			Thallium					Thallium	Liver	1.2E-02			1.2E-02
			Vanadium					Vanadium	Kidney	3.0E-02			3.0E-02
Surface Water	Surface Water	Surface Water	Tetrachloroethene	3.8E-08		1.1E-07	1.5E-07	Tetrachloroethene	Liver	8.2E-05		2.4E-04	3.2E-04
			2,3,7,8-TCDD TEQ	1.7E-08		1.7E-06	1.7E-06	2,3,7,8-TCDD TEQ					
			Arsenic	2.4E-07		7.9E-09	2.5E-07	Arsenic	Skin, Vascular	6.2E-03		2.0E-04	6.4E-03
			Iron					Iron	Liver, Blood, GI Tract	4.7E-03		1.6E-04	4.9E-03
			Manganese					Manganese	CNS	2.3E-03		1.9E-03	4.3E-03
						Total Risk Across Subsurface Soil	1.0E-05					Total Hazard Index Across Subsurface Soil	6.6E-01
						Total Risk Across Sediment	4.1E-06					Total Hazard Index Across Sediment	1.3E-01
						Total Risk Across Surface Water	2.1E-06					Total Hazard Index Across Surface Water	1.6E-02

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	5.0E-07	2.5E-07	1.4E-08	7.6E-07	1,2-Dichloroethane	NA	3.2E-03	4.5E-05	8.7E-05	3.3E-03
			Benzene	3.0E-07	9.1E-08	2.5E-08	4.2E-07	Benzene	Blood	1.6E-02	4.6E-03	1.4E-03	2.2E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.1E+00	7.3E-01	5.4E-02	1.9E+00
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	3.5E-01	2.4E-01	1.7E-02	6.1E-01
			Trichloroethylene	2.8E-07	7.9E-08	2.7E-08	3.9E-07	Trichloroethylene	Liver	8.5E-01	7.8E-04	8.0E-02	9.3E-01
			Vinyl chloride	3.6E-04	9.9E-06	1.0E-05	3.8E-04	Vinyl chloride	Liver	1.9E+00	1.3E-01	5.4E-02	2.1E+00
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF	4.9E-06		5.5E-05	6.0E-05	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan	7.7E-01		1.1E-02	7.8E-01
			Arsenic	2.6E-05		5.8E-08	2.6E-05	Arsenic	Skin, Vascular	6.8E-01		1.5E-03	6.8E-01
			Barium					Barium	Kidney	1.0E-01		3.2E-03	1.0E-01
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract	3.0E+00		6.5E-03	3.0E+00
			Manganese					Manganese	CNS	7.7E-01		4.2E-02	8.1E-01
			Vanadium					Vanadium	Kidney	1.7E-01		1.5E-02	1.9E-01
						Total Risk Across Groundwater	4.7E-04					Total Hazard Index Across Groundwater	1.1E+01

Total Risk Across All Media and All Exposure Routes	4.9E-04
Total Hazard Index Across All Media and All Exposure Routes	1.2E+01

Total Blood HI =	5.2E+00
Total Liver HI =	6.9E+00
Total CNS HI =	8.1E-01
Total Kidney HI =	4.6E-01
Total Immune System HI =	8.8E-02

Total Kidney HI =	6.8E-01
Total Vascular HI =	9.0E-01
Total Skin HI =	9.0E-01
Total Nails HI =	8.8E-02
Total Gastrointestinal HI =	3.3E+00

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	6.8E-08		9.9E-09	7.8E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	1.9E-07		2.7E-08	2.1E-07	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.3E-02			2.3E-02
			Arsenic	7.5E-07		2.5E-08	7.8E-07	Arsenic	Skin, Vascular	5.8E-02		2.0E-03	6.0E-02
			Iron					Iron	Liver, Blood, GI Tract	8.7E-02			8.7E-02
			Vanadium					Vanadium	Kidney	4.7E-02			4.7E-02
Sediment	Sediment	Sediment	Benzo(a)anthracene	1.8E-08		2.7E-09	2.1E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	2.1E-07		3.0E-08	2.4E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	2.9E-08		4.2E-09	3.3E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	6.2E-08		9.0E-09	7.1E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	1.1E-08		1.6E-09	1.3E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	7.5E-09		1.2E-09	8.7E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	7.2E-08		2.4E-09	7.4E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	1.0E-02			1.0E-02
			Arsenic	1.3E-07		4.5E-09	1.4E-07	Arsenic	Skin, Vascular	1.0E-02		3.5E-04	1.1E-02
			Iron					Iron	Liver, Blood, GI Tract	2.4E-02			2.4E-02
			Thallium					Thallium	Liver	5.9E-03			5.9E-03
			Vanadium					Vanadium	Kidney	1.5E-02			1.5E-02
Surface Water	Surface Water	Surface Water	Tetrachloroethene	1.3E-08		3.7E-08	4.9E-08	Tetrachloroethene	Liver	8.2E-05		2.4E-04	3.2E-04
			2,3,7,8-TCDD TEQ	5.8E-09		5.5E-07	5.6E-07	2,3,7,8-TCDD TEQ					
			Arsenic	8.0E-08		2.6E-09	8.2E-08	Arsenic	Skin, Vascular	6.2E-03		2.0E-04	6.4E-03
			Iron					Iron	Liver, Blood, GI Tract	4.7E-03		1.6E-04	4.9E-03
			Manganese					Manganese	CNS	2.3E-03		1.9E-03	4.3E-03
						Total Risk Across Subsurface Soil	1.1E-06					Total Hazard Index Across Subsurface Soil	2.2E-01
						Total Risk Across Sediment	5.9E-07					Total Hazard Index Across Sediment	6.6E-02
						Total Risk Across Surface Water	6.9E-07					Total Hazard Index Across Surface Water	1.6E-02

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	1.1E-07	1.4E-07	2.6E-09	2.5E-07	1,2-Dichloroethane	NA	2.1E-03	2.5E-05	5.1E-05	2.2E-03
			Benzene	6.7E-08	5.1E-08	4.9E-09	1.2E-07	Benzene	Blood	1.1E-02	2.5E-03	7.8E-04	1.4E-02
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.3E-01	4.0E-01	3.1E-02	1.2E+00
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	2.4E-01	1.3E-01	1.0E-02	3.8E-01
			Trichloroethylene	6.3E-08	4.4E-08	5.1E-09	1.1E-07	Trichloroethylene	Liver	5.7E-01	4.3E-04	4.6E-02	6.2E-01
			Vinyl chloride	8.1E-05	5.5E-06	2.0E-06	8.8E-05	Vinyl chloride	Liver	1.3E+00	7.3E-02	3.1E-02	1.4E+00
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF	1.1E-06		1.1E-05	1.2E-05	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan	5.1E-01		5.6E-03	5.2E-01
			Arsenic	5.9E-06		9.7E-09	5.9E-06	Arsenic	Skin, Vascular	4.6E-01		7.5E-04	4.6E-01
			Barium					Barium	Kidney	6.8E-02		1.6E-03	6.9E-02
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract	2.0E+00		3.3E-03	2.0E+00
			Manganese					Manganese	CNS	5.1E-01		2.1E-02	5.3E-01
			Vanadium					Vanadium	Kidney	1.2E-01		7.3E-03	1.2E-01
						Total Risk Across Groundwater	1.1E-04					Total Hazard Index Across Groundwater	7.2E+00

Total Risk Across All Media and All Exposure Routes: 1.1E-04

Total Hazard Index Across All Media and All Exposure Routes: 7.5E+00

Total Blood HI =	3.3E+00
Total Liver HI =	4.5E+00
Total CNS HI =	5.4E-01
Total Kidney HI =	2.5E-01
Total Immune System HI =	3.3E-02

Total Kidney HI =	4.6E-01
Total Vascular HI =	5.3E-01
Total Skin HI =	5.3E-01
Total Nails HI =	3.3E-02
Total Gastrointestinal HI =	2.1E+00

TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	2.6E-07		1.4E-07	4.0E-07	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	7.2E-07		3.7E-07	1.1E-06	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	7.2E-03			7.2E-03
			Arsenic	2.9E-06		3.5E-07	3.2E-06	Arsenic	Skin, Vascular	1.9E-02		2.2E-03	2.1E-02
			Iron					Iron	Liver, Blood, GI Tract	2.8E-02			2.8E-02
			Vanadium					Vanadium	Kidney	1.5E-02			1.5E-02
Sediment	Sediment	Sediment	Benzo(a)anthracene	4.7E-08		2.4E-08	7.1E-08	Benzo(a)anthracene					
			Benzo(a)pyrene	5.3E-07		2.7E-07	8.0E-07	Benzo(a)pyrene					
			Benzo(b)fluoranthene	7.3E-08		3.8E-08	1.1E-07	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	1.6E-07		8.2E-08	2.4E-07	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	2.9E-08		1.5E-08	4.4E-08	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	1.9E-08		1.1E-08	3.0E-08	Aroclor-1260					
			2,3,7,8-TCDD TEQ	1.8E-07		2.2E-08	2.1E-07	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	2.2E-03			2.2E-03
			Arsenic	3.4E-07		4.1E-08	3.9E-07	Arsenic	Skin, Vascular	2.2E-03		2.7E-04	2.5E-03
			Iron					Iron	Liver, Blood, GI Tract	5.1E-03			5.1E-03
			Thallium					Thallium	Liver	1.3E-03			1.3E-03
			Vanadium					Vanadium	Kidney	3.2E-03			3.2E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	6.5E-09		2.6E-07	2.6E-07	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	3.0E-09		3.9E-06	3.9E-06	2,3,7,8-TCDD TEQ					
			Arsenic	4.1E-08		1.8E-08	6.0E-08	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03
						Total Risk Across Subsurface Soil	4.7E-06					Total Hazard Index Across Subsurface Soil	7.1E-02
						Total Risk Across Sediment	1.9E-06					Total Hazard Index Across Sediment	1.4E-02
						Total Risk Across Surface Water	4.2E-06					Total Hazard Index Across Surface Water	2.1E-03

TABLE 9.8. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	8.5E-07	2.1E-07	3.2E-08	1.1E-06	1,2-Dichloroethane	NA	1.4E-03	9.6E-06	5.1E-05	1.4E-03
			Benzene	5.2E-07	7.8E-08	6.0E-08	6.5E-07	Benzene	Blood	6.8E-03	9.8E-04	7.9E-04	8.6E-03
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	4.7E-01	1.6E-01	3.1E-02	6.5E-01
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	1.5E-01	5.1E-02	1.0E-02	2.1E-01
			Trichloroethylene	4.9E-07	6.8E-08	6.2E-08	6.2E-07	Trichloroethylene	Liver	3.7E-01	1.7E-04	4.7E-02	4.1E-01
			Vinyl chloride	6.2E-04	4.2E-06	2.4E-05	6.5E-04	Vinyl chloride	Liver	8.0E-01	2.8E-02	3.2E-02	8.6E-01
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF	8.5E-06		1.3E-04	1.4E-04	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan	3.3E-01		6.6E-03	3.4E-01
			Arsenic	4.5E-05		1.4E-07	4.5E-05	Arsenic	Skin, Vascular	2.9E-01		8.8E-04	2.9E-01
			Barium					Barium	Kidney	4.3E-02		1.9E-03	4.5E-02
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract	1.3E+00		3.8E-03	1.3E+00
			Manganese					Manganese	CNS	3.3E-01		2.5E-02	3.5E-01
			Vanadium					Vanadium	Kidney	7.4E-02		8.5E-03	8.3E-02
						Total Risk Across Groundwater	8.3E-04					Total Hazard Index Across Groundwater	4.5E+00

Total Risk Across All Media and All Exposure Routes	8.4E-04

Total Hazard Index Across All Media and All Exposure Routes	4.6E+00

Total Blood HI =	2.0E+00
Total Liver HI =	2.8E+00
Total CNS HI =	3.5E-01
Total Kidney HI =	1.5E-01
Total Immune System HI =	9.4E-03

Total Kidney HI =	2.9E-01
Total Vascular HI =	3.2E-01
Total Skin HI =	3.2E-01
Total Nails HI =	9.4E-03
Total Gastrointestinal HI =	1.3E+00

TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	2.5E-08		3.8E-09	2.9E-08	Benzo(a)anthracene					
			Dibenzo(a,h)anthracene	7.0E-08		1.0E-08	8.1E-08	Dibenzo(a,h)anthracene					
			Aluminum					Aluminum	Immunological, Nails	2.4E-03			2.4E-03
			Arsenic	2.8E-07		9.6E-09	2.9E-07	Arsenic	Skin, Vascular	6.3E-03		2.1E-04	6.5E-03
			Iron					Iron	Liver, Blood, GI Tract	9.4E-03			9.4E-03
			Vanadium					Vanadium	Kidney	5.1E-03			5.1E-03
Sediment	Sediment	Sediment	Benzo(a)anthracene	6.9E-09		1.0E-09	7.9E-09	Benzo(a)anthracene					
			Benzo(a)pyrene	7.7E-08		1.1E-08	8.9E-08	Benzo(a)pyrene					
			Benzo(b)fluoranthene	1.1E-08		1.6E-09	1.2E-08	Benzo(b)fluoranthene					
			Dibenzo(a,h)anthracene	2.3E-08		3.4E-09	2.7E-08	Dibenzo(a,h)anthracene					
			Indeno(1,2,3-cd)pyrene	4.2E-09		6.2E-10	4.8E-09	Indeno(1,2,3-cd)pyrene					
			Aroclor-1260	2.8E-09		4.5E-10	3.3E-09	Aroclor-1260					
			2,3,7,8-TCDD TEQ	2.7E-08		9.2E-10	2.8E-08	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Immunological, Nails	1.1E-03			1.1E-03
			Arsenic	5.0E-08		1.7E-09	5.2E-08	Arsenic	Skin, Vascular	1.1E-03		3.8E-05	1.2E-03
			Iron					Iron	Liver, Blood, GI Tract	2.5E-03			2.5E-03
			Thallium					Thallium	Liver	6.4E-04			6.4E-04
			Vanadium					Vanadium	Kidney	1.6E-03			1.6E-03
Surface Water	Surface Water	Surface Water	Tetrachloroethene	1.9E-09		7.5E-08	7.7E-08	Tetrachloroethene	Liver	3.5E-06		1.4E-04	1.4E-04
			2,3,7,8-TCDD TEQ	8.6E-10		1.1E-06	1.1E-06	2,3,7,8-TCDD TEQ					
			Arsenic	1.2E-08		5.4E-09	1.7E-08	Arsenic	Skin, Vascular	2.7E-04		1.2E-04	3.9E-04
			Iron					Iron	Liver, Blood, GI Tract	2.0E-04		9.1E-05	2.9E-04
			Manganese					Manganese	CNS	1.0E-04		1.1E-03	1.2E-03
						Total Risk Across Subsurface Soil	4.0E-07					Total Hazard Index Across Subsurface Soil	2.3E-02
						Total Risk Across Sediment	2.2E-07					Total Hazard Index Across Sediment	7.0E-03
						Total Risk Across Surface Water	1.2E-06					Total Hazard Index Across Surface Water	2.1E-03

TABLE 9.8a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	1.2E-07	1.2E-07	5.4E-09	2.4E-07	1,2-Dichloroethane	NA	6.4E-04	5.3E-06	3.0E-05	6.8E-04
			Benzene	7.1E-08	4.3E-08	1.0E-08	1.2E-07	Benzene	Blood	3.2E-03	5.4E-04	4.6E-04	4.2E-03
			cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.2E-01	8.6E-02	1.8E-02	3.2E-01
			trans-1,2-Dichloroethene					trans-1,2-Dichloroethene	Blood, Liver	7.1E-02	2.8E-02	5.9E-03	1.0E-01
			Trichloroethylene	6.7E-08	3.8E-08	1.1E-08	1.1E-07	Trichloroethylene	Liver	1.7E-01	9.2E-05	2.7E-02	2.0E-01
			Vinyl chloride	8.5E-05	2.3E-06	4.1E-06	9.1E-05	Vinyl chloride	Liver	3.8E-01	1.6E-02	1.8E-02	4.1E-01
			Dibenzofuran					Dibenzofuran	NA				
			2,3,7,8-TCDD TEF	1.2E-06		2.2E-05	2.3E-05	2,3,7,8-TCDD TEF	NA				
			Aluminum					Aluminum	Immunological, Nails				
			Antimony					Antimony	Lifespan	1.5E-01		3.3E-03	1.6E-01
			Arsenic	6.2E-06		2.0E-08	6.2E-06	Arsenic	Skin, Vascular	1.4E-01		4.4E-04	1.4E-01
			Barium					Barium	Kidney	2.0E-02		9.3E-04	2.1E-02
			Chromium					Chromium	Fetotoxicity/GS/Bone				
			Iron					Iron	Liver, Blood, GI Tract	5.9E-01		1.9E-03	6.0E-01
			Manganese					Manganese	CNS	1.5E-01		1.2E-02	1.7E-01
			Vanadium					Vanadium	Kidney	3.5E-02		4.3E-03	3.9E-02
						Total Risk Across Groundwater	1.2E-04					Total Hazard Index Across Groundwater	2.2E+00

Total Risk Across All Media and All Exposure Routes: 1.2E-04

Total Hazard Index Across All Media and All Exposure Routes: 2.2E+00

Total Blood HI =	9.3E-01
Total Liver HI =	1.3E+00
Total CNS HI =	1.7E-01
Total Kidney HI =	6.7E-02
Total Immune System HI =	3.5E-03

Total Kidney HI =	1.4E-01
Total Vascular HI =	1.5E-01
Total Skin HI =	1.5E-01
Total Nails HI =	3.5E-03
Total Gastrointestinal HI =	6.1E-01

TABLE 9.9. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL (CHILD + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	8.7E-07		3.6E-07	1.2E-06
			Dibenzo(a,h)anthracene	2.4E-06		9.8E-07	3.4E-06
			Aluminum				
			Arsenic	9.6E-06		9.1E-07	1.1E-05
			Iron				
			Vanadium				
Sediment	Sediment	Sediment	Benzo(a)anthracene	1.6E-07		6.4E-08	2.2E-07
			Benzo(a)pyrene	1.8E-06		7.2E-07	2.5E-06
			Benzo(b)fluoranthene	2.4E-07		1.0E-07	3.5E-07
			Dibenzo(a,h)anthracene	5.3E-07		2.2E-07	7.5E-07
			Indeno(1,2,3-cd)pyrene	9.6E-08		3.9E-08	1.4E-07
			Aroclor-1260	6.4E-08		2.8E-08	9.3E-08
			2,3,7,8-TCDD TEQ	6.1E-07		5.8E-08	6.7E-07
			Aluminum				
			Arsenic	1.1E-06		1.1E-07	1.3E-06
			Iron				
			Thallium				
			Vanadium				
Surface Water	Surface Water	Surface Water	Tetrachloroethene	4.5E-08		3.7E-07	4.1E-07
			2,3,7,8-TCDD TEQ	2.0E-08		5.5E-06	5.6E-06
			Arsenic	2.8E-07		2.6E-08	3.1E-07
			Iron				
			Manganese				
						Total Risk Across Subsurface Soil	1.5E-05
						Total Risk Across Sediment	6.0E-06
						Total Risk Across Surface Water	6.3E-06

TABLE 9.9. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL (CHILD + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	1.4E-06	4.6E-07	4.5E-08	1.9E-06
			Benzene	8.2E-07	1.7E-07	8.5E-08	1.1E-06
			cis-1,2-Dichloroethene				
			trans-1,2-Dichloroethene				
			Trichloroethylene	7.7E-07	1.5E-07	8.9E-08	1.0E-06
			Vinyl chloride	9.8E-04	1.4E-05	3.5E-05	1.0E-03
			Dibenzofuran				
			2,3,7,8-TCDD TEF	1.3E-05		1.8E-04	2.0E-04
			Aluminum				
			Antimony				
			Arsenic	7.1E-05		1.9E-07	7.2E-05
			Barium				
			Chromium				
			Iron				
			Manganese				
			Vanadium				
						Total Risk Across Groundwater	1.3E-03

Total Risk Across All Media and All Exposure Routes 1.3E-03

TABLE 9.9a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL (CHILD + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Subsurface Soil	Benzo(a)anthracene	9.3E-08		1.4E-08	1.1E-07
			Dibenzo(a,h)anthracene	2.6E-07		3.8E-08	3.0E-07
			Aluminum				
			Arsenic	1.0E-06		3.5E-08	1.1E-06
			Iron				
			Vanadium				
Sediment	Sediment	Sediment	Benzo(a)anthracene	2.5E-08		3.7E-09	2.9E-08
			Benzo(a)pyrene	2.8E-07		4.1E-08	3.2E-07
			Benzo(b)fluoranthene	3.9E-08		5.7E-09	4.5E-08
			Dibenzo(a,h)anthracene	8.5E-08		1.2E-08	9.7E-08
			Indeno(1,2,3-cd)pyrene	1.5E-08		2.3E-09	1.8E-08
			Aroclor-1260	1.0E-08		1.6E-09	1.2E-08
			2,3,7,8-TCDD TEQ	9.8E-08		3.3E-09	1.0E-07
			Aluminum				
			Arsenic	1.8E-07		6.2E-09	1.9E-07
			Iron				
			Thallium				
			Vanadium				
Surface Water	Surface Water	Surface Water	Tetrachloroethene	1.5E-08		1.1E-07	1.3E-07
			2,3,7,8-TCDD TEQ	6.6E-09		1.7E-06	1.7E-06
			Arsenic	9.2E-08		8.0E-09	1.0E-07
			Iron				
			Manganese				
						Total Risk Across Subsurface Soil	1.5E-06
						Total Risk Across Sediment	8.2E-07
						Total Risk Across Surface Water	1.9E-06

TABLE 9.9a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TOTAL RESIDENTIAL (CHILD + ADULT)
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child + Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	1,2-Dichloroethane	2.3E-07	2.5E-07	8.0E-09	4.9E-07
			Benzene	1.4E-07	9.4E-08	1.5E-08	2.5E-07
			cis-1,2-Dichloroethene				
			trans-1,2-Dichloroethene				
			Trichloroethylene	1.3E-07	8.1E-08	1.6E-08	2.3E-07
			Vinyl chloride	1.7E-04	7.8E-06	6.1E-06	1.8E-04
			Dibenzofuran				
			2,3,7,8-TCDD TEF	2.3E-06		3.2E-05	3.4E-05
			Aluminum				
			Antimony				
			Arsenic	1.2E-05		2.9E-08	1.2E-05
			Barium				
			Chromium				
			Iron				
			Manganese				
			Vanadium				
						Total Risk Across Groundwater	2.3E-04

Total Risk Across All Media and All Exposure Routes 2.3E-04

CALCULATION OF AIR CONCENTRATIONS IN A TRENCH
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

For Mass-Transfer Coefficients

Kg,H2O	0.833	cm/s
MWH2O	18	
Kg,O2	0.002	cm/s
MWO2	32	
T	77	F
T	298	K
R	8.20E-05	atm-m3/mol-K

For Emission Flux and Concentration in Trench

CF1	1.00E-03	L/cm3
CF2	1.00E+04	cm2/m2
CF3	3600	s/hr
F	1	
ACH	360	hr-1

Trench dimensions

Length	8	ft
	2.44	m
Width	11	ft
	3.35	m
Depth	10	ft
	3.05	m
Width/Depth	1.10	

Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep

	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Volatile Organic Compounds (VOCs)									
Benzene	71-43-2	78.11	5.55E-03	5.09E-01	1.28E-03	1.27E-03	1.00E+00	4.15E-02	4.15E-02
1,2-Dichloroethane	107-06-2	98.96	9.79E-04	4.71E-01	1.14E-03	1.07E-03	1.00E+00	3.52E-02	3.52E-02
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	4.74E-01	1.15E-03	1.13E-03	1.70E+02	3.72E-02	6.32E+00
trans-1,2-Dichloroethene	156-60-5	96.94	9.38E-03	4.74E-01	1.15E-03	1.14E-03	1.10E+02	3.75E-02	4.12E+00
Trichloroethene	79-01-6	131.39	1.03E-02	4.28E-01	9.87E-04	9.82E-04	4.00E+00	3.22E-02	1.29E-01
Vinyl Chloride	75-01-4	62.50	2.70E-02	5.49E-01	1.43E-03	1.43E-03	8.80E+01	4.68E-02	4.12E+00

Volatilization From Showering with Groundwater- RME
Source: Foster & Chrostowski, 1987.
Site 4 - NCBC, Gulfport, Mississippi

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
1,2-Dichloroethane	1.00E-03	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	3.72E-04	3.10E-04	4.91E-02
Benzene	1.00E-03	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	4.68E-04	3.90E-04	6.17E-02
cis-1,2-Dichloroethene	1.70E-01	6.45E+01	1.10E-02	1.65E+01	1.58E+03	1.61E+01	2.12E+01	8.63E-02	7.19E-02	6.70E-02
trans-1,2-Dichloroethene	1.10E-01	9.70E+01	9.39E-03	1.35E+01	1.29E+03	1.31E+01	1.73E+01	4.81E-02	4.01E-02	5.78E-02
Trichloroethene	4.00E-03	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.56E-03	1.30E-03	5.16E-02
Vinyl chloride	8.80E-02	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	4.54E-02	3.79E-02	6.82E-02

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake = :	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Inhalation Cancer Slope Factor $(mg/kg/day)^{-1}$	Inhalation Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloroethane	3.10E-04	2.3E-06	6.7E-06	9.10E-02	7.00E-01	2.1E-07	4.6%	9.6E-06	0.0%
Benzene	3.90E-04	2.9E-06	8.5E-06	2.70E-02	8.60E-03	7.8E-08	1.7%	9.8E-04	0.4%
cis-1,2-Dichloroethene	7.19E-02	5.3E-04	1.6E-03		1.00E-02	NA	NA	1.6E-01	65.9%
trans-1,2-Dichloroethene	4.01E-02	3.0E-04	8.7E-04		1.70E-02	NA	NA	5.1E-02	21.6%
Trichloroethene	1.30E-03	9.7E-06	2.8E-05	7.00E-03	1.70E-01	6.8E-08	1.5%	1.7E-04	0.1%
Vinyl chloride	3.79E-02	2.8E-04	8.2E-04	1.50E-02	2.90E-02	4.2E-06	92.2%	2.8E-02	12.0%
					Total	**4.6E-06**	**100.0%**	**2.4E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	3.96	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	6	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake = :	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloroethane	3.10E-04	2.7E-06	3.1E-05	9.10E-02	7.00E-01	2.5E-07	2.4%	4.5E-05	0.0%
Benzene	3.90E-04	3.4E-06	3.9E-05	2.70E-02	8.60E-03	9.1E-08	0.9%	4.6E-03	0.4%
cis-1,2-Dichloroethene	7.19E-02	6.2E-04	7.3E-03		1.00E-02	NA	NA	7.3E-01	65.9%
trans-1,2-Dichloroethene	4.01E-02	3.5E-04	4.1E-03		1.70E-02	NA	NA	2.4E-01	21.6%
Trichloroethene	1.30E-03	1.1E-05	1.3E-04	7.00E-03	1.70E-01	7.9E-08	0.8%	7.8E-04	0.1%
Vinyl chloride	3.79E-02	3.3E-04	3.8E-03	3.00E-02	2.90E-02	9.9E-06	96.0%	1.3E-01	12.0%
					Total	**1.0E-05**	**100.0%**	**1.1E+00**	**100.0%**

Volatilization From Showering with Groundwater- CTE
Source: Foster & Chrostowski, 1987.
Site 4 - NCBC, Gulfport, Mississippi

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K Ra x CF
1,2-Dichloroethane	1.00E-03	9.90E+01	9.78E-04	1.33E+01	1.28E+03	1.06E+01	1.40E+01	3.72E-04	3.10E-04	2.72E-02
Benzene	1.00E-03	7.80E+01	5.56E-03	1.50E+01	1.44E+03	1.44E+01	1.89E+01	4.68E-04	3.90E-04	3.42E-02
cis-1,2-Dichloroethene	1.70E-01	6.45E+01	1.10E-02	1.65E+01	1.58E+03	1.61E+01	2.12E+01	8.63E-02	7.19E-02	3.71E-02
trans-1,2-Dichloroethene	1.10E-01	9.70E+01	9.39E-03	1.35E+01	1.29E+03	1.31E+01	1.73E+01	4.81E-02	4.01E-02	3.20E-02
Trichloroethene	4.00E-03	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.56E-03	1.30E-03	2.86E-02
Vinyl chloride	8.80E-02	6.30E+01	2.71E-02	1.67E+01	1.60E+03	1.66E+01	2.18E+01	4.54E-02	3.79E-02	3.77E-02

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	350	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake = :	4.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Inhalation Cancer Slope Factor $(mg/kg/day)^{-1}$	Inhalation Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloroethane	3.10E-04	1.3E-06	3.7E-06	9.10E-02	7.00E-01	1.2E-07	4.6%	5.3E-06	0.0%
Benzene	3.90E-04	1.6E-06	4.7E-06	2.70E-02	8.60E-03	4.3E-08	1.7%	5.4E-04	0.4%
cis-1,2-Dichloroethene	7.19E-02	3.0E-04	8.6E-04		1.00E-02	NA	NA	8.6E-02	65.9%
trans-1,2-Dichloroethene	4.01E-02	1.7E-04	4.8E-04		1.70E-02	NA	NA	2.8E-02	21.6%
Trichloroethene	1.30E-03	5.4E-06	1.6E-05	7.00E-03	1.70E-01	3.8E-08	1.5%	9.2E-05	0.1%
Vinyl chloride	3.79E-02	1.6E-04	4.5E-04	1.50E-02	2.90E-02	2.3E-06	92.2%	1.6E-02	12.0%
					Total	**2.5E-06**	**100.0%**	**1.3E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	2.19	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	6	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake = :	4.8E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	5.6E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES WHILE SHOWERING WITH GROUNDWATER

SITE NAME: SITE 4 - GOLF COURSE LANDFILL
LOCATION: NCBC, GULFPORT, MISSISSIPPI
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE: 06/07/06

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
1,2-Dichloroethane	3.10E-04	1.5E-06	1.7E-05	9.10E-02	7.00E-01	1.4E-07	2.4%	2.5E-05	0.0%
Benzene	3.90E-04	1.9E-06	2.2E-05	2.70E-02	8.60E-03	5.1E-08	0.9%	2.5E-03	0.4%
cis-1,2-Dichloroethene	7.19E-02	3.5E-04	4.0E-03		1.00E-02	NA	NA	4.0E-01	65.9%
trans-1,2-Dichloroethene	4.01E-02	1.9E-04	2.2E-03		1.70E-02	NA	NA	1.3E-01	21.6%
Trichloroethene	1.30E-03	6.3E-06	7.3E-05	7.00E-03	1.70E-01	4.4E-08	0.8%	4.3E-04	0.1%
Vinyl chloride	3.79E-02	1.8E-04	2.1E-03	3.00E-02	2.90E-02	5.5E-06	96.0%	7.3E-02	12.0%
					Total	**5.7E-06**	**100.0%**	**6.1E-01**	**100.0%**

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)																		
78-93-3	2-Butanone	0.009	J	0.012	J	mg/kg	04SB0601	2/10	0.025 - 0.037	0.012	NA	2200	N	84.5	84.5	MDEQ	No	BSL
67-64-1	Acetone	0.022	J	0.27	J	mg/kg	04SB0801-D	9/9	---	0.27	NA	1400	N	7820	104000	MDEQ	No	BSL
75-15-0	Carbon Disulfide	0.0007	J	0.006		mg/kg	04SB1001	9/10	0.005	0.006	NA	36	N	7.97	7.97	MDEQ	No	BSL
108-90-7	Chlorobenzene	0.001	J	0.001	J	mg/kg	04SB0401	1/10	0.005 - 0.006	0.001	NA	15	N	1.19	1.19	MDEQ	No	BSL
100-41-4	Ethylbenzene	0.003	J	0.17		mg/kg	04SB0601	2/10	0.005 - 0.007	0.17	NA	400	sat	395	395	MDEQ	No	BSL
98-82-8	Isopropylbenzene	0.0008	J	0.0008	J	mg/kg	04SB0201	1/10	0.005 - 0.007	0.0008	NA	57	N	9.43	9.43	MDEQ	No	BSL
TTNUS054	M+P-Xylenes	0.002	J	0.002	J	mg/kg	04SB0201	1/10	0.010 - 0.015	0.002	NA	27	N	NA	NA	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	0.002	J	0.006		mg/kg	04SB0201	2/10	0.005 - 0.007	0.006	NA	260	N	NA	NA	MDEQ	No	BSL
100-42-5	Styrene	0.088		0.088		mg/kg	04SB0601	1/10	0.005 - 0.007	0.088	NA	1700	sat	384	384	MDEQ	No	BSL
108-88-3	Toluene	0.0007	J	0.36	J	mg/kg	04SB0601	2/10	0.005 - 0.007	0.36	NA	520	sat	38	38	MDEQ	No	BSL
75-69-4	Trichlorofluoromethane	0.001	J	0.004	J	mg/kg	04SB0601	9/10	0.005	0.004	NA	39	N	23500	143000	MDEQ	No	BSL
75-01-4	Vinyl Chloride	0.003	J	0.006		mg/kg	04SB0801	1/10	0.005 - 0.007	0.006	NA	0.079	C	0.426	0.939	MDEQ	No	BSL
Semivolatile Organics (mg/kg)																		
92-52-4	1,1-Biphenyl	0.34	J	0.34	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	300	N	3910	10200	MDEQ	No	BSL
91-57-6	2-Methylnaphthalene	2.9	J	2.9	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	5.6	N(7)	1560	40900	MDEQ	No	BSL
83-32-9	Acenaphthene	6.1	J	6.1	J	mg/kg	04SB0201	1/10	0.39 - 0.44	6.1	NA	370	N	4690	123000	MDEQ	No	BSL
120-12-7	Anthracene	1.7		1.7		mg/kg	04SB0201	1/10	0.39 - 0.44	1.7	NA	2200	N	23500	613000	MDEQ	No	BSL
100-52-7	Benzaldehyde	0.26	J	0.26	J	mg/kg	04SB0601	1/10	0.39 - 0.44	0.26	NA	610	N	7820	204000	MDEQ	No	BSL
56-55-3	Benzo(a)anthracene	0.76	J	0.76	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.76	NA	0.62	C	0.875	7.84	MDEQ	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.56	J	0.56	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.56	NA	0.62	C	0.875	7.84	MDEQ	No	BSL
191-24-2	Benzo(g,h,i)perylene	0.39	J	0.39	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.39	NA	230	N(8)	2350	61300	MDEQ	No	BSL
207-08-9	Benzo(k)fluoranthene	0.87	J	0.87	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.87	NA	6.2	C	8.75	78.4	MDEQ	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	0.24	J	0.6	J	mg/kg	04SB0201	4/10	0.39 - 0.44	0.6	NA	35	C	45.6	409	MDEQ	No	BSL
86-74-8	Carbazole	0.6	J	0.6	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.6	NA	24	C	31.9	286	MDEQ	No	BSL
218-01-9	Chrysene	1.2		1.2		mg/kg	04SB0201	1/10	0.39 - 0.44	1.2	NA	62	C	87.5	784	MDEQ	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.21	J	0.21	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.21	NA	0.062	C	0.0875	0.784	MDEQ	Yes	ASL
132-64-9	Dibenzofuran	2.9	J	2.9	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	15	N	313	8180	MDEQ	No	BSL
206-44-0	Fluoranthene	2.7		2.7		mg/kg	04SB0201	1/10	0.39 - 0.44	2.7	NA	230	N	3130	81700	MDEQ	No	BSL
86-73-7	Fluorene	4.2	J	4.2	J	mg/kg	04SB0201	1/10	0.39 - 0.44	4.2	NA	270	N	3130	81700	MDEQ	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.34	J	0.34	J	mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	0.62	C	0.875	7.84	MDEQ	No	BSL
91-20-3	Naphthalene	2.1	J	2.1	J	mg/kg	04SB0201	1/10	0.39 - 0.44	2.1	NA	5.6	N	194	247	MDEQ	No	BSL
85-01-8	Phenanthrene	7		7		mg/kg	04SB0201	1/10	0.39 - 0.44	7	NA	230	N(8)	2350	61300	MDEQ	No	BSL
129-00-0	Pyrene	4.4		4.4		mg/kg	04SB0201	1/10	0.39 - 0.44	4.4	NA	230	N	2350	61300	MDEQ	No	BSL
Pesticides/PCBs (mg/kg)																		
72-54-8	4,4'-DDD	0.0063		0.0063		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0063	NA	2.4	C	2.66	23.8	MDEQ	No	BSL
72-55-9	4,4'-DDE	0.0037	J	0.0037	J	mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0037	NA	1.7	C	1.88	16.8	MDEQ	No	BSL
5103-71-9	alpha-Chlordane	0.024		0.024		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.024	NA	1.6	C(9)	NA	NA	MDEQ	No	BSL
12789-03-06	gamma-Chlordane	0.28	J	0.28	J	mg/kg	04SB0201	1/10	0.002 - 0.0023	0.28	NA	1.6	C(9)	NA	NA	MDEQ	No	BSL
Dioxins/Furans(ng/kg)																		
3268-87-9	OCDD	120	J	320		ng/kg	04SB0701	2/2	---	320	NA	39000	C	4260	38200	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	12		33		ng/kg	04SB0701	2/2	---	33	NA	390	C	426	3820	MDEQ	No	BSL
19408-74-3	1,2,3,7,8,9-HxCDD	4.3	J	4.3	J	ng/kg	04SB0701	1/2	2	4.3	NA	39	C	103	923	MDEQ	No	BSL
1746-01-6	2,3,7,8-TCDD	1.4		1.4		ng/kg	04SB0701	1/2	0.2	1.4	NA	3.9	C	4.26	38.2	MDEQ	No	BSL
37871-00-4	TOTAL HpCDD	27		180		ng/kg	04SB0701	2/2	---	180	NA	NA		NA	NA	NA	NA	NA
34465-46-8	TOTAL HxCDD	15		200		ng/kg	04SB0701	2/2	---	200	NA	NA		NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	86		86		ng/kg	04SB0701	1/2	1.7	86	NA	NA		NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	1.6		95		ng/kg	04SB0701	2/2	---	95	NA	NA		NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	0.672		2.6		ng/kg	04SB0701	2/2	---	2.6	NA	3.9	C	4.26	38.2	MDEQ	No	BSL

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Inorganics (mg/kg)																		
7429-90-5	Aluminum	1240		7680		mg/kg	04SB0701	10/10	---	7680	NA	7600	N	78200	2040000	MDEQ	Yes	ASL
7440-38-2	Arsenic	0.27		7.6		mg/kg	04SB0701	10/10	---	7.6	NA	0.39	C	0.426	3.82	MDEQ	Yes	ASL
7440-39-3	Barium	4.3		68.7		mg/kg	04SB0201	10/10	---	68.7	NA	540	N	5480	14300	MDEQ	No	BSL
7440-41-7	Beryllium	0.03		0.57		mg/kg	04SB0701	6/10	0.02	0.57	NA	15	N	156	1020	MDEQ	No	BSL
7440-70-2	Calcium	28.6		20000		mg/kg	04SB0201	10/10	---	20000	NA	NA	N	NA	NA	MDEQ	No	NUT
7440-47-3	Chromium	2.4		15.2		mg/kg	04SB0701	10/10	---	15.2	NA	30	C(10)	NA	NA	MDEQ	No	BSL
7440-48-4	Cobalt	0.41		3.9	J	mg/kg	04SB0701	6/10	0.33 - 0.46	3.9	NA	140	N	4690	12300	MDEQ	No	BSL
7440-50-8	Copper	1.2		13.9		mg/kg	04SB0201	10/10	---	13.9	NA	310	N	3130	8170	MDEQ	No	BSL
7439-89-6	Iron	931		10300		mg/kg	04SB0701	10/10	---	10300	NA	2300	N	23500	613000	MDEQ	Yes	ASL
7439-92-1	Lead	8.8		80.5		mg/kg	04SB0201	2/10	1.1 - 8.2	80.5	NA	400	N(11)	400	1700	MDEQ	No	BSL
7439-95-4	Magnesium	77.9	J	2110	J	mg/kg	04SB0201	10/10	---	2110	NA	NA	N	NA	NA	MDEQ	No	NUT
7439-96-5	Manganese	2.2		131		mg/kg	04SB0201	10/10	---	131	NA	180	N	1560	4080	MDEQ	No	BSL
7439-97-6	Mercury	0.01	J	0.03	J	mg/kg	04SB0601	5/10	0.01	0.03	NA	2.3	N	10	61.3	MDEQ	No	BSL
7440-02-0	Nickel	12.4		12.4		mg/kg	04SB0201	1/10	1.3 - 7.3	12.4	NA	160	N	1560	4080	MDEQ	No	BSL
7440-09-7	Potassium	254		782		mg/kg	04SB0701	3/10	88.1 - 163	782	NA	NA	N	NA	NA	MDEQ	No	NUT
7782-49-2	Selenium	0.43		0.43		mg/kg	04SB1001	1/10	0.28 - 0.39	0.43	NA	39	N	391	1020	MDEQ	No	BSL
7440-23-5	Sodium	45.2	J	116	J	mg/kg	04SB0201	3/10	9.6 - 40.4	116	NA	NA		NA	NA	MDEQ	No	NUT
7440-28-0	Thallium	0.44		0.44		mg/kg	04SB0801	1/10	0.31 - 0.43	0.44	NA	0.52	N	5.48	143	MDEQ	No	BSL
7440-62-2	Vanadium	2.4		19.8		mg/kg	04SB0201	9/10	2	19.8	NA	7.8	N	548	1430	MDEQ	Yes	ASL
7440-66-6	Zinc	1.4		193		mg/kg	04SB0201	10/10	---	193	NA	2300	N	23500	61300	MDEQ	No	BSL
Miscellaneous Parameters (mg/kg)																		
57-12-5	Cyanide	0.32	J	0.77	J	mg/kg	04SB0801-D	3/10	0.5 - 0.63	0.77	NA	120	N	1560	4080	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (USEPA, July 1994).

Associated Samples:

04SB0101	04SB0501	04SB0801-DUP
04SB0201	04SB0601	04SB0901
04SB0301	04SB0701	04SB1001
04SB0401	04SB0801	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Porcedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002 for Unrestricted and Restricted Land Use.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS - SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)															
78-93-3	2-Butanone	0.009		0.012		mg/kg	04SB0601	2/10	0.025 - 0.037	0.012	NA	4.4	24000	No	BSL
67-64-1	Acetone	0.022		0.27		mg/kg	04SB0801-D	9/9	---	0.27	NA	6.6	NA	No	BSL
75-15-0	Carbon Disulfide	0.0007		0.006		mg/kg	04SB1001	9/10	0.005	0.006	NA	1.5	720	No	BSL
108-90-7	Chlorobenzene	0.001		0.001		mg/kg	04SB0401	1/10	0.005 - 0.006	0.001	NA	0.065	13	No	BSL
100-41-4	Ethylbenzene	0.003		0.17		mg/kg	04SB0601	2/10	0.005 - 0.007	0.17	NA	0.67	400	No	BSL
98-82-8	Isopropylbenzene	0.0008		0.0008		mg/kg	04SB0201	1/10	0.005 - 0.007	0.0008	NA	18	850	No	BSL
TTNUS054	M+P-Xylenes	0.002		0.002		mg/kg	04SB0201	1/10	0.010 - 0.015	0.002	NA	7.1	420	No	BSL
108-87-2	Methyl Cyclohexane	0.002		0.006		mg/kg	04SB0201	2/10	0.005 - 0.007	0.006	NA	NA	490	No	BSL
100-42-5	Styrene	0.088		0.088		mg/kg	04SB0601	1/10	0.005 - 0.007	0.088	NA	0.18	1500	No	BSL
108-88-3	Toluene	0.0007		0.36		mg/kg	04SB0601	2/10	0.005 - 0.007	0.36	NA	0.59	650	No	BSL
75-69-4	Trichlorofluoromethane	0.001		0.004		mg/kg	04SB0601	9/10	0.005	0.004	NA	8	110	No	BSL
75-01-4	Vinyl Chloride	0.003		0.006		mg/kg	04SB0801	1/10	0.005 - 0.007	0.006	NA	0.00067	0.28	Yes	ASL
Semivolatile Organics (mg/kg)															
92-52-4	1,1-Biphenyl	0.34		0.34		mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	57	NA	No	BSL
91-57-6	2-Methylnaphthalene	2.9		2.9		mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	NA	NA	No	NTX
83-32-9	Acenaphthene	6.1		6.1		mg/kg	04SB0201	1/10	0.39 - 0.44	6.1	NA	31	NA	No	BSL
120-12-7	Anthracene	1.7		1.7		mg/kg	04SB0201	1/10	0.39 - 0.44	1.7	NA	650	NA	No	BSL
100-52-7	Benzaldehyde	0.26		0.26		mg/kg	04SB0601	1/10	0.39 - 0.44	0.26	NA	0.86	NA	No	BSL
56-55-3	Benzo(a)anthracene	0.76		0.76		mg/kg	04SB0201	1/10	0.39 - 0.44	0.76	NA	0.16	NA	Yes	ASL
205-99-2	Benzo(b)fluoranthene	0.56		0.56		mg/kg	04SB0201	1/10	0.39 - 0.44	0.56	NA	0.49	NA	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.39		0.39		mg/kg	04SB0201	1/10	0.39 - 0.44	0.39	NA	NA	NA	No	NTX
207-08-9	Benzo(k)fluoranthene	0.87		0.87		mg/kg	04SB0201	1/10	0.39 - 0.44	0.87	NA	0.49	NA	Yes	ASL
117-81-7	Bis(2-ethylhexyl)phthalate	0.24		0.6		mg/kg	04SB0201	4/10	0.39 - 0.44	0.6	NA	180	NA	No	BSL
86-74-8	Carbazole	0.6		0.6		mg/kg	04SB0201	1/10	0.39 - 0.44	0.6	NA	0.03	NA	Yes	ASL
218-01-9	Chrysene	1.2		1.2		mg/kg	04SB0201	1/10	0.39 - 0.44	1.2	NA	0.16	NA	Yes	ASL
53-70-3	Dibenzo(a,h)anthracene	0.21		0.21		mg/kg	04SB0201	1/10	0.39 - 0.44	0.21	NA	1.5	NA	No	BSL
132-64-9	Dibenzofuran	2.9		2.9		mg/kg	04SB0201	1/10	0.39 - 0.44	2.9	NA	2.4	NA	Yes	ASL
206-44-0	Fluoranthene	2.7		2.7		mg/kg	04SB0201	1/10	0.39 - 0.44	2.7	NA	310	NA	No	BSL
86-73-7	Fluorene	4.2		4.2		mg/kg	04SB0201	1/10	0.39 - 0.44	4.2	NA	41	NA	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.34		0.34		mg/kg	04SB0201	1/10	0.39 - 0.44	0.34	NA	1.4	NA	No	BSL
91-20-3	Naphthalene	2.1		2.1		mg/kg	04SB0201	1/10	0.39 - 0.44	2.1	NA	3.1	17	No	BSL
85-01-8	Phenanthrene	7		7		mg/kg	04SB0201	1/10	0.39 - 0.44	7	NA	NA	NA	No	NTX
129-00-0	Pyrene	4.4		4.4		mg/kg	04SB0201	1/10	0.39 - 0.44	4.4	NA	230	NA	No	BSL
Pesticides/PCBs (mg/kg)															
72-54-8	4,4'-DDD	0.0063		0.0063		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0063	NA	0.71	NA	No	BSL
72-55-9	4,4'-DDE	0.0037		0.0037		mg/kg	04SB0201	1/10	0.0039 - 0.0044	0.0037	NA	2.2	NA	No	BSL
5103-71-9	alpha-Chlordane (7)	0.024		0.024		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.024	NA	0.48	72	No	BSL
12789-03-06	gamma-Chlordane (7)	0.28		0.28		mg/kg	04SB0201	1/10	0.002 - 0.0023	0.28	NA	0.48	72	No	BSL
Dioxins/Furans(ng/kg)															
3268-87-9	OCDD	120		320		ng/kg	04SB0701	2/2	---	320	NA	2800	430000	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	12		33		ng/kg	04SB0701	2/2	---	33	NA	28	4300	Yes	ASL
19408-74-3	1,2,3,7,8,9-HxCDD	4.3		4.3		ng/kg	04SB0701	1/2	2	4.3	NA	3200	2460000	No	BSL
1746-01-6	2,3,7,8-TCDD	1.4		1.4		ng/kg	04SB0701	1/2	0.2	1.4	NA	0.28	43	Yes	ASL
37871-00-4	TOTAL HpCDD	27		180		ng/kg	04SB0701	2/2	---	180	NA	NA	NA	NA	NA
34465-46-8	TOTAL HxCDD	15		200		ng/kg	04SB0701	2/2	---	200	NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	86		86		ng/kg	04SB0701	1/2	1.7	86	NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	1.6		95		ng/kg	04SB0701	2/2	---	95	NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	0.672		2.6		ng/kg	04SB0701	2/2	---	2.6	NA	0.28	43	Yes	ASL

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS - SUBSURFACE SOIL
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Inorganics (mg/kg)															
7429-90-5	Aluminum	1240		7680		mg/kg	04SB0701	10/10	---	7680	NA	8.3	686000	Yes	ASL
7440-38-2	Arsenic	0.27		7.6		mg/kg	04SB0701	10/10	---	7.6	NA	0.29	745	Yes	ASL
7440-39-3	Barium	4.3		68.7		mg/kg	04SB0201	10/10	---	68.7	NA	82	68600	No	BSL
7440-41-7	Beryllium	0.03		0.57		mg/kg	04SB0701	6/10	0.02	0.57	NA	3.2	133	No	BSL
7440-70-2	Calcium	28.6		20000		mg/kg	04SB0201	10/10	---	20000	NA	NA	NA	No	NUT
7440-47-3	Chromium(8)	2.4		15.2		mg/kg	04SB0701	10/10	---	15.2	NA	2.1	267	Yes	ASL
7440-48-4	Cobalt	0.41		3.9		mg/kg	04SB0701	6/10	0.33 - 0.46	3.9	NA	0.17	1140	Yes	ASL
7440-50-8	Copper	1.2		13.9		mg/kg	04SB0201	10/10	---	13.9	NA	560	NA	No	BSL
7439-89-6	Iron	931		10300		mg/kg	04SB0701	10/10	---	10300	NA	NA	NA	No	BSL
7439-92-1	Lead	8.8		80.5		mg/kg	04SB0201	2/10	1.1 - 8.2	80.5	NA	NA	NA	No	BSL
7439-95-4	Magnesium	77.9		2110		mg/kg	04SB0201	10/10	---	2110	NA	NA	NA	No	NUT
7439-96-5	Manganese	2.2		131		mg/kg	04SB0201	10/10	---	131	NA	110	6860	Yes	ASL
7439-97-6	Mercury	0.01		0.03		mg/kg	04SB0601	5/10	0.01	0.03	NA	NA	NA	No	BSL
7440-02-0	Nickel	12.4		12.4		mg/kg	04SB0201	1/10	1.3 - 7.3	12.4	NA	14	NA	No	BSL
7440-09-7	Potassium	254		782		mg/kg	04SB0701	3/10	88.1 - 163	782	NA	NA	NA	No	NUT
7782-49-2	Selenium	0.43		0.43		mg/kg	04SB1001	1/10	0.28 - 0.39	0.43	NA	0.26	NA	Yes	ASL
7440-23-5	Sodium	45.2		116		mg/kg	04SB0201	3/10	9.6 - 40.4	116	NA	NA	NA	No	NUT
7440-28-0	Thallium	0.44		0.44		mg/kg	04SB0801	1/10	0.31 - 0.43	0.44	NA	0.056	NA	Yes	ASL
7440-62-2	Vanadium	2.4		19.8		mg/kg	04SB0201	9/10	2	19.8	NA	260	NA	No	BSL
7440-66-6	Zinc	1.4		193		mg/kg	04SB0201	10/10	---	193	NA	680	NA	No	BSL
Miscellaneous Parameters (mg/kg)															
57-12-5	Cyanide	0.32		0.77		mg/kg	04SB0801-D	3/10	0.5 - 0.63	0.77	NA	2	NA	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limit
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 - EPA Soil Screening Levels. EPA Internet Site at http://risk.lsd.ornl.gov/calc_start.shtml (Soil to air SSLs for noncarcinogens are divided by 10). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
If the maximum concentration of a chemical exceeds the SSL for Migration to Air (i.e., inhalation), risks for that chemical are quantitatively evaluated in the risk assessment.
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
8 As Hexavalent Chromium.

Associated Samples:

04SB0101	04SB0501	04SB0801-DUP
04SB0201	04SB0601	04SB0901
04SB0301	04SB0701	04SB1001
04SB0401	04SB0801	

Definitions:
COPC = Chemical of Potential Concern
J = Estimated Value
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level

For Elimination as a COPC:
BSL = Below COPC Screening Level
NUT = Essential Nutrient
NTX = No toxicity information available

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 4
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (ug/L)																	
75-34-3	1,1-Dichloroethane	0.1	J	0.2	J	ug/L	04GP2401	2/38	5	0.2	NA	81	N	798	MDEQ	No	BSL
75-35-4	1,1-Dichloroethene	0.6	J	0.6	J	ug/L	04GW1601	1/38	5	0.6	NA	34	N	7	MDEQ	No	BSL
107-06-2	1,2-Dichloroethane	0.2	J	0.2	J	ug/L	04GW1601	1/38	5	0.2	NA	0.12	C	5	MDEQ	Yes	ASL
106-46-7	1,4-Dichlorobenzene	0.3	J	0.3	J	ug/L	04GP0101	1/38	5	0.3	NA	0.5	C	75	MDEQ	No	BSL
156-59-2	cis-1,2-Dichloroethene	0.2	J	280		ug/L	04GW1601	12/38	5	280	NA	6.1	N	70	MDEQ	Yes	ASL
156-60-5	trans-1,2-Dichloroethene	7		190		ug/L	04GW1601	10/38	5	190	NA	12	N	100	MDEQ	Yes	ASL
540-59-0	Total 1,2-Dichloroethene	0.2	J	470		ug/L	04GW1601	7/25	10	470	NA	6.1	N	NA	NA	Yes	ASL
78-93-3	2-Butanone	2	J	2	J	ug/L	04GP0201, 04GW11R01	2/35	5 - 20	2	NA	700	N	1910	MDEQ	No	BSL
67-64-1	Acetone	2	J	290	J	ug/L	04GP0201	9/33	5 - 50	290	NA	550	N	608	MDEQ	No	BSL
71-43-2	Benzene	0.1	J	0.4	J	ug/L	04GP0101	6/38	5	0.4	NA	0.35	C	5	MDEQ	Yes	ASL
75-15-0	Carbon Disulfide	0.2	J	0.9	J	ug/L	04GW10R01	10/38	5	0.9	NA	100	N	1040	MDEQ	No	BSL
108-90-7	Chlorobenzene	0.2	J	5		ug/L	04GP0101	3/38	5	5	NA	11	N	100	MDEQ	No	BSL
98-82-8	Isopropylbenzene	0.3	J	0.3	J	ug/L	04GW1401	1/38	5	0.3	NA	66	N	679	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	2	J	2	J	ug/L	04GP0601	1/25	5	2	NA	520	N	NA	NA	No	BSL
108-88-3	Toluene	0.2	J	2	J	ug/L	04GW1701	3/38	5	2	NA	72	N	1000	MDEQ	No	BSL
79-01-6	Trichloroethene	0.8	J	20.4		ug/L	04GP1301	8/38	5	20.4	NA	0.028	C	5	MDEQ	Yes	ASL
75-01-4	Vinyl Chloride	0.2	J	172		ug/L	04GP1301	14/38	5	172	NA	0.02	C	2	MDEQ	Yes	ASL
Semivolatile Organics (ug/L)																	
106-44-5	4-Methylphenol	5	J	8	J	ug/L	04GW11R01	4/23	10	8	NA	18	N	183	MDEQ	No	BSL
83-32-9	Acenaphthene	7	J	25	J	ug/L	04GW1401	2/23	10	25	NA	37	N	365	MDEQ	No	BSL
105-60-2	Caprolactam	23		38		ug/L	04GW11R01	2/23	10	38	NA	1800	N	18300	MDEQ	No	BSL
132-64-9	Dibenzofuran	7	J	7	J	ug/L	04GW1401	1/23	10	7	NA	1.2	N	24.3	MDEQ	Yes	ASL
206-44-0	Fluoranthene	10		10		ug/L	04GW1401	1/23	10	10	NA	150	N	1460	MDEQ	No	BSL
86-73-7	Fluorene	4	J	14		ug/L	04GW1401	2/23	10	14	NA	24	N	243	MDEQ	No	BSL
85-01-8	Phenanthrene	4	J	4	J	ug/L	04GW1901	1/23	10	4	NA	18	N(7)	1100	MDEQ	No	BSL
129-00-0	Pyrene	8	J	8	J	ug/L	04GW1401	1/23	10	8	NA	18	N	183	MDEQ	No	BSL
Dioxins/Furans (pg/L)																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	87	J	210		pg/L	04GW1701	3/13	1.6 - 25	210	NA	4500	C	446	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	31	J	31	J	pg/L	04GW1401	1/13	0.81 - 16	31	NA	45	C	44.6	MDEQ	No	BSL
37871-00-4	Total HpCDD	40		62		pg/L	04GW1401	2/13	0.81 - 12	62	NA	NA		NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	2.1		10		pg/L	04GW1401	3/13	---	10	NA	0.45	C	0.446	MDEQ	Yes	ASL
Inorganics (ug/L)																	
7429-90-5	Aluminum	1480	J	8690	J	ug/L	04GP0301	5/23	17.9 - 757	8690	NA	3600	N	36500	MDEQ	Yes	ASL
7440-36-0	Antimony	26.3		26.3		ug/L	04GW1401	1/23	0.19 - 2.34	26.3	NA	1.5	N	6	MDEQ	Yes	ASL
7440-38-2	Arsenic	3.3		11.4		ug/L	04GW1401	4/23	0.75 - 8.6	11.4	NA	0.045	C	50	USEPA	Yes	ASL
7440-39-3	Barium	22.3		1620		ug/L	04GW1201, 04GW1201-D	23/23	---	1620	NA	260	N	2000	MDEQ	Yes	ASL
7440-41-7	Beryllium	0.33		0.33		ug/L	04GP0201	1/23	0.27	0.33	NA	7.3	N	4	MDEQ	No	BSL
7440-70-2	Calcium	6690		273000		ug/L	04GP0801-D	23/23	---	273000	NA	NA		NA	NA	No	NUT
7440-47-3	Chromium	2.2		11.8		ug/L	04GP0401	6/23	0.8 - 10.1	11.8	NA	11	N(8)	100	MDEQ	Yes	ASL
7440-50-8	Copper	11.9		13.3		ug/L	04GP0701	3/23	1.9 - 12.6	13.3	NA	150	N	1300	MDEQ	No	BSL
7439-89-6	Iron	370		69700		ug/L	04GP0801-D	22/23	126 - 146	69700	NA	1100	N	11000	MDEQ	Yes	ASL
7439-92-1	Lead	0.18	J	3.2		ug/L	04GP0401	6/23	0.15 - 1.7	3.2	NA	15	(9)	15	MDEQ	No	BSL

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 4
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
7439-95-4	Magnesium	1270		63300		ug/L	04GP0801-D	23/23	---	63300	NA	NA		NA	NA	No	NUT
7439-96-5	Manganese	35.1		465		ug/L	04GW1301	23/23	---	465	NA	88	N	730	MDEQ	Yes	ASL
7439-97-6	Mercury	0.02		0.02		ug/L	04GP0401	1/23	0.01 - 0.08	0.02	NA	1.1	N	2	MDEQ	No	BSL
7440-02-0	Nickel	7.8		11		ug/L	04GP0401	2/23	1 - 10.8	11	NA	73	N	730	MDEQ	No	BSL
7440-09-7	Potassium	1300		19600		ug/L	04GW1201	19/23	722 - 2960	19600	NA	NA		NA	NA	No	NUT
7782-49-2	Selenium	3.9		3.9		ug/L	04GP1001	1/23	3.71 - 4.2	3.9	NA	18	N	50	MDEQ	No	BSL
7440-23-5	Sodium	5770	J	73400	J	ug/L	04GW1201	23/23	---	73400	NA	NA		NA	NA	No	NUT
7440-62-2	Vanadium	4.2		18.1		ug/L	04GP0701	6/23	4.14	18.1	NA	3.6	N	256	MDEQ	Yes	ASL
7440-66-6	Zinc	1.6		43.9		ug/L	04GP0201	8/23	1.44 - 6.3	43.9	NA	1100	N	11000	MDEQ	No	BSL
Miscellanous Parameters (ug/L)																	
16887-00-6	Chloride	5400		41000		ug/L	04GW1201	22/22	---	41000	NA	NA		NA	MDEQ	No	NTX
57-12-5	Cyanide	4.4	J	53	J	ug/L	04GP0801-D	5/23	10	53	NA	73	N	200	MDEQ	No	BSL
74-84-0	Ethane	0.0019	J	8.6		ug/L	04GW10R01	13/13	---	8.6	NA	NA		NA	NA	No	NTX
74-85-1	Ethene	0.0046	J	20		ug/L	04GW1601	12/13	0.005	20	NA	NA		NA	NA	No	NTX
1333-74-0	Hydrogen	0.9		23		ug/L	04GW1601	12/13	---	23	NA	NA		NA	NA	No	NTX
74-82-8	Methane	4.7	J	8500		ug/L	04GW1901	13/13	---	8500	NA	NA		NA	NA	No	NTX
TTNUS495	Nitrate-N	5.4	J	20	J	ug/L	04GP0701	5/22	50	20	NA	10000		10000	MDEQ	No	BSL
TTNUS496	Nitrite-N	5.5	J	94		ug/L	04GP0301	5/22	50	94	NA	1000		1000	MDEQ	No	BSL
14808-79-8	Sulfate	1100		380000		ug/L	04GP0901	17/22	1000 - 2000	380000	NA	NA		NA	NA	No	NTX

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for phenanthrene.
8 Hexavalent Chromium.
9 Action Level at the tap (Winter 2004).

Associated Samples:

04GP0101	04GP0601	04GP1201	04GP1901	04GW0901	04GW1401
04GP0201	04GP0701	04GP1301	04GP2001	04GW10R01	04GW1501
04GP0301	04GP0801	04GP1401	04GP2101	04GW1101	04GW1601
04GP0301_STL	04GP0801-D	04GP1501	04GP2201	04GW11R01	04GW1701
04GP0401	04GP0901	04GP1601	04GP2301	04GW1201	04GW1801
04GP0401_STL	04GP1001	04GP1701	04GP2401	04GW1201-D	04GW1901
04GP0501	04GP1101	04GP1801	04GP2501	04GW1301	04GW2001

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Porcedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient
NTX = No toxicity information available

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (ug/L)																	
67-64-1	Acetone	11	J	11	J	ug/L	04SW0301	1/3	5 - 10	11	NA	550	N	608	MDEQ	No	BSL
127-18-4	Tetrachloroethene	3	J	3	J	ug/L	04SW0301	1/3	5	3	NA	0.1	C	5	MDEQ	Yes	ASL
108-88-3	Toluene	2	J	2	J	ug/L	04SW0301	1/3	5	2	NA	72	N	1000	MDEQ	No	BSL
Dioxins/Furans (pg/L)																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	1200		1200		pg/L	04SW0301	1/3	16 - 19	1200	NA	4500	C	446	MDEQ	No	BSL
39001-02-0	1,2,3,4,6,7,8,9-OCDF	51	J	51	J	pg/L	04SW0301	1/3	1.9 - 4.5	51	NA	4500	C	446	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	120		120		pg/L	04SW0301	1/3	2.8 - 4	120	NA	45	C	44.6	MDEQ	Yes	ASL
37871-00-4	Total HpCDD	260		260		pg/L	04SW0301	1/3	3.4 - 4	260	NA	NA		NA	NA	NA	NA
38998-75-3	Total HpCDF	37		37		pg/L	04SW0301	1/3	1.7 - 3.5	37	NA	NA		NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	4.9		4.9		pg/L	04SW0301	1/3		4.9	NA	0.45	C	0.446	MDEQ	Yes	ASL
Inorganics (ug/L)																	
7440-38-2	Arsenic	3.6		6.8		ug/L	04SW0101	3/3	0	6.8	NA	0.045	C	10	USEPA	Yes	ASL
7440-39-3	Barium	31.1		51.7		ug/L	04SW0101	3/3	0	51.7	NA	260	N	2000	MDEQ	No	BSL
7440-70-2	Calcium	15500		22000		ug/L	04SW0101-D	3/3	0	22000	NA	NA		NA	MDEQ	No	NUT
7440-47-3	Chromium	1.2		1.2		ug/L	04SW0101	1/3	0.8	1.2	NA	11	N	100	MDEQ	No	BSL
7439-89-6	Iron	2800		5180		ug/L	04SW0101	3/3	0	5180	NA	1100	N	11000	MDEQ	Yes	ASL
7439-92-1	Lead	3.2	J	3.2	J	ug/L	04SW0301	1/3	1.7	3.2	NA	15	(8)	15	MDEQ	No	BSL
7439-95-4	Magnesium	1820		2870		ug/L	04SW0101, 04SW0101-D	3/3	0	2870	NA	NA		NA	MDEQ	No	NUT
7439-96-5	Manganese	75.9		205		ug/L	04SW0101-D	3/3	0	205	NA	88	N	730	MDEQ	Yes	ASL
7440-09-7	Potassium	1440		1800		ug/L	04SW0201	3/3	1180	1800	NA	NA		NA	MDEQ	No	NUT
7440-23-5	Sodium	7010	J	10700	J	ug/L	04SW0101	3/3	0	10700	NA	NA		NA	MDEQ	No	NUT
7440-66-6	Zinc	9.1		9.1		ug/L	04SW0301	1/3	1.7 - 3.8	9.1	NA	1100	N	11000	MDEQ	No	BSL
Miscellanous Parameters (ug/L)																	
57-12-5	Cyanide	3.9	J	6.4	J	ug/L	04SW0101-D	2/3	10	6.4	NA	73	N	200	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Hexavalent Chromium.
8 Action Level at the tap (Winter 2004).

Associated Samples:
04SW0101 04SW0201
04SW0101-D 04SW0301

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Porcedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Volatile Organics (mg/kg)																		
78-93-3	2-Butanone	0.014	J	0.062	J	mg/kg	04SD0401	7/8	0.029 -0.0 57	0.062	NA	2200	N	84.5	84.5	MDEQ	No	BSL
67-64-1	Acetone	0.038	J	0.34	J	mg/kg	04SD0401	8/8	---	0.34	NA	1400	N	7820	104000	MDEQ	No	BSL
75-15-0	Carbon Disulfide	0.0009	J	0.008	J	mg/kg	04SD0701	7/8	0.006 -0.011	0.008	NA	36	N	7.97	7.97	MDEQ	No	BSL
75-00-3	Chloroethane	0.002	J	0.002	J	mg/kg	04SD0201	1/8	0.006 -0.011	0.002	NA	3	C	220	1970	MDEQ	No	BSL
110-82-7	Cyclohexane	0.0007	J	0.0008	J	mg/kg	04SD0701	2/8	0.006 -0.011	0.0008	NA	140	sat	NA	NA	MDEQ	No	BSL
108-87-2	Methyl Cyclohexane	0.008		0.008		mg/kg	04SD0201	1/8	0.006 -0.011	0.008	NA	260	N	NA	NA	MDEQ	No	BSL
1634-04-4	Methyl Tert-butyl Ether	0.018	J	0.018	J	mg/kg	04SD0701	1/8	0.006 -0.011	0.018	NA	32	C	782	1210	MDEQ	No	BSL
108-88-3	cis-1,2-Dichloroethene	0.018	J	0.018	J	mg/kg	04SD0701	1/8	0.011 - 0.023	0.018	NA	4.3	N	NA	NA	MDEQ	No	BSL
TTNUS054	Total-1,2-Dichloroethene	0.002	J	0.002	J	mg/kg	04SD0201	1/8	0.011 - 0.023	0.002	NA	4.3	N	3910	8740	MDEQ	No	BSL
108-88-3	Toluene	0.002	J	0.002	J	mg/kg	04SD0801	1/8	0.006 -0.011	0.002	NA	520	sat	38	38	MDEQ	No	BSL
100-42-5	Trichloroethene	0.001	J	0.001	J	mg/kg	04SD0701	1/8	0.006 -0.011	0.001	NA	0.053	C	5.17	7.92	MDEQ	No	BSL
75-69-4	Trichlorofluoromethane	0.001		0.006		mg/kg	04SD0701	7/8	0.006 -0.011	0.006	NA	39	N	23500	143000	MDEQ	No	BSL
75-01-4	Vinyl Chloride	0.044		0.044		mg/kg	04SD0701	1/8	0.006 -0.011	0.044	NA	0.079	C	0.426	0.939	MDEQ	No	BSL
Semivolatile Organics (mg/kg)																		
83-32-9	Acenaphthene	0.15	J	0.15	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.15	NA	370	N	4690	123000	MDEQ	No	BSL
120-12-7	Anthracene	0.28	J	0.28	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.28	NA	2200	N	23500	613000	MDEQ	No	BSL
100-52-7	Benzaldehyde	0.43	J	0.43	J	mg/kg	04SD0401	1/8	0.440 - 0.580	0.43	NA	610	N	7820	204000	MDEQ	No	BSL
56-55-3	Benzo(a)anthracene	0.043	J	1.6		mg/kg	04SD0501	4/8	0.440 - 0.580	1.6	NA	0.62	C	0.875	7.84	MDEQ	Yes	ASL
50-32-8	Benzo)a)pyrene	0.063	J	1.8		mg/kg	04SD0501	4/8	0.440 - 0.580	1.8	NA	0.062	C	0.0875	0.784	MDEQ	Yes	ASL
205-99-2	Benzo(b)fluoranthene	2.5		2.5		mg/kg	04SD0501	1/8	0.440 - 0.580	2.5	NA	0.62	C	0.875	7.84	MDEQ	Yes	ASL
191-24-2	Benzo(g,h,i)perylene	0.07	J	1		mg/kg	04SD0501	2/8	0.440 - 0.580	1	NA	230	N(7)	2350	61300	MDEQ	No	BSL
207-08-9	Benzo(k)fluoranthene	0.082	J	1.5		mg/kg	04SD0501	2/8	0.440 - 0.580	1.5	NA	6.2	C	8.75	78.4	MDEQ	No	BSL
117-81-7	Bis(2-ethylhexyl)phthalate	0.61		0.61		mg/kg	04SD0401	1/8	0.440 - 0.580	0.61	NA	35	C	45.6	409	MDEQ	No	BSL
86-74-8	Carbazole	0.11	J	0.11	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.11	NA	24	C	31.9	286	MDEQ	No	BSL
218-01-9	Chrysene	0.06	J	1.8		mg/kg	04SD0501	5/8	0.440 - 0.580	1.8	NA	62	C	87.5	784	MDEQ	No	BSL
53-70-3	Dibenzo(a,h)anthracene	0.54	J	0.54	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.54	NA	0.062	C	0.0875	0.784	MDEQ	Yes	ASL
	Dibenzofuran	0.092	J	0.092	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.092	NA	15	N	313	8180	MDEQ	No	BSL
206-44-0	Fluoranthene	0.049	J	1.2		mg/kg	04SD0501	7/8	0.440 - 0.580	1.2	NA	230	N	3130	81700	MDEQ	No	BSL
86-73-7	Fluorene	0.2	J	0.2	J	mg/kg	04SD0501	1/8	0.440 - 0.580	0.2	NA	270	N	3130	81700	MDEQ	No	BSL
193-39-5	Indeno(1,2,3-cd)pyrene	0.98		0.98		mg/kg	04SD0501	1/8	0.440 - 0.580	0.98	NA	0.62	C	0.875	7.84	MDEQ	Yes	ASL
85-01-8	Phenanthrene	0.042	J	0.8		mg/kg	04SD0501	4/8	0.440 - 0.580	0.8	NA	230	N(7)	2350	61300	MDEQ	No	BSL
129-00-0	Pyrene	0.059	J	2		mg/kg	04SD0501	7/8	0.440 - 0.580	2	NA	230	N	2350	61300	MDEQ	No	BSL
Pesticides/PCBs (mg/kg)																		
72-54-8	4,4'-DDD	0.0026	J	0.012	J	mg/kg	04SD0501	2/8	0.0044 - 0.0054	0.012	NA	2.4	C	2.66	23.8	MDEQ	No	BSL
72-55-9	4,4'-DDE	0.005	J	0.005	J	mg/kg	04SD0401	1/8	0.0044 - 0.0058	0.005	NA	1.7	C	1.88	16.8	MDEQ	No	BSL
5103-71-9	alpha-Chlordane	0.0051	J	0.0051	J	mg/kg	04SD0801	1/8	0.0022 -0.003	0.0051	NA	1.6	C(8)	NA	NA	MDEQ	No	BSL
12789-03-06	gamma-Chlordane	0.37		0.37		mg/kg	04SD0801	1/8	0.0022 -0.003	0.37	NA	1.6	C(8)	NA	NA	MDEQ	No	BSL
11096-82-5	Aroclor-1260	0.046	J	0.24	J	mg/kg	04SD0501	4/8	0.022 - 0.028	0.24	NA	0.22	C	1	10	MDEQ	Yes	ASL
Dioxins/Furans(ng/kg)																		
3268-87-9	OCDD	500		6000		ng/kg	04SD0801	2/2	---	6000	NA	39000	C	4260	38200	MDEQ	Yes	ASL
39001-02-0	OCDF	18	J	250		ng/kg	04SD0801	2/2	---	250	NA	39000	C	4260	38200	MDEQ	No	BSL
35822-46-9	1,2,3,4,6,7,8-HpCDD	63		670		ng/kg	04SD0801	2/2	---	670	NA	390	C	426	3820	MDEQ	Yes	ASL
67562-39-4	1,2,3,4,6,7,8-HpCDF	7.5	J	98		ng/kg	04SD0801	2/2	---	98	NA	390	C	426	3820	MDEQ	No	BSL
55673-89-7	1,2,3,4,7,8,9-HpCDF	9.2		9.2		ng/kg	04SD0801	1/2	0.95 - 1.2	9.2	NA	390	C	426	3820	MDEQ	No	BSL
39227-28-6	1,2,3,4,7,8-HxCDD	8.7		8.7		ng/kg	04SD0801	1/2	0.59 - 0.63	8.7	NA	39	C	42.6	382	MDEQ	No	BSL
70648-26-9	1,2,3,4,7,8-HxCDF	7.1	J	7.1	J	ng/kg	04SD0801	1/2	0.95 - 1.3	7.1	NA	39	C	42.6	382	MDEQ	No	BSL
57653-85-7	1,2,3,6,7,8-HxCDD	4.1		25		ng/kg	04SD0801	2/2	2.8	25	NA	39	C	103	923	MDEQ	No	BSL
57117-44-9	1,2,3,6,7,8-HxCDF	8.3	J	8.3	J	ng/kg	04SD0801	1/2	1.1 - 1.2	8.3	NA	39	C	42.6	382	MDEQ	No	BSL
19408-74-3	1,2,3,7,8,9-HxCDD	6.5	J	19		ng/kg	04SD0801	2/2	---	19	NA	39	C	103	923	MDEQ	No	BSL
40321-76-4	1,2,3,7,8-PeCDD	6	J	6	J	ng/kg	04SD0801	1/2	0.47 - 0.6	6	NA	3.9	C	8.52	76.3	MDEQ	Yes	ASL
60851-34-5	2,3,4,6,7,8-HxCDF	5.9	J	5.9	J	ng/kg	04SD0801	1/2	0.55 - 0.73	5.9	NA	39	C	42.6	382	MDEQ	No	BSL
1746-01-6	2,3,7,8-TCDD	1.3	J	8		ng/kg	04SD0801	2/2	---	8	NA	3.9	C	4.26	38.2	MDEQ	Yes	ASL
51207-31-9	2,3,7,8-TCDF	1.6		1.6		ng/kg	04SD0801	1/2	0.59 - 0.65	1.6	NA	39	C	42.6	382	MDEQ	No	BSL
37871-00-4	TOTAL HpCDD	120		1400		ng/kg	04SD0801	2/2	---	1400	NA	NA		NA	NA	NA	NA	NA

TABLE 2.5
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SEDIMENT
SITE 4 - GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Canal No. 1

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value (Unrestricted Land Use)	Potential ARAR/TBC Value (Restricted Land Use)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
34465-46-8	TOTAL HxCDD	40		170		ng/kg	04SD0801	2/2	---	170	NA	NA		NA	NA	NA	NA	NA
36088-22-9	TOTAL PeCDD	5.2		6		ng/kg	04SD0801	2/2	3.7	6	NA	NA		NA	NA	NA	NA	NA
41903-57-5	TOTAL TCDD	10		33		ng/kg	04SD0101	2/2	---	33	NA	NA		NA	NA	NA	NA	NA
38998-75-3	TOTAL HpCDF	23		330		ng/kg	04SD0801	2/2	---	330	NA	NA		NA	NA	NA	NA	NA
55684-94-1	TOTAL HxCDF	10		150		ng/kg	04SD0801	2/2	---	150	NA	NA		NA	NA	NA	NA	NA
30402-15-4	TOTAL PeCDF	22		22		ng/kg	04SD0801	1/2	2.1 - 2.2	22	NA	NA		NA	NA	NA	NA	NA
55722-27-5	TOTAL TCDF	11		100		ng/kg	04SD0101	2/2	---	100	NA	NA		NA	NA	NA	NA	NA
	2,3,7,8-TCDD TEQ	3.9		30.5	0.0305	ng/kg	04SD0801	2/2	---	30.5	NA	3.9	C	4.26	38.2	MDEQ	Yes	ASL
Inorganics (mg/kg)																		
7429-90-5	Aluminum	3190	J	18600	J	mg/kg	04SD0401	8/8	---	18600	NA	7600	N	78200	2040000	MDEQ	Yes	ASL
7440-38-2	Arsenic	0.74		5.7		mg/kg	04SD0601	8/8	---	5.7	NA	0.39	C	0.426	3.82	MDEQ	Yes	ASL
7440-39-3	Barium	9.3	J	54.1	J	mg/kg	04SD0401	8/8	---	54.1	NA	540	N	5480	14300	MDEQ	No	BSL
7440-41-7	Beryllium	0.07		0.21		mg/kg	04SD0401	7/8	0.02 - 0.03	0.21	NA	15	N	156	1020	MDEQ	No	BSL
7440-70-2	Calcium	228	J	2120	J	mg/kg	04SD0501	8/8	---	2120	NA	NA		NA	NA	MDEQ	No	NUT
7440-47-3	Chromium	3.8	J	18.8	J	mg/kg	04SD0401	8/8	---	18.8	NA	30	C(9)	NA	NA	MDEQ	No	BSL
7440-48-4	Cobalt	0.58		2.4		mg/kg	04SD0401	8/8	0.47	2.4	NA	140	N	4690	12300	MDEQ	No	BSL
7440-50-8	Copper	1.8		12.6		mg/kg	04SD0501	8/8	---	12.6	NA	310	N	3130	8170	MDEQ	No	BSL
7439-89-6	Iron	1640	J	13000	J	mg/kg	04SD0401, 04SD0601	8/8	---	13000	NA	2300	N	23500	613000	MDEQ	Yes	ASL
7439-92-1	Lead	5.1	J	43.4	J	mg/kg	04SD0401	7/8	14.2	43.4	NA	400	(10)	400	1700	MDEQ	No	BSL
7439-95-4	Magnesium	134	J	703	J	mg/kg	04SD0401	8/8	---	703	NA	NA		NA	NA	MDEQ	No	NUT
7439-96-5	Manganese	7.2	J	38	J	mg/kg	04SD0201	8/8	---	38	NA	180	N	1560	4080	MDEQ	No	BSL
7439-97-6	Mercury	0.03		0.09		mg/kg	04SD0401, 04SD0501	8/8	---	0.09	NA	2.3	N	10	61.3	MDEQ	No	BSL
7440-09-7	Potassium	181	J	443	J	mg/kg	04SD0401	4/8	77.5 - 274	443	NA	NA		NA	NA	MDEQ	No	NUT
7782-49-2	Selenium	0.6		0.78		mg/kg	04SD0401	3/8	0.26 - 0.55	0.78	NA	39	N	391	1020	MDEQ	No	BSL
7440-23-5	Sodium	85.4	J	1260	J	mg/kg	04SD0501	2/8	16.9 - 58.7	1260	NA	NA		NA	NA	MDEQ	No	NUT
7440-28-0	Thallium	0.73		0.76		mg/kg	04SD0801	2/8	0.28 - 0.61	0.76	NA	0.52	N	5.48	143	MDEQ	Yes	ASL
7440-62-2	Vanadium	5.6		27.5		mg/kg	04SD0401	8/8	---	27.5	NA	7.8	N	548	1430	MDEQ	Yes	ASL
7440-66-6	Zinc	4.7	J	87.9	J	mg/kg	04SD0501	8/8	---	87.9	NA	2300	N	23500	61300	MDEQ	No	BSL
Miscellaneous Parameters (mg/kg)																		
57-12-5	Cyanide	0.27	J	0.37	J	mg/kg	04SD0501	3/8	0.5 - 0.69	0.37	NA	120	N	1560	4080	MDEQ	No	BSL

Footnotes:
1 Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No background data are available for NCBC, Gulfport.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2004).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 Chlordane is used as a surrogate for alpha- and gamma-chlordane.
9 Hexavalent Chromium.
10 OSWER soil screening level for residential land use (USEPA, July 1994).

Associated Samples:

04SD0101	04SD0201	04SD0401	04SD0601	04SD0801
04SD0101-D	04SD0301	04SD0501	04SD070	

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogen
COPC = Chemical of Potential Concern
J = Estimated Value
MDEQ = Mississippi Department of Environmental Quality, Risk Evaluation Porcedures for Voluntary Cleanup and Redevelopment of Brownfield Sites, February 2002 for Unrestricted and Restricted Land Use.
N = Noncarcinogen
NA = Not Applicable/Not Available.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC Screening Level/ARAR/TBC

For Elimination as a COPC:
BSL = Below COPC Screening Level/ARAR/TBC
NUT = Essential Nutrient

APPENDIX E
FOOD CHAIN MODELING

EVALUATION OF POTENTIAL RISKS TO PISCIVOROUS WILDLIFE

The objective of the food chain modeling was to evaluate potential risks to representative receptors from screening-level COPCs that are known to bioaccumulate or biomagnify. USEPA Region 4 considers chemicals in this category 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. USEPA Region 4 does not consider PAHs to bioaccumulate unless they are present in percent levels in soil or sediment. Screening-level COPCs at Site 4 are shown in Tables 7-2 and 7-3; those that are known to bioaccumulate or biomagnify consist of dioxins, several pesticides, and the metals lead and selenium. The remaining COPCs are not known to bioaccumulate or biomagnify and were not included in the food chain model.

Risk via the food chain was evaluated using two scenarios. The first scenario used maximum detected COPC concentrations in surface water and sediment and conservative assumptions for body weight, food consumption, and sediment ingestion. The second scenario used average COPC concentrations, and less conservative values for body weight, food consumption, and sediment ingestion. 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 piscivorous birds and mammals were calculated using the equation shown below.

$$PD = [[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF]/BW \qquad \text{(Equation 1)}$$

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}	=	concentration in sediment (mg/kg)
I_{sed}	=	sediment ingestion rate (kg/day)
AUF	=	area use factor (portion of home range that overlaps affected area)
BW	=	weight of receptor (kg)

Representative Receptors

The mink (*Mustela vison*) was used to represent mammals that prey upon fish and sediment invertebrates at Site 4. Birds that prey on fish and sediment invertebrates at Site 4 were represented by the green heron (*Butorides virescens*) and the belted kingfisher (*Ceryle alcyon*). The selected species are assumed to be representative of other species within the same trophic group or guild and represent the groups of organisms specified in the assessment endpoints. Information regarding these representative receptors is presented below and in Appendix E Table 1. Values for body weight, food consumption, and water consumption were taken preferentially from the *Wildlife Exposure Factors Handbook* (USEPA, 1993b). Appendix E Table 2 presents the values for body weight, food and water consumption, and incidental sediment ingestion that were used in the food chain model (Equation 1), and was derived from Appendix E Table 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, 1993b). 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, 1993b).

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, 1993b).

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 (1993b). Because female mink are especially sensitive to the COPCs of greatest concern in this risk evaluation mink body weight and food ingestion values are 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 (Appendix E Tables 1 and 2).

APPENDIX E
TABLE 1

DERIVATION OF BODY WEIGHT, FOOD INTAKE, AND WATER INTAKE FACTORS FOR REPRESENTATIVE WILDLIFE RECEPTORS
SITE 4 GOLF COURSE LANDFILL
NCBC GULFPORT, MISSISSIPPI

Species/Factor	Age/Sex/Season[a]	Value	Derivation of Factors Used in Food Chain Modeling and Shown in Table 5-2		
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			
Water Ingestion Rate (g/g-day)	A F	0.11	Average female	0.069 g/g/day	
	A M	0.099	Conservative scenario:	0.1356 L/day	Maximum ingestion rate (0.11 g/g/day) × maximum body weight (1.233 kg)
	A F	0.028	Less conservative scenario:	0.03919 L/day	Average female ingestion rate (0.069 g/g/day) × average female body weight (0.568 kg)
Belted Kingfisher[b]					
Body Weight (g)	A B	150	Minimum Value	0.136 kg	
	A B	136	Maximum Value	0.170 kg	
	A B	158	Overall Study Average	0.152 kg	
	A B	147			
	AB	148			
	AB	170			
Food Ingestion Rate (g/g-day)	A B	0.5	Conservative scenario:	0.0213 kg/day	Ingestion rate (0.5 g/g/day) × maximum body weight (0.170 kg) × 0.25[c]
			Less conservative scenario:	0.019 kg/day	Ingestion rate (0.5 g/g/day) × average body weight (0.152 kg) × 0.25[c]
Water Ingestion Rate (g/g-day)	A B	0.11	Conservative scenario:	0.019 L/day	Ingestion rate (0.11 g/g/day) × maximum body weight (0.170 kg)
			Less conservative scenario:	0.017 L/day	Ingestion rate (0.11 g/g/day) × average body weight (0.152 kg)
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
Water Ingestion Rate (L/day)			Conservative scenario:	0.022 L/day	Using equation 3-15 from USEPA (1993) for 0.224 kg bird
			Less conservative scenario:	0.021 L/day	Using equation 3-15 from USEPA (1993) for 0.212 kg bird

Notes:
a A=adult, M=male, F=female, B=both
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.

APPENDIX E
TABLE 2

FOOD CHAIN EXPOSURE PARAMETERS FOR PISCIVOROUS WILDLIFE
SITE 4 GOLF COURSE LANDFILL
NCBC GULFPORT, MISSISSIPPI

Species/Exposure Inputs	Conservative Scenario		Average Scenario	
	Values	Units	Values	Units
Mink				
Body Weight	0.550	kg	0.568	kg
Food Ingestion Rate(1)	0.0678	kg/day	0.0227	kg/day
Water Ingestion Rate	0.1356	L/day	0.0392	L/day
Sediment Ingestion Rate(2)	0.0064	kg/day	0.0021	kg/day
Belted kingfisher				
Body Weight	0.136	kg	0.152	kg
Food Ingestion Rate(1)	0.021	kg/day	0.019	kg/day
Water Ingestion Rate	0.019	L/day	0.017	L/day
Sediment Ingestion Rate(2)	0.0011	kg/day	0.0010	kg/day
Green Heron				
Body Weight	0.200	kg	0.212	kg
Food Ingestion Rate(1)	0.031	kg/day	0.030	kg/day
Water Ingestion Rate	0.022	L/day	0.021	L/day
Sediment Ingestion Rate(2)	0.0016	kg/day	0.0015	kg/day

(1) Food ingestion rates are dry-weight values. The derivation of values in this table is presented in Appendix text

(2) 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 belted kingfisher and green heron) see Appendix text

Food ingestion rates for mink ranged from 0.12 to 0.22 g/g body weight/day (USEPA, 1993b). The food ingestion in the conservative scenario (0.0678 kg/day; Appendix E Table 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; Appendix E Table 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; Appendix E Table 2), then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value.

Water ingestion rates for mink ranged from 0.028 to 0.11 g/g body weight/day (USEPA, 1993b). Water ingestion in the conservative scenario (0.1356 L/day; Appendix E Table 2) was derived by multiplying the maximum water ingestion rate (0.11 g/g body weight/day) by the maximum body weight (1.233 kg). Water ingestion rate in the less conservative scenario (0.0392 L/day; Appendix E Table 2) was derived by multiplying the average female water ingestion rate (0.069 g/g body weight/day) by the average female body weight (0.568 kg).

The two incidental sediment ingestion rates in Appendix E Table 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.

Belted Kingfisher

The belted kingfisher is common in Mississippi and its range includes most of North America. Kingfishers are typically found along rivers, streams, seacoasts, estuaries, and along the edges of lakes and ponds. They prefer water that is free of overhanging trees that obscure the view of the water. Fish are the preferred prey, commonly comprising about 90 to 95 percent of the diet, and are usually less than 18 cm in length. Because belted kingfishers typically prey on fish that swim near the surface or in shallow water, they require relatively clear water that is free of thick vegetation to see and catch their prey. Belted kingfishers will also consume crustaceans and other aquatic organisms when fish are sparse. Belted kingfishers nest in burrows excavated on steep earthen banks devoid of vegetation beside rivers, streams, ponds, and lakes. They sometimes nest in slopes created by human excavations such as in roadcuts and landfills. Sandy soil banks, which are easy to excavate and provide good drainage, are preferred (USEPA, 1993b).

Kingfisher body weight data were not available by sex, but adult body weights (both sexes) ranged from 136 to 170 g in six studies (Volume II of USEPA, 1993b); the average of those values is 152 g. The BW term in Equation 1 was 0.136 kg in the conservative scenario and 0.152 kg in the average scenario (Appendix E Table 2).

One food ingestion rate for adult belted kingfishers was available: 0.5 g/g body weight/day (USEPA, 1993b). Food ingestion in the conservative scenario (0.021 kg/day; Appendix E Table 2) was derived by multiplying the food ingestion rate by the maximum body weight (0.170 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). The food ingestion rate in the average scenario (0.019 kg/day; Appendix E Table 2) was derived by multiplying the food ingestion rate (0.5 g/g body weight/day) by the average body weight (0.152 kg), then multiplying by 0.25 to convert the ingestion rate from a wet-weight value to a dry-weight value.

One water ingestion rate for adult belted kingfishers was available: 0.11 g/g body weight/day (USEPA, 1993b). Water ingestion in the conservative scenario (0.019 kg/day = 0.019 L//day; Appendix E Table 2) was derived by multiplying the water ingestion rate (0.11 g/g body weight/day) by the maximum body weight (0.170 kg). Water ingestion in the average scenario (0.017 L/day; Appendix E Table 2) was derived by multiplying the water ingestion rate (0.11 g/g body weight/day) by the average body weight (0.152 kg).

Sediment ingestion data for fish-eating birds were not available in the literature. However, a 5 percent sediment ingestion rate for piscivorous birds represented by the belted kingfisher was assumed. Belted kingfishers capture prey primarily from the water column rather than by probing on or near the sediment substrate, so they would be expected to ingest only small amounts of sediment. Therefore, an assumed value of 5 percent for incidental sediment ingestion is probably a conservative estimate. The two sediment ingestion rates in Appendix E Table 2 (0.0011 kg/day and 0.0010 kg/day) were calculated by multiplying the two food ingestion rates (0.021 kg/day and 0.019 kg/day) by incidentally ingested sediment (5 percent of diet).

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 Mississippi are non-migratory. The green heron is typically a solitary bird, but it nests in colonies with other green herons or with other species (Davis and Kushlan, 1994).

Data for the green heron were not included in USEPA's *Wildlife Exposure Factors Handbook* (USEPA, 1993b), so data were obtained elsewhere. 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 (Appendix E Table 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; Appendix E Table 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 2 standard deviations from Dunning's (1993) green heron data (see paragraph immediately above); 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; Appendix E Table 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.

Water ingestion rates for the green heron were not available. Water ingestion in the conservative scenario (0.022 L//day; Appendix E Table 2) was derived using equation 3-15 from the *Wildlife Exposure Factors Handbook* (USEPA, 1993b) for a 0.224 kg bird. Water ingestion in the average scenario (0.021 L/day; Appendix E Table 2) was derived using equation 3-15 from the *Wildlife Exposure Factors Handbook* (USEPA, 1993b) for a 0.212 kg bird.

As mentioned earlier, sediment ingestion data for fish-eating birds were not available in the literature. However, a 5 percent sediment ingestion rate for piscivorous birds represented by the green heron was assumed. Unlike shorebirds, herons do not probe the sediment. Green herons capture prey with a darting stroke, grasping or spearing with the bill (Davis and Kushlan, 1994). Therefore, an assumed value of 5 percent for incidental sediment ingestion is probably a conservative estimate. The two sediment ingestion rates in Appendix E Table 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 incidentally ingested sediment (5 percent of 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), and are shown in Appendix E Table 3.

Organic Compounds

BSAFs for pesticides were taken from *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition* (USEPA, 2004b).

A BSAF for dioxin was derived using data from the US Army Corps of Engineers Waterways Experiment Station (WES) online database (USACE, 2006). The dioxin BSAF derived from the on-line database was 0.623. The derivation of the BSAF using the WES database is described below.

The WES database (USACE, 2006) contains dioxin BSAF data for a variety of invertebrates. Appendix E Table 4 summarizes the invertebrate BSAF data for 2,3,7,8-TCDD in the WES database. The data in Appendix E Table 4 include all invertebrates in the BSAF database except the blue crab and Dungeness crab, which are not similar to any species at Site 4. Although most of the organisms in Appendix E Table 4 are marine and/or estuarine species and would not be found in Canal No. 1, the organisms are at least similar to those that would be expected there (molluscs, grass shrimp, and worms). Most organisms in Appendix E Table 4 are polychaete worms. Polychaete worms are related to leeches and earthworms and together make up the phylum Annelida. The average of the 20 BSAFs in Appendix E Table 4 is 0.563. Two studies cited in the table (SAIC, 1995 and Shrock et al., 1997) contain multiple entries for a single organism. The average of all values from SAIC (1995) is 1.688, and the average of all values from Shrock et al. (1997) is 0.146. Using these two average values with values from the other nine studies is summarized in Appendix E Table 4 results in an average BSAF of 0.623, which is slightly greater than the 0.563 average value. The greater of these two average values (0.623) was conservatively used to represent the dioxin BSAF.

Chemical concentrations of dioxins and pesticides in food items of the representative receptors at Site 4 (i.e., values for the C_{food} term in Equation 1) were estimated using the following equation from USEPA (2004b):

$$TBP = BSAF(C_s/f_{oc})f_l \qquad \text{(Equation 2)}$$

APPENDIX E
TABLE 3

BIOTA SEDIMENT ACCUMULATION FACTORS (BSAFs)
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	BSAFs		Source
	Conservative[1]	Average[1]	
Pesticides			
4,4'-DDD	0.28	0.28	USEPA (2004)
4,4'-DDT	1.67	1.67	USEPA (2004)
Total DDT	7.7	7.7	USEPA (2004)
Alpha-Chlordane	4.77	4.77	USEPA (2004)
Gamma-Chlordane	2.22	2.22	USEPA (2004)
Aroclor-1260	1.85	1.85	USEPA (2004)
Dioxins			
2,3,7,8-TCDD TEQ	0.623[2]	0.623[2]	USACE (2006)
Inorganics			
Lead	0.607	0.071	ORNL (1998)
Selenium	1.0	1.0	NA[3]

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); average value is median value from ORNL (1988). Only one BSAF was available in USEPA (2004); thus, the same BSAF value was used for the conservative and average scenarios.

2 BSAF derived from data in Appendix Table 4 and explained in Appendix text.

3 BSAF not available; default value of 1.0 was used as BSAF.

APPENDIX E
TABLE 4

INVERTEBRATE BIOTA SEDIMENT ACCUMULATION FACTORS (BSAFs) FOR 2,3,7,8-TCDD
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Organism			Citation	BSAF	Notes
Species	**Common name**	**Category**			
Arabellidae	Polychaete worm	Worms-marine/estuarine	SAIC, 1995	0.271	Average of values from SAIC (1995) = 1.688.
				1.658	
				3.134	
Cerebratulus lacteus	Milky ribbon worm	Worms-marine/estuarine	McFarland *et al*., 1994	0.514	
Dreissena polumorpha and D. bugensis	Zebra & Quagga mussels	Molluscs-freshwater	Marvin *et al*., 2000	0.150	
Lumbrineridae misc	Polychaete worm	Worms-marine/estuarine	McFarland *et al*., 1994	1.212	
Macoma nasuta	Bent-nosed clam	Molluscs-marine/estuarine	Pruell *et al*., 1993	0.900	
Mollusca misc	Not specified	Molluscs-marine/estuarine	McFarland *et al*., 1994	0.304	
Neanthes virens	Sandworm (polychaete worm)	Worms-marine/estuarine	Schrock *et al*., 1997	0.160	Average of values from Schrock *et al*. (1997) = 0.146.
				0.130	
				0.170	
				0.140	
				0.140	
				0.130	
				0.110	
				0.190	
Neanthes virens	Sandworm (polychaete worm)	Worms-marine/estuarine	Pruell *et al*., 1993	0.500	
Nephtys sp.	Polychaete worm	Worms-marine/estuarine	McFarland *et al*., 1994	0.349	
Palaemonetes pugio	Grass shrimp	Crustacea - marine	Pruell *et al*., 1993	0.750	
Polychaete misc	Polychaete worms	Worms-marine/estuarine	McFarland *et al*., 1994	0.344	
			Average of above BSAFs (n=20):	0.563	

Notes:
TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin.

where TBP = theoretical bioaccumulation potential (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 TBP is an estimate of the equilibrium concentration of a contaminant in tissue if the sediment in question is the only source of contamination, and it represents the magnitude of bioaccumulation likely to be associated with non-polar organic contaminants in sediment (USEPA, 2004b). The TBP can be thought of as the expected concentration of a contaminant in tissue (assuming equilibrium conditions), given a specific BSAF, sediment concentration, organic carbon concentration, and organism lipid content.

Sediment TOC data are available from 8 samples (and one duplicate) collected from Canal No. 1 in August 2004. The average TOC in these 8 samples is 1.82 percent; thus, a value of 0.0182 was used as the f_{oc} term in Equation 2. The average TOC was used to calculate the dose for piscivorous birds and mammals because these animals obtain their food over a large area.

The lipid content used in Equation 2 was obtained from the USACE (2005b) database. The average dry weight lipid content in freshwater crustaceans is 10.98 percent. The average dry weight lipid content in freshwater molluscs is 10.50 percent (USACE, 2005b). The greater of these two values (10.98 percent = 0.1098) was used to represent the f_l term in the conservative scenario, and the average of these two values (10.74 percent = 0.1074) was used to represent the f_l term in the average scenario.

Inorganic Compounds

BSAFs for metals were not available from USEPA (2004b), so BSAFs from ORNL (1998) were used to estimate tissue concentrations of metals in food items of piscivorous birds and mammals. A default value of 1.0 was used for the BSAF if chemical-specific data were not available. 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 maximum and average 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, 1993b). The home range of each representative receptor was assumed to be equal in size to the length of Canal No. 1 at Site 4 in both the conservative and less conservative initial estimates of ingested doses (i.e., AUF = 1.0). Due to the size of and habitat conditions at Site 4, this assumption is overly conservative for receptors that forage on minnows and sediment invertebrates at the site, and AUFs were evaluated in subsequent iterations of dose calculations for some COPCs. Home ranges for the mink, belted kingfisher, 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, 1993b; MDC, 2004). 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 (Nebraska Game and Parks Commission, undated). In Idaho, males used 0.6 to 1.25 miles of shoreline (Sullivan, 1996). In eastern Oregon, territories in riparian habitats were 1.6 km (1 mile) long, which was suggested as a minimum length of habitat necessary to support a pair of mink (Ahlborn, 2003). 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 terms of 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, 1993b). 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, 1993b). Based on USEPA's (1993b) 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. The estimated length of Canal No. 1 at Site 4 is approximately 1,120 feet, so an area use factor (AUF) for the mink at Site 4 can be calculated as 1,120 feet ÷ 6,600 feet, or approximately 0.17.

Belted Kingfisher

Mean lengths of belted kingfisher breeding territories varied from 0.39 to 4.8 km (0.24 to 2.98 miles) of shoreline in studies summarized in Volume II of the *Wildlife Exposure Factors Handbook* (USEPA, 1993b). Taking the same approach as done for the mink, the midpoint of this range of values is 1.61 miles of shoreline, or 8500 feet. The estimated length of Canal No. 1 at Site 4 is approximately 1,120 feet, so a reasonable AUF for the belted kingfisher would be 1,120 feet ÷ 8500 feet, or approximately 0.13.

Green Heron

The green heron was not included in the *Wildlife Exposure Factors Handbook* (USEPA, 1993b), 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:

$$\text{home range } (km^2) = 8.3\ W^{1.37} \quad \text{where } W = \text{body mass (kg)}$$

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).

Wading birds such as the green heron would not forage throughout the entire 13-acre former landfill area; instead they typically forage only in areas of standing water. Even under high water conditions, surface water in Canal No. 1 would cover much less than 69 acres. To be conservative, however, it was assumed that a green heron would forage throughout Site 4. Based on the above acreages, an AUF for the green heron would be 13 acres ÷ 245 acres, or approximately 0.05.

<u>Ecological Effects Evaluation</u>

Effects to 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 used herein (mink, green heron, and belted kingfisher) were not available, toxicity data from laboratory species were extrapolated to the representative receptor species. TRVs were obtained from an Oak Ridge National Laboratory report (Sample, et al.,

1996) that compiled toxicity data from several sources. No-observed-adverse-effects levels (NOAELs) and lowest-observed-adverse-effects levels (LOAELs) were used to provide a range of risks. TRVs used in this ecological risk assessment and their sources are presented in Appendix E Table 5.

To evaluate risk via the food chain, estimated doses were compared to TRVs (NOAELs and LOAELs). 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.

Appendix E Tables 6 – 11 contain the computational spreadsheets used for the food chain analyses.

APPENDIX E
TABLE 5

TOXICITY REFERENCE VALUES (TRVs)
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Concentration (mg/kg/day)	Endpoint	Effect	Study Duration	Species	Primary Reference	Source of Reference
Pesticides							
Chlordane[1]	2.14	NOAEL	mortality	84 days	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane[1]	10.7	LOAEL	mortality	84 days	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane[1]	4.58	NOAEL	reproduction	6 generations (>1 year)	mouse	WHO, 1984	Sample et.al., 1996
Chlordane[1]	9.16	LOAEL	reproduction	6 generations (>1 year)	mouse	WHO, 1984	Sample et.al., 1996
4,4'-DDT[2]	0.8	NOAEL	reproductive	2 years	rat	Fitzhugh, 1948	Sample et.al., 1996
4,4'-DDT[2]	4	LOAEL	reproductive	2 years	rat	Fitzhugh, 1948	Sample et.al., 1996
4,4'-DDT[2]	0.028	LOAEL	reproduction	5 years	brown pelican	Anderson et al., 1975	Sample et.al., 1996
Aroclor-1260[3]	0.18	NOAEL	reproduction	17 weeks	ring-necked Pheasant	Dahlgren et al.,1972	Sample et.al., 1996
Aroclor-1260[3]	1.8	LOAEL	reproduction	17 weeks	ring-necked Pheasant	Dahlgren et al.,1972	Sample et.al., 1996
Aroclor-1260[3]	0.14	NOAEL	reproduction	4.5 months	mink	Aulerich and Ringer (1977)	Sample et.al., 1996
Aroclor-1260[3]	0.69	LOAEL	reproduction	4.5 months	mink	Aulerich and Ringer (1977)	Sample et.al., 1996
Dioxins/Furans							Sample et.al., 1996
2,3,7,8-TCDD	0.000001	NOAEL	reproduction	>1 year	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD	0.00001	LOAEL	reproduction	>1 year	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD	0.000014	NOAEL	reproduction	10 weeks	pheasant	Nosek et al., 1992	Sample et.al., 1996
2,3,7,8-TCDD	0.00014	LOAEL	reproduction	10 weeks	pheasant	Nosek et al., 1992	Sample et.al., 1996
Inorganics							
Lead	8	NOAEL	reproduction	>1 year	rat	Azar et al., 1973	Sample et.al., 1996
Lead	80	LOAEL	reproduction	>1 year	rat	Azar et al., 1973	Sample et.al., 1996
Lead	1.13	NOAEL	reproduction	12 weeks	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Lead	11.3	LOAEL	reproduction	12 weeks	Japanese quail	Edens et al., 1976	Sample et.al., 1996
Selenium	0.4	NOAEL	reproduction	100 days	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.8	LOAEL	reproduction	100 days	mallard duck	Heinz et al., 1989	Sample et.al., 1996
Selenium	0.2	NOAEL	reproduction	1 year	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Selenium	0.33	LOAEL	reproduction	1 year	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996

1 Chlordane TRVs used for alpha- and gamma-chlordane.
2 4,4'-DDT TRVs also used for 4,4'-DDD.
3 Aroclor-1254 TRVs used for Aroclor -1260
Note: A NOAEL was not available for 4,4'-DDT, Aroclor 1260 (bird), so the NOAEL was estimated by dividing the LOAEL by 10.

APPENDIX E
TABLE 6
FOOD CHAIN HAZARD QUOTIENTS FOR MAMMALS REPRESENTED BY THE MINK
CONSERVATIVE SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.012	0.0	0.28	0.02	0.003	0.8	4	0.003	0.0007
4,4'-DDT	0.005	0.0	1.67	0.05	0.01	0.8	4	0.01	0.00
Alpha-Chlordane	0.0051	0.0	4.77	0.15	0.02	4.58	9.16	0.00	0.00
Gamma-Chlordane	0.37	0.0	2.22	4.96	0.62	4.58	9.16	0.13	0.07
Aroclor-1260	0.24	0.0	1.85	2.68	0.333	0.14	0.69	**2.38**	0.483
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.0000305	4.9E-09	0.623	0.000115	0.00001	0.000001	0.00001	**14.49**	**1.45**
INORGANICS									
Lead	43.4	0.0032	0.607	26.34	3.75	8	80	0.47	0.05
Selenium	0.78	0.0	1.0	0.78	0.11	0.2	0.33	0.53	0.32

Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$
C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC
C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$
C_{water} = contaminant concentration in water
C_{sed} = contaminant concentration in sediment

BW = body weight	0.55	kg
I_f = food food ingestion rate	0.0678	kg/day
I_{water} = water ingestion rate	0.1356	L/day
I_{sed} = sediment ingestion rate	0.0063732	kg/day

BSAF = biota-sediment accumulation factor
HQ = Hazard Quotient = Dose $\div$ NOAEL or Dose $\div$ LOAEL
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
TOC = average total organic cart 1.82 % = 0.0182
Lipid content 10.98 % = 0.1098
AUF = area use factor (assume 1.0 for maximum exposure)
Bolded values indicate HQ is greater than 1.0.

APPENDIX
TABLE 7
FOOD CHAIN HAZARD QUOTIENTS FOR MAMMALS REPRESENTED BY THE MINK
STEP 3A SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.004	0.0	0.280	0.005	0.0002	0.8	4	0.0003	0.00006
4,4'-DDT	0.003	0.0	1.670	0.02	0.001	0.8	4	0.00	0.000
Alpha-Chlordane	0.002	0.0	4.770	0.05	0.002	4.58	9.16	0.00	0.000
Gamma-Chlordane	0.047	0.0	2.2	0.51	0.0205	4.58	9.16	0.004	0.0022
Aroclor-1260	0.079	0.0	1.9	0.71	0.0288	0.14	0.69	0.206	0.0417
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.00001719	0.0	0.623	0.0001	0.00000	0.000001	0.00001	**2.15**	0.22
INORGANICS									
Lead	19.44	0.0016	0.071	1.38	0.127	8	80	0.02	0.002
Selenium	0.39	0.0	1.0	0.39	0.017	0.2	0.33	0.09	0.05

Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$

C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC

C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$

C_{water} = contaminant concentration in water

C_{sed} = contaminant concentration in sediment

BW = body weight	0.568	kg
I_f = food food ingestion rate	0.0227	kg/day
I_{water} = water ingestion rate	0.0392	L/day
I_{sed} = sediment ingestion rate	0.0021	kg/day

BSAF = biota-sediment accumulation factor

HQ = Hazard Quotient = Dose $\div$ NOAEL or Dose $\div$ LOAEL

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

TOC = total organic carbon 2.2 % = 0.022

Lipid content 10.74 % = 0.1074

AUF = area use factor (assume 1.0 for maximum exposure)

Bolded values indicate HQ is greater than 1.0.

APPENDIX E
TABLE 8
FOOD CHAIN HAZARD QUOTIENTS FOR BIRDS REPRESENTED BY THE BELTED KINGFISHER
CONSERVATIVE SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.012	0.0	0.28	0.02	0.003	0.0028	0.028	**1.15**	0.12
4,4'-DDT	0.005	0.0	1.67	0.05	0.01	0.0028	0.028	**2.79**	0.28
Alpha-Chlordane	0.0051	0.0	4.77	0.15	0.02	2.14	10.7	0.01	0.002
Gamma-Chlordane	0.37	0.0	2.22	4.96	0.77	2.14	10.7	0.36	0.07
Aroclor-1260	0.24	0.0	1.85	2.68	0.415	0.18	1.8	**2.31**	0.231
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.0000305	4.9E-09	0.623	0.00011	0.00002	0.000014	0.00014	**1.28**	0.13
INORGANICS									
Lead	43.4	0.0032	0.607	26.34	4.40	1.13	11.3	**3.90**	0.39
Selenium	0.78	0.0	1.0	0.78	0.13	0.4	0.8	0.32	0.16

NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.

Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$

C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC

C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$

C_{water} = contaminant concentration in water

C_{sed} = contaminant concentration in sediment

BW = body weight	0.136	kg
I_f = food food ingestion rate	0.021	kg/day
I_{water} = water ingestion rate	0.019	L/day
I_{sed} = sediment ingestion rate	0.0011	kg/day

BSAF = biota-sediment accumulation factor

HQ = Hazard Quotient = Dose $\div$ NOAEL or Dose $\div$ LOAEL

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

TOC = average total organic carb 1.82 % = 0.0182

Lipid content 10.98 % = 0.1098

AUF = area use factor (assume 1.0 for maximum exposure)

APPENDIX
TABLE 9
FOOD CHAIN HAZARD QUOTIENTS FOR BIRDS REPRESENTED BY THE BELTED KINGFISHER
STEP 3A SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.004	0.0	0.28	0.005	0.001	0.0028	0.028	0.25	0.03
4,4'-DDT	0.003	0.0	1.67	0.024	0.00	0.0028	0.028	**1.10**	0.11
Alpha-Chlordane	0.002	0.0	4.77	0.047	0.01	2.14	10.7	0.00	0.00
Gamma-Chlordane	0.047	0.0	2.22	0.509	0.06	2.14	10.7	0.03	0.006
Aroclor-1260	0.079	0.0	1.85	0.713	0.090	0.18	1.8	0.498	0.0498
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.00001719	0.0	0.623	0.000052	0.00001	0.000014	0.00014	0.47	0.05
INORGANICS									
Lead	19.44	0.0016	0.071	1.38	0.29	1.13	11.3	0.26	0.03
Selenium	0.39	0	1.0	0.39	0.05	0.4	0.8	0.13	0.06

NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.

Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$

C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC

C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$

C_{water} = contaminant concentration in water

C_{sed} = contaminant concentration in sediment

BW = body weight	0.152	kg
I_f = food food ingestion rate	0.019	kg/day
I_{water} = water ingestion rate	0.017	L/day
I_{sed} = sediment ingestion rate	0.0010	kg/day

BSAF = biota-sediment accumulation factor

HQ = Hazard Quotient = Dose ÷ NOAEL or Dose ÷ LOAEL

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

TOC = total organic carbon	2.20 % = 0.022
Lipid content	10.74 % = 0.1074

AUF = area use factor (assume 1.0 for maximum exposure)

APPENDIX E
TABLE 10
FOOD CHAIN HAZARD QUOTIENTS FOR BIRDS REPRESENTED BY THE GREEN HERON
CONSERVATIVE SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.012	0.0	0.28	0.02	0.003	0.0028	0.028	**1.16**	0.12
4,4'-DDT	0.005	0.0	1.67	0.05	0.01	0.0028	0.028	**2.80**	0.28
Alpha-Chlordane	0.0051	0.0	4.77	0.15	0.023	2.14	10.7	0.01	0.00
Gamma-Chlordane	0.37	0.0	2.220	4.96	0.77	2.14	10.7	0.36	0.07
Aroclor-1260	0.24	0.0	1.850	2.68	0.417	0.18	1.8	**2.32**	0.232
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.0000305	4.9E-09	0.623	0.00011	0.00002	0.000014	0.00014	**1.29**	0.13
INORGANICS									
Lead	43.4	0.0032	0.607	26.34	4.43	1.13	11.3	**3.92**	0.39
Selenium	0.78	0.0	1.0	0.78	0.13	0.4	0.8	0.32	0.16

NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.
Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$
C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC
C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$
C_{water} = contaminant concentration in water
C_{sed} = contaminant concentration in sediment

BW = body weight	0.2	kg
I_f = food food ingestion rate	0.031	kg/day
I_{water} = water ingestion rate	0.022	L/day
I_{sed} = sediment ingestion rate	0.0016	kg/day

BSAF = biota-sediment accumulation factor
HQ = Hazard Quotient = Dose ÷ NOAEL or Dose ÷ LOAEL
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level
TOC = average total organic carbon 1.82 % = 0.0182
Lipid content 10.98 % = 0.1098
AUF = area use factor (assume 1.0 for maximum exposure)
Bolded values indicate HQ is greater than 1.0.

APPENDIX
TABLE 11
FOOD CHAIN HAZARD QUOTIENTS FOR BIRDS REPRESENTED BY THE GREEN HERON
STEP 3A SCENARIO
SITE 4 GOLF COURSE LANDFILL
NCBC, GULFPORT, MISSISSIPPI

Chemical	Sediment Concentration (mg/kg)	Surface Water Concentration (mg/L)	BSAF	Prey Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ	LOAEL HQ
PESTICIDES/PCBs									
4,4'-DDD	0.004	0.0	0.280	0.005	0.001	0.0028	0.028	0.29	0.03
4,4'-DDT	0.003	0.0	1.670	0.02	0.00	0.0028	0.028	**1.24**	0.12
Alpha-Chlordane	0.002	0.0	4.8	0.05	0.007	2.14	10.7	0.00	0.00
Gamma-Chlordane	0.047	0.0	2.22	0.51	0.07	2.14	10.7	0.03	0.007
Aroclor-1260	0.079	0.0	1.9	0.71	0.102	0.18	1.8	0.564	0.056
DIOXINS/FURANS									
2,3,7,8-TCDD TEQ	0.00001719	0.0	0.623	0.0001	0.00001	0.000014	0.00014	0.54	0.05
INORGANICS									
Lead	19.44	0.0016	0.071	1.38	0.33	1.13	11.3	0.29	0.03
Selenium	0.39	0	1.0	0.39	0.06	0.4	0.8	0.14	0.07

NA = The HQ could not be calculated because the NOAEL and LOAEL were not available.

Dose = $[(C_{food} \times I_f) + (C_{water} \times I_w) + (C_{sed} \times I_{sed})] \times AUF \div BW$

C_{food} = contaminant concentration in food (organics) = $C_{sed} \times BSAF \times$ lipid content $\div$ sediment TOC

C_{food} = contaminant concentration in food (inorganics) = $C_{sed} \times BSAF$

C_{water} = contaminant concentration in water

C_{sed} = contaminant concentration in sediment

BW = body weight	0.212	kg
I_f = food food ingestion rate	0.03	kg/day
I_{water} = water ingestion rate	0.021	L/day
I_{sed} = sediment ingestion rate	0.0015	kg/day

BSAF = biota-sediment accumulation factor

HQ = Hazard Quotient = Dose $\div$ NOAEL or Dose $\div$ LOAEL

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

TOC = total organic carbon 2.20 % = 0.022

Lipid content 10.74 % = 0.1074

AUF = area use factor (assume 1.0 for maximum exposure)

Bolded values indicate HQ is greater than 1.0.

APPENDIX F
ADDITIONAL STUDIES

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TtNUS/TLH-06-067/9666-4.1

June 11, 2007

Project Number 9666

Commander, Southeast
Naval Facilities Engineering Command
ATTN: Art Conrad (Code OPGEVR)
Remedial Project Manager
2155 Eagle Drive
North Charleston, SC 29419-9010

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 9666

Subject: Treatability Study (TS) Memorandum for Site 4
Naval Construction Battalion Center, Gulfport, Mississippi

Dear Mr. Art Conrad:

Tetra Tech NUS (TtNUS), under contract to the U. S. Department of the Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE), has prepared this Treatability Study (TS) Memorandum for Site 4 at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi. This memorandum was prepared under the Comprehensive Long-term Environmental Action Navy (CLEAN) III, Contract No. N62467-94-D-0888.

Introduction

The objective of the TS at Site 4 was to provide information for the selection of a remedial option for chlorinated volatile organic compounds (CVOCs) in groundwater to compliment the overall cap/cover presumptive remedy for Site 4. A bioaugmentation technology using substrate and microbial culture injection was tested in a small area of the site. Analytical data collected prior to and following the technology application were evaluated to determine how successfully the injected materials were in dechlorinating CVOCs present in groundwater at the site. This report describes the field activities, data collection, laboratory analyses, and data evaluation that were

performed for the TS. Initial information on the TS was provided in the Remedial Investigation (RI) and Treatability Study Work Plan Addendum submitted in November 2005. The following investigation activities provided the data for evaluating conditions at Site 4:

1997/1998	Base wide groundwater study and surface water/sediment study identified CVOC plume
August 2004	RI DPT groundwater sampling
September 2004	RI monitoring well sampling
March 2006	Groundwater delineation - DPT Sampling with mobile laboratory
April 2006	Baseline groundwater and soil sampling
September 2006	Verification groundwater sampling and substrate (sodium lactate) application
October 2006	Injection of Bacterial Culture
January 2007	Performance Monitoring

Site Background

The RI conducted at Site 4 in 2004 investigated a plume of CVOC-contaminated groundwater first detected in 1997. Groundwater samples were collected using direct push technology (DPT) from 25 locations for VOC analysis and groundwater samples were collected for full suite analysis from monitoring wells. CVOCs were detected in groundwater samples at concentrations exceeding risk-based screening criteria. The lithology of the site includes discontinuous clay and sandy clay horizons that may influence vertical distribution of contaminants. Analysis of natural biodegradation indicator parameters (e.g. dissolved oxygen, reduction/oxidation potential, etc.) indicated that reducing conditions were present in site groundwater.

These data suggest that the phenomena known as "DCE/VC stall" has occurred in the dissolved VOC plume at Site 4. A site is considered to be in DCE/VC stall if these compounds are accumulating as concentrations of TCE are reduced. DCE/VC stall may occur when insufficient electron donors or microbes are present, and/or adverse environmental conditions prevent complete biological anaerobic reductive dechlorination (ARD) of VOCs to non-toxic components such as ethene, ethane, carbon dioxide, and water. Despite the fact that DCE/VC stall is occurring at the site, the lack of VOCs in some wells and the relatively high ethane concentrations in the wells sampled provide evidence that complete ARD is also occurring.

Field Activities

Field activities conducted for the TS include:

- Installation of three temporary monitoring points (MPs) in treatment cell area, installed to a depth of 18 feet
- Collection of groundwater and soil samples from the MP locations and groundwater samples from selected monitoring wells to establish baseline conditions
- Technology application - Injection of substrate and microbial culture
- Performance Monitoring

Field activities were conducted in accordance with the site specific Health and Safety Plan and the RI Work Plan (TtNUS, 2004). Detailed descriptions of field procedures are located in the RI Work Plan. Locations that were sampled for the TS and parameters analyzed are summarized in Table 1.

To fill data gaps from the initial RI, additional field sampling activities were conducted in March and April 2006. The activities included advancement of 20 soil borings via DPT and collection of 63 groundwater samples at varying depths in those borings. DPT groundwater samples were analyzed in a mobile laboratory. Data from the field analysis of the samples found the highest VOC concentrations were at the 04GP28 DPT location (Figure 1):

- trichloroethene (TCE) - 120 micrograms per liter (µg/L)
- cis-1,2-dichlorethene (cis-1,2-DCE) - 970 µg/L
- trans-1,2-dichloroethene (trans-1,2-DCE) - 800 µg/L
- vinyl chloride (VC) - 1,600 µg/L

Ten permanent monitoring wells were installed for long term monitoring of the CVOC plume. Three of these wells were installed in the 04GP28 area:

- GPT-04-21 screened from 6 to 16 feet
- GPT-04-22 screened from 19 to 24 feet
- GPT-04-23 screened from 40 to 45 feet

Groundwater samples were collected from each of these locations as well as seven existing monitoring wells and analyzed in a fixed-base laboratory. These data were used to delineate the extent of the CVOC plume and identify the location of the highest CVOC concentrations.

Because the groundwater samples collected at 04GP28 had the highest detected CVOC concentrations, the treatment cell for the TS was moved from between monitoring wells GPT-04-13/GPT-04-14 and GPT-04-16/GPT-04-17, as originally planned, to the area between monitoring wells GPT-04-13/GPT-04-14 and GPT-04-21/GPT-04-22/GPT-04-23 (Figure 1).

MP installation

Three temporary MPs were installed for the TS. Two of the MPs, MP-01 and MP-02, were located downgradient of monitoring well GPT-04-21 (installed at the 04GP28 location) in the general direction of monitoring wells GPT-04-13/GPT-04-14 (Figure 1). The third MP, MP-03, was installed to the west of monitoring wells GPT-04-21/GPT-04-22/GPT-04-23 (Figure 1).

Baseline Sampling

Baseline or pre-treatment sampling for the TS was conducted to determine the existing contaminant concentrations and geochemical conditions. Baseline samples were collected from the three temporary MPs installed in the TS cell area and selected permanent monitoring wells. The baseline sampling analyses are summarized in Table 1. Field sampling data forms and validated laboratory data are included in the Appendix.

Baseline Site Conditions

CVOC concentrations were less than expected in the MP samples. Elevated CVOC concentrations in the TS cell area were limited to GPT-04-22 (screened from 19 to 24 feet):

- TCE 110 µg/L
- cis-1,2-DCE 470 µg/L
- trans-1,2-DCE 310 µg/L
- VC 190 µg/L

Elevated CVOC concentrations were reported in GPT-04-14 and GPT-04-16, located downgradient of the TS area (Table 2). These results indicated that the CVOC contamination was occurring in the deeper part of the shallow aquifer. Analytical results for CVOCs are summarized in Table 2.

Conditions in the aquifer at the site range from slightly reducing to strongly reducing. The oxidation reduction potential (ORP) was negative, ranging from -19 to -132 millivolts (mV). The dissolved oxygen (DO) readings were below 1 milligram per liter (mg/L), with one of the readings below 0.5 mg/L. pH readings ranged from 5.75 to 6.85 in the TS area. Field water quality measurements are summarized in Table 3.

Very low quantities of microbes responsible for degradation of DCE and VC were present in the groundwater at MP-01 and MP-03. Dhc concentrations at those wells were 13.4 and 5.48 cells per milliliter, respectively (Table 4). The functional genes believed to be responsible for reduction of DCE and VC, BAV1 VC R-Dase and VC R-Dase, were present at only very low concentrations, less than 1 cell per milliliter. Laboratory reports for the microbial census are included in the Appendix.

Soil samples from the temporary wells indicate that chlorinated VOCs are not present in the soil in the TS area (Table 5).

Pre-Treatment Verification Sampling

Because the CVOC concentrations in the baseline samples from the three MPs were far lower than anticipated (Table 2), the three shallow MPs were resampled and DPT groundwater samples were collected from locations adjacent to the MPs at a depth of 24 feet before the injection of the sodium lactate substrate. The DPT sample locations are identified as MP-01D, MP-02D, and MP-03D. Analytical results from the verification samples indicated that the CVOC plume did not have the horizontal extent in the TS cell area and was at deeper depths than suggested by the DPT data collected for the RI.

Technology Selection

Using data from the RI and baseline and verification sampling, several remedial technologies were evaluated for the TS, including

- chemical oxidation,
- enhanced aerobic biodegradation,
- enhanced ARD via biostimulation (addition of substrate),
- enhanced ARD via biostimulation and bioaugmentation (addition of suitable microbiota),
- cometabolic biodegradation.

Chemical oxidation, enhanced aerobic biodegradation, and cometabolic biodegradation rely on the presence of an oxidizing environment. At Site 4, the present conditions are naturally reducing. Additionally, there is a significant amount of organic carbon present in the soil and groundwater at the site which would deplete the oxidizer or other aerobic amendment as it was added, thus competing with the aerobic degradation of VOCs. Before these technologies could be effective, the natural reducing conditions would have to be overcome, requiring application of significant quantities of oxidizer or other aerobic amendment, potentially over a series of injection events.

Therefore, technologies were evaluated that would exploit the naturally occurring reducing conditions and enhance the natural ARD occurring at the site. Based on the data, it appeared that natural reduction of TCE was occurring, with the reactions in some portions of the site stalling at DCE and VC. This is a common occurrence at sites where either insufficiently reducing conditions, lack of the proper microbial community, and/or some other condition inhibiting biodegradation (e.g., pH outside of the optimal range, elevated sulfate concentrations, etc.) are present.

Data from the site indicate that while reducing conditions sufficient for ARD of DCE and VC are present in some portions of the site, they may not be present in the area where the highest contaminant concentrations have been observed (the TS area). Therefore, biostimulation, through the addition of a carbon source (substrate) to the subsurface, will be implemented. In this case, a fast acting substrate (lactate) has been chosen over a slow release substrate such as vegetable oil; lactate was chosen to quickly achieve strongly reducing conditions in the TS area and to provide timely information on the success of enhanced ARD.

Another cause of DCE/VC stall can be the lack of the proper microbial community in the subsurface. While several bacterial groups are involved in partial reductive dechlorination (e.g., *Dehalobacter, Desulfuromonas, etc*), *Dehalococcoides* (Dhc) is the key consortia involved in complete reductive dechlorination to ethene. However, the Dhc organism is not ubiquitous and, if present, may be at insufficient quantities for complete ARD. Laboratory data from Site 4 showed that Dhc concentrations in the TS area were orders of magnitude below levels believed to sustain ARD. Further, the Dhc functional genes believed to be responsible for ARD of DCE and VC are not present at sufficient levels. Bioaugmentation is the process of supplementing the existing microbial population with a culture of Dhc. In this case, biostimulation was implemented with bioaugmention to create favorable conditions and continue to provide a food source for the

bacteria for complete, efficient, and rapid ARD, while providing more of the microbes responsible for complete ARD.

Treatment Design and Application

Based on the reducing conditions already present at the site, and the low levels of microbes capable of reducing VC and DCE, ARD via biostimulation and bioaugmentation was chosen as the technology most likely to be successful at Site 4. Specifically, this included injection of fast acting organic substrate (lactate) and microorganisms known to degrade less chlorinated VOCs (e.g., Dhc) into the subsurface. Other conditions that may be contributing to the DCE/VC stall the site include low pH and the presence of competing electron acceptors. The optimal pH for ARD is between 6 and 9. The pH observed at GPT-04-22, located in the TS area, was 5.75. Therefore, sodium bicarbonate was added with the substrate to raise the pH to more optimal conditions.

The substrate application was conducted in September 2006. 220 gallons of 60% sodium lactate solution was mixed with tap water to create a lactate solution of approximately 15 percent (by weight). A total of approximately 650 gallons of water was required to properly dilute the lactate. The solution was mixed in approximately 175-gallon batches. Each batch contained 44 gallons of lactate and 130 gallons of water. Because of the low pH in the TS area, approximately six pounds of sodium bicarbonate was added to each batch of the solution, to raise the pH of the aquifer.

The solution was injected into the aquifer at five locations using DPT (Figure 2). Each 175-gallon batch of solution was injected evenly through the DPT rods from a depth of approximately 24 feet to a depth of approximately eight feet.

The microbial culture was applied in October 2006. The selected Dhc culture was KB-1 dechlorinator provided by SiREM Laboratories. The Dhc culture was added to the aquifer after sufficient time to develop reducing conditions to allow the microbes to propagate, based on field readings (primarily DO and ORP) after addition of the lactate in September (Table 3). The injection of the Dhc culture (in locations at or near the locations of the lactate addition) was done in accordance with the manufacturer's instructions. Field data records of the KB-1 application and photographs of the application equipment are included in the Appendix.

Performance Monitoring

To evaluate the efficacy of the technology chosen for the treatability study, a round of performance monitoring sampling was conducted in January 2007, approximately three months following the injection of the Dhc culture. Baseline samples were collected from the three temporary MPs installed in the TS cell area, using DPT at locations adjacent to the MPs, and selected permanent monitoring wells. The baseline sampling analyses are summarized in Table 1. Field sampling data forms and validated laboratory data are included in the Appendix.

Data Evaluation

The success of the technology application in promoting ARD has been evaluated using two lines of evidence:

- Primary Evidence – Evaluate changes in CVOC concentrations and mass balance that may be attributed to ARD and the concentrations of final break-down products of ARD - dissolved gas (ethene and ethane) and chloride.

- Secondary Evidence– Determine if aquifer geochemical conditions support ARD and if a suitable microbiological consortium is present

Data were compared for locations in the treatment cell MP-01/MP-01D and GPT-04-22, downgradient of the injection area, MP-02/MP-02D and side gradient of the treatment cell, MP-03/MP-03D (CVOC concentrations at this location were less than TRGs). CVOC data from the TS sampling events are shown in Figure 2.

Changes in Contaminant Concentration

The concentrations of CVOCs at each of the sample locations decreased following the application of the substrate and Dhc culture, except for the VC concentration at GPT-04-22, which increased (Table 6). The decreased CVOC concentrations may not necessarily indicate destruction of the CVOCs. Comparison of overall changes of the total CVOC concentration to changes in individual CVOC species can indicate if decreasing concentrations have resulted from dechlorination. Analytical results from MP-01D and GPT-04-22, within the treatment cell, clearly show higher concentrations changes for TCE and lower concentration changes for VC, suggesting ARD in these locations. The increasing VC concentration in GPT-04-22 particularly indicates dechlorination of TCE and DCE, producing VC. The data from MP-02D, located downgradient of

the treatment cell, indicate that each of the chlorinated ethenes decreased equally in concentration, suggesting that the reduced concentrations did not result from dechlorination.

Changes in the contaminant mass balance

Comparison of the ratios of molar concentrations of CVOCs is more indicative of contaminant destruction than comparison of concentration by volume, because dechlorination of CVOCs produces lower molecular weight daughter products (Table 7). Analytical data from MP-01, MP-01D, and GPT-04-22 again generally show decreases in TCE and DCE as part of the total CVOC mass and increases in VC, indicating that the more chlorinated ethenes are being reduced to VC or ethene. By comparison, data from MP-02D show that the molar fractions of the CVOCs do not change as the mass per volume concentrations decrease, indicating that the decrease is not due to ARD.

Changes in concentrations of break-down products

Chloride concentrations almost doubled in the sample locations in the treatment cell (MP-01 and GPT-04-22). Chlorine atoms removed from the CVOCs during dechlorination can increase the chloride concentration in the groundwater. Chloride concentrations increased less significantly at MP-02 and MP-03.

Ethene concentrations increased three orders of magnitude in the treatment cell area. Ethene is the resulting byproduct when all of the chlorine atoms are removed from a chlorinated ethene, e.g., DCE or VC. Therefore, an increase in ethene concentrations can indicate that CVOCs are being dechlorinated. Ethene concentrations outside the treatment cell and ethane concentrations in the samples collected showed little change.

Secondary Lines of Evidence

Evaluation of secondary lines of evidence for ARD helps determine the degree to which the technology application was successful in creating conditions in the subsurface suitable for ARD, including indicators of reductive conditions (DO and ORP), microbial concentrations, volatile fatty acids concentrations, and concentrations of bio-indicator parameters. These data are summarized in Table 8.

ORP in each of the sample locations decreased shortly following the substrate application and have remained at these decreased levels, indicating that an adequate amount of substrate was supplied to maintain highly reducing conditions in the treatment cell area.

DO concentrations in each of the wells and monitoring points showed an increase following the substrate injection (Table 3). This DO increase may have resulted from the use of tap water to dilute the sodium lactate solution. These changes in DO concentration do not correlate with observed increases in methane or the very low ORP measurements, which indicate reducing conditions. DO data measured during the performance monitoring sampling event indicated that DO concentrations in locations outside of the treatment cell, MP-02 and MP-03 had returned to very low levels, while the DO concentrations in the treatment cell area, MP-01 and GPT-04-22 were still elevated.

Hydrogen concentrations in the treatment cell area, MP-01 and GPT-04-22 remained at levels conducive to ARD, greater than 2 nanomoles per liter (nM/L) (Table 8). Hydrogen concentrations decreased in wells outside of the treatment cell compared to the baseline and correspond to a higher redox state more suitable to iron (0.2 to 0.8 nM/L) and sulfate reduction (1 to 4 nM/L).

The microbial census data showed an increase in the population of Dhc in the site groundwater, but an overall decrease in total microbes (Table 5). These changes in microbe abundance can be attributed to the dilution of the existing micro biota and the preferential addition of Dhc in the KB-1 Dechlorinator.

Concentrations of volatile fatty acids were observed to increase, up to five or six orders of magnitude in some cases, at the sample locations inside the treatment cell, suggesting increased microbial metabolic activity (Table 8).

Sulfate concentrations inside the treatment cell area decreased, suggesting that sulfate reduction is not competing with ARD in this area (Table 8). Sulfate concentrations increased outside of treatment area.

Sulfide concentrations increased across the TS area (Table 8), suggesting the sufficiently reducing conditions are present to reduce sulfate.

Dissolved iron concentrations decreased at the sampling locations inside and outside of the treatment cell (Table 8), which is the opposite of what is expected under reducing conditions. The decrease in iron concentrations may be tied to coprecipitation of iron with the increased sulfides.

Nitrate and nitrite concentrations have been at or below detection limits in samples collected at Site 4, indicating that nitrate reduction is not a factor in groundwater geochemistry at the site.

Concentrations of orthophosphate in site groundwater have been low and shown little change, indicating little impact on microbial activity at the site (Table 8).

Summary of Treatability Study

Data collected during the TS indicate that enhanced ARD can be an effective remedial approach for this site as demonstrated by the following:

- The substrate injection appears to have rapidly improved aquifer conditions for ARD
- Application of the Dhc culture has established a higher proportion of Dhc in the subsurface micro biota
- Evidence of ARD was observed in two sampling locations, MP-01/MP-01D and GPT-04-22, where mass balance changes in CVOCs suggest dechlorination is occurring.
- Increased chloride and ethene concentrations as break down products in the treatment cell area also support the occurrence of ARD

A pilot scale test should be considered prior to full scale implementation of this technology at Site 4. To optimize application of Dhc culture, more detailed vertical delineation of the contaminant plume is advised. A source of low DO groundwater water or treated tap water should be secured prior to preparation of the lactate solution. DPT injection appears to be a viable method of substrate and Dhc application. The area of influence of each injection location and injection spacing was suitable to treat groundwater in the treatment cell, however there appears to have been little enhancement of ARD downgradient or sidegradient of the treatment cell.

If you have any questions regarding the information presented in this document, please contact me by phone at (850) 385-9899 or via email at Robert.Fisher@ttnus.com.

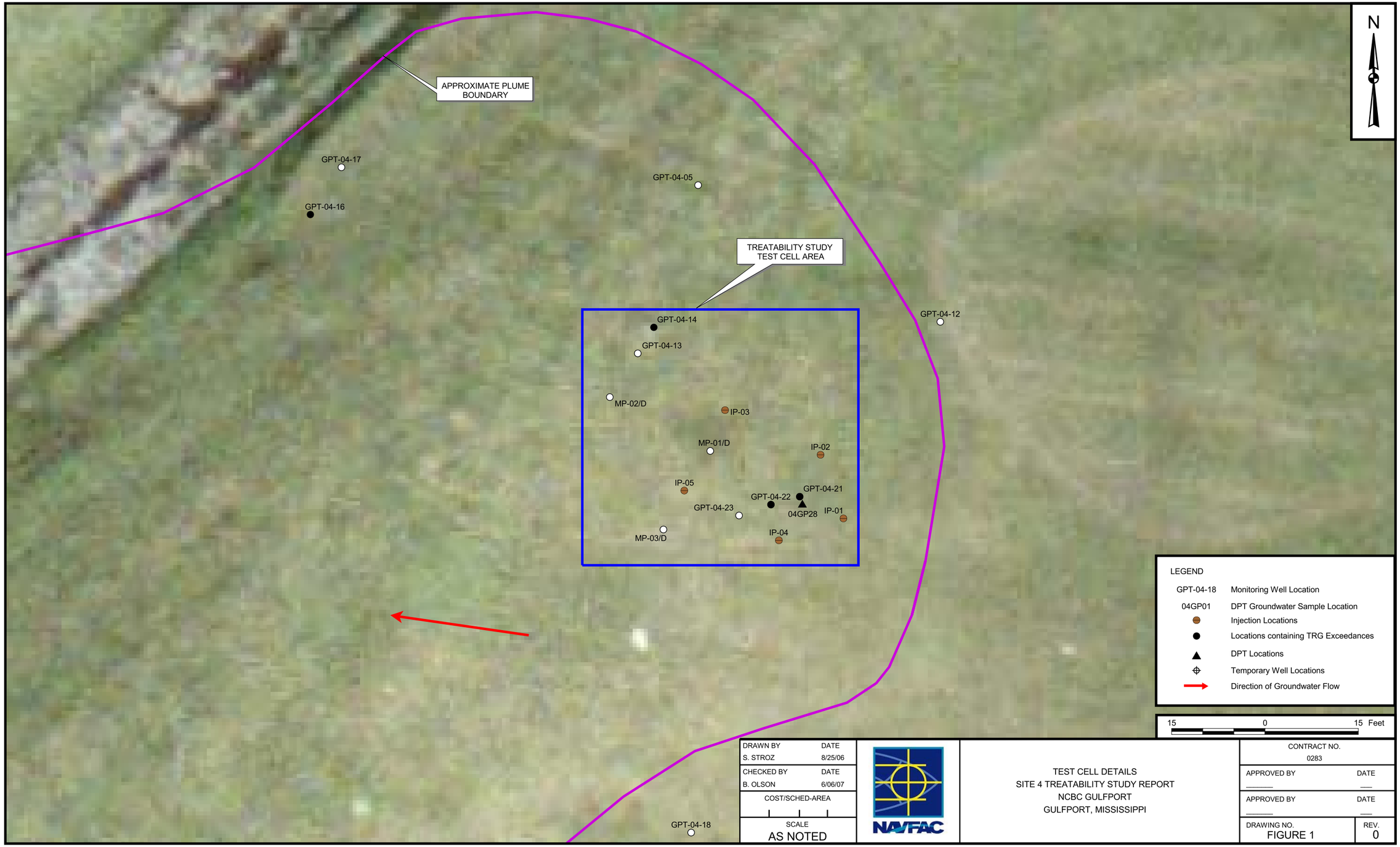
Sincerely,

Robert Fisher
Task Order Manager

Enclosures: 2 copies

CC:
Gordon Crane, NCBC Gulfport (2 copies)
Debbie Humbert (Letter Only)
Mark Perry/File

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR UPDATED SITE 4 GROUNDWATER VOC TRG LAYOUT 6/06/07 SS



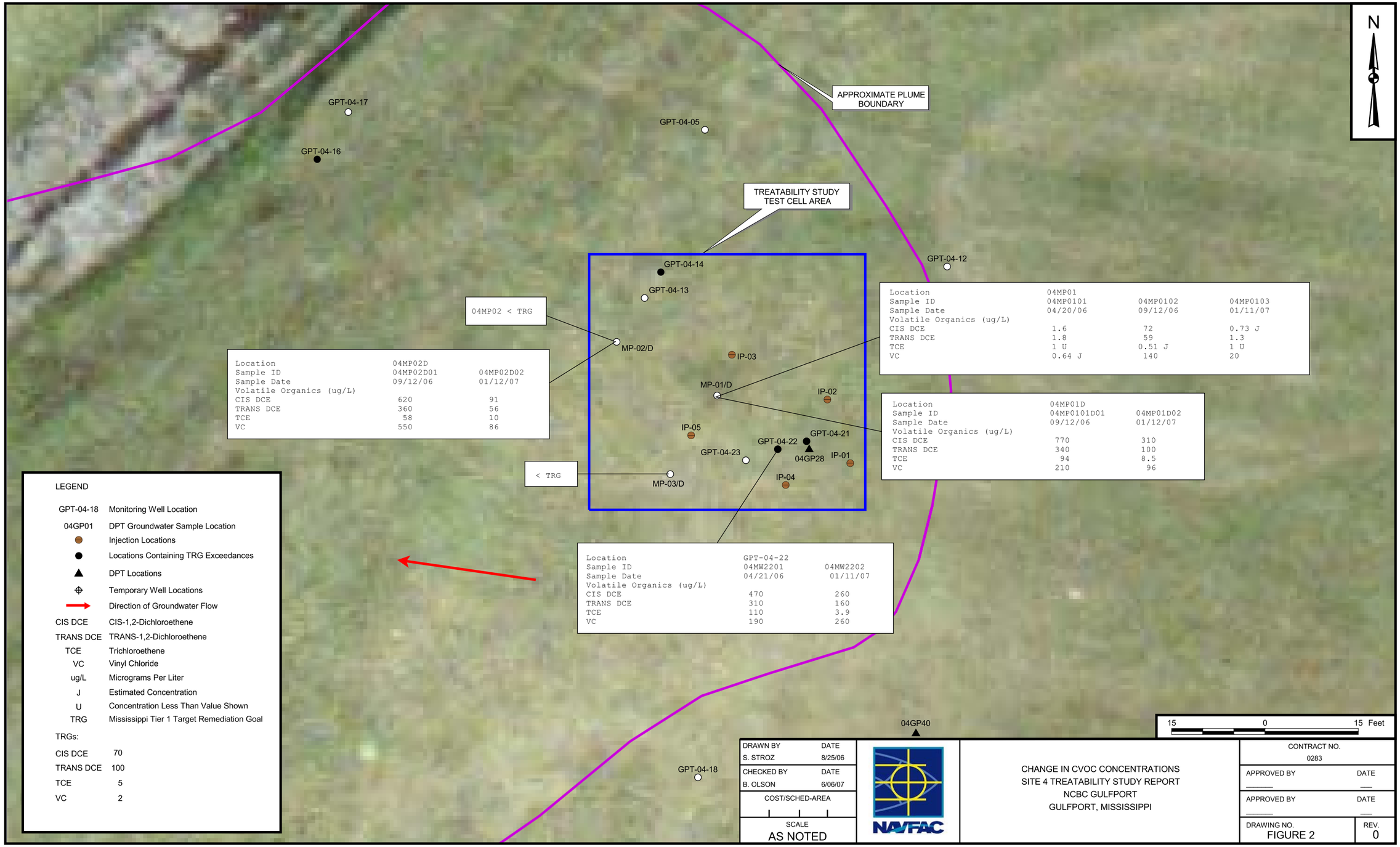
DRAWN BY	DATE
S. STROZ	8/25/06
CHECKED BY	DATE
B. OLSON	6/06/07
COST/SCHED-AREA	
SCALE	
AS NOTED	

NAVFAC

TEST CELL DETAILS
SITE 4 TREATABILITY STUDY REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.	
0283	
APPROVED BY	DATE
_____	___
APPROVED BY	DATE
_____	___
DRAWING NO.	REV.
FIGURE 1	0

P:\GIS\GULFPORT_CBC\MAPDOCS\APR\SITE04.APR CHANGES IN CVOC CONCENTRATIONS LAYOUT 6/06/07 SS



Location	04MP02D	
Sample ID	04MP02D01	04MP02D02
Sample Date	09/12/06	01/12/07
Volatile Organics (ug/L)		
CIS DCE	620	91
TRANS DCE	360	56
TCE	58	10
VC	550	86

Location	04MP01		
Sample ID	04MP0101	04MP0102	04MP0103
Sample Date	04/20/06	09/12/06	01/11/07
Volatile Organics (ug/L)			
CIS DCE	1.6	72	0.73 J
TRANS DCE	1.8	59	1.3
TCE	1 U	0.51 J	1 U
VC	0.64 J	140	20

Location	04MP01D	
Sample ID	04MP0101D01	04MP01D02
Sample Date	09/12/06	01/12/07
Volatile Organics (ug/L)		
CIS DCE	770	310
TRANS DCE	340	100
TCE	94	8.5
VC	210	96

Location	GPT-04-22	
Sample ID	04MW2201	04MW2202
Sample Date	04/21/06	01/11/07
Volatile Organics (ug/L)		
CIS DCE	470	260
TRANS DCE	310	160
TCE	110	3.9
VC	190	260

LEGEND

GPT-04-18	Monitoring Well Location
04GP01	DPT Groundwater Sample Location
	Injection Locations
	Locations Containing TRG Exceedances
	DPT Locations
	Temporary Well Locations
	Direction of Groundwater Flow
CIS DCE	CIS-1,2-Dichloroethene
TRANS DCE	TRANS-1,2-Dichloroethene
TCE	Trichloroethene
VC	Vinyl Chloride
ug/L	Micrograms Per Liter
J	Estimated Concentration
U	Concentration Less Than Value Shown
TRG	Mississippi Tier 1 Target Remediation Goal

TRGs:

CIS DCE	70
TRANS DCE	100
TCE	5
VC	2

DRAWN BY	DATE
S. STROZ	8/25/06
CHECKED BY	DATE
B. OLSON	6/06/07

COST/SCHED-AREA

SCALE
AS NOTED

NAVFAC

CHANGE IN CVOC CONCENTRATIONS
SITE 4 TREATABILITY STUDY REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CONTRACT NO.
0283

APPROVED BY ____ DATE ____

APPROVED BY ____ DATE ____

DRAWING NO. FIGURE 2

REV. 0

TABLE 1
SAMPLING AND ANALYSIS SUMMARY
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

Baseline Sampling			Verification Sampling			Performance Monitoring		
March/April 2006			September 12, 2006			January 11, 2007		
Location	**Sample ID**	**Analyses**	**Location**	**Sample ID**	**Analyses**	Location	Sample ID	Analyses
Monitoring Wells								
GPT-04-16	04GW1602	CVOC/NA/Microbial Census						
GPT-04-22	04MW2201	VOC				GPT-04-22	04MW2202	CVOC
Temporary Monitoring Points								
04MP01	04MP0101	CVOC/NA/Microbial Census/Soil	04MP01	04MP0102	CVOC	04MP01	04MP0103	CVOC
04MP02	04MP0201	CVOC/NA/Soil	04MP02	04MP0202	CVOC	04MP02	04MP0203	CVOC/NA/Microbial Census
04MP03	04MP0301	CVOC/NA/Microbial Census/Soil	04MP03	04MP0302	CVOC	04MP03	04MP0303	CVOC/NA/Microbial Census
			DPT Monitoring Points					
			04MP01D	04MP01D01	CVOC	04MP01D	04MP01D02	CVOC
			04MP02D	04MP02D01	CVOC	04MP02D	04MP02D02	CVOC
			04MP03D	04MP03D01	CVOC	04MP03D	04MP03D02	CVOC

Notes:
CVOC Chlorinated Volatile Organic Compounds
NA Natural Attenuation Parameters
Soil Soil samples for CVOC and total organic carbon

TABLE 2
GROUNDWATER CVOC ANALYTICAL SUMMARY
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

MONITORING WELLS

location		GPT-04-13		GPT-04-14		GPT-04-16		GPT-04-17		GPT-04-21	GPT-04-22		GPT-04-23
sample ID		04GW1301	04MW1302	04GW1401	04MW1402	04GW1601	04GW1602	04GW1701	04MW1702	04MW2101	04MW2201	04MW2202	04MW2301
sample date	Mississippi	09/22/04	04/11/06	09/22/04	04/13/06	09/13/04	03/30/06	09/13/04	04/13/06	04/21/06	04/21/06	01/11/07	04/20/06
sample depth - feet	Tier 1	5-15		24-34		4-14		35-40		6-16	19-24		45-50
sample event	TRG	RI Sampling	Baseline	RI Sampling	Baseline	RI Sampling	Baseline	RI Sampling	Baseline	Baseline	Baseline	Perf. Mon.	Baseline
Volatile Organics (ug/L)													
1,1-DICHLOROETHENE	7	5 U	1 U	5 U	1 U	0.6 J	2 U	5 U	1 U	1 U	1.2	2 U	1 U
1,2-DICHLOROETHANE	5	5 U	1 U	5 U	1 U	0.2 J	2 U	5 U	1 U	1 U	0.24 J	2 U	1 U
CIS-1,2-DICHLOROETHENE	70	5 U	1 U	55	47	**280**	**170**	5 U	1 U	5.9	**470**	**260**	1 U
TRANS-1,2-DICHLOROETHENE	100	5 U	1 U	30	22	**190**	89	5 U	1 U	6.4	**310**	**160**	1 U
TETRACHLOROETHENE	5	5 U	1 U	5 U	1 U	5 U	2 U	5 U	1 U	1 U	0.72 J	2 U	1 U
TRICHLOROETHENE	5	5 U	1 U	0.8 J	0.55 J	**8**	4.1	5 U	1 U	1	**110**	3.9	1 U
VINYL CHLORIDE	2	5 U	1 U	**25**	**14**	**150**	**84**	5 U	1 U	**18**	**190**	**260**	1 U

TEMPORARY MONITORING POINTS

location		04MP01			04MP02			04MP03		
sample ID		04MP0101	04MP0102	04MP0103	04MP0201	04MP0202	04MP0203	04MP0301	04MP0302	04MP0303
sample date	Mississippi	04/20/06	09/12/06	01/11/07	04/20/06	09/12/06	01/11/07	04/20/06	09/12/06	01/11/07
sample depth - feet	Tier 1	8-18			8-18			8-18		
sample event	TRG	Baseline	Verification	Perf. Mon.	Baseline	Verification	Perf. Mon.	Baseline	Verification	Perf. Mon.
Volatile Organics (ug/L)										
1,1-DICHLOROETHENE	7	1 U	0.46 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	1.6	**72**	0.73 J	0.37 J	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	100	1.8	59	1.3	0.38 J	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5	1 U	0.51 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	2	0.64 J	**140**	**20**	1 U	1.4	1 U	1 U	1 U	1 U

DPT MONITORING POINTS

location		04MP01D		04MP02D		04MP03D	
sample ID		04MP01D01	04MP01D02	04MP02D01	04MP02D02	04MP03D01	04MP03D02
sample date	Mississippi	09/12/06	01/12/07	09/12/06	01/12/07	09/12/06	01/12/07
sample depth - feet	Tier 1	20-24		20-24		20-24	
sample event	TRG	Verification	Perf. Mon.	Verification	Perf. Mon.	Verification	Perf. Mon.
Volatile Organics (ug/L)							
1,1-DICHLOROETHENE	7	10 U	2 U	10 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	5	10 U	2 U	10 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	70	**770**	**310**	**620**	**91**	1 U	0.84 J
TRANS-1,2-DICHLOROETHENE	100	**340**	100	**360**	56	1 U	1 U
TETRACHLOROETHENE	5	100	2 U	10 U	1 U	1 U	1 U
TRICHLOROETHENE	5	**94**	**8.5**	**58**	**10**	1 U	1 U
VINYL CHLORIDE	2	**210**	**96**	**550**	**86**	1 U	0.32 J

Notes:

ug/L	micrograms per liter
Perf. Mon.	Performance Monitoring Event
U	Concentration less than value shown
J	Estimated concentration

Concentrations in bold exceed Tier 1 TRG

TABLE 3
FIELD WATER QUALITY DATA
SITE 4 TREATABILITY STUDY REPORT
NCBC GULFPORT
GULFPORT, MISSISSIPPI

Sample Location	GPT-04-22			MP-01			MP-02			MP-03		
Sample Date		9/27/2006	1/11/2007		9/27/2006	1/11/2007		9/27/2006	1/11/2007		9/27/2006	1/11/2007
Sample Event	Baseline	Verification	Perf. Mon.	Baseline	Verification	Perf. Mon.	Baseline	Verification	Perf. Mon.	Baseline	Verification	Perf. Mon.
pH	5.75	6.14	5.48	6.56	6.64	5.54	6.83	7.12	6.00	6.85	6.98	5.87
Conductivity (mS/cm)	0.92	1.49	2.56	1.91	6.8	2.86	2.03	1.46	2.37	2.20	1.98	2.72
Temperature (C^o)	22.56	24.46	23.05	21.65	25.85	22.12	21.48	25.74	20.08	22.22	26	21.34
Turbidity (NTU)	2.4	195	8.4	20.5	61.1	9	11.3	17	0.16	6.16	9.5	2.1
Dissolved Oxygen (mg/L)	0.44	2.26	2.08	0.57	2.10	1.11	0.94	2.18	0.00		2.81	0.00
ORP (mV)	-19	-315	-298	-118	-434	-395	-197	-270	-274	-132	-322	-337

Notes:

Perf. Mon.	Performance Monitoring
mS/cm	millisiemens/centimeter
C^o	Degrees celsius
NTU	Nephelometric Turbidity Unit
mg/L	milligrams per liter
ORP	Oxidation-Reduction Potential
mV	millivolts

TABLE 4
MICROBIAL CENSUS RESULTS
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

Location	04MP01		04MP03		GPT-4-16
Sample ID	04MP0101	04MP0103	04MP0301	04MP0303	04GW1602
Depth Range (feet)					
Sample Date	4/20/2006	1/11/2007	4/20/2006	1/11/2007	3/30/2006
Dechlorinating Bacteria (cells/mL)					
Dehalococcoides spp	1.34E+01	**5.35E+01**	5.48E+00	**1.44E+01**	3.52E-01
Desulfuromonas sp	9.88E+01	1.73E+01	9.11E+01	**1.04E+02**	1.2E+00
Dehalobacter spp.	5.5E+03	8.51E+00	1.92E+03	7.89E-01	9.24E+03
Desulfitobacterium sp.	3.1E+04	2.03E+02	7.35E+04	2.1E+03	5.29E+01
Functional Genes (cells/mL)					
BAV1 VC R-Dase	<8.33E-01	<6.25E-01	<4.17E-01	<3.33E-01	<2E-01
TCE R-Dase	<8.33E-01	**3.56E-01 (J)**	<4.17E-01	<3.33E-01	<2E-01
VC R-Dase	<8.33E-01	**2.01E+01**	1.21E-01 (J)	<3.33E-01	<2E-01
Soluble Methane Monooxygenase	2.67E+01	**1.98E+02**	1.19E+01	**1.3E+04**	1.43E+02
Other Genera (cells/mL)					
Geobacter spp.	2.47E+03	<9.38E-01	1.34E+03	<5E-01	3.99E+01
Other Genera (cells/mL)					
Eubacteria	1.29E+06	**2.99E+06**	5.79E+05	**2.63E+06**	1.21E+05
Methanogens	3.11E+04	<1.25E+00	2.71E+04	**3.36E+04**	8.72E+03
Sulfate and Iron Reducing Bacteria	9.86E+03	<9.38E-01	6.91E+03	2.55E+01	4.46E+02
Methanotrophs (total)	2.67E+04	**8.45E+06**	4.29E+04	**2.99E+07**	2.15E+04
Type I MOB	1.37E+04	4.84E+03	1.55E+04	**2.81E+06**	5.E+03
Type II MOB	1.31E+04	**8.45E+06**	2.75E+04	**2.71E+07**	1.65E+04

Notes:
J = estimated value
Values in bold show an increase over baseline sampling results

TABLE 5
SOIL ANALYTICAL RESULTS
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

Sample ID Sample Depth - Feet Sample Date	04MP0101 4-8 04/13/06	04MP0201 4-8 04/13/06	04MP0301 4-8 04/13/06
Volatile Organics (ug/kg)			
1,1-DICHLOROETHENE	5 U	5.6 U	6.6 U
1,2-DICHLOROETHANE	5 U	5.6 U	6.6 U
CARBON TETRACHLORIDE	5 U	5.6 U	6.6 U
CHLOROFORM	5 U	5.6 U	6.6 U
CHLOROMETHANE	0.55 U	0.45 U	0.74 U
CIS-1,2-DICHLOROETHENE	5 U	5.6 U	6.6 U
METHYLENE CHLORIDE	13 U	13 U	17 U
TETRACHLOROETHENE	5 U	5.6 U	6.6 U
TRANS-1,2-DICHLOROETHENE	5 U	5.6 U	6.6 U
TRICHLOROETHENE	5 U	5.6 U	6.6 U
VINYL CHLORIDE	5 U	5.6 U	6.6 U
Miscellaneous Parameters (mg/kg)			
TOTAL ORGANIC CARBON	2700	2600	5000

ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
U - Sample concentration less than value shown

TABLE 6
GROUNDWATER CVOC ANALYTICAL RESULTS
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

	RI SAMPLING	BASELINE SAMPLING	VERIFICATION SAMPLING	PERFORMANCE MONITORING	CONCENTRATION CHANGE
location		04MP01	04MP01	04MP01	
sample ID		04MP0101	04MP0102	04MP0103	
sample date		04/20/06	09/12/06	01/11/07	% decreased
CIS-1,2-DCE		1.6	72	0.73	99
TRANS-1,2-DCE		1.8	59	1.3	98
TCE		1 U	0.51	0.5	2
VINYL CHLORIDE		0.64 J	140	20	86
TOTAL CVOC			272	23	92
location			04MP01D	04MP01D	
sample ID			04MP01D01	04MP01D02	
sample date			09/12/06	01/11/07	% decreased
CIS-1,2-DCE			770	310	60
TRANS-1,2-DCE			340	100	71
TCE			94	8.5	91
VINYL CHLORIDE			210	96	54
TOTAL CVOC			1,414	515	64
location			04MP02D	04MP02D	
sample ID			04MP02D01	04MP02D02	
sample date			09/12/06	01/11/07	% decreased
CIS-1,2-DCE			620	91	85
TRANS-1,2-DCE			360	56	84
TCE			58	10	83
VINYL CHLORIDE			550	86	84
TOTAL CVOC			1,588	243	85
location		GPT-04-22		GPT-04-22	
sample ID		04MW2201		04MW2202	
sample date		04/20/06		1/11/2007	% decreased
CIS-1,2-DCE		470		220	53
TRANS-1,2-DCE		310		130	58
TCE		110		4.6	96
VINYL CHLORIDE		190		260	Increased 37 %
TOTAL CVOC		1,080		615	43
location	GPT-04-14	GPT-04-14			
sample ID	04GW1401	04GW1402			
sample date	09/22/04	04/11/06			% decreased
CIS-1,2-DCE	55	47			15
TRANS-1,2-DCE	30	22			27
TCE	0.8	0.55			31
VINYL CHLORIDE	25	14			44
TOTAL CVOC	111	84			25
location	GPT-04-16	GPT-04-16			
sample ID	04GW1601	04GW1602			
sample date	09/13/04	03/30/06			% decreased
CIS-1,2-DCE	280	170			39
TRANS-1,2-DCE	190	89			53
TCE	8	4.1			49
VINYL CHLORIDE	150	84			44
TOTAL CVOC	628	347			45

DCE - Dichloroethene
TCE - Trichloroethene
Concentrations in ug/L

TABLE 6
GROUNDWATER CVOC ANALYTICAL RESULTS
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

CVOC - Chlorinated Volatile Organic Compounds

TABLE 7
CVOC MASS BALANCE
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

location	04MP01	Molar	Molar	04MP01	Molar	Molar	Change in
sample ID	04MP0102	Concentration	Fraction	04MP0103	Concentration	Fraction	Molar Fraction
sample date	09/12/06	(moles/liter)	(per cent)	01/11/07	(moles/liter)	(per cent)	(per cent)
CIS-1,2-DCE (ug/L)	72	7.42651E-07	21	0.73	7.52965E-09	3	-17
TRANS-1,2-DCE (ug/L)	59	6.08561E-07	17	1.3	1.3409E-08	6	-11
TCE (ug/L)	0.51	3.88157E-09	0.1	0.5	5.1573E-09	2	2
VINYL CHLORIDE (ug/L)	140	2.23964E-06	62	20	2.06292E-07	89	26
	Total	3.59474E-06		Total	2.32388E-07		

location	04MP01D	Molar	Molar	04MP01D	Molar	Molar	Change in
sample ID	04MP01D01	Concentration	Fraction	04MP01D02	Concentration	Fraction	Mole Fraction
sample date	09/12/06	(moles/liter)	(per cent)	01/11/07	(moles/liter)	(per cent)	(per cent)
CIS-1,2-DCE (ug/L)	770	7.94224E-06	51	310	3.19752E-06	55	4
TRANS-1,2-DCE (ug/L)	340	3.50696E-06	23	100	1.03146E-06	18	-5
TCE (ug/L)	94	7.15427E-07	5	8.5	6.46929E-08	1	-3
VINYL CHLORIDE (ug/L)	210	3.35946E-06	22	96	1.53575E-06	26	5
	Total	1.55241E-05		Total	5.82943E-06		

location	04MP02D	Molar	Molar	04MP02D	Molar	Molar	Change in
sample ID	04MP02D01	Concentration	Fraction	04MP02D02	Concentration	Fraction	Mole Fraction
sample date	09/12/06	(moles/liter)	(per cent)	01/11/07	(moles/liter)	(per cent)	(per cent)
CIS-1,2-DCE (ug/L)	620	6.39505E-06	33	91	9.38628E-07	32	-1
TRANS-1,2-DCE (ug/L)	360	3.71325E-06	19	56	5.77617E-07	19	0
TCE (ug/L)	58	4.41434E-07	2	10	7.61093E-08	3	0
VINYL CHLORIDE (ug/L)	550	8.79859E-06	45	86	1.37578E-06	46	1
	Total	1.93483E-05		Total	2.96813E-06		

location	GPT-04-22	Molar	Molar	GPT-04-22	Molar	Molar	Change in
sample ID	04MW2201	Concentration	Fraction	04MW2202	Concentration	Fraction	Mole Fraction
sample date	04/20/06	(moles/liter)	(per cent)	1/11/2007	(moles/liter)	(per cent)	(per cent)
CIS-1,2-DCE (ug/L)	470	4.84786E-06	41	220	2.26921E-06	29	-12
TRANS-1,2-DCE (ug/L)	310	3.19752E-06	27	130	1.3409E-06	17	-10
TCE (ug/L)	110	8.37202E-07	7	4.6	3.50103E-08	0.4	-7
VINYL CHLORIDE (ug/L)	190	3.03951E-06	25	260	4.15933E-06	53	28
	Total	1.19221E-05		Total	7.80445E-06		

Mass/Molar Conversion Factor	grams/mole	ug/mole
CIS-1,2-DICHLOROETHENE	96.95	96,950,000
TRANS-1,2-DICHLOROETHENE	96.95	96,950,000
TRICHLOROETHENE	131.39	131,390,000
VINYL CHLORIDE	62.51	62,510,000

TABLE 8
INDICATOR PARAMETERS
SITE 4 TREATABILITY STUDY
NCBC GULFPORT
GULFPORT, MISSISSIPPI

	In TS Cell		Downgradient of TS Cell		Sidegradient of TS Cell		Downgradient Plume Edge	
location	04MP01	GPT-04-22	04MP02		04MP03		GPT-04-16	
sample ID	04MP0101	04MW2202	04MP0201	04MP0203	04MP0301	04MP0303	04GW1601	04GW1602
sample date	04/20/06	01/12/07	04/20/06	01/12/07	04/20/06		9/13/04	03/30/06
sampling event	Baseline	Perf. Mon.	Baseline	Perf. Mon.	Baseline	Perf. Mon.	RI Sampling	Baseline
Inorganics (ug/L)								
IRON	23,200	11,900	1,720	485	9,440	3,610	48,000	38,600
IRON (Filtered)	20,400	6,260	1,200	289	5,120	700		6,890
Miscellaneous Parameters (mg/L)								
CHLORIDE	28.2	41.2	17.3	23.1	17.5	26.9	34	30.1
ORTHOPHOSPHATE-P	0.076	0.01 U	0.059	0.26	0.041	0.12		0.01 U
SULFATE	106	6.8	222	501	348	568	96	69.2
SULFIDE	0.75 U	5.4	1.3	2.1	0.8 J	2.7		0.75 U
TOTAL ORGANIC CARBON	45	520	25	19	35	28	31	31
Volatile Fatty Acids (mg/L)								
ACETIC ACID	0.667	410		0.12	0.125	1.9		0.11
BUTANOIC ACID	0.282	56		0.07 U	0.07 U	0.07 U		0.07 U
HEXANOIC ACID	0.1 U	6.4		0.1 U	0.1 U	0.1 U		0.10 U
LACTIC ACID	0.1 U	10 J		0.24 U	0.1 U	0.1 U		0.10 U
PENTANOIC ACID	0.07 U	42		0.07 U	0.07 U	0.07 U		0.07 U
PROPIONIC ACID	0.07 U	580		0.07 U	0.07 U	0.13		0.07 U
PYRUVIC ACID	0.07 U	7.3		0.07 U	0.07 U	0.07 U		0.07 U
Light Gases (ug/L)								
BUTANE	0.037	0.05 U	0.044	0.13	0.059	0.046		0.017 J
ETHANE	5.8	6.7	0.27	0.3	2.7	2.3	3.4	2.5
ETHENE	0.038	15	0.009 J	0.008 J	0.013	0.01 U	20	14
ISOBUTANE	0.022 J	0.05 U	0.022 J	0.044 J	0.037	0.022 J		0.014 J
METHANE	3,600	12,000	1,600	6,000	1,900	6,300	3,000	1,600
PROPANE	0.38	0.064	0.27	0.36	0.39	0.24		0.22
PROPYLENE	0.022 J	0.25	0.025 U	0.015 J	0.014 J	0.05 U		0.10
HYDROGEN (NM)	3.9	3	2.6	0.68	2.5	1.3	1.1	3.5

ug/L - micrograms per liter
mg/L - milligrams per liter
NM - Nano moles
ug/Perf. Mon. - Performance Monitoring
J - Estimated concentration
U - Sample concentration less tha value shown
Blank cells indicate sample not analyzed for that parameter

KB-1 Dechlorinator transfer vessel showing inlet and outlet ports

Driving DPT screen to application depth

Withdrawing DPT rods to open screen

Application of KB-1 at selected depth, note scale used to determine injection amount

Application of KB-1 using argon gas displacement

2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone: (865) 573-8188
Fax: (865) 573-8133
Email: info@microbe.com

Analysis Report

Client: Amy Thompson
Tetra Tech , Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, PA 15220

Phone: (412) 921-8874

Fax: (412) 921-7276

MI Identifier: 057DC **Date Rec:** 03/31/2006 **Report Date:** 04/05/2006

Client Project #: N9666 **Client Project Name:** Gulfport/Site 4

Purchase Order #:

Analysis Requested: CENSUS (final)

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported By:

Reviewed By:

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

MICROBIAL INSIGHTS, INC.

2340 Stock Creek Blvd. Rockford, TN 37853-3044
Tel: (865) 573-8188; Fax: (865) 573-8133

Q Potential (DNA)

Client: **Tetra Tech , Inc.**
Project: Gulfport/Site 4

MI Project Number: **057DC**
Date Received: 03/31/2006

Sample Information

Client Sample ID:	**04GW1602**
Sample Date:	03/30/2006
Units:	cells/mL

Dechlorinating Bacteria

Dehalococcoides spp (1)	DHC	**3.52E-01**
Desulfuromonas sp.	DSM	**1.2E+00**
Dehalobacter spp.	DHB	**9.24E+03**
Desulfitobacterium sp.	DSB	**5.29E+01**

Functional Genes

BAV1 VC R-Dase (1)	BVC	<2E-01
TCE R-Dase (1)	TCE	<2E-01
VC R-Dase	VCR	<2E-01
Soluble Methane Monooxygenase	sMMO	**1.43E+02**

Other Genera

Geobacter spp.	GEO	**3.99E+01**

Phylogenetic Group

Eubacteria	EBAC	**1.21E+05**
Methanogens	MGN	**8.72E+03**
Sulfate & Iron Reducing Bacteria	IRB/SRB	**4.46E+02**
Methanotrophs (total)	MOB	**2.15E+04**
Type I MOB	MOBI	**5E+03**
Type II MOB	MOBII	**1.65E+04**

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Notes:
1 Bio-Dechlor Census technology was developed by Dr. Loeffler and colleagues at Georgia Institute of Technology and was licensed for use through Regenesis.

KB-1™ Dechlorinator Quote Request Information Sheet

SIREM Site Recovery & Management
130 Research Lane, Suite 2 ◦ Guelph, Ontario, Canada N1G 5G3 ◦ Phone (519) 822-2265 or toll free 1-866-251-1747 Fax (519)822-3151
www.siremlab.com

Name: Bill Olson	Business Phone: 850 385-9899	Site Location: Gulfport, MS
Title: geologist	Business Fax: 850 385-9860	Estimated Start Date: 10-16/06
Organization: T+NUS	E-mail: William.Olson@TNUS.com	Mail
Street Address: 3360 Capital Circle NE Suite A	City: Tallahassee	Please Send Quote via: (circle) Fax
State/Province: FL	Country: US	ZIP/Postal Code: 32317	E-Mail

Physical Description of Biologically Active Zone (BAZ) Closed Landfill

Predominant Geology of BAZ (e.g., gravel, sand, silt, clay, fractured bedrock, etc.)		Units (circle)
Length	40	feet
Width	30	metres
Saturated Thickness	15	
Heterogeneity	Low / Moderate / High	
BAZ Hydrogeology		
Porosity	30	%
Hydraulic Gradient	0.03	unitless
Bulk Hydraulic Conductivity	40	cm/s / m/s / ft/day
Average Groundwater Velocity	4	m/day / m/year / ft/day / ft/year

BAZ Design/Operation/ Type of Electron Donor (check appropriate boxes)	
BAZ design to treat:	
Plume	
Source	
BAZ operation will be:	
Passive Biobarrier	
Recirculation Loop/System	
Batch Additon of Donors	

Proposed Number of Injection Points: 3

Specify electron donor(s) to be used & anticipated concentration: Sodium lactate 15% Soln

Comments/Additional Information:

DHC census results
134/ml ~~unfiltered~~
5.48/ml
0.352/ml

Current Geochemistry of BAZ (* Required Fields)

		Max	Average	mg/L	µg/L	Other
* Chlorinated Ethenes	PCE	<1			X	
	TCE	34			X	
	cis-DCE	560			X	
	trans-DCE	630			X	
	1,1-DCE	1.2			X	
	VC	1600			X	
Chlorinated Ethanes	1,1,1,2-TeCA	ND				
	1,1,2,2-TeCA	ND				
	* 1,1,1-TCA	ND				
	1,1,2-TCA	ND				
	1,2-DCA	0.6				
	1,1-DCA	1.2				
	CA	ND				
Chlorinated Methanes	CT	ND				
	* CF	ND				
	DCM	ND				
	CM	ND				
Biogenic Gases	Ethene	0.038	0.02		X	
	Ethane	5.8	3		X	
	Methane	3600	2300		X	
Inorganic Parameters	Chloride	28.2	18	X		
	* Nitrate	<0.05		X		
	* Sulfate	348	200	X		
	Dissolved Iron	20400	8900	X		
	Total Iron	23200	11450	X		
	Dissolved Manganese	NA				
Field Parameters	* Dissolved Oxygen	0.94	0.40	X		
	* ORP	-476	-350			mV
	Temperature	26	25			°C
	Specific Conductance	7.32				mS/cm
	* pH	7.12	6.77			
Other Parameters	TOC	45	35	X		

Abreviations
PCE, TCE, DCE, VC: tetrachloroethene, trichloroethene, dichloroethene, vinyl chloride
TeCA, TCA, DCA, CA: tetrachloroethane, trichloroethane, dichloroethane, chloroethane
CT, CF, DCM, CM: carbon tetrachloride, chloroform, dichloromethane, chloromethane
mV: millivolts
ORP: oxidation reduction potential

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2340 Stock Creek Blvd.
Rockford TN 37853-3044
Phone: (865) 573-8188
Fax: (865) 573-8133
Email: info@microbe.com

Analysis Report

Client: Amy Thompson
Tetra Tech , Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, PA 15220

Phone: (412) 921-8874

Fax: (412) 921-7276

MI Identifier: 041DD **Date Rec:** 04/21/2006 **Report Date:** 04/26/2006

Client Project #: CTO 283 **Client Project Name:** Gulfport

Purchase Order #:

Analysis Requested: CENSUS (final), Chain of Custody

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported By: Dora M Ogles

Reviewed By: Greg A. Davis

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MICROBIAL INSIGHTS, INC.

2340 Stock Creek Blvd. Rockford, TN 37853-3044
Tel: (865) 573-8188; Fax: (865) 573-8133

Q Potential (DNA)

Client: **Tetra Tech , Inc.**
Project: Gulfport

MI Project Number: **041DD**
Date Received: 04/21/2006

Sample Information

Client Sample ID:		**04MP0101**	**04MP0301**
Sample Date:		04/20/2006	04/20/2006
Units:		cells/mL	cells/mL
Dechlorinating Bacteria			
Dehalococcoides spp (1)	DHC	**1.34E+01**	**5.48E+00**
Desulfuromonas sp.	DSM	**9.88E+01**	**9.11E+01**
Dehalobacter spp.	DHB	**5.5E+03**	**1.92E+03**
Desulfitobacterium sp.	DSB	**3.1E+04**	**7.35E+04**
Functional Genes			
BAV1 VC R-Dase (1)	BVC	<8.33E-01	<4.17E-01
TCE R-Dase (1)	TCE	<8.33E-01	<4.17E-01
VC R-Dase	VCR	<8.33E-01	**1.21E-01 (J)**
Soluble Methane Monooxygenase	sMMO	**2.67E+01**	**1.19E+01**
Other Genera			
Geobacter spp.	GEO	**2.47E+03**	**1.34E+03**
Phylogenetic Group			
Eubacteria	EBAC	**1.29E+06**	**5.79E+05**
Methanogens	MGN	**3.11E+04**	**2.71E+04**
Sulfate & Iron Reducing Bacteria	IRB/SRB	**9.86E+03**	**6.91E+03**
Methanotrophs (total)	MOB	**2.67E+04**	**4.29E+04**
Type I MOB	MOBI	**1.37E+04**	**1.55E+04**
Type II MOB	MOBII	**1.31E+04**	**2.75E+04**

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Notes:
1 Bio-Dechlor Census technology was developed by Dr. Loeffler and colleagues at Georgia Institute of Technology and was licensed for use through Regenesis.

REPORT TO:

Reports will be provided to the contact(s) listed below. Parties other than the contact(s) listed below will require prior approval.

Name: Amy Thomson
Company: Tetra Tech
Address: Foster Plaza 7
Pitt, PA

email:
Phone: ( )
Fax: ( )

Project Manager: Robert Fisher
Project Name: Gulfport
Project No.: CTO 283

INVOICE TO:

For Invoices **paid by a third party** it is imperative that contact information & corresponding reference No. be provided.

Name: Robert Fisher
Company: Tetra Tech
Address: 3360 Capital Circle NE
Suite B
Tall, FL 32308

email:
Phone: (850) 385 9889
Fax: ( )

Purchase Order No.
Subcontract No.

microbialinsights
2340 Stock Creek Blvd.
Rockford, TN 37853-3044
phone (865) 573-8188
fax: (865) 573-8133
email: info@microbe.com
www.microbe.com

Please Check One:
☐ More samples to follow
☒ No Additional Samples

Saturday Delivery
Please see sampling protocol for instructions

Report Type: ☒ Standard (default) ☐ Comprehensive (15% surcharge) ☐ Historical (30% surcharge)

Please contact us prior to submitting samples regarding questions about the analyses you are requesting at (865) 573-8188 (8:00 am to 4:00 pm M-F). After these hours please call (865) 300-8053.

Sample Information

MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	PLFA	VFA	M/E/E	DGGE+3ID	DGGE+3ID	Q-Potential (DNA)	Q-Expression (RNA)*	qDHC (Dehalococcoides)	Other:	Other:	Other:
1	04MP0101	4/20/06	0825	GW						X					
2	04MP0301	4/20/06	1005	GW						X					

Q-Targets: Prior to selecting targets mark either Q-Potential for DNA or Q-Expression for RNA

Sample(s) Received: 4-21-06 Time: 11:00

COC sent: (Y) N Bottle ID match: (Y) N

Temp.: 5° All intact? ✓

No. of damaged/missing samples: ✓

Sample Analyses Requested

CUL (DNA) IAQ PLFA VFA Other:

Set #: 041DD Signed:

Relinquished by: Date: 4/20/06 Received by:

In order for analysis to be completed correctly, it is vital that chain of custody is filled out correctly & that all relative information is provided. Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable. * additional cost and sample preservation are associated with RNA samples.

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Rockford TN 37853-3044
Phone: (865) 573-8188
Fax: (865) 573-8133
Email: info@microbe.com

Analysis Report

Client: Robert Fisher
Tetra Tech , Inc.
3360 Capital Circle NE
Suite 13
Tallahassee, FL 32308

Phone: (850) 385-9899

Fax:

MI Identifier: 020EA **Date Rec:** 01/12/2007 **Report Date:** 01/19/2007

Client Project #: **Client Project Name:** Gulfport

Purchase Order #:

Analysis Requested: CENSUS (final)

Comments:

All samples within this data package were analyzed under U.S. EPA Good Laboratory Practice Standards: Toxic Substances Control Act (40 CFR part 790). All samples were processed according to standard operating procedures. Test results submitted in this data package meet the quality assurance requirements established by Microbial Insights, Inc.

Reported By: Anita Biernacki

Reviewed By: Lora M Ogles

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Tel: (865) 573-8188; Fax: (865) 573-8133

Q Potential (DNA)

Client: **Tetra Tech , Inc.**
Project: Gulfport

MI Project Number: **020EA**
Date Received: 01/12/2007

Sample Information

Client Sample ID:		**04MP0303**	**04MP0103**
Sample Date:		01/11/2007	01/11/2007
Units:		cells/mL	cells/mL

Dechlorinating Bacteria

Dehalococcoides spp (1)	DHC	**1.44E+01**	**5.35E+01**
Desulfuromonas spp.	DSM	**1.04E+02**	**1.73E+01**
Dehalobacter spp.	DHB	**7.89E-01**	**8.51E+00**
Desulfitobacterium sp.	DSB	**2.1E+03**	**2.03E+02**

Functional Genes

TCE R-Dase (1)	TCE	<3.33E-01	<6.25E-01
BAV1 VC R-Dase (1)	BVC	<3.33E-01	**3.56E-01 (J)**
VC R-Dase	VCR	<3.33E-01	**2.01E+01**
Soluble Methane Monooxygenase	sMMO	**1.3E+04**	**1.98E+02**

Other Genera

Geobacter spp.	GEO	<5E-01	<9.38E-01

Phylogenetic Group

Eubacteria	EBAC	**2.63E+06**	**2.99E+06**
Methanogens	MGN	**3.36E+04**	<1.25E+00
Sulfate & Iron Reducing Bacteria	IRB/SRB	**2.55E+01**	<9.38E-01
Methanotrophs (total)	MOB	**2.99E+07**	**8.45E+06**
Type I MOB	MOBI	**2.81E+06**	**4.84E+03**
Type II MOB	MOBII	**2.71E+07**	**8.45E+06**

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Notes:
1 Bio-Dechlor Census technology was developed by Dr. Loeffler and colleagues at Georgia Institute of Technology and was licensed for use through Regenesis.

REPORT TO:

Reports will be provided to the contact(s) listed below. Parties other than the contact(s) listed below will require prior approval.

Name:
Company: Tetra Tech
Address:

email:
Phone: 850 385 9899
Fax: ( )

Project Manager: Robert Fisher
Project Name: Gulfport
Project No.:

INVOICE TO:

For Invoices paid by a third party it is imperative that contact information & corresponding reference No. be provided.

Name:
Company:
Address:

email:
Phone: ( )
Fax: ( )

Purchase Order No.
Subcontract No.

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Rockford, TN 37853-3044
phone (865) 573-8188
fax: (865) 573-8133
email: info@microbe.com
www.microbe.com

Please Check One:
☐ More samples to follow
☒ No Additional Samples

Saturday Delivery
Please see sampling protocol for instructions

Report Type: ☒ Standard (default) ☐ Comprehensive (15% surcharge) ☐ Historical (30% surcharge)

Please contact us prior to submitting samples regarding questions about the analyses you are requesting at (865) 573-8188 (8:00 am to 4:00 pm M-F). After these hours please call (865) 300-8053.

Sample Information

MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	PLFA	VFA	M/E/E	DGGE+3ID	DGGE+5ID	Q-Potential (DNA)	Q-Expression (RNA)*	qDHC (Dehalococcoides)	qTCE R-Case	Other	Other
020EA 1	04MP0303	1-11-07	1310	Aq						X					
2	04MP0103	1-11-07	1200	Aq						X					

Q-Targets: Prior to selecting targets mark either Q-Potential for DNA or Q-Expression for RNA

FedEx

Sample(s) Received: 01.12.07 Time: 1010

COC sent: (Y) N Bottle ID match: (Y) N

Temp.: 8°C All intact? Yes (Field Ref: 1405)

No. of damaged/missing samples:

Sample Analyses Requested

CUL (DNA) PLFA VFA Other:

Set #: 020EA Signed:

Relinquished by: Date: 1/11/07 Received by: Tiffany Stone Date 1-12-07

In order for analysis to be completed correctly, it is vital that chain of custody is filled out correctly & that all relative information is provided. Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable. * additional cost and sample preservation are associated with RNA samples.

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: M

nsample	04GW0901	nsample	04GW1001	nsample	04GW1101
samp_date	9/8/2004	samp_date	9/9/2004	samp_date	9/9/2004
lab_id	WU2885-001	lab_id	WU2934-001	lab_id	WU2934-002
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	382	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	84.3		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	8920		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	1220		
LEAD	1.7	U	
MAGNESIUM	1270		
MANGANESE	35.1		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	2120	U	A
SELENIUM	3.71	U	
SILVER	3.8	U	A
SODIUM	5770	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.6		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	17.9	U	
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	229		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	68900		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	2250		
LEAD	1.7	U	
MAGNESIUM	11500		
MANGANESE	57.3		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	5170		
SELENIUM	4.2	U	A
SILVER	2.84	U	
SODIUM	21400	J	I
THALLIUM	11.1	U	A
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	105	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	151		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	9400		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	7860		
LEAD	1.7	U	
MAGNESIUM	5520		
MANGANESE	246		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3410		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	20100	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: M

nsample	04GW1601	nsample	04GW1701	nsample	04GW2001
samp_date	9/13/2004	samp_date	9/13/2004	samp_date	9/10/2004
lab_id	WU2974-001	lab_id	WU2974-002	lab_id	WU2954-002
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	197	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	405		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	115000		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	48000		
LEAD	1.7	U	
MAGNESIUM	41000		
MANGANESE	390		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	7490		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	46600	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	757	U	A
ANTIMONY	2.34	U	
ARSENIC	3.03	U	
BARIUM	210		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	15600		
CHROMIUM	2.3	U	A
COBALT	4.36	U	
COPPER	12.6		
IRON	3920		
LEAD	1.7	U	
MAGNESIUM	7050		
MANGANESE	179		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3890		
SELENIUM	3.71	U	
SILVER	3	U	A
SODIUM	25400	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	3.3		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	93.7	U	A
ANTIMONY	2.34	U	
ARSENIC	3.3		
BARIUM	195		
BERYLLIUM	0.27	U	
CADMIUM	3.97	U	
CALCIUM	17100		
CHROMIUM	0.8	U	
COBALT	4.36	U	
COPPER	1.91	U	
IRON	10300		
LEAD	1.7	U	
MAGNESIUM	8230		
MANGANESE	312		
MERCURY	0.01	U	
NICKEL	10.8	U	
POTASSIUM	3720		
SELENIUM	3.71	U	
SILVER	2.84	U	
SODIUM	26400	J	I
THALLIUM	4.09	U	
VANADIUM	4.14	U	
ZINC	1.44	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW0901
samp_date	9/8/2004
lab_id	WU2885-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	14		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	23		
TOTAL ORGANIC CARBON	MG/L	1.8		

nsample	04GW1001
samp_date	9/9/2004
lab_id	WU2934-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	23		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	73		

nsample	04GW1101
samp_date	9/9/2004
lab_id	WU2934-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	5.4		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	2	U	

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1201
samp_date	9/14/2004
lab_id	WU3000-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.0055	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	68		
TOTAL ORGANIC CARBON	MG/L	29		

nsample	04GW1201D
samp_date	9/14/2004
lab_id	WU3000-3
qc_type	NM
Pct_Solids	
DUP_OF:	04GW1201

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41		
CYANIDE	UG/L	4.7	J	P
NITRATE-N	MG/L	0.0055	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	69		
TOTAL ORGANIC CARBON	MG/L	28		

nsample	04GW1501
samp_date	9/10/2004
lab_id	WU2954-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	19		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.022	J	DP
SULFATE	MG/L	110		
TOTAL ORGANIC CARBON	MG/L	9.7		

PROJ_NO: 9666

SDG: 2834 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1601
samp_date	9/13/2004
lab_id	WU2974-1
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	34		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	96		
TOTAL ORGANIC CARBON	MG/L	31		

nsample	04GW1701
samp_date	9/13/2004
lab_id	WU2974-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	6.4		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.0054	J	DP
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	2.4		
TOTAL ORGANIC CARBON	MG/L	5.2		

nsample	04GW2001
samp_date	9/10/2004
lab_id	WU2954-2
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	5.8		
CYANIDE	UG/L	10	U	
NITRATE-N	MG/L	0.05	UJ	D
NITRITE-N	MG/L	0.05	UJ	D
SULFATE	MG/L	1.1		
TOTAL ORGANIC CARBON	MG/L	5.4		

PROJ_NO: 9666

SDG: P0603551 MEDIA: WATER DATA FRACTION: OVG

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01B
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ETHANE	2.5		
ETHENE	14		
METHANE	1600		

PROJ_NO: 9666

SDG: P0603551 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ACETIC ACID	MG/L	0.11		
ACETYLENE	UG/L	1.0	U	
BUTANE	UG/L	0.017	J	P
BUTANOIC ACID	MG/L	0.07	U	
HEXANOIC ACID	MG/L	0.10	U	
I-HEXANOIC ACID	MG/L	0.10	U	
I-PENTANOIC ACID	MG/L	0.07	U	
ISOBUTANE	UG/L	0.014	J	P
LACTIC ACID	MG/L	0.10	U	
PENTANOIC ACID	MG/L	0.07	U	
PROPANE	UG/L	0.22		
PROPIONIC ACID	MG/L	0.07	U	
PROPYLENE	UG/L	0.10		
PYRUVIC ACID	MG/L	0.07	U	
TOTAL ORGANIC CARBON	MG/L	31.0		

PROJ_NO: 9666

SDG: P0603551 MEDIA: AIR DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	P0603551-01B
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	3.5		

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: OV

nsample	04GW1602	nsample	04GW1602
samp_date	3/30/2006	samp_date	3/30/2006
lab_id	0603432-01	lab_id	0603432-01
qc_type	NM	qc_type	NM
units	UG/L	units	UG/L
Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	2	U	
1,1,2,2-TETRACHLOROETHANE	2	U	
1,1,2-TRICHLOROETHANE	2	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	2	U	
1,1-DICHLOROETHANE	2	U	
1,1-DICHLOROETHENE	2	U	
1,2,4-TRICHLOROBENZENE	2	U	
1,2-DIBROMO-3-CHLOROPROPANE	4	U	
1,2-DIBROMOETHANE	2	U	
1,2-DICHLOROBENZENE	2	U	
1,2-DICHLOROETHANE	2	U	
1,2-DICHLOROPROPANE	2	U	
1,3-DICHLOROBENZENE	2	U	
1,4-DICHLOROBENZENE	2	U	
2-BUTANONE	20	U	
2-HEXANONE	10	U	
4-METHYL-2-PENTANONE	10	U	
ACETONE	20	U	
BENZENE	2	U	
BROMODICHLOROMETHANE	2	U	
BROMOFORM	2	U	
BROMOMETHANE	4	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	2	U	
CHLOROBENZENE	2	U	
CHLORODIBROMOMETHANE	2	U	
CHLOROETHANE	4	U	
CHLOROFORM	2	U	
CHLOROMETHANE	4	U	
CIS-1,2-DICHLOROETHENE	170		
CIS-1,3-DICHLOROPROPENE	2	U	
CYCLOHEXANE	4	U	

Parameter	Result	Val Qual	Qual Code
DICHLORODIFLUOROMETHANE	4	U	
ETHYLBENZENE	2	U	
ISOPROPYLBENZENE	2	U	
METHYL ACETATE	2	U	
METHYL CYCLOHEXANE	2	U	
METHYL TERT-BUTYL ETHER	2	U	
METHYLENE CHLORIDE	4	U	
STYRENE	2	U	
TETRACHLOROETHENE	2	U	
TOLUENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,2-DICHLOROETHENE	89		
TRANS-1,3-DICHLOROPROPENE	2	U	
TRICHLOROETHENE	4.1		
TRICHLOROFLUOROMETHANE	4	U	
VINYL CHLORIDE	84		

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: M

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	38600			

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: MF

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	6890			

PROJ_NO: 9666

SDG: 0603432 MEDIA: WATER DATA FRACTION: MISC

nsample	04GW1602
samp_date	3/30/2006
lab_id	0603432-01
qc_type	NM
Pct_Solids	
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	30.1			
NITRATE-N	MG/L	0.05	U	U	
NITRITE-N	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.01	U	U	
SULFATE	MG/L	69.2			
SULFIDE	MG/L	0.75	U	U	

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0101	nsample	04MP0201	nsample	04MP0301
samp_date	4/20/2006	samp_date	4/20/2006	samp_date	4/20/2006
lab_id	0604242-03	lab_id	0604242-04	lab_id	0604242-05
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	28.2			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.076			
SULFATE	MG/L	106			
SULFIDE	MG/L	0.75	U	U	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	17.3			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.059			
SULFATE	MG/L	222			
SULFIDE	MG/L	1.3			

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
CHLORIDE	MG/L	17.5			
NITRATE	MG/L	0.05	U	U	
NITRITE	MG/L	0.05	U	U	
ORTHOPHOSPHATE-P	MG/L	0.041			
SULFATE	MG/L	348			
SULFIDE	MG/L	0.8	B	J	P

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: MF

nsample	04MP0101
samp_date	4/20/2006
lab_id	0604242-03Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	20400			

nsample	04MP0201
samp_date	4/20/2006
lab_id	0604242-04Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	1200			

nsample	04MP0301
samp_date	4/20/2006
lab_id	0604242-05Solub
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	5120			

PROJ_NO: 9666

SDG: GULFPORT4-001 MEDIA: WATER DATA FRACTION: M

nsample	04MP0101	nsample	04MP0201	nsample	04MP0301
samp_date	4/20/2006	samp_date	4/20/2006	samp_date	4/20/2006
lab_id	0604242-03	lab_id	0604242-04	lab_id	0604242-05
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	23200			

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	1720			

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	9440			

PROJ_NO: 9666

SDG: P0604379 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0101
samp_date	4/20/2006
lab_id	P0604379-01A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETIC ACID	MG/L	0.667	M		
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.037			
BUTANOIC ACID	MG/L	0.282			
HEXANOIC ACID	MG/L	0.1	U	U	
HYDROGEN	NM	3.9			
I-HEXANOIC ACID	MG/L	0.1	U	U	
I-PENTANOIC ACID	MG/L	0.07	U	U	
ISOBUTANE	UG/L	0.022	J	J	P
LACTIC ACID	MG/L	0.1	U	U	
PENTANOIC ACID	MG/L	0.07	U	U	
PROPANE	UG/L	0.38			
PROPIONIC ACID	MG/L	0.07	U	U	
PROPYLENE	UG/L	0.022	J	J	P
PYRUVIC ACID	MG/L	0.07	U	U	
TOTAL ORGANIC CARBON	MG/L	45			

nsample	04MP0201
samp_date	4/20/2006
lab_id	P0604379-02B
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.044			
HYDROGEN	NM	2.6			
ISOBUTANE	UG/L	0.022	J	J	P
PROPANE	UG/L	0.27			
PROPYLENE	UG/L	0.025	U	U	
TOTAL ORGANIC CARBON	MG/L	25			

nsample	04MP0301
samp_date	4/20/2006
lab_id	P0604379-03A
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
ACETIC ACID	MG/L	0.125	M		
ACETYLENE	UG/L	1	U	U	
BUTANE	UG/L	0.059			
BUTANOIC ACID	MG/L	0.07	U	U	
HEXANOIC ACID	MG/L	0.1	U	U	
HYDROGEN	NM	2.5			
I-HEXANOIC ACID	MG/L	0.1	U	U	
I-PENTANOIC ACID	MG/L	0.07	U	U	
ISOBUTANE	UG/L	0.037			
LACTIC ACID	MG/L	0.1	U	U	
PENTANOIC ACID	MG/L	0.07	U	U	
PROPANE	UG/L	0.39			
PROPIONIC ACID	MG/L	0.07	U	U	
PROPYLENE	UG/L	0.014	J	J	P
PYRUVIC ACID	MG/L	0.07	U	U	
TOTAL ORGANIC CARBON	MG/L	35			

PROJ_NO: 9666

SDG: P0604379 MEDIA: WATER DATA FRACTION: OVG

nsample	04MP0101	nsample	04MP0201	nsample	04MP0301
samp_date	4/20/2006	samp_date	4/20/2006	samp_date	4/20/2006
lab_id	P0604379-01B	lab_id	P0604379-02B	lab_id	P0604379-03B
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	5.8			
ETHENE	0.038			
METHANE	3600			

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	0.27			
ETHENE	0.009	J	J	P
METHANE	1600			

Parameter	Result	Lab Qual	Val Qual	Qual Code
ETHANE	2.7			
ETHENE	0.013			
METHANE	1900			

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03	lab_id	0701065-04	lab_id	0701065-01
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	23.1		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.26		
SULFATE	MG/L	501		
SULFIDE	MG/L	2.1		

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	26.9		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.12		
SULFATE	MG/L	568		
SULFIDE	MG/L	2.7		

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41.2		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.01	U	
SULFATE	MG/L	6.8		
SULFIDE	MG/L	5.4		

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: MF

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03Solub	lab_id	0701065-04Solub	lab_id	0701065-01Solub
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
IRON	289		

Parameter	Result	Val Qual	Qual Code
IRON	700		

Parameter	Result	Val Qual	Qual Code
IRON	6260		

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: M

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03	lab_id	0701065-04	lab_id	0701065-01
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
IRON	485		

Parameter	Result	Val Qual	Qual Code
IRON	3610		

Parameter	Result	Val Qual	Qual Code
IRON	11900		

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03	lab_id	0701065-04	lab_id	0701065-01
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	23.1		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.26		
SULFATE	MG/L	501		
SULFIDE	MG/L	2.1		

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	26.9		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.12		
SULFATE	MG/L	568		
SULFIDE	MG/L	2.7		

Parameter	units	Result	Val Qual	Qual Code
CHLORIDE	MG/L	41.2		
NITRATE-N	MG/L	0.05	U	
NITRITE-N	MG/L	0.05	U	
ORTHOPHOSPHATE-P	MG/L	0.01	U	
SULFATE	MG/L	6.8		
SULFIDE	MG/L	5.4		

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: MF

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03Solub	lab_id	0701065-04Solub	lab_id	0701065-01Solub
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
IRON	289		

Parameter	Result	Val Qual	Qual Code
IRON	700		

Parameter	Result	Val Qual	Qual Code
IRON	6260		

PROJ_NO: 9666

SDG: GULFPORTSITE4-0 MEDIA: WATER DATA FRACTION: M

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	0701065-03	lab_id	0701065-04	lab_id	0701065-01
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
IRON	485		

Parameter	Result	Val Qual	Qual Code
IRON	3610		

Parameter	Result	Val Qual	Qual Code
IRON	11900		

PROJ_NO: 9666

SDG: P0701151 MEDIA: AIR DATA FRACTION: MISC

nsample	04MP0303
samp_date	1/11/2007
lab_id	P0701151-03B
qc_type	NM
Pct_Solids	0.0
DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	1.3		

PROJ_NO: 9666

SDG: P0701151 MEDIA: WATER DATA FRACTION: OVG

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	P0701151-02A	lab_id	P0701151-03B	lab_id	P0701151-01A
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/L	units	UG/L	units	UG/L
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ETHANE	0.3		
ETHENE	0.008	J	P
METHANE	6000		

Parameter	Result	Val Qual	Qual Code
ETHANE	2.3		
ETHENE	0.01	U	
METHANE	6300		

Parameter	Result	Val Qual	Qual Code
ETHANE	6.7		
ETHENE	15		
METHANE	12000		

PROJ_NO: 9666

SDG: P0701151 MEDIA: WATER DATA FRACTION: MISC

nsample	04MP0203	nsample	04MP0303	nsample	04MW2202
samp_date	1/11/2007	samp_date	1/11/2007	samp_date	1/11/2007
lab_id	P0701151-02A	lab_id	P0701151-03A	lab_id	P0701151-01A
qc_type	NM	qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
ACETIC ACID	MG/L	0.12		
ACETYLENE	UG/L	0.5	U	
BUTANE	UG/L	0.13		
BUTANOIC ACID	MG/L	0.07	U	
HEXANOIC ACID	MG/L	0.1	U	
I-HEXANOIC ACID	MG/L	0.1	U	
I-PENTANOIC ACID	MG/L	0.07	U	
ISOBUTANE	UG/L	0.044	J	P
LACTIC ACID	MG/L	0.24	U	A
PENTANOIC ACID	MG/L	0.07	U	
PROPANE	UG/L	0.36		
PROPIONIC ACID	MG/L	0.07	U	
PROPYLENE	UG/L	0.015	J	P
PYRUVIC ACID	MG/L	0.07	U	
TOTAL ORGANIC CARBON	MG/L	19		

Parameter	units	Result	Val Qual	Qual Code
ACETIC ACID	MG/L	1.9		
ACETYLENE	UG/L	1	U	
BUTANE	UG/L	0.046		
BUTANOIC ACID	MG/L	0.07	U	
HEXANOIC ACID	MG/L	0.1	U	
I-HEXANOIC ACID	MG/L	0.1	U	
I-PENTANOIC ACID	MG/L	0.07	U	
ISOBUTANE	UG/L	0.022	J	P
LACTIC ACID	MG/L	0.1	U	
PENTANOIC ACID	MG/L	0.07	U	
PROPANE	UG/L	0.24		
PROPIONIC ACID	MG/L	0.13		
PROPYLENE	UG/L	0.05	U	
PYRUVIC ACID	MG/L	0.07	U	
TOTAL ORGANIC CARBON	MG/L	28		

Parameter	units	Result	Val Qual	Qual Code
ACETIC ACID	MG/L	410		
ACETYLENE	UG/L	0.13	J	P
BUTANE	UG/L	0.05	U	
BUTANOIC ACID	MG/L	56		
HEXANOIC ACID	MG/L	6.4		
I-HEXANOIC ACID	MG/L	0.49		
I-PENTANOIC ACID	MG/L	1.9		
ISOBUTANE	UG/L	0.05	U	
LACTIC ACID	MG/L	10	J	P
PENTANOIC ACID	MG/L	42		
PROPANE	UG/L	0.064		
PROPIONIC ACID	MG/L	580		
PROPYLENE	UG/L	0.25		
PYRUVIC ACID	MG/L	7.3		
TOTAL ORGANIC CARBON	MG/L	520		

PROJ_NO: 9666

SDG: P0701168 MEDIA: AIR DATA FRACTION: MISC

nsample	04MP0203	nsample	04MW2202
samp_date	1/12/2007	samp_date	1/12/2007
lab_id	P0701168-01A	lab_id	P0701168-02A
qc_type	NM	qc_type	NM
Pct_Solids	0.0	Pct_Solids	0.0
DUP_OF:		DUP_OF:	

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	0.68		

Parameter	units	Result	Val Qual	Qual Code
HYDROGEN	NM	3		

APPENDIX G
REGULATORY REVIEW COMMENTS

STATE OF MISSISSIPPI
HALEY BARBOUR
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
TRUDY D. FISHER, EXECUTIVE DIRECTOR

7 August 2009

Robert Fisher
NAVFAC SE (OPG6)
PO Box 30, Bldg 903
NAS Jacksonville, FL 32212-0030

Re: Remedial Investigation Report for Site 4 (Golf Course Landfill), Naval Construction Battalion Center Gulfport, Mississippi, Draft, October 2007.

The Mississippi office of pollution control (OPC) has reviewed the above referenced document and offers the following comments. The report includes a Remedial Investigation (RI), Baseline Human Health Risk Assessment (BRA) and a Screening Level Ecological Risk Assessment (SLERA). Review of this document was postponed due to site prioritization by the Navy. Offbase areas of concern (AOCs), Site 5 and Site 8 (B and C) were placed in a higher priority status and evaluated ahead of Site 4. The following concerns were noted during review of the Remedial Investigation Report for Site 4.

1. The executive summary should contain more detail (concentration ranges and trends, etc.) about the findings of both the current Remedial Investigation and pertinent previous investigations. An evaluation of the nature and extent of contamination should be abstracted from the main body of the report.

2. The text (pages 2-2 and 2-3) should reference Tables 4-2 and 4-3 for subsurface soil and Table 4-4 for surface soil sample results.

3. Hydro geologic units underlying the site should be correctly identified and described. The text (page 3-8, paragraph 6) states that the Miocene Aquifers include the Citronelle Formation and the Graham Ferry formation (Pliocene). The term Miocene Strata indicates strata of Miocene age, which do not include strata of younger Pleistocene (Citronelle) or Pliocene (Graham Ferry Formation) age. Hydro geologic units typically acquire the names of formations comprising them but these units do not extend beyond formational time-stratigraphic boundaries to include other formations deposited at different times.

The thickness of the "thin gray clay layer" described in the report (ex. page 3-3, paragraph 1 and page ES-3) should be provided. The lithology of this unit should be verified because pure "clay" (containing no silt or sand) is rare in Coastal Plain strata. This unit is similarly identified (gray clay) on the cross section shown on Figure 3-5.

The geologic units should be identified on the "Geologic Cross Section" provided as Figure 3-5. Only generalized lithologic descriptions are given. This would permit identification and correlation of aquifers and stratigraphic units (described in the report) underlying the site.

4. The maximum site wide TCE concentration (130.0 ppb) given on page 4-12 (paragraph 1) is different from that shown on Table 4-6 and Figure 4-2 (120.0 ppb). The correct concentration should be determined and appropriate corrections made.

5. The text (pages 4-14 and 4-15) compares the results of filtered and non filtered groundwater samples. It should be noted that OPC does not utilize filtered groundwater samples in site evaluations and that only non filtered (slow purge) samples are typically used for screening purposes.

6. The text (page 4-19, last paragraph) states that TCDD was detected in all three sediment samples although the statement on page 4-17 (paragraph 5) reports the collection of eight sediment samples from Canal 1. Additional sediment and surface water sampling was requested in a comment letter (dated 2 March 2007) regarding the Draft Site 4 Remedial Investigation Report (dated October 2006) in order to determine the extent of contamination areas of Canal 1 located away from (upstream and downstream of) Site 4. Only three of the eight sediment samples collected during the RI were analyzed for dioxin.

   Dioxin was detected above the unrestricted screening level (4.26 ppb) at both of the two sediment sampling locations. These two locations comprise three samples, including a duplicate at location SD01. Total dioxin (TEQ) concentrations were 3.17 ppt in SD01, 4.36 ppt in SD01D and 32.5 ppt in SD08. Each of the three samples contained appreciable concentrations of 2,3,7,8 TCDD (1.3 ppt, 1.4 ppt and 8.0 ppt in samples SD01, SD01D and SD08, respectively).

   The text (page 4-20, paragraph 1) states that TCDD contributes less than one percent of the total concentration of substituted chlorinated congeners, which suggests that Herbicide Orange (HO) is not the major contributor of dioxins and furans in Site 4 Sediment. The relevance of this statement is unclear and needs clarification. A minimal amount of TCDD in sediment/soil samples that will determine the presence of HO alteration products has not been determined or agreed to by OPC.

Dioxin congener concentration ratios (TCDD/TEQ) indicate that 2,3,7,8 TCDD contributes 25% to 30% of the total TEQ dioxin sediment concentration. This would indicate that TCDD is a major contributor to the total sediment concentration. Please re-evaluate or clarify. The relevancy of whether TCDD (Herbicide Orange footprint) is or is not a major contributor to sediment contamination at this site is not clear, as 2,3,7,8 TCDD contamination (and the presence of TCDD in 100% of the samples taken) has been demonstrated.

7. It is noted that PAH concentrations exceeded ecological and human health screening levels. Elevated PAH and dioxin concentrations in sediment samples collected from Canal 1 indicate potential risk in areas of the stream located away from the landfills. Ecological and human health risk evaluations, as well as associated remedial plans, should address areas of Canal 1 located beyond (upstream and downstream of) stream segments located adjacent to the landfills (Sites 3, 4 and 5).

8. A heading should be inserted between paragraphs 3 and 4 of page 7-13 to indicate the transition from Step 2 to Step 3A of the Ecological Risk Assessment (ERA). It is noted that the Navy is concluding the ERA at the end of Step 3A. The ERA should be reviewed (and the decision to terminate the ERA at this stage should be evaluated) by all appropriate stakeholders (including U.S. Fish and Wildlife, EPA and NOAA) before the ERA is finalized.

Please feel free to contact me if I can be of further assistance.

Sincerely,

Bob Merrill

Bob Merrill

cc. Bart Reedy, USEPA

RESPONSE TO COMMENTS

Responses to MDEQ comments dated August 9, 2009 for the Remedial Investigation Report for the Site 4 – Golf Course Landfill at NCBC Gulfport dated October, 17, 2007 (Rev. 1).

MDEQ Comment 1:

The executive summary should contain more detail (concentration ranges and trends, etc.) about the findings of both the current and Remedial Investigation and pertinent previous investigations. An evaluation of the nature and extent of contamination should be abstracted from the main body of the report.

Response to MDEQ Comment 1:

The executive summary will be re-written to include the synopsis of current and previous investigations and to minimize the evaluation of nature and extend in this section.

MDEQ Comment 2:

The text (pages 2-2 and 2-3) should reference Tables 4-2 and 4-3 for subsurface soil and Table 4-4 for surface soil sample results.

Response to MDEQ Comment 2:

The text will be revised to provide references to the tables.

MDEQ Comment 3:

Hydro geologic units underlying the site should be correctly identified and described. The text (page-3, paragraph 6) states that the Miocene Aquifers include the Citronelle Formation and the Graham Ferry formation (Pliocene). The term Miocene Strata indicates strata of the Miocene age, which do not include strata of younger Pleistocene (Citronelle) or Pliocene (Graham Ferry Formation) age. Hydro geologic units typically acquire the names of formations compromising them but these units do not extend beyond formation time stratigraphic boundaries to include other formations deposited at different times.

The thickness of the "thin gray clay layer" described in the report (ex. Page 3-3, paragraph 1 and page ES-3) should be provided. The lithology of this unit should be verified because pure "clay" (containing no silt or sand) is rare in the Coastal Plain strata. This unit is similarly identified (gray clay) on the cross section shown on Figure 3-5.

The geologic unites should be identified on the "Geologic Cross Section" provide as Figure 3-5. Only generalized lithologic descriptions are given. This would permit identification and correlation of aquifers and stratigraphic units (described in the report) underlying the site.

Response to MDEQ Comment 3:

The use of the term "Miocene Aquifers" will be removed from the report.

The report will be revised to indicate that the unit identified as a thin gray clay is a unit with varying amounts of clay, silt and sand. The thickness of this unit will be discussed further.

Because most of the literature regarding the stratigraphy in shallow zone at this area describes the younger units as undifferentiated, therefore further differentiation would be difficult. The lithologic

descriptions allow correlation of horizons with similar hydrogeologic properties which may effect contaminant fate and transport.

MDEQ Comment 4:

The maximum site wide TCE concentration (130.0 ppb) given on page 4-12 (paragraph 1) is different from that shown on Table 4-6 and Figure 4-2 (120.00 ppb). The correct concentration should be determined and appropriate corrections made.

Response to MDEQ Comment 4:

The correct TCE concentration will be identified (120 µg/L) and used in the revised report. According to the validated laboratory data there is a typographical error in section 4-12.

MDEQ Comment 5:

The text (pages 4-14 and 4-15) compares the results of filtered and non filtered groundwater samples. It should be noted that the OPC does not utilize filtered groundwater samples in site evaluations and that only non filtered (slow purge) samples are typically used for screening purposes.

Response to MDEQ Comment 5:

The discussion will be revised to clarify that the non-filtered samples were used for screening purposes. Furthermore, this information was not used for decision-making

MDEQ Comment 6:

The text (page 4-19, last paragraph) states that TCDD was detected in all three sediment samples although the statement on page 4-17 (paragraph 5) reports the collection of eight sediment samples from Canal 1. Additional sediment and surface water sampling was requested in a comment letter (dated 2 March 2007) regarding the Draft Site 4 Remedial Investigation Report (dated October 2006) in order to determine the extent of contamination areas of Canal 1 located away from (upstream and downstream of) Site 4. Only three of eight samples collected during the RI were analyzed for dioxin.

Dioxin was detected above the unrestricted screening level (4.26 ppb) at both of the two sediment sampling locations. These two locations comprise threes samples, including a duplicate at location SD01. Total dioxin (TEQ) concentrations were 3.17 ppt in SD01, 4.36 ppt in SD01D AND 32.6 in SD08. Each of the three samples contained appreciable concentrations of 2,3,7,8 TCDD (1.3 ppt, 1.4 ppt and 8.0 ppt in samples SD01, SD01D, and SD08, respectively).

The text (page 4-20, paragraph 1) states that TCDD contributes to less than one percent of the total concentration of substituted chlorinated congeners, which suggest that Herbicide Orange (HO) is not the major contributor of dioxins and furans in Site 4 Sediment. The relevance of this statement is unclear and needs clarifications. A minimal amount of TCDD in sediment/soil samples that will determine the presence of HO alteration products has not been determined or agreed to by OPC.

Dioxin congener concentration ratios (TCDD/TEQ) indicate that 2,3,7,3 TCDD contributes to 25% to 30% of the total TEQ dioxin sediment concentration. This would indicate that TCDD is a major contributor to the total sediment concentration. Please reevaluate or clarify. The relevancy of whether TCDD (Herbicide Orange footprint) is or is not a major contributor to sediment contamination at this site is not clear, as 2,3,7,8 TCDD contamination (and the presence of TCDD in 100% of the samples taken has been demonstrated.

Response to MDEQ Comment 6:

The discussion of dioxin congener concentrations distribution at Site 4 will be revised to clarify the nature and extent of dioxin at Site 4 in light of the presumptive remedy strategy. The congener concentration ratios provided were for the total mass of TCDD/total mass of 2,3,7,8 chlorinated congeners, rather than the TEQ, however the presence of TCDD in sediment at Site 4 will be addressed in the selected remedy. Text will be revised and modified to address your concern.

MDEQ Comment 7:

> It is noted that PAH concentrations exceeded ecological and human health screening levels. Elevated PAH and dioxin concentrations sediment samples collected from Canal 1 indicate potential risk in areas of the stream located away from the landfills. Ecological and human health risk evaluations, as well as associated remedial plans, should address areas of Canal 1 located beyond) upstream and downstream of) stream segments located adjacent to the landfills)Sites 3, 4, and 5).

Response to MDEQ Comment 7:

Because most of the western half of NCBC Gulfport can potentially contribute contaminants to Canal 1, the RI s for the landfill sites adjacent to Canal 1 has focused on the potential for migration of contaminants from the landfills to the Canal. The presumptive remedy strategy is designed to contain waste at the sites and prevent future migration of contaminants. Further evaluation of areas of Canal 1 not directly linked to releases from the landfill sites is beyond the scope of this remedial investigation.

MDEQ Comment 8:

> A heading should be inserted between paragraphs 3 and 4 of page 7-13 to indicate the transition from Step 2 to Step 3A. The ERA should be reviewed and the decision to terminate the ERA at this stage should be evaluated) by all appropriate stakeholders (including U.S. Fish and Wildlife, EPA, and NOAA) before the ERA is finalized.

Response to MDEQ Comment 8:

The text format change was made to clarify the steps of the SLERA. Navy policy is to use step 3A as the management decision point to either implement remedial actions to address site conditions or to end the investigation as warranted based on the findings of the SLERA. For Site 4, step 3A provides sufficient data to proceed with the presumptive remedy.