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Remedial Investigation Report for Site 44 (Former UST Site 3221 SW)

Naval Air Station Pensacola
Pensacola, Florida

Contract Task Order 0367

October 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST

NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

REMEDIAL INVESTIGATION REPORT
FOR
SITE 44 (FORMER UST SITE 3221 SW)

NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

Submitted to:
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Southeast
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Jacksonville, Florida 32212

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PROFESSIONAL CERTIFICATION

Remedial Investigation Report
Site 44 (Former UST Site 3221 SW)
Naval Air Station Pensacola, Florida

This Remedial Investigation Report was prepared under the direct supervision of the undersigned geologist using geologic and hydrogeologic principles standard to the profession at the time the report was prepared in general conformance with the Requirements of Chapter 62-770, Florida Administrative Code. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of additional information on the assessment described in this report. This report was developed specifically for the referenced site and should not be construed to apply to any other site.

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October 24, 2008

Date

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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
ATSDR	Agency for Toxic Substance and Disease Registry
BCF	bioconcentration factor
BHC	bnezene hexachloride
bls	below land surface
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylene
°C	degrees Celsius
Cal EPA	California Environmental Protection Agency
CAR	Contamination Assessment Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
cm^2	centimeters squared
COC	Chemical of Concern
COPC	Chemical of Potential Concern
cPAH	carcinogenic polynuclear aromatic hydrocarbon
C_{SAT}	Soil Saturation Limits
CSF	cancer slope factor
CSM	Conceptual Site Model
CTL	Cleanup Target Level
CTO	Contract Task Order
CVOC	chlorinated volatile organic compound
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DPT	Direct-push Technology
Eco SSL	ecological soil screening level
EDB	ethylene dibromide
Eh	Oxidation Reduction Potential of Groundwater
EPC	exposure point concentration
ESV	ecological screening values
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection

ACRONYMS (CONTINUED)

FL-PRO	Florida Petroleum Range Organics
ft	feet/foot
ft/day	feet per day
ft/min	feet per minute
GCTL	Groundwater Cleanup Target Level
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HSA	hollow stem auger
ILCR	Incremental Lifetime Cancer Risk
IR	Installation Restoration
IRIS	Integrated Risk Information System
k	hydraulic conductivity
K_d	distribution coefficient
kg	killigrams
K_{OC}	Organic Carbon Parition Coefficient
K_{Ow}	Octanol/Water Parition Coefficient
L	liter
m^3	cubic meters
m^3/mole	cubic meters per mole
MCL	Maximum Contaminant Level
mg	milligrams
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MI	Mobility Index
mm Hg	millimeters mercury
MRL	minimal risk levels
msl	mean sea level
MWR	Morale, Welfare, and Recreation
NARF	Naval Air Rework Facility
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast

ACRONYMS (CONTINUED)

NCEA	National Center for Environmental Assessment
NEESA	Naval Energy and Environmental Support Activity
NFA	No Further Action
NRWQC	National Recommended Water Quality Criteria
NTTC	Navy Technical Training Center
NTX	no toxicity criteria
NUT	essential nutrient
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORNL	Oak Ridge National Laboratory
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear Aromatic Hydrocarbon
Pb	lead
PCB	Polychlorinated Biphenyl
PCE	tetrachloroethene
PEF	particulate emissions factor
ppb	parts per billion
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Values
PRG	preliminary remediation goal
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RAGS	Risk Asessment Guidance for Superfund
RBCAP	risk-based corretive action process
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI	Remedial Investigation
RME	resonable maximum exposure
RMO	Risk Management Option
S	Water Solubility
SAP	Sampling and Analysis Plan
SAR	Site Assessment Report
SARA	Superfund Amendments and Reauthorization Act
SCTL	Soil Cleanup Target Level
SCV	secondary chronic value

ACRONYMS (CONTINUED)

SMPD	scientific/management decision point
SOP	Standard Operating Procedure
SPLP	synthetic precipitation leaching procedure
SQG	Soil Quality Guidelines
SQL	sample quantitation limit
SSL	Soil Screening Level
SVOC	Semivolatile Organic Compound
SWL	Static Water Level
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TCL	Target Compound List
TEC	Threshold Effects Concentration
TEF	Toxicity Equivalency Factor
TPH	total petroleum hydrocarbons
TRW	Technical Review Workgroup
TtNUS	Tetra Tech NUS, Inc.
TRPH	total recoverable petroleum hydrocarbons
UCL	Upper Confidence Limit
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VF	Volatilization Factor
VOC	Volatile Organic Compound
VP	Vapor Pressure

EXECUTIVE SUMMARY

The primary objective of the Remedial Investigation (RI) at Site 44 is to provide data to guide the selection of a remedy for contamination that is protective of human health and the environment. In order to achieve this primary objective, samples from various media were collected and analyzed to fill data gaps from previous investigations and to evaluate the extent of contamination previously documented at the site.

SITE HISTORY

Site 44 is located at the southwest end of Building 3221, a large hangar currently used to refurbish aircraft used for museum display. Building 3221 is adjacent to Forrest Sherman Field. The hangar and adjacent paved areas were part of the Naval Air Rework Facility (NARF), and were probably used for aircraft maintenance before the current National Museum of Naval Aviation location opened in 1975.

The paved area adjacent to the southwest corner of Building 3221 is currently used as a wash rack for cleaning aircraft and aircraft parts. Surface drainage in this area flows to a small concrete-lined ditch located on the southeast edge of the pavement. When aircraft parts washing activities are being conducted, a diverter system is used to direct the run off to the sanitary sewer system for treatment at the Naval Air Station (NAS) Pensacola Industrial Wastewater Treatment Plant.

PREVIOUS INVESTIGATION

Site 44 was first investigated as Underground Storage Tank (UST) Site 3221 SW in 1992, following the removal of a 1,000-gallon UST located at the southwest corner of Building 3221. Tetrachloroethene (PCE) was detected at concentrations exceeding the state guidance concentrations in four wells downgradient of the UST. Because of the low concentrations of PCE, the site investigation was allowed to continue in accordance with the petroleum program. The source of chlorinated solvents in groundwater was not determined during the UST investigation. Because of the detection of chlorinated solvents in groundwater, the Navy transferred this site to the Installation Restoration (IR) Program for further assessment.

NATURE AND EXTENT OF CONTAMINATION

The release of contaminants at Site 44 appears to have resulted from routine aircraft maintenance operations. The time of disposal or accidental releases are unknown.

Soil screening for volatile organic compounds (VOCs) with the mobile laboratory identified one soil boring location with a detectable concentration of PCE that was less than screening levels. Arsenic delineation sampling indicated that arsenic exceedances were limited to one soil boring location. Arsenic was

reported in two soil samples at concentrations greater than the residential Soil Cleanup Target Level (SCTL). These arsenic concentrations were within the background range determined by statistical analysis of arsenic and iron distribution at NAS Pensacola. Carcinogenic polynuclear aromatic hydrocarbon (cPAH) delineation sampling identified an area of cPAH exceedances around the foundation of former Building 3629. Four soil boring locations had benzo(a)pyrene equivalent concentrations exceeding the residential SCTL. Lead and cadmium were reported at concentrations exceeding their Groundwater Cleanup Target Levels (GCTLs) in several synthetic precipitation leaching procedure (SPLP) samples. The total lead concentrations in all samples were less than the NAS Pensacola reference concentration. The total cadmium results in all samples were less than the default leaching SCTL.

Groundwater was determined to flow to the northeast at the site overall. Groundwater flow velocity was estimated to be approximately 0.48 feet per day.

Trichloroethene (TCE) was detected at concentrations exceeding the GCTL in six shallow monitoring wells. One plume was identified in the vicinity of PEN-3221-09, which was installed as part of the UST investigation and previously had TCE exceedances. The second, larger plume extends north from the northwest corner of Building 3221, and includes monitoring wells PEN-44-11, PEN-44-14, PEN-44-15, PEN-44-21, and PEN-44-24.

RISK ASSESSMENT

The noncarcinogenic risks are below the target hazard index (HI) [United States Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) requirements] for exposure to surface soil, subsurface soil, and groundwater. Carcinogenic risks exceed 1×10^{-4} for exposure to groundwater by the hypothetical future resident, which is greater than the FDEP target risk level of 1×10^{-6} and the USEPA risk range of 1×10^{-4} to 1×10^{-6}. Carcinogenic risks associated with exposure to subsurface soil exceed FDEP's target risk level for the hypothetical future resident. In soil, the primary driver of risk are cPAHs; in groundwater, the primary driver of risk is TCE.

The ecological risk assessment found that the overall level of ecological risk associated with detected contaminants is negligible.

CONCLUSIONS AND RECOMMENDATIONS

Arsenic and cPAHs were detected in surface soil and subsurface soil samples at concentrations exceeding risk-based screening criteria. TCE in groundwater samples exceeded risk-based screening criteria. The contaminants in Site 44 surface and subsurface soil will require measures to eliminate or

minimize exposure by active cleanup, engineering controls, and/or institutional controls. A detailed evaluation of alternatives to achieve this goal should be presented in a Feasibility Study for Site 44.

1.0 INTRODUCTION

Tetra Tech NUS, Inc., (TtNUS) under contract to the Department of Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE) is submitting this RI Report for Site 44 at NAS Pensacola, located in Pensacola, Florida. This RI Report was prepared under the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0367.

1.1 PURPOSE OF REMEDIAL INVESTIGATION

The primary objective of the RI is to provide data to evaluate the current environmental conditions and guide the selection of a remedy, if required, that is protective of human health and the environment for any contamination present at Site 44. In order to achieve this primary objective, samples from various media were collected and analyzed to fill data gaps from previous investigations. Samples from various media were used to evaluate the extent of contamination previously documented at the site and evaluate the effect remedial actions have had on site conditions.

1.2 FACILITY BACKGROUND

NAS Pensacola (Figure 1-1) is located in Escambia County, in Florida's northwest coastal area, approximately 5 miles west of the Pensacola City limits. The federal government established the Navy Yard at Pensacola in 1825 and was placed in caretaker status in 1911. Naval aviation operations began at the facility in 1914 and the facility was expanded in 1930's as an NAS.

Current land use at NAS Pensacola consists of areas used for flight operations at Forrest Sherman Field, various military housing, training, and support activities, and historical facilities open to the Public, including the National Museum of Naval Aviation. Additional details on the NAS Pensacola facility may be found in the facility administrative record.

Site 44 is located adjacent to the southwest end of Building 3221, approximately 1,500 feet northwest of the intersection of Taylor Road and Radford Boulevard and consists of an area approximately 250 feet by 250 feet in size.

1.2.1 Site Description and History

Site 44 is located at the southwest end of Building 3221, which is currently used by the National Museum of Naval Aviation staff to refurbish aircraft used for display. Building 3221 is a large hangar adjacent to Forrest Sherman Field, which was opened in 1955 as the master jet landing field for NAS Pensacola

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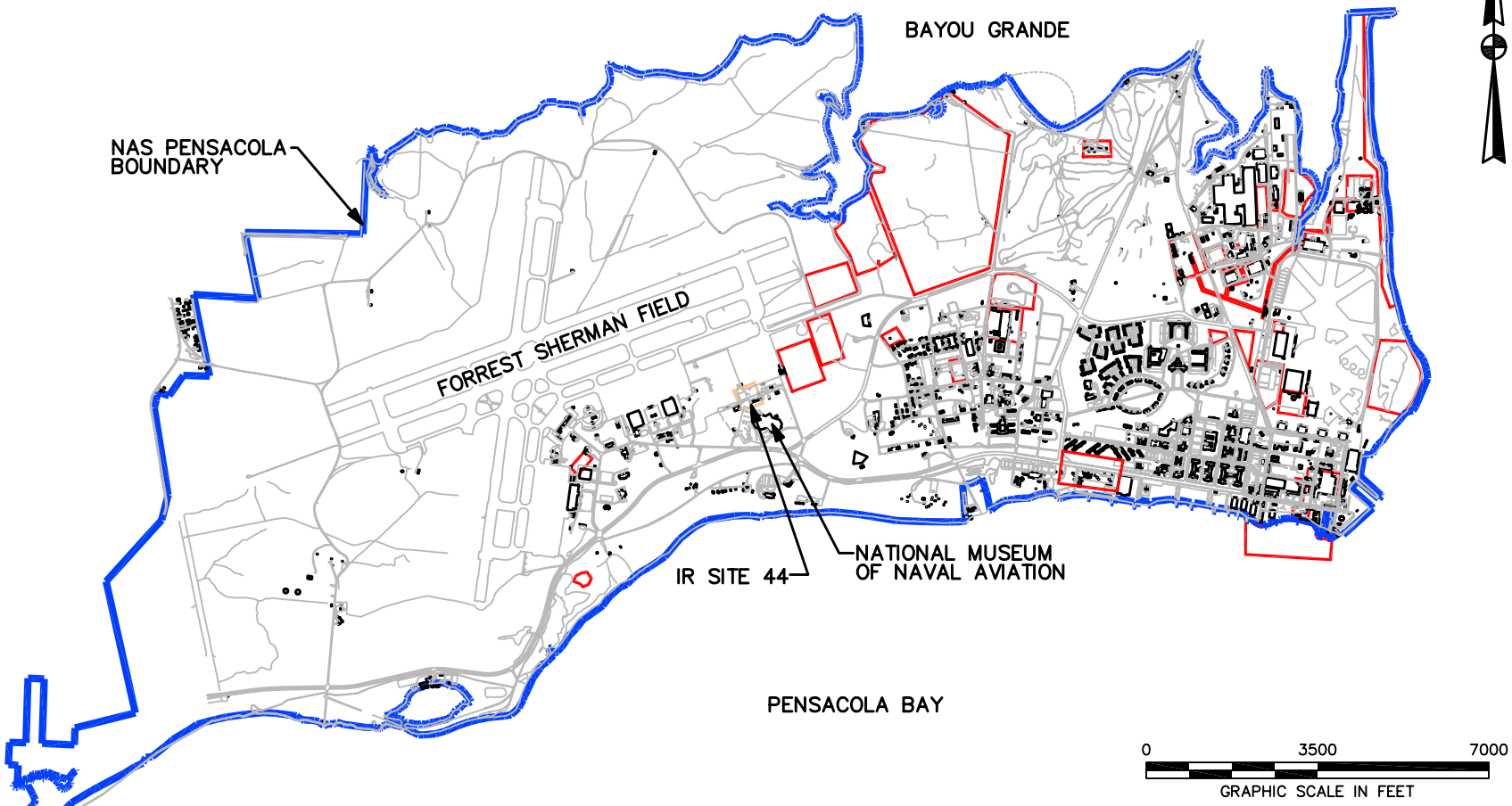

DRAWN BY MF	DATE 12/15/06	SITE LOCATION MAP SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NO. 0007
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SCALE AS NOTED			DRAWING NO. FIGURE 1-1 / REV. 0

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(Figure 1-1). In 1983, Building 3221 was shown as part of the NARF, formerly the NAS Pensacola operations and repair department [Naval Energy and Environmental Support Activity (NEESA), 1983] and was probably used for aircraft maintenance before the current National Museum of Naval Aviation location opened in 1975.

The paved area adjacent to the southwest corner of Building 3221 is currently used as a wash rack for cleaning aircraft and aircraft parts (Figure 1-2). According to National Museum of Naval Aviation personnel, only Simple Green (a biodegradable surfactant agent) is used by the National Museum of Naval Aviation to clean parts. Surface drainage in this area flows to a small concrete-lined ditch located on the southeast edge of the pavement. Normal rainfall is directed through this ditch to a stormwater infall, but when aircraft parts washing activities are being conducted a diverter system is used to direct the run off to the sanitary sewer system where it is treated at the NAS Pensacola Industrial Wastewater Treatment Plant.

The surface cover for the site is a mix of grass, asphalt, concrete, and tree cover. The north-central portion of the site is covered with cement; the northwest portion is an asphalt-covered storage area for various aircraft parts and is bounded to the west by a wooded area; the northeast portion abutting Building 3221 is an asphalt parking area; and the southern portion is grass-covered with an unpaved access road trending southwest-northeast through it. An overhead power line runs through the northern portion of the site, trending southwest-northeast coincident with the southeast face of Building 3221. An underground water line enters the site from the central northern portion, terminating in a fire hydrant connection.

1.2.2 Previous Investigations

Site 44 was first investigated as UST Site 3221 SW in 1992, following the removal of a 1,000-gallon UST located at the southwest corner of Building 3221 (Figure 1-2). The former tank had been installed in 1967 and was reportedly used to store PD-680 (a petroleum distillate cleaning solvent). The UST was removed in 1992 and replaced with a new 1,000-gallon UST used to store waste oil (ABB=ES, 1993). During tank removal activities, soil samples collected from the excavation were slightly above the state screening level for petroleum hydrocarbons.

A Contamination Assessment Report (CAR) was prepared as part of the UST investigation [ABB Environmental Services, Inc. (ABB-ES), 1993]. Soil samples were field screened for organic vapors by the headspace method and analyzed at an off-site laboratory for total metals; groundwater samples were analyzed for waste oil analytical group constituents. Water level measurements in site wells indicated that shallow groundwater flows from southwest to northeast. Groundwater analytical results indicated that concentrations of petroleum constituents were below state standards. However, PCE was detected

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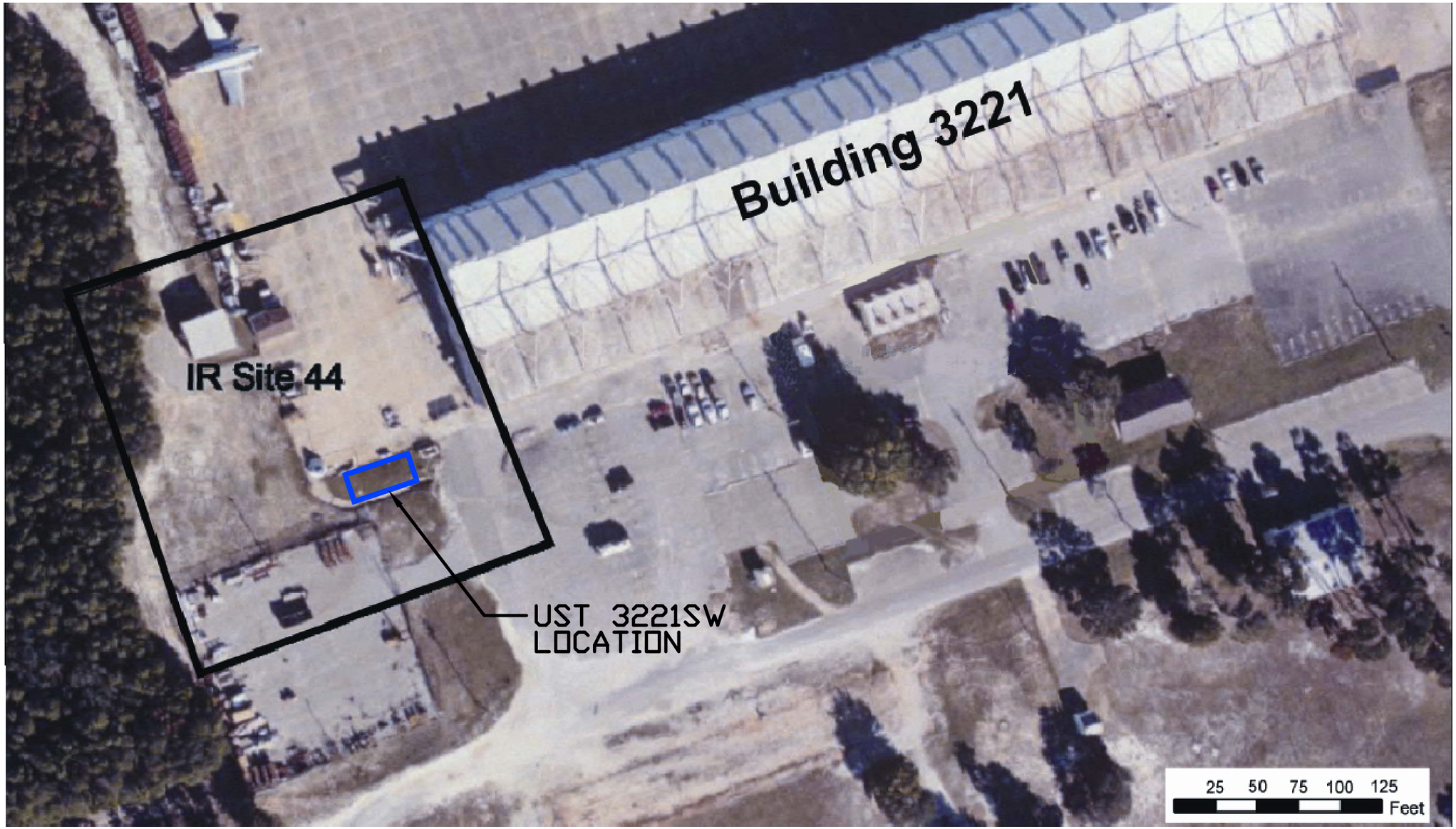

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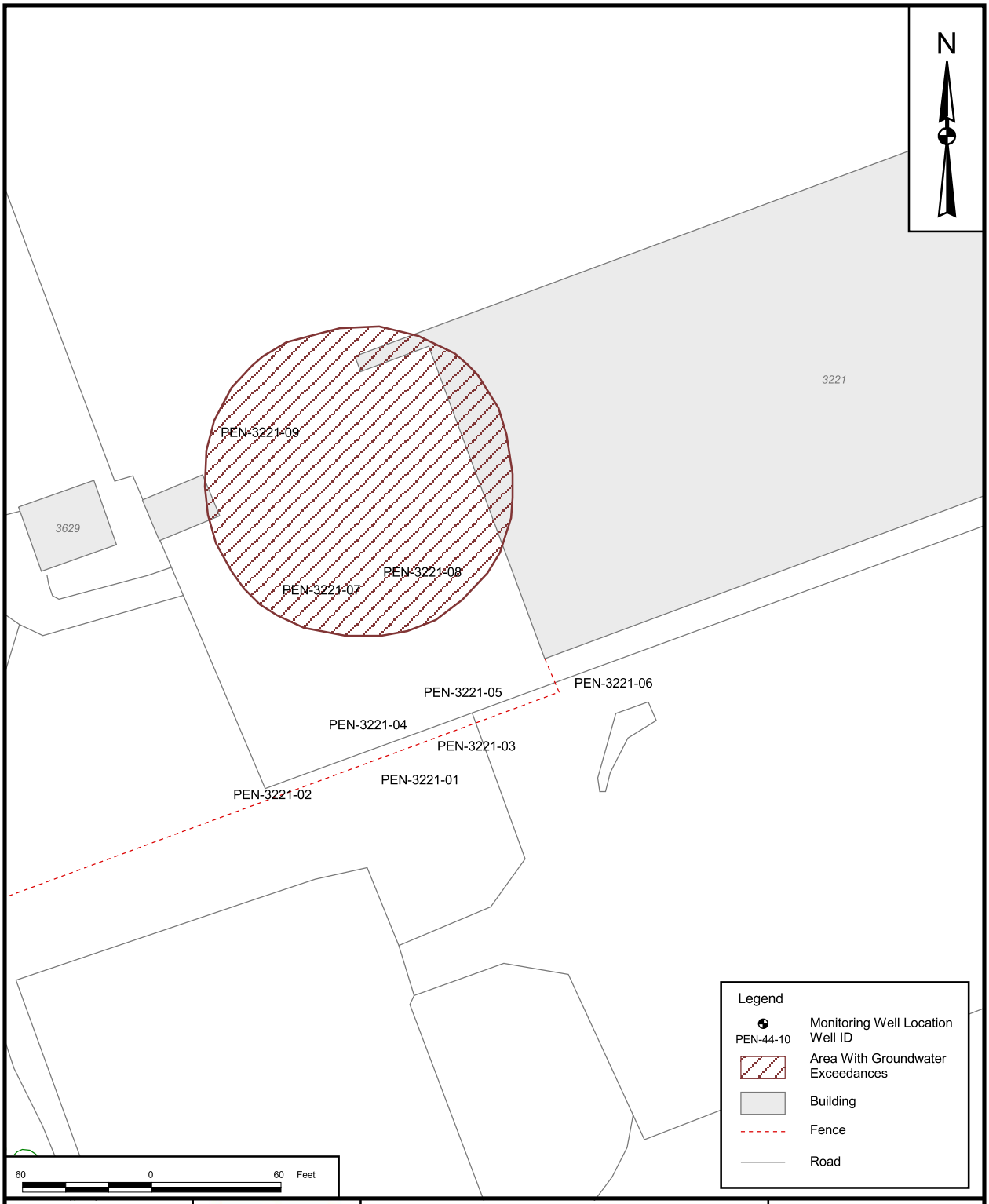
at concentrations slightly exceeding the then-state guidance concentrations in four wells downgradient of the UST (Figure 1-3). Because of the low concentrations of PCE, the site investigation was allowed to continue in accordance with the petroleum program. Additional monitoring wells and soil borings were installed at the site and sampled.

Soil results indicated that petroleum contamination was not significant in that media. PCE was not detected in groundwater samples located in the area near the former UST, but was present in a single well approximately 100 feet downgradient of the former UST. TCE was not detected at locations near the former UST, but was present in three downgradient wells (beginning at approximately 75 feet downgradient of the former UST) at progressively increasing concentrations of 4, 5, and 25 parts per billion (ppb), respectively.

The source of chlorinated solvents in groundwater was not determined during the UST investigation, but was speculated to be associated with the former Building 3629, the flammable storage area located west of Building 3221 and just off the surface of the parking apron (see Figure 1-3). Groundwater samples have not been collected since the contamination assessment fieldwork in 1992. Soil samples were not analyzed for chlorinated solvent constituents during the investigation, therefore no definitive statement can be made regarding impacts to that media.

Because of the detection of chlorinated solvents in groundwater, the Navy transferred this site to the IR Program for further assessment. Site soil and groundwater did not exceed state UST program guideline concentrations for petroleum constituents, therefore No Further Action (NFA) was required under the UST program.

In addition to UST Site 3221 SW, UST Site 3241 is located to the east of Site 44 (Figure 1-4). A fuel oil UST of unknown capacity was closed by removal in 1994. Soil collected from the excavation indicated the presence of total xylenes and PCE above FDEP SCTLs. A single monitoring well that was installed in the tank excavation area yielded benzene at a concentration exceeding the FDEP GCTLs. TtNUS completed a Site Assessment Report (SAR) for this site in 2003. As part of this investigation, 19 direct-push technology (DPT) soil borings were completed and five additional monitoring wells installed and sampled. The results of the investigation indicated that concentrations of petroleum constituents in soil were less than SCTLs, that free product was not present in soil or groundwater, and that benzene remained above the GCTL in the old tank excavation area. Following implementation of a natural attenuation monitoring plan under the Florida UST program, the site was approved for NFA.



DRAWN BY C. SPEHAR	DATE 2/07/06	GROUNDWATER CONTAMINATION FOUND IN UST INVESTIGATION SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER —
CHECKED BY B. OLSON	DATE 5/03/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1 - 3 / REV 0

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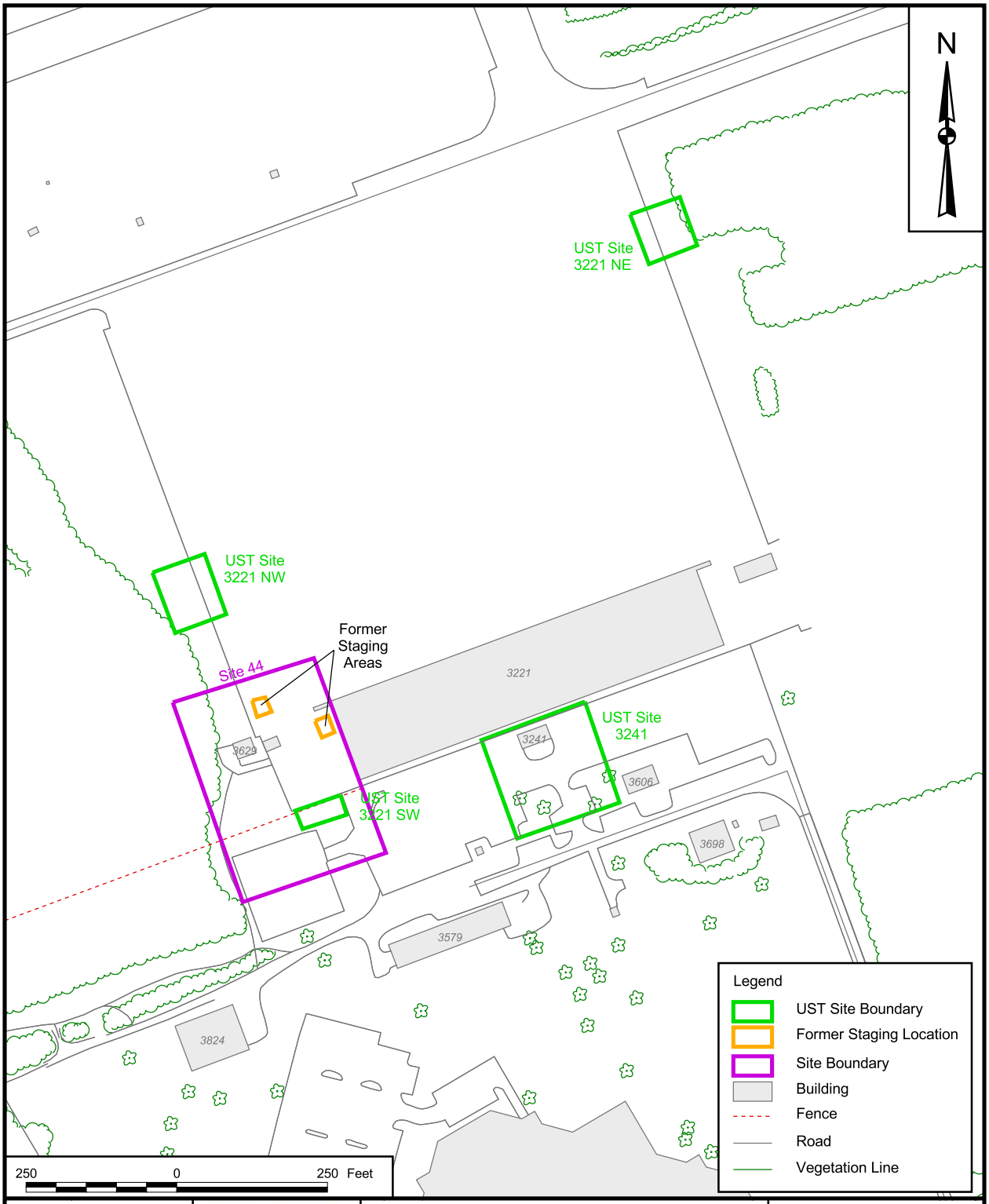

DRAWN BY C. SPEHAR	DATE 3/22/06	ADJACENT UST SITES SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER —
CHECKED BY B. OLSON	DATE 5/03/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1 - 4 / REV 0

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1.2.3 Regulatory Setting

The Navy IR Program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations, with the goal of expediting and improving environmental response actions while protecting human health and the environment. The IR program is conducted in accordance with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that federal facilities comply with the act, both procedurally and substantively. Site 44 is being investigated as part of CERCLA requirements.

1.3 REPORT ORGANIZATION

The RI Report is organized into 8 sections with supporting references and appendices:

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

2.0 STUDY AREA INVESTIGATION

Soil screening samples were collected for on-site laboratory analysis to provide a preliminary evaluation of site conditions and potential releases. Selection of full analyte list soil sample locations and additional monitoring well locations were based on the results of the soil screening investigation. Soil and groundwater samples were collected for full analyte list off-site laboratory analysis and the analytical results were screened against appropriate federal and state screening values. Field activities, such as sampling and monitoring well installation, were conducted in accordance with the Health and Safety Plan (HASP) and the FDEP Standard Operating Procedures (SOPs) for Field Activities (FDEP, 2004).

2.1 SOIL SCREENING

Twenty-nine soil borings were advanced to collect soil samples for on-site laboratory analysis (Figure 2-1). Samples submitted to the mobile laboratory were analyzed for a select list of chlorinated VOCs (CVOCs), including 1,1- and 1,2-dichloroethane (DCA), 1,1- and 1,2-(cis and trans) dichloroethene (DCE), methylene chloride, 1,1,1- and 1,1,2-trichloroethane (TCA), TCE, and PCE. The samples were also analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) and naphthalene.

The rationale for selecting soil boring locations was:

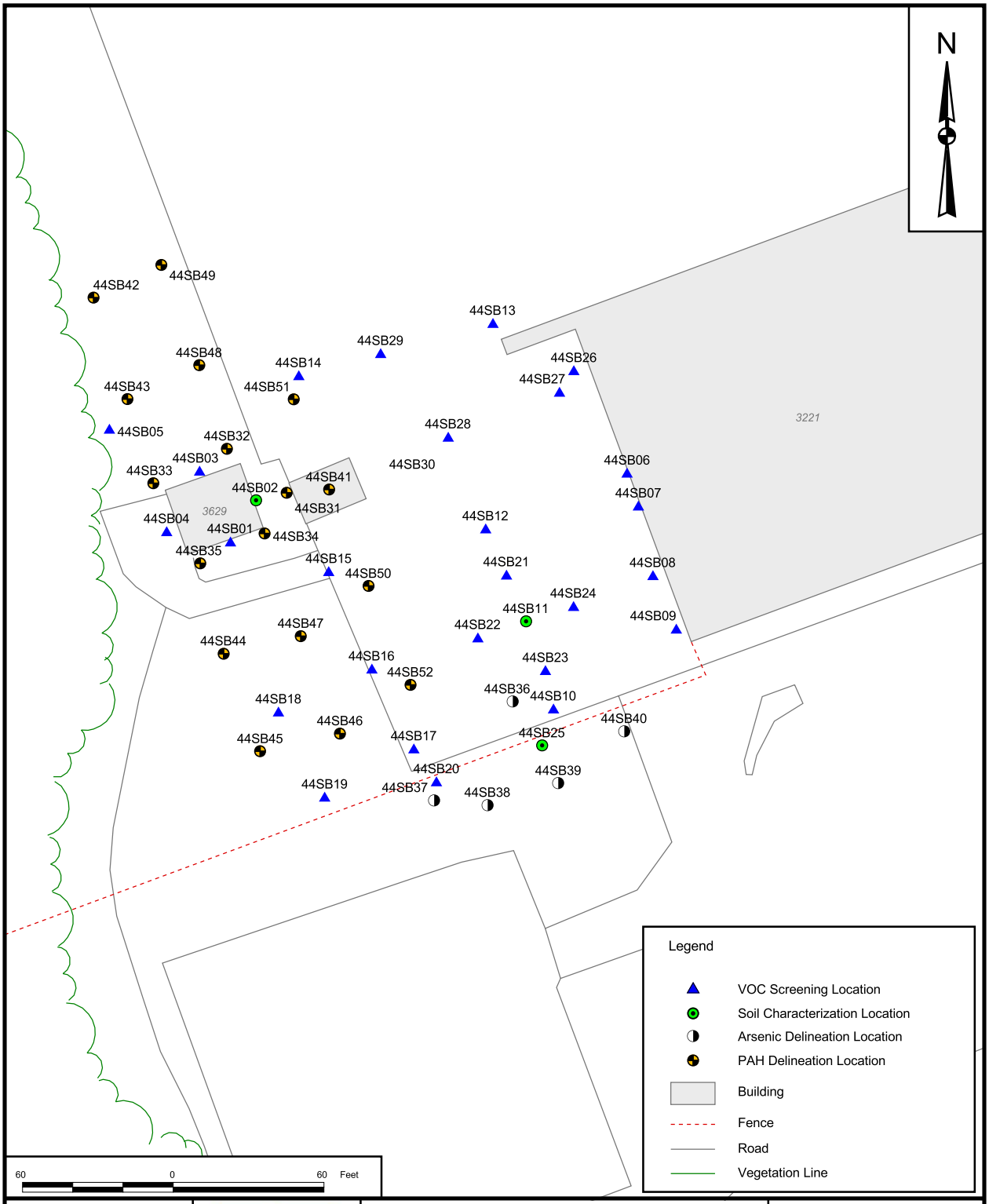
- Soil borings 44SB01 through 44SB04 were placed around the perimeter of the foundation of former Building 3629, which had been used for hazardous materials storage.

- Soil borings 44SB05 through 44SB20, the majority of the soil boring locations, were based on a sampling grid to provide full coverage of the washrack area.

- Four soil borings, 44SB21 through 44SB24, were spaced equally around the 44SB11 location, based on analytical results from the mobile laboratory.

- Soil boring 44SB25 was advanced at the approximate location of UST 3221 SW.

- Soil borings 44SB26 and 44SB27 were located at a materials staging area marked on the concrete adjacent to the southwest end of Building 3221.



DRAWN BY C. SPEHAR	DATE 1/20/06	SOIL BORING LOCATIONS SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
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SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV 0

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- One soil boring, 44SB28, was advanced central to the four exisiting shallow wells that had VOC exceedances during the previous UST investigation.

- One soil boring, 44SB29, was located at a materials staging area marked on the concrete adjacent to the west edge of the apron.

Soil screening samples were collected at each location from ground surface (below any pavement if present) to the saturated zone. Depth to groundwater at the site was approximately 6 feet. The soil screening samples were collected from the following depth intervals:

- Ground surface to 6 inches
- 6 inches to 2 feet
- 2 feet to 4 feet
- 4 feet to 6 feet

Soil boring logs are included in Appendix A.

2.2 SOIL CHARACTERIZATION SAMPLING

Following the soil screening, additional soil sampling was in conducted in September 2005 to further characterize the nature of potential contaminants at the site. Three locations for characterization soil sampling were selected (Figure 2-1):

- Soil boring 44SB02 was located on the northeast of the foundation of former Building 3629, which had been used for hazardous materials storage.
- Soil boring 44SB11 was located based on analytical results from the mobile laboratory for screening samples.
- Soil boring 44SB25 was located at the approximate location of UST 3221 SW.

The characterization soil samples collected during the site characterization were analyzed for the full list of Target Compound List (TCL) and Target Analyte List (TAL) analytes, as well as petroleum hydrocarbons. The soil samples were analyzed for TCL VOCs (USEPA Method SW-846 8260B) and ethylene dibromide (EDB) (USEPA 504.1), TCL semivolatile organic compounds (SVOCs) and polynuclear aromatic hydrocarbons (PAHs) (USEPA Method SW-846 8270C/8310), TCL pesticides and polychlorinated biphenyls (PCBs) (USEPA Method SW-846 8081/8082), total recoverable petroleum hydrocarbons (TRPH) [Florida Petroleum Range Organics (FL-PRO)] and TAL metals (USEPA Method SW 846 6010B, 9010, and 7471).

The soil borings at Site 44 were advanced using a DPT soil-sampling system to obtain continuous subsurface soil samples. The DPT sampler was used to collect samples from discrete intervals from the ground surface to above the zone of groundwater saturation. Soil boring logs are included in Appendix A. In addition, quality assurance and quality control (QA/QC) samples were collected. One trip blank, one rinsate blank, and one field duplicate sample were collected during the soil characterization for QA/QC purposes. The subsurface soil investigation locations are shown on Figure 2-2.

Characterization soil samples were collected from these locations for SPLP extraction and analysis for TCL VOCs and TAL metals. The SPLP sampling targeted CVOCs previously identified in groundwater samples collected during the UST Site 3221 investigations included TCE and PCE. In addition, some of the metals previously detected during the UST investigation do not have default leaching SCTLs and site specific testing is required to determine if site soils may leach these elements to groundwater.

Based on the TCL pesticide analytical results for the initial characterization samples, one additional SPLP sample was collected from 0 to 6 inches at the 44SB02 sampling location and analyzed for selected pesticides.

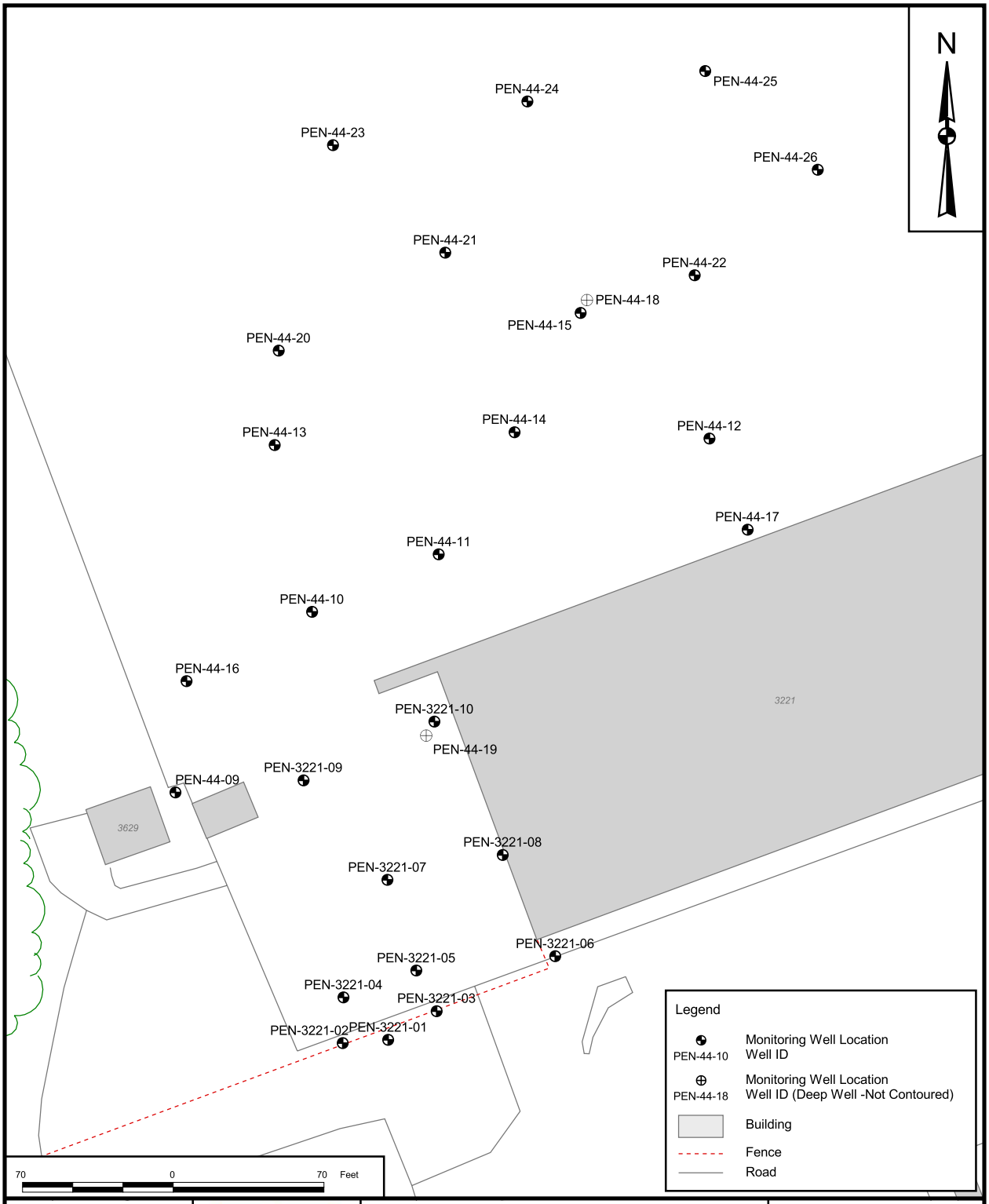
2.3 SOIL DELINEATION SAMPLING

Following evaluation of the soil characterization sample data, additional soil samples were collected from selected areas at Site 44. Arsenic concentrations exceeding screening criteria were identified at one site characterization sample location, soil boring 44SB25 (Figure 2-1). In May 2006, five additional soil borings (44SB36 to 44SB40) were advanced around this location and the samples were analyzed for arsenic.

PAH concentrations exceeding screening criteria were identified at one site characterization sample location, soil boring 44SB02 (Figure 2-1). In May and August 2006, 17 additional soil borings (44SB31 to 44SB35 and 44SB41 to 44SB52) were advanced around this location and the samples were analyzed for PAHs.

2.4 EXISTING WELL EVALUATION

A network of 10 shallow monitoring wells was previously installed at the site during the UST Site 3221 SW investigation (Figure 2-2). Previously installed monitoring wells at the site are identified with 3221 in the well identifier. A summary of the well construction details are provided in Table 2-1. The previously installed monitoring wells were evalauated to determine if the wells were useful for current and future groundwater monitoring activities. Static water levels and total depths were recorded for each of the



DRAWN BY C. SPEHAR	DATE 1/20/06	MONITORING WELL LOCATIONS SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
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TABLE 2-1

MONITORING WELL INSTALLATION SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Monitoring Well Designation	Well Type	Installation Date	Installation Method	Total Depth	Screened Interval Depth	Top-of-Casing Elevation	Comments
PEN-3221-01	Shallow	Unknown	HSA	14.8	4.8'-14.8'	24.61	UST 3221 NW Investigation
PEN-3221-02	Shallow	Unknown	HSA	14.7	4.7'-14.7'	24.49	UST 3221 NW Investigation
PEN-3221-03	Shallow	Unknown	HSA	15	5'-15'	24.89	UST 3221 NW Investigation
PEN-3221-04	Shallow	Unknown	HSA	14.7	4.7'-14.7'	24.42	UST 3221 NW Investigation
PEN-3221-05	Shallow	Unknown	HSA	15	5'-15'	24.82	UST 3221 NW Investigation
PEN-3221-06	Shallow	Unknown	HSA	14.7	4.7'-14.7'	25.21	UST 3221 NW Investigation
PEN-3221-07	Shallow	Unknown	HSA	14.8	4.8'-14.8'	24.81	UST 3221 NW Investigation
PEN-3221-08	Shallow	Unknown	HSA	14.8	4.8'-14.8'	25.41	UST 3221 NW Investigation
PEN-3221-09	Shallow	Unknown	HSA	14.7	4.7'-14.7'	25.00	UST 3221 NW Investigation
PEN-3221-10	Shallow	Unknown	HSA	15	5'-15'	25.44	UST 3221 NW Investigation
PEN-44-09	Shallow	10/3/2005	HSA	14	4'-14'	24.66	RI Groundwater Characterization
PEN-44-10	Shallow	10/3/2005	HSA	14	4'-14'	25.26	RI Groundwater Characterization
PEN-44-11	Shallow	10/3/2005	HSA	14	4'-14'	25.18	RI Groundwater Characterization
PEN-44-12	Shallow	10/3/2005	HSA	14	4'-14'	25.08	RI Groundwater Characterization
PEN-44-13	Shallow	10/3/2005	HSA	14	4'-14'	24.44	RI Groundwater Characterization
PEN-44-14	Shallow	10/3/2005	HSA	14	4'-14'	24.84	RI Groundwater Characterization
PEN-44-15	Shallow	10/3/2005	HSA	14	4'-14'	24.54	RI Groundwater Characterization
PEN-44-16	Shallow	5/9/2006	HSA	14	4'-14'	25.37	RI Groundwater Delineation
PEN-44-17	Shallow	5/10/2006	HSA	14	4'-14'	25.49	RI Groundwater Delineation
PEN-44-18	Deep	12/5/2005	Sonic	75	65'-75'	24.48	RI Groundwater Characterization
PEN-44-19	Deep	12/5/2005	Sonic	75	65'-75'	25.37	RI Groundwater Characterization
PEN-44-20	Shallow	5/9/2006	HSA	14	4'-14'	24.04	RI Groundwater Delineation
PEN-44-21	Shallow	5/10/2006	HSA	14	4'-14'	23.96	RI Groundwater Delineation
PEN-44-22	Shallow	5/10/2006	HSA	14	4'-14'	24.13	RI Groundwater Delineation
PEN-44-23	Shallow	8/13/2006	HSA	15	5'-15'	23.28	RI Groundwater Delineation
PEN-44-24	Shallow	8/13/2006	HSA	14	4'-14'	23.62	RI Groundwater Delineation
PEN-44-25	Shallow	8/13/2006	HSA	14	4'-14'	23.31	RI Groundwater Delineation
PEN-44-26	Shallow	8/13/2006	HSA	14	4'-14'	24.04	RI Groundwater Delineation

Notes:
HSA = Hollow stem auger
Depths in feet below grade
Elevations relative to arbitrary benchmark, top of casing for PEN-3221-09 of 25.00 feet
Wells are flush mount surface completions

previously installed wells to determine if the wells were screened at appropriate intervals and if the wells had silted up or had become obstructed over time. Based on these observations, the 10 shallow monitoring wells installed previously for the UST Site 3221 SW investigation were suitable for the Site 44 groundwater monitoring program.

2.5 MONITORING WELL INSTALLATION

A new permanent monitoring well network, including both shallow and deep monitoring wells, was installed during the RI to supplement the existing wells (Figure 2-2). Seven shallow monitoring wells (PEN-44-09 to PEN-44-15) were installed during the first phase of the site characterization investion to an approximate depth of 15 feet below land surface (bls). In addition, two deep permanent monitoring wells (PEN-44-18 and PEN-44-19) were installed to an approximate depth of 75 feet bls. Based on the results of the initial groundwater sampling event, nine additional shallow wells (PEN-44-16 and PEN-44-17, PEN-44-20 to PEN-44-26) were installed at the site to delineate VOCs detected in groundwater. Well construction details are provided in Table 2-1 and Appendix A.

The monitoring wells installed at Site 44 were designed to investigate the aquifer interval from the water table down to a low-permeability confining unit, which is typically encountered from 50 to 75 feet bls at NAS Pensacola (Geraghty and Miller, 1986). Material above the this low-permeabilty unit comprises the uppermost portion of the surficial aquifer, and is composed of quartz sand with generally small percentages of humic material, shell material, and heavy minerals. The primary focus of groundwater investigations at NAS Pensacola include the uppermost interval of this unit (bracketing the water table) and the lowermost interval (immediately above the low-permeability unit), referred to as the shallow and deep aquifer intervals, respectively.

The shallow monitoring wells were installed using hollow stem auger (HSA) drilling methods and the deep wells were installed using sonic drilling methods. The monitoring wells were constructed using 2-inch diameter polyvinyl chloride (PVC) screens (10 feet in length, and .010-inch factory slotted) and 2-inch diameter PVC risers. The monitoring wells were installed and constructed in accordance with NAVFAC SE and FDEP guidance documents. Following each round of well installation, the top-of-casing elevations for the newly installed wells were surveyed relative to an arbitrary benchmark, top of casing for PEN-3221-09 of 25.00 feet.

2.6 GROUNDWATER SAMPLING

Groundwater samples were collected from the existing Site 3221 wells and the newly installed monitoring wells to assess the current groundwater conditions (Figure 2-2). Groundwater sampling was conducted in three events:

- Event 1 - December 2005. Ten exisiting UST Site 3221 shallow wells (PEN-3221-01 to PEN-322-10), seven new Site 44 shallow wells (PEN-44-09 to PEN-44-15), and two new Site 44 deep wells (PEN-44-18 and PEN-44-19) were sampled for full suite TCL/TAL and TRPH analyses.

- Event 2 - May 2006. Five new shallow wells (PEN-44-15, PEN-44-16, PEN-44-20 to PEN-44-22) were sampled for CVOCs, four previously installed wells were resampled for selected analytes detected in Event 1 samples (PEN-3221-03 for manganese, PEN-44-15 for bis(2-ethylhexyl)phthalate, PEN-44-18 for iron and manganese, and PEN-44-19 for iron, manganese, and bis(2-ethylhexyl)phthalate).

- Event 3 - August 2006. Four new shallow wells were sampled for CVOCs (PEN-44-23 to PEN-44-26).

Static water levels (SWL) and total well depths were measured in each well at the time of sampling. The wells were purged and sampled using a peristaltic pump and low-flow quiescent purging technique. Groundwater sampling was conducted on December 13 and 14, 2006. The monitoring wells were purged in accordance with FS 2212, Well Purging Techniques (FDEP, 2004). Groundwater samples were collected in accordance with FS 2220, Groundwater Sampling Techniques (FDEP, 2004). Water level and groundwater sampling records are in Appendix A.

Groundwater samples previously collected at site for the UST investigation were analyzed for petroleum constituents required by the Florida UST program; therefore, the groundwater samples collected during RI sampling Event 1 were analyzed for the full list of TCL and TAL analytes, as well as petroleum hydrocarbons. The groundwater samples were analyzed for contract Laboratory Program (CLP) TCL VOCs (USEPA Method SW-846 8260B) and EDB (USEPA 504.1), TCL SVOCs and PAHs (USEPA Method SW-846 8270C/8310), TCL pesticides and PCBs (USEPA Method SW-846 8081/8082), TRPH (FL-PRO) and TAL metals (USEPA Method SW 846 6010B, 9010, and 7471). Two trip blanks, one rinsate blank, and two field duplicate samples were collected during the groundwater characterization for QA/QC purposes.

The May 2006 RI sampling Event 2 focused on analytes that were reported at concentrations greater than GCTLs in the December 2005 sampling event. The following monitoring wells were resampled for analytes detected at concentrations greater than Florida GCTLs:

- PEN-3221-03 manganese
- PEN-44-15 bis(2-ethylhexyl)phthalate

- PEN-44-18 iron and manganese
- PEN-44-19 iron, manganese, and bis(2-ethylhexyl)phthalate

In addition, five newly installed shallow monitoring wells (PEN-44-15, PEN-44-16, PEN-44-20, PEN-44-21, and PEN-44-22) were sampled for CVOCs only (USEPA Method SW-846 8260B).

The August 2006 RI sampling Event 3 focused on delineating the CVOC plume at the site. Four newly installed shallow monitoring wells (PEN-44-23, PEN-44-24, PEN-44-25, and PEN-44-26) were sampled for CVOCs only (USEPA Method SW-846 8260B).

2.7 AQUIFER EVALUATION

Synoptic rounds of SWL measurement data were recorded from Site 44 monitoring wells in December 2005, May 2006, and August 2006. The SWL measurement data and the elevations from the well top-of-casings were used to determine the groundwater elevation at each monitoring well.

Slug tests were conducted in three shallow wells and two deep wells at Site 44. 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. Both rising head and falling head slug tests were conducted in each well.

Calculations were performed using the Aqtesolv™ aquifer characterization program. The Bouwer and Rice and the Hvorslev solutions were calculated for each of the slug tests. Slug test data and calculations used to determine hydraulic conductivity are included in Appendix A.

The geometric means of the slug test results for the shallow and the deep aquifer intervals were calculated for each type of test (rising head/falling head) and each analytical method (Bouwer and Rice/Hvorslev). The geometric mean of these results was used to represent the average hydraulic conductivity for each of the aquifer zones.

Specific capacity analyses were calculated for the two deep wells at Site 44 using data recorded during well development. Pumping rate, drawdown from static, and pumping time were used to calculate hydraulic conductivity. The hydraulic conductivity values calculated using the specific capacity method were compared to the values from the slug test analyses.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

Data to evaluate site conditions and characteristics were obtained from available literature and the site specific investigations.

3.1 SURFACE FEATURES

NAS Pensacola is located in the extreme southeastern portion of Escambia County, Florida, which lies within the Coastal Plain Province of the United States. As described in the Initial Assessment of NAS Pensacola (NEESA, 1983), NAS Pensacola lies within the coastal lowland that is characterized by a series of broad, nearly level marine terraces that extend several miles from the coast and merge with the narrow terraces along the Escambia and Perdido Rivers. NAS Pensacola is located on a peninsula with gently sloping terrain. The land surface elevations on the peninsula range from sea level to approximately 40 feet above mean sea level (msl).

Site 44 is southwest of Building 3221 (Figure 3-1). The area covers approximately 60,000 square feet and the site elevation is approximately 25 feet above msl. There is little vertical relief in the concrete paved areas of the site.

3.2 METEOROLOGY

Escambia County has a warm, humid-temperate climate [United States Department of Agriculture (USDA) 2004]. Along the coast, the Gulf of Mexico moderates high temperatures in the summer and low temperatures in the winter. Total annual precipitation is about 62 inches. The greatest amount of rain falls in July and August. Occasionally, short droughts occur in late spring.

3.3 SURFACE WATER HYDROLOGY

NAS Pensacola is bordered on the south by Big Lagoon, on the south and east by Pensacola Bay, and on the north by Bayou Grande (NEESA, 1983). Sandy surface soil in this area allows for a high proportion of rainfall to infiltrate into the ground and consequently there are few streams. The surface topography has little dissection and the natural drainage system is poorly developed. Much of the surface drainage has been constructed or modified to accommodate structures on base. Swampy areas exist at or near the western portion of NAS Pensacola, and man-made drainage ways and storm drains feed into the short intermittent streams emptying in to Pensacola Bay and Bayou Grande. No perennial streams enter or exit NAS Pensacola, but the marshy areas and three small lakes on the golf course retain water throughout the year.

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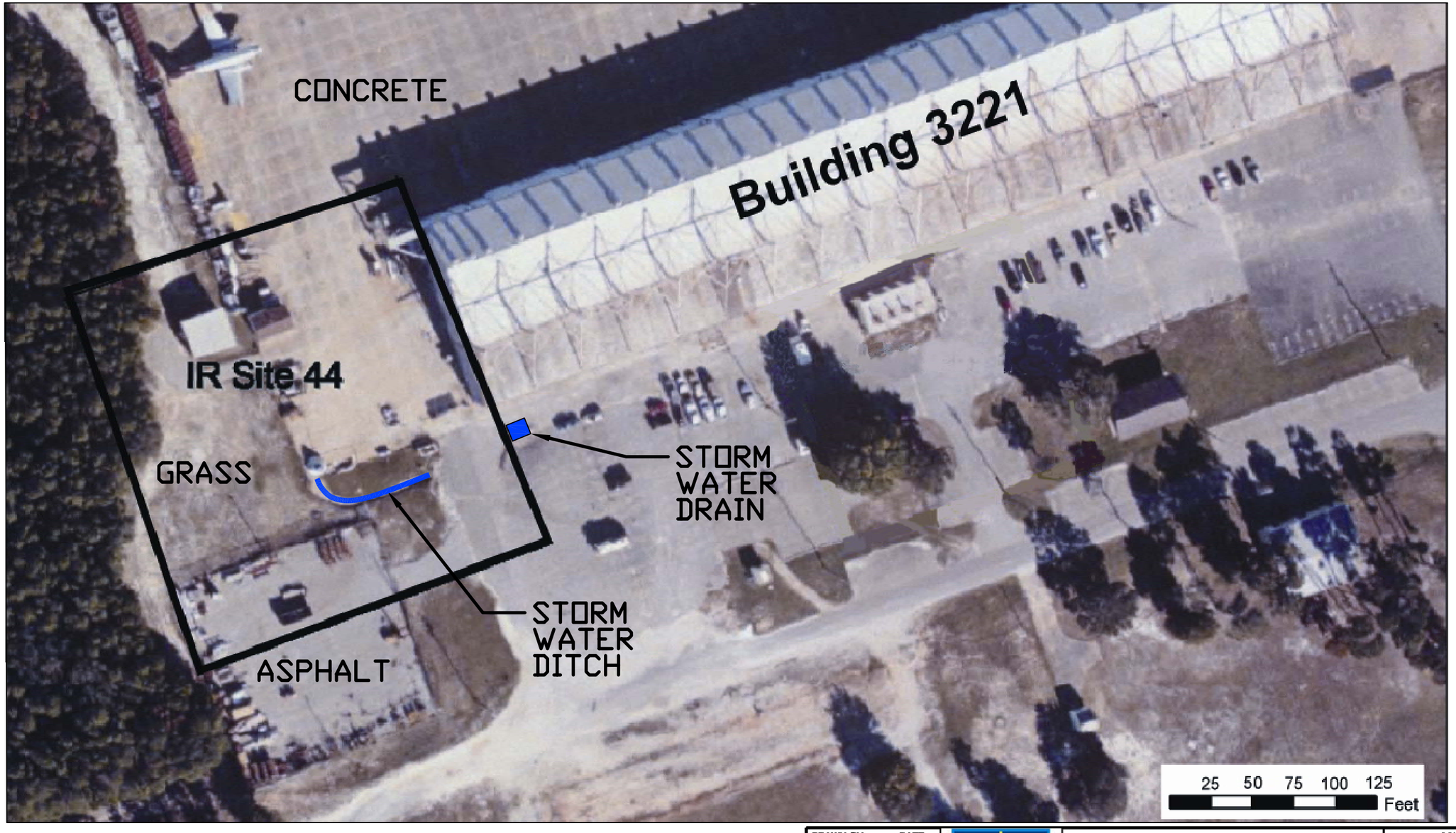


DRAWN BY MF	DATE 12/15/06	SURFACE FEATURES SITE 44 IR REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NO. 0007
CHECKED BY	DATE		OWNER NO. 0367
REVISED BY	DATE		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 / REV. 0

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

Surface water features are not present at Site 44 and runoff from the paved areas is directed into the storm water sewer system at the southwest corner of the pavement (Figure 3-1). A diverter that is connected to the NAS Pensacola sanitary sewer system is used during aircraft washing operations. An intermittant stream is located approximately ¼ mile to the northeast of the site and is the nearest surface water body. This intermittant stream drains to Bayou Grande approximately ¾ mile to the northeast of the site. Pensacola Bay is approximately ½ mile south of Site 44.

3.4 GEOLOGY

The surficial geology of the area consists of Pleistocene marine deposits made up of light brown to tan, fine quartz sand with associated stringers and lenses of gravel and clay. Underlying these deposits, increasing with age, are the Citronelle Formation, the Miocene Coarse Clastics, the Pensacola Clay, the Tampa Formation, the Chickasawhay Limestone, the Bucatunna Clay member of the Byram Formation, the Ocala Group, the Lisbon equivalent, the Tallahatta Formation, and the Hatchetigbee Formation. The Pleistocene deposits and Citronelle formation are often impossible to differentiate, and together range in thickness from approximately 30 feet to 800 feet across the county (NEESA, 1983).

The lithologies observed during drilling of Site 44 monitoring wells are typical of the undifferentiated Pleistocene marine deposits. The ground surface to 1-foot interval at most of the sampling locations showed signs of disturbance either grading and filling or pavement construction. Below 2 feet, typical lithologies included sand ranging from white or tan to dark brown in color. Significant clay or gravel horizons were not encountered. At some monitoring well locations, a dark brown, well indurated, peat layer was encontered at a depth of approximately 14 feet. The thickness of this peat horizon was approximately 1 foot. Most of the shallow wells were installed above this interval.

3.5 SOILS

Soils from the developed areas at Site 44 are classified as urban land, which are typical of industrial areas (USDA, 2004). The native soils typically have been altered by grading or fill and the ground surfaces have been paved or built upon.

Soils from the undeveloped areas west and south of Building 3221 are classified as Kureb sand, 0-8 percent slopes, which consists of very deep, excessively drained sandy soils formed in coastal lowlands (USDA, 2004). These soils are found on low ridges in uplands and old dunes in coastal lowlands. Slopes are generally short and complex. Typically the surface layer is dark gray sand about 3 inches thick. The next subsurface layer of white sand extends to a depth of 19 inches. The substratum to a depth of 80 inches is yellowish brown and brownish yellow sand. The seasonal high water is below a depth of 6 feet throughout the year.

The soils observed while collecting soil samples at Site 44 are comparable in texture and color of the description of the Kureb Sand. The ground surface to the 4-foot interval at most of the soil sampling locations showed signs of disturbance due to grading and construction at the site.

3.6 GROUNDWATER HYDROLOGY

3.6.1 Regional Hydrology

Groundwater in Escambia county occurs in three major aquifers: a shallow aquifer which is both artesian and nonartesian (the sand and gravel aquifer), and two deep artesian aquifers (the upper and lower limestones of the Floridan Aquifer). In the southern half of the area, the sand and gravel aquifer and the upper limestone of the Floridan Aquifer are separated by a thick section of relatively impermeable clay; however, in the northern half the sand and gravel aquifer and the upper limestone of the Floridan Aquifer are in contact with one another. The upper limestone of the Floridan Aquifer is separated from the lower limestone by a thick clay bed.

The sand and gravel aquifer is composed of sand but has numerous lenses and layers of clay and gravel. The formation also contains lenses of hardpan where the sand has been cemented by iron oxide minerals. This aquifer lies at the surface throughout Escambia County. Logs of borings from various locations at NAS Pensacola show that the surficial sands extend from ground surface to a depth of approximately 35 feet msl below which is a 15-foot thick marine clay, the continuity of which is uncertain. Underlying the clay is more sand with numerous clay lenses (Geraghty and Miller, 1986). This marine clay horizon was not encountered in borings advanced at Site 44.

Water levels in the shallow aquifer range from 0 to approximately 30 feet bls across the NAS Pensacola area. The groundwater flow has historically been found toward the Gulf of Mexico and the Escambia and Perdido rivers although groundwater flow can vary locally due to the effect of topography or surface water bodies. The aquifer recharge is predominantly from local precipitation.

The shallow saturated permeable beds in the sand and gravel aquifer contain groundwater under nonartesian conditions, while the deeper permeable beds contain groundwater under artesian pressure, where they are confined by lenses of clay and sandy clay (NEESA, 1983).

Below the sand and gravel aquifer, the limestone layers comprise the regionally extensive Floridan aquifer, which in this area is divided into upper and lower units separated by the Bucatunna clay. The upper Floridan aquifer is an important source of water in areas east of Escambia County; however, in the Pensacola area it is highly mineralized and not used as a water supply. The lower Floridan aquifer is also

highly mineralized and is designated for use as an injection zone for waste disposal in this area (Geraghty and Miller, 1986).

3.6.2 Site Specific Hydrology

Hydrogeologic data were collected to evaluate movement of groundwater in the shallow surficial aquifer at Site 44. 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 data collected at the site.

3.6.2.1 Static Water Level and Groundwater Elevations

Synoptic rounds of SWL measurement data were recorded from Site 44 monitoring wells in December 2005 (two events), May 2006, and August 2006 (Table 3-1). The SWL measurement data and the elevations from the well top-of-casings were used to determine relative groundwater elevations at each well (Appendix A – Groundwater Level Measurement Sheet).

Monitoring wells installed at Site 44 are grouped by the subsurface interval of the well screen:

- Shallow Aqifer Interval — Screened up to 15 feet below grade
- Deep Aquifer Interval — Screened from 65 to 75 feet below grade

The relative groundwater elevations in the shallow monitoring wells showed significant seasonal variation (Table 3-1):

- December 6, 2005 — 18.14 to 18.95 feet
- December 20, 2005 — 18.29 to 19.11 feet
- May 12, 2006 — 16.56 to 17.13 feet
- August 14, 2006 — 15.29 to 15.64 feet

The highest groundwater elevations in the shallow monitoring wells were observed in wells located at the southwest corner of the site – PEN-3221-01 and PEN3221-02. The lowest groundwater elevations were observed in the most northerly monitoring wells that were installed at the time of the measuring event – PEN-44-15 in December 2005, PEN-44-21 in May 2006, and PEN-44-24 in August 2006.

Groundwater elevations at Site 44 exhibit a strong seasonal variation (Table 3-2). The average change in shallow wells from December 2005, a wet month, to May 2006, a typically dry month, was -1.88 feet. The average change from May to August 2006 was -1.30 feet, due to drought conditions in a normally

TABLE 3-1

WATER LEVEL MEASUREMENT SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

MONITORING WELL ID	TOP-OF-CASING ELEVATION	December 6, 2005		December 20, 2005		May 12, 2006		August 14, 2006	
		DEPTH TO WATER	GROUNDWATER ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION
Shallow Wells									
PEN-3221-01	24.61	5.69	18.92	5.50	19.11	7.51	17.10	8.97	15.64
PEN-3221-02	24.49	5.54	18.95	5.41	19.08	7.36	17.13	8.85	15.64
PEN-3221-03	24.89	6.01	18.88	5.87	19.02	7.81	17.08	9.26	15.63
PEN-3221-04	24.42	5.52	18.90	5.38	19.04	7.33	17.09	8.79	15.63
PEN-3221-05	24.82	5.98	18.84	5.84	18.98	7.76	17.06	9.20	15.62
PEN-3221-06	25.21	6.43	18.78	6.31	18.90	8.23	16.98	9.62	15.59
PEN-3221-07	24.81	6.01	18.80	5.87	18.94	7.79	17.02	9.19	15.62
PEN-3221-08	25.41	6.66	18.75	6.55	18.86	8.43	16.98	9.80	15.61
PEN-3221-09	25.00	6.25	18.75	6.08	18.92	8.03	16.97	9.37	15.63
PEN-3221-10	25.44	6.80	18.64	6.66	18.78	8.54	16.90	9.85	15.59
PEN-44-09	24.66	5.82	18.84	5.66	19.00	7.64	17.02	9.02	15.64
PEN-44-10	25.26	6.64	18.62	6.49	18.77	8.36	16.90	9.66	15.60
PEN-44-11	25.18	6.70	18.48	NM	NM	8.36	16.82	9.61	15.57
PEN-44-12	25.08	6.75	18.33	6.63	18.45	8.36	16.72	9.53	15.55
PEN-44-13	24.44	6.04	18.40	5.89	18.55	7.68	16.76	8.91	15.53
PEN-44-14	24.84	6.51	18.33	6.37	18.47	8.13	16.71	9.32	15.52
PEN-44-15	24.54	6.40	18.14	6.25	18.29	7.91	16.63	9.04	15.50
PEN-44-16	25.37	Wells installed May, 2006.				8.40	16.97	9.74	15.63
PEN-44-17	25.49					8.73	16.76	9.92	15.57
PEN-44-20	24.04					7.37	16.67	8.58	15.46
PEN-44-21	23.96					7.40	16.56	8.55	15.41
PEN-44-22	24.13					7.55	16.58	8.66	15.47
PEN-44-23	23.28	Wells installed August, 2006.						7.82	15.46
PEN-44-24	23.62							8.33	15.29
PEN-44-25	23.31							7.88	15.43
PEN-44-26	24.04							8.62	15.42
Deep Wells									
PEN-44-18	24.48	9.65	14.83	9.85	14.63	11.68	12.80	13.06	11.42
PEN-44-19	25.37	9.95	15.42	10.09	15.28	11.98	13.39	13.39	11.98

Notes:
Elevations relative to arbitrary benchmark, top-of-casing for PEN-3221-09, 25.00 feet
Depths in feet below top-of-casing
The highest and lowest elevations for each round of measurements are shown in bold.
NM - Not Measured, access to well was blocked

TABLE 3-2

CHANGES IN GROUNDWATER ELEVATION
SITE 44 SITE REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

MONITORING WELL ID	GROUNDWATER ELEVATIONS				CHANGES IN GROUNDWATER ELEVATION		
	December 6, 2005	December 20, 2005	May 12, 2006	August 14, 2006	December 6 to December 20, 2005	December 2005 to May 2006	May 2006 to August 2006
Shallow Wells							
PEN-3221-01	18.92	19.11	17.10	15.64	**0.19**	**-2.01**	-1.46
PEN-3221-02	18.95	19.08	17.13	15.64	0.13	-1.95	**-1.49**
PEN-3221-03	18.88	19.02	17.08	15.63	0.14	-1.94	-1.45
PEN-3221-04	18.90	19.04	17.09	15.63	0.14	-1.95	-1.46
PEN-3221-05	18.84	18.98	17.06	15.62	0.14	-1.92	-1.44
PEN-3221-06	18.78	18.90	16.98	15.59	0.12	-1.92	-1.39
PEN-3221-07	18.80	18.94	17.02	15.62	0.14	-1.92	-1.40
PEN-3221-08	18.75	18.86	16.98	15.61	0.11	-1.88	-1.37
PEN-3221-09	18.75	18.92	16.97	15.63	0.17	-1.95	-1.34
PEN-3221-10	18.64	18.78	16.90	15.59	0.14	-1.88	-1.31
PEN-44-09	18.84	19.00	17.02	15.64	0.16	-1.98	-1.38
PEN-44-10	18.62	18.77	16.90	15.60	0.15	-1.87	-1.30
PEN-44-11	18.48	NM	16.82	15.57	PEN-44-11 not measured 12/20/2006		-1.25
PEN-44-12	18.33	18.45	16.72	15.55	**0.12**	-1.73	-1.17
PEN-44-13	18.40	18.55	16.76	15.53	0.15	-1.79	-1.23
PEN-44-14	18.33	18.47	16.71	15.52	0.14	-1.76	-1.19
PEN-44-15	18.14	18.29	16.63	15.50	0.15	**-1.66**	-1.13
PEN-44-16	Wells installed May 2006.		16.97	15.63	Wells installed May 2006.		-1.34
PEN-44-17			16.76	15.57			-1.19
PEN-44-20			16.67	15.46			-1.21
PEN-44-21			16.56	15.41			-1.15
PEN-44-22			16.58	15.47			**-1.11**
PEN-44-23	Wells installed August 2006.			15.46	Wells installed August 2006.		
PEN-44-24				15.29			
PEN-44-25				15.43			
PEN-44-26				15.42			
Deep Wells							
PEN-44-18	14.83	14.63	12.80	11.42	-0.2	-1.83	-1.38
PEN-44-19	15.42	15.28	13.39	11.98	-0.14	-1.89	-1.41

Notes:
Elevations relative to arbitrary benchmark, top-of-casing for PEN-3221-09, 25.00 feet
The highest and lowest elevations for each round of measurements are shown in bold.
NM - Not Measured, access to well was blocked

wet time of year in the Pensacola area. Seasonal changes in the deep wells showed a similar trend, the average change from December 2005 to May 2006 was -1.86 feet and from May to August was -1.39 feet.

3.6.2.2 Groundwater Flow Direction

To evaluate the direction of groundwater flow at the water table, the groundwater elevations from the shallow monitoring wells for each measuring event were plotted on site maps (Figure 3-2, 3-3, 3-4, and 3-5). Insufficient data were available to contour the groundwater elevations in the deep wells. 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 Site 44 indicates that overall, groundwater flow at the water table is to the northeast.

3.6.2.3 Water Table Gradient

The average horizontal groundwater gradient across the site was calculated from the groundwater elevations measured in shallow monitoring wells and the groundwater flow direction. A minimum estimated horizontal gradient was calculated for the deep monitoring wells. The gradient values for the deep wells are estimated because groundwater elevation data is available for only two deep wells, therefore the direction of groundwater flow in the deep zone cannot be determined.

The groundwater flow gradient was determined using the following equation:

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

Where:

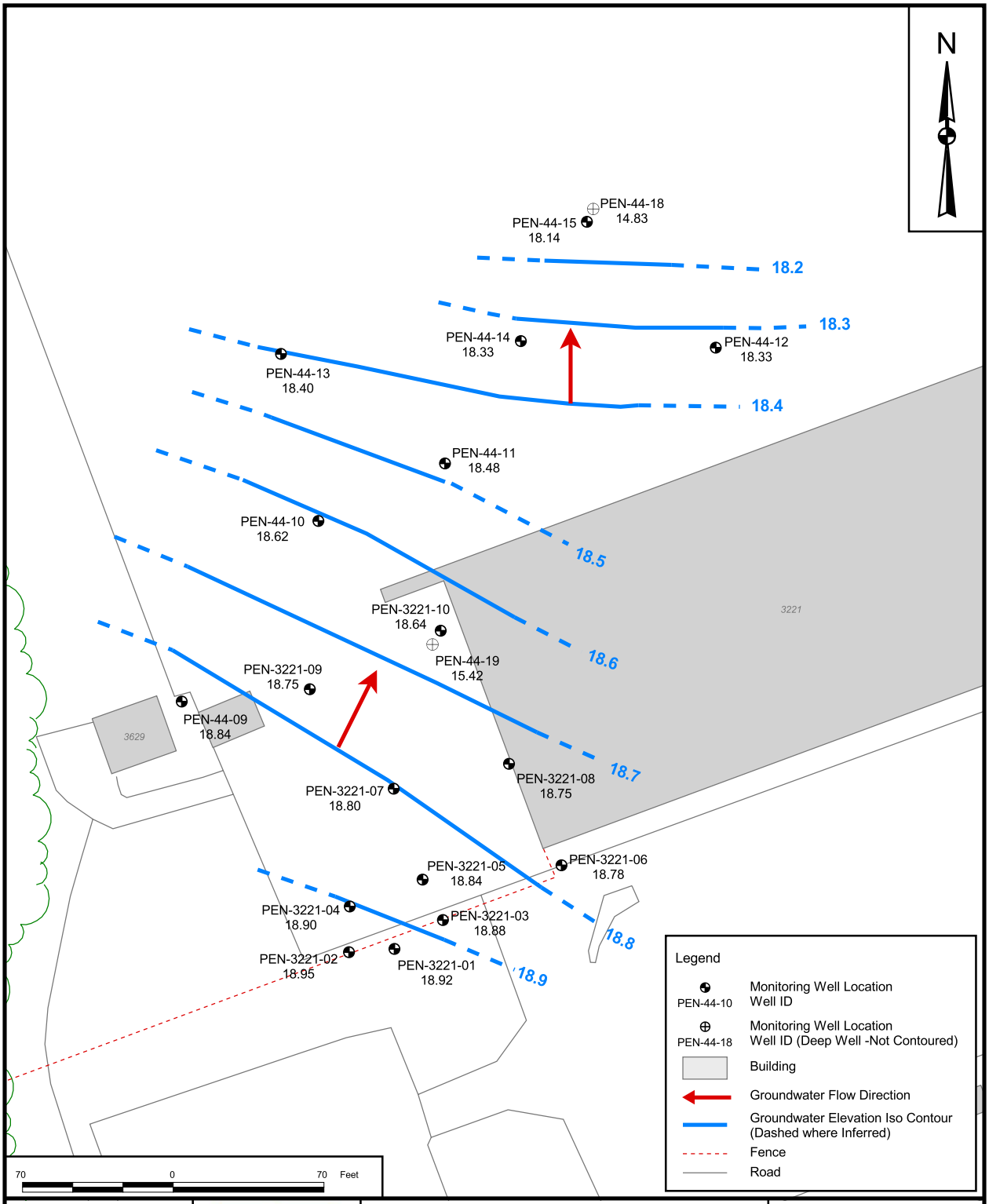
I = the hydraulic gradient

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 gradient data are summarized in Table 3-3. The horizontal gradient values for the water table wells ranged from 0.001 to 0.003 feet/foot.



DRAWN BY	DATE		CONTRACT NUMBER
C. SPEHAR	1/20/06	GROUNDWATER ELEVATIONS	CTO 0367
CHECKED BY	DATE	SHALLOW MONITORING WELLS 12/06/05	APPROVED BY / DATE
B. OLSON	5/03/07	SITE 44 RI REPORT	— / —
COST/SCHEDULE-AREA		NAS PENSACOLA	APPROVED BY / DATE
		PENSACOLA, FLORIDA	— / —
SCALE			DRAWING NO. / REV
AS NOTED			FIGURE 3-2 / 0

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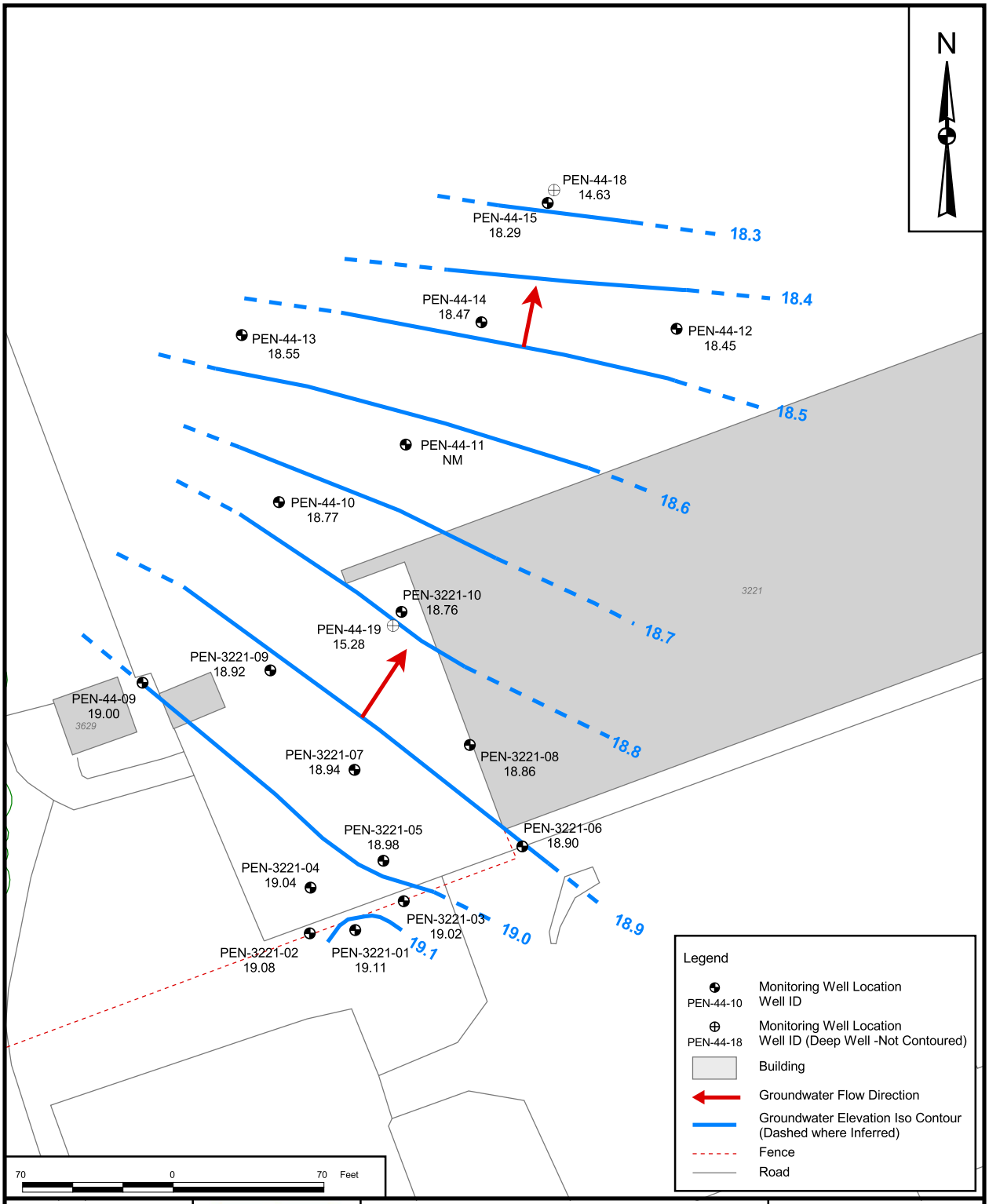

DRAWN BY C. SPEHAR	DATE 1/20/06	GROUNDWATER ELEVATIONS SHALLOW MONITORING WELLS 12/20/05 SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
CHECKED BY B. OLSON	DATE 5/03/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 3-3 / REV 0

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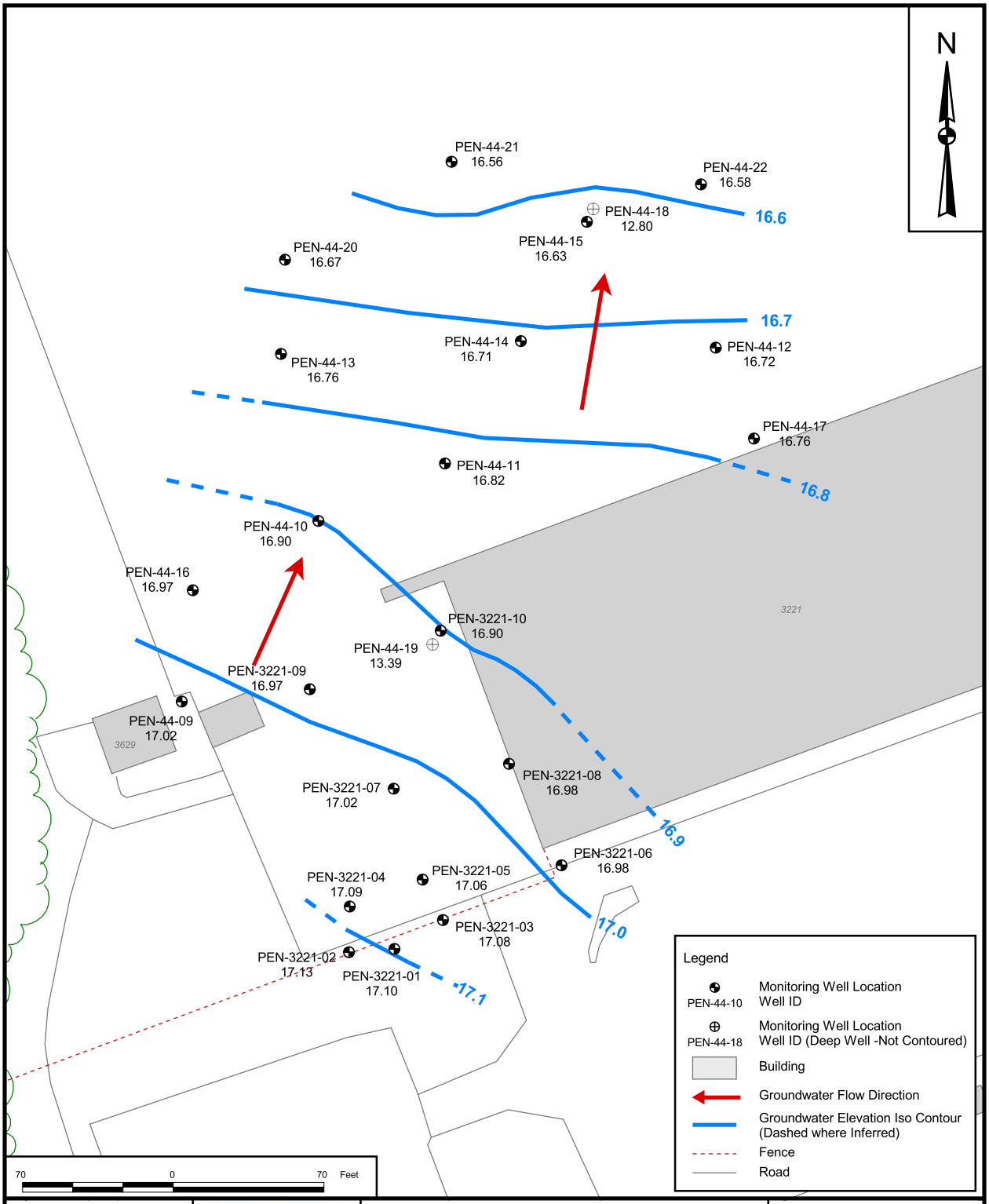

DRAWN BY C. SPEHAR DATE 1/20/06	GROUNDWATER ELEVATIONS	CONTRACT NUMBER CTO 0367	
CHECKED BY B. OLSON DATE 4/25/07	SHALLOW MONITORING WELLS 05/12/06	APPROVED BY — DATE —	
COST/SCHEDULE-AREA	SITE 44 RI REPORT	APPROVED BY — DATE —	
SCALE AS NOTED	NAS PENSACOLA	DRAWING NO. FIGURE 3-4	REV 0
	PENSACOLA, FLORIDA		

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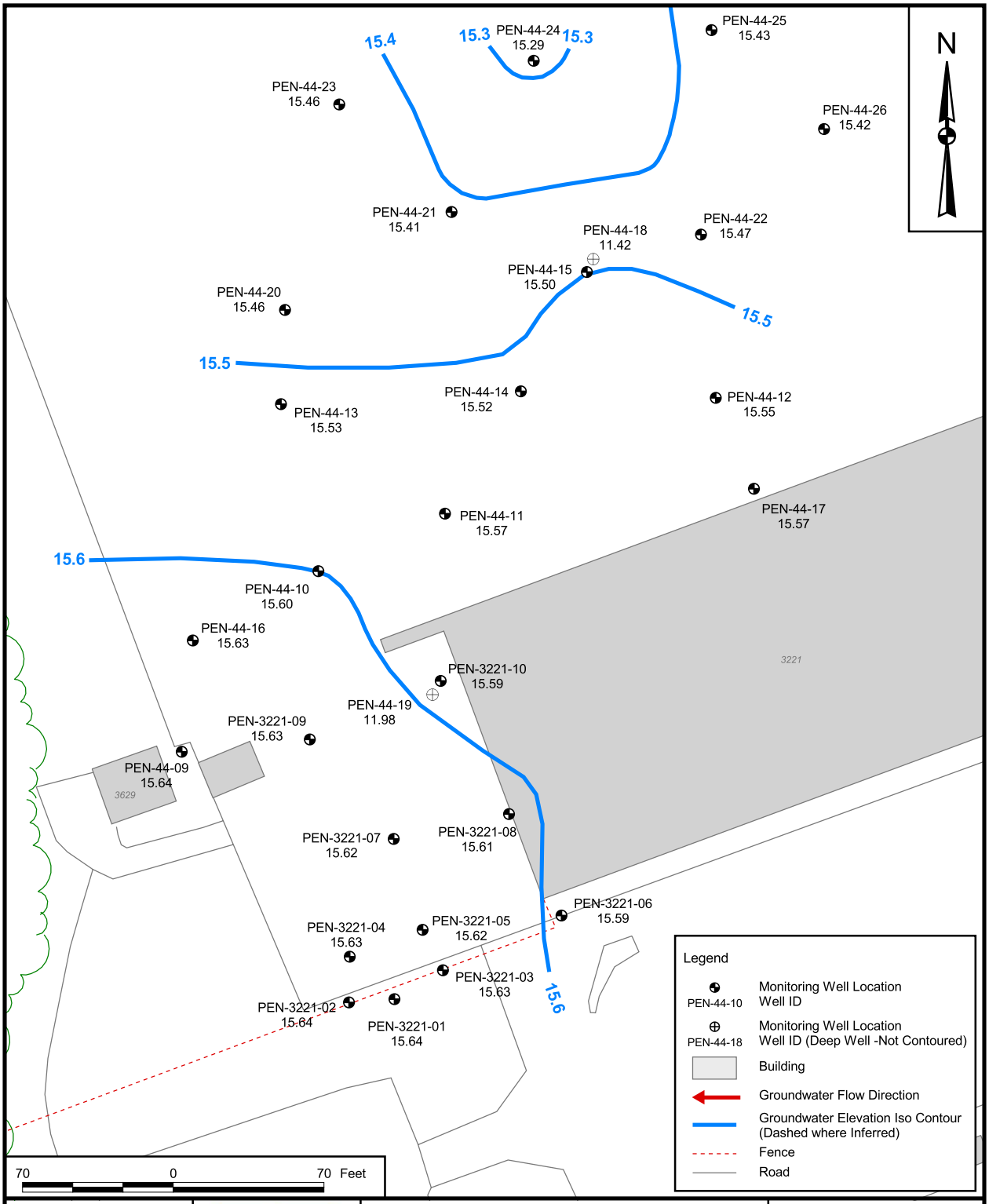

DRAWN BY C. SPEHAR — DATE 1/20/06	NAVFAC	GROUNDWATER ELEVATIONS SHALLOW MONITORING WELLS 08/14/06 SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
CHECKED BY B. OLSON — DATE 4/25/07			APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 3-5 — REV 0

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TABLE 3-3

HORIZONTAL HYDRAULIC GRADIENT
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

SHALLOW WELLS							
		WELL PAIRS	TOTAL DEPTH	SCREENED INTERVAL	TOP OF CASING ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION
12/6/2005	Highest	PEN-3221-02	14.7	4.7-14.7	24.49	5.54	18.95
	Lowest	PEN-44-15	14	4-14	24.54	6.40	18.14
		HORIZONTAL DISTANCE (feet)		305	HORIZONTAL GRADIENT (feet/foot)		0.003
12/20/2005	Highest	PEN-3221-01	14.8	4.8-14.8	24.61	5.50	19.11
	Lowest	PEN-44-15	14	4-14	24.54	6.25	18.29
		HORIZONTAL DISTANCE (feet)		315	HORIZONTAL GRADIENT (feet/foot)		0.003
5/12/2006	Highest	PEN-3221-02	14.7	4.7-14.7	24.49	7.36	17.13
	Lowest	PEN-44-21	14	4-14	23.96	7.40	16.56
		HORIZONTAL DISTANCE (feet)		365	HORIZONTAL GRADIENT (feet/foot)		0.002
8/14/2006	Highest	PEN-3221-01	14.8	4.8-14.8	24.61	8.97	15.64
	Lowest	PEN-44-24	14	4-14	23.62	8.33	15.29
		HORIZONTAL DISTANCE (feet)		440	HORIZONTAL GRADIENT (feet/foot)		0.001

DEEP WELLS							
		WELL PAIRS	TOTAL DEPTH	SCREENED INTERVAL	TOP OF CASING ELEVATION	DEPTH TO WATER	GROUNDWATER ELEVATION
12/6/2005	Highest	PEN-44-19	75	65-75	25.37	9.95	15.42
	Lowest	PEN-44-18	75	65-75	24.48	9.65	14.83
		HORIZONTAL DISTANCE (feet)		210	HORIZONTAL GRADIENT (feet/foot)		0.003
12/20/2005	Highest	PEN-44-19	75	65-75	25.37	10.09	15.28
	Lowest	PEN-44-18	75	65-75	24.48	9.85	14.63
		HORIZONTAL DISTANCE (feet)		210	HORIZONTAL GRADIENT (feet/foot)		0.003
5/12/2006	Highest	PEN-44-19	75	65-75	25.37	11.98	13.39
	Lowest	PEN-44-18	75	65-75	24.48	11.68	12.80
		HORIZONTAL DISTANCE (feet)		210	HORIZONTAL GRADIENT (feet/foot)		0.003
8/14/2006	Highest	PEN-44-19	75	65-75	25.37	13.39	11.98
	Lowest	PEN-44-18	75	65-75	24.48	13.06	11.42
		HORIZONTAL DISTANCE (feet)		210	HORIZONTAL GRADIENT (feet/foot)		0.003

Notes:
Depths in feet below top of casing
Elevations relative to arbitrary benchmark, top-of-casing for PEN-3221-09, 25.00 feet
Horizontal distance measure parallel to direction of groundwater flow

Recharge due to precipitation appears to have a strong influence on the horizontal hydraulic gradient in the shallow aquifer zone. The minimum hydraulic gradient for the deep aquifer zone is 0.003 feet/foot and was consistent in each of the measurement events.

3.6.2.4 Vertical 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 determined by the mid point of the water column in shallow wells that bracket the water table and the mid point of the well screen in deep wells that are screened below the water table. The vertical gradients for Site 44 ranged from -0.05 to -0.07 feet/foot. The vertical groundwater gradient data are summarized in Table 3-4.

3.6.2.5 Hydraulic Conductivity

Hydraulic conductivity values for Site 44 were estimated using data from slug tests and specific capacity data collected during well development conducted as part of the RI. The slug test results are summarized in Table 3-5 and the slug test data and test analyses are included in Appendix A. The geometric mean of the hydraulic conductivity values reported for shallow wells at Site 44 is approximately 0.05 feet/minute or 72 feet/day. The geometric mean of the hydraulic conductivity values reported for the deep wells at Site 44 is approximately 0.003 feet/minute or 4.3 feet/day, which is an order of magnitude less than the shallow wells.

3.6.2.6 Groundwater Flow Velocity

Potential movement of groundwater by natural flow in the saturated zone can be estimated by Darcy's Law, which may be expressed as:

$$V = \frac{(K \times I)}{n}$$

Where:

V = average velocity

K = hydraulic conductivity

I = average hydraulic gradient

n = effective porosity

TABLE 3-4

VERTICAL GRADIENT
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FL

				12/6/2006			12/20/2006			5/12/2006			8/14/2006		
WELL PAIRS	TOTAL DEPTH	SCREENED INTERVAL	TOP OF CASING ELEVATION	DEPTH TO WATER	SCREEN MID -POINT	GROUND WATER ELEVATION	DEPTH TO WATER	SCREEN MID -POINT	GROUND WATER ELEVATION	DEPTH TO WATER	SCREEN MID -POINT	GROUND WATER ELEVATION	DEPTH TO WATER	SCREEN MID -POINT	GROUND WATER ELEVATION
PEN-3221-10	15	5-15	25.44	6.80	10.9	18.64	6.66	10.8	18.78	8.54	11.8	16.90	9.85	12.4	15.59
PEN-44-19	75	65-75	25.37	9.95	70	15.42	10.09	70	15.28	11.98	70	13.39	13.39	70	11.98
				VERTICAL GRADIENT		-0.05	VERTICAL GRADIENT		-0.06	VERTICAL GRADIENT		-0.06	VERTICAL GRADIENT		-0.06
PEN-44-15	14	4-14	24.54	6.40	10.2	18.14	6.25	10.1	18.29	7.91	11.0	16.63	9.04	11.5	15.50
PEN-44-18	75	65-75	24.48	9.65	70	14.83	9.85	70	14.63	11.68	70	12.80	13.06	70	11.42
				VERTICAL GRADIENT		-0.06	VERTICAL GRADIENT		-0.06	VERTICAL GRADIENT		-0.06	VERTICAL GRADIENT		-0.07

NOTES:
Screen mid-point for shallow wells is the mid-point of the water column
Screen mid-point for deep wells is the mid-point of the screened interval
Negative gradients are downward
Positive Gradients are upward

TABLE 3-5

AQUIFER TEST RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FL

SLUG TEST RESULTS					
Monitoring Well	**Aquifer Interval**	**Test Type**	**Solution Model**	**K (ft/min)**	**Comments**
PEN-44-07	Shallow	Falling Head	Bouwer/Rice	0.014	
		Falling Head	Hvorslev	0.017	
		Rising Head	Bouwer/Rice	0.046	
		Rising Head	Hvorslev	0.078	
PEN-44-09	Shallow	Rising Head	Bouwer/Rice	0.06	
		Rising Head	Hvorslev	0.10	
		Rising Head	Bouwer/Rice	0.084	
		Rising Head	Hvorslev	0.01	
		Rising Head	Bouwer/Rice	0.06	
		Rising Head	Hvorslev	0.09	
PEN-44-11	Shallow	Rising Head	Bouwer/Rice	0.06	
		Rising Head	Hvorslev	0.10	
		Rising Head	Bouwer/Rice	0.04	
		Rising Head	Hvorslev	0.07	
		Rising Head	Bouwer/Rice	0.01	
		Rising Head	Hvorslev	0.04	
PEN-44-18	Deep	Falling Head	Bouwer/Rice	0.003	
		Falling Head	Hvorslev	0.003	
		Rising Head	Bouwer/Rice	0.003	
		Rising Head	Hvorslev	0.003	
PEN-44-19	Deep	Falling Head	Bouwer/Rice	0.001	
		Falling Head	Hvorslev	0.001	
		Rising Head	Bouwer/Rice	0.001	
		Rising Head	Hvorslev	0.014	

SHALLOW WELL STATISTICAL SUMMARY					
	Falling Head	**Rising Head**	**Bouwer/Rice**	**Hvorslev**	
PEN-44-07	0.014	0.046	0.014	0.017	
	0.017	0.078	0.046	0.078	
PEN-44-09		0.06	0.056	0.097	
		0.10	0.084	0.012	
		0.084	0.057	0.090	
		0.01			
		0.06			
		0.09			
PEN-44-11		0.06	0.056	0.10	
		0.10	0.042	0.072	
		0.04	0.013	0.040	
		0.07			
		0.01			**Geometric Mean of**
		0.04			**Shallow K (ft/min)**
Geometric Mean	**0.015**	**0.051**	**0.039**	**0.050**	**0.046**

DEEP WELL STATISTICAL SUMMARY					
	Falling Head	**Rising Head**	**Bouwer/Rice**	**Hvorslev**	
PEN-44-18	0.0025	0.0025	0.0025	0.0028	
	0.0028	0.0027	0.0025	0.0027	
PEN-44-19	0.0014	0.0013	0.0014	0.0015	**Geometric Mean of**
	0.0015	0.014	0.0013	0.014	**Shallow K (ft/min)**
Geometric Mean	**0.0020**	**0.0034**	**0.0018**	**0.0036**	**0.0026**

SPECIFIC CAPACITY TEST RESULTS					
Well	**Total Depth (ft)**	**Flow Rate (gpm)**	**Pumping Duration**	**Drawdown (ft)**	**Conductivity (ft/day)**
PEN-44-18	75	1.5	20 minutes	16.35	1.27
PEN-44-19	75	1.1	32 minutes	16.45	0.93

Notes:
ft = feet/foot
ft/day = feet per day
gpm = gallons per minute
k = hydraulic conductivity

Data from soil borings advanced at Site 44 indicate that fine grained sand and silty sand are the typical lithologies at the site. Review of standard literature suggests that a representative effective porosity for this lithology is approximately 30 percent.

The groundwater flow velocity for the shallow aquifer zone was calculated using an average hydraulic conductivity of 72 feet per day, an average hydraulic gradient of 0.002 feet/foot, and an effective porosity value of 30 percent. The estimated average groundwater velocity for the water table zone at Site 44 was calculated at 0.48 feet/day or about 175 feet/year.

The minimum groundwater flow velocity for the deep aquifer zone was calculated using an average hydraulic conductivity of 4.3 feet per day, the minimum hydraulic gradient of 0.003 feet/foot, and an effective porosity value of 30 percent. The estimated minimum groundwater velocity for the deep zone at Site 44 was calculated at 0.043 feet/day or about 16 feet/year.

3.6.2.7 On Base Potable Water Supply Wells

Three water wells are located on NAS Pensacola to provide an emergency backup potable water supply (NEESA, 1983). The backup water supply wells are completed at depths ranging from 224 to 250 feet bls and extract groundwater from the sand and gravel aquifer. The nearest potable water well to Site 44 is Well 3, located approximately 2,800 feet to the east. The main source of potable water for the base is the Navy-owned well field located at Naval Technical Training Center (NTTC) Corry Station, which is located approximately three miles north of NAS Pensacola on the north side of Bayou Grande.

3.7 DEMOGRAPHY AND LAND USE

NAS Pensacola is located west of the City of Pensacola, Florida, in southern Escambia County. NAS Pensacola is an active military facility. The primary mission is aviation training. 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 off-base areas adjacent to NAS Pensacola is primarily residential.

Site 44 is located adjacent to the National Museum of Naval Aviation and controlled public access is allowed for tours and air shows; therefore, recreational users as well as site and maintenance workers are expected to use the site.

3.8 ECOLOGY

Site 44 is located in a developed area of the base, adjacent to the active flight line. Ground cover at the site is predominantly concrete. A wooded area is located to the west of Building 3221. No wetlands are located in the immediate vicinity of Site 44. On-site wildlife may temporarily use Site 44, but due to flight line activities, wildlife use is assumed to be infrequent.

A list of federally listed threatened and endangered species and species of special concern for Escambia County was obtained from the web site for the Ecological Services and Fisheries Resource Office of the U.S. Fish and Wildlife Service in Panama City, Florida and is included in Appendix B. Five fish, 12 amphibians/reptiles, 14 birds, 4 mammals, and 24 plants are listed as threatened, endangered, or a species of special concern for the county. However, the habitats listed for these special status species (i.e., estuarine, palustrine, upland forests, etc.) do not exist at Site 44; therefore, none of the special status species recorded in Escambia County would be expected at the site.

4.0 NATURE AND EXTENT OF CONTAMINATION

The analytical results for soil and groundwater samples collected for this investigation were compared to appropriate cleanup target levels (CTLs) established by FDEP, preliminary remediation goals established by USEPA Region 9, and USEPA Maximum Contaminant Levels (MCLs) for groundwater and SPLP samples. Analytical summary tables and contaminant concentration maps are presented in the investigation results sections. Analytical reports from the mobile laboratory is included in Appendix C and validation reports for the laboratory analytical results are included in Appendix C.

4.1 CONTAMINANT SOURCES

The release of contaminants at Site 44 appears to have resulted from routine aircraft maintenance and wash activities or undocumented minor spills. The source and nature of materials, as well as the time of release, are unknown.

4.2 SOILS AND VADOSE ZONE

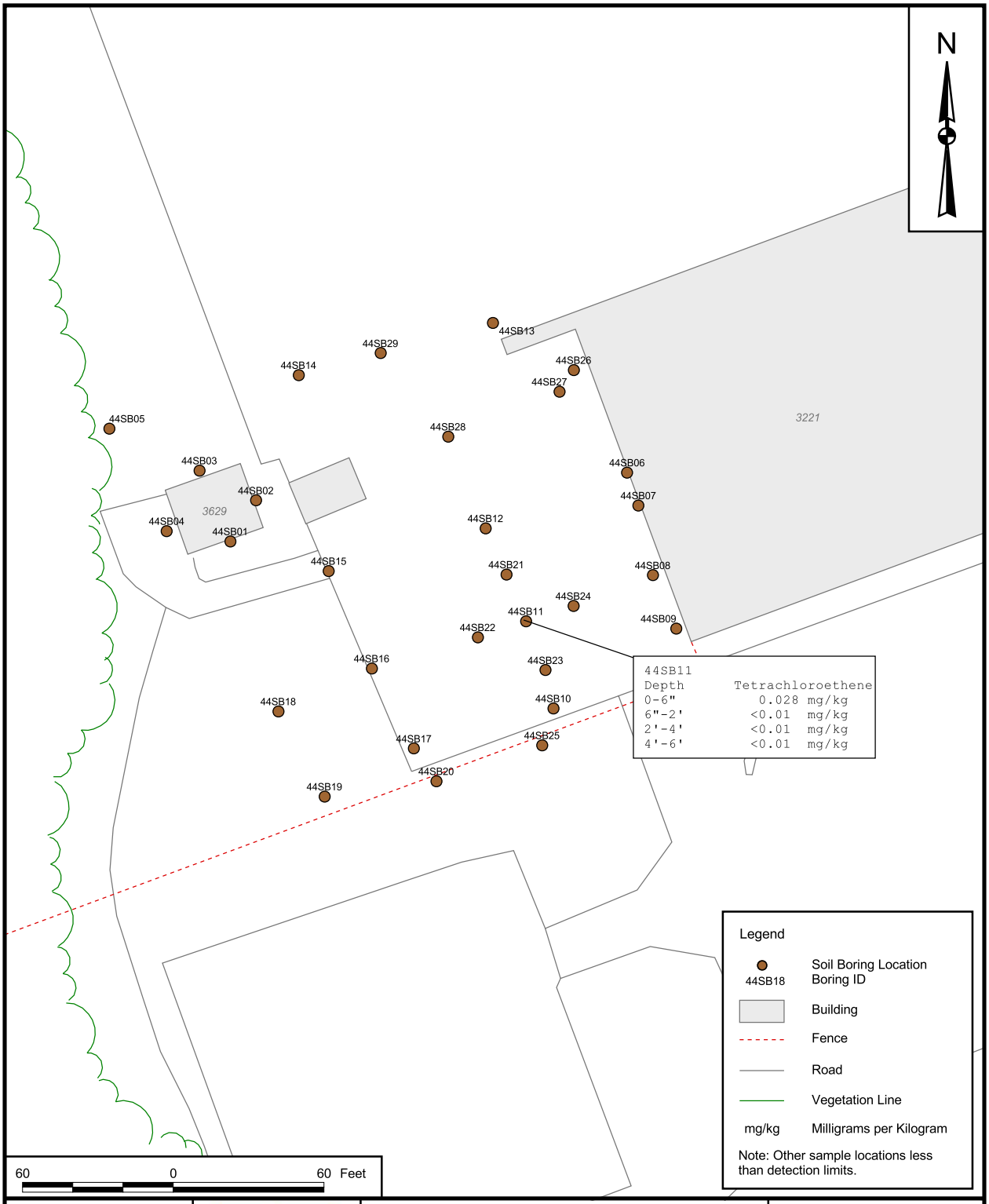
To evaluate the nature and extent of contaminants at Site 44, the surface and subsurface soil analytical results were compared to the risk-based SCTLs established in 62-777, Florida Administrative Code (FAC) for direct exposure-residential, direct exposure-industrial, and leachability based on groundwater criteria.

4.2.1 Soil Screening

Soil screening samples were collected at 29 locations at Site 44 for on-site analysis for selected VOCs. PCE was detected in the 0- to 6-inch soil sample collected at the 44SB11 location (Figure 4-1). The reported concentration in this sample, 0.028 milligrams per kilogram (mg/kg), was less than the residential SCTL of 8.8 mg/kg and the leaching to groundwater SCTL of 0.03 mg/kg. The VOC concentrations in the other soil samples were less than the laboratory detection limits. The analytical report from the mobile laboratory is included in Appendix C.

4.2.2 Soil Characterization Sampling

The characterization soil samples were collected at three locations, 44SB02, 44SB11, and 44SB25. Three soil samples were collected from each of the three boring locations at depths of 0 to 6 inches, 6 inches to 2 feet, and 2 feet to 4 feet. The characterization samples were analyzed for TAL metals, TCL VOCs, TCL SVOCs and PAHs, TCL pesticides and PCBs, and petroleum hydrocarbons. The



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C. SPEHAR	2/07/06			—
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B. OLSON	5/03/07			— / —
COST/SCHEDULE-AREA				APPROVED BY / DATE
				— / —
SCALE				DRAWING NO. / REV
AS NOTED				FIGURE 4 - 1 / 0

SOIL SCREENING DETECTIONS
SITE 44 RI REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR SOIL RESULTS SITE 44 LAYOUT 5/03/07 JEE

characterization samples were also submitted for SPLP extraction and analysis for TAL metals and TCL VOCs. Data validation reports are included in Appendix C.

4.2.2.1 VOC

The soil characterization samples were analyzed for TCL VOCs. Table 4-1 summarizes the organic analytes detected in the characterization soil samples. Acetone was detected in one of the characterization surface soil samples, 44SB0201, at an estimated concentration of 120 micrograms per kilogram (μg/kg), less than the SCTL (Table 4-1). Concentrations of other VOCs were less than standard laboratory detection limits. TCE was not detected in the 0 to 6 inch interval characterization soil sample from 44SB11, which had a mobile laboratory result exceeding the leaching SCTL.

2-Hexanone, 4-methyl-2-pentanone, styrene, and toluene were reported in one or more of the SPLP VOC analyses of the soil characterization samples. The reported SPLP results were less than GCTLs for these compounds. None of these compounds were reported as detections in the total TCL VOC analytical results.

Acetone was reported in the rinsate blank collected during the soil characterization sampling event at a concentration below the data validation action level. Acetone was also detected the trip blank at a concentration less than the data validation action level.

4.2.2.2 SVOCs

The soil samples collected for full suite analysis were analyzed for TCL SVOCs. Table 4-1 provides a summary of organic analytes detected in surface soil. No SVOCs were detected at concentrations exceeding leaching to groundwater criteria. SVOCs reported at concentrations greater than direct exposure screening criteria were limited to cPAHs (Figure 4-2) and are discussed in the following section.

4.2.2.3 Carcinogenic PAHs

The seven cPAHs listed in 62-777, FAC are benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, and indeno(1,2,3-CD)pyrene. The concentration of each cPAH is converted to a benzo(a)pyrene equivalent concentration using a toxic equivalency factor (TEF). The TEFs for the cPAHS are:

- Benzo(a)pyrene 1.0
- Benzo(a)anthracene 0.1
- Benzo(b)fluoranthene 0.1
- Benzo(k)fluoranthene 0.01
- Dibenzo(a,h)anthracene 1.0
- Chrysene 0.001
- Indeno(1,2,3-CD)pyrene 0.1

TABLE 4-1

ORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 1 of 4

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB02			
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	PEN44SB0201	PEN44SB0201D	PEN44SB0202	PEN44SB0203
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	Field Duplicate	0.5 - 2	2 - 4
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	9/19/2005	9/19/2005	9/19/2005	9/19/2005
Volatile Organics (ug/kg)									
ACETONE	11,000,000	68,000,000	25,000	14,000,000	54,000,000	120 J	24 U	34 U	5 U
Semivolatile Organics (ug/kg)									
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	NA	NA	0.6 U	0.9 J	0.6 J	0.6 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	3,700,000	29,000,000	0.8 J	0.7 U	0.7 U	0.7 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	NA	NA	1 J	1 J	0.6 U	0.5 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	22,000,000	100,000,000	2 J	4 J	0.9 J	0.8 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	NA	NA	30 J	61 J	8 J	2 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	72,000	390,000	3,600,000	35,000	120,000	99 J	110 J	240 J	77 U
BUTYL BENZYL PHTHALATE	17,000,000	380,000,000	310,000	12,000,000	100,000,000	100 J	90 J	71 U	70 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	2,300,000	22,000,000	22 J	210 J	4 J	2 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	1 J	0.9 U	0.9 U	0.9 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	8 J	31	2 J	2 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	30 J	200 J	4 J	2 U
Carcinogenic PAHs (ug/kg)									
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	31 J	200 J	10 J	1 U
BENZO(A)PYRENE	100	700	8,000	62	210	40 J	150 J	7 J	0.8 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	70 J	260 J	12 J	4 J
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	25 J	84 J	5 J	1 U
CHRYSENE	NA	NA	77,000	62,000	210,000	23 J	170 J	1 U	1 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	2 UJ	2 UJ	2 UJ	2 UJ
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	44 J	79 J	6 J	2 UJ
BENZO(A)PYRENE EQUIVALENT	100	700	NA	NA	NA	56	205	11	2
Pesticides/PCBs (ug/kg)									
4,4'-DDD	4,200	22,000	5,800	2,400	10,000	0.44 U	1.4 J	0.45 U	0.45 U
ALDRIN	60	300	200	29	100	0.54 U	0.94 J	0.55 U	0.55 U
ALPHA-BHC	100	600	0.3	90	360	1 U	1.1 J	1 U	1 U
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	0.89 J	1.2 J	0.48 U	0.48 U
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	0.47 U	3.1 J	0.48 U	0.48 U
TOTAL CHLORDANE	2,800	14,000	9,600	1,600	6,500	0.89 J	4.3 J	0.96 U	0.96 U
BETA-BHC	500	2,400	1	320	1,300	0.61 U	1.6 J	0.62 U	0.62 U
DIELDRIN	60	300	2	30	110	1.2 J	1.5 J	0.38 U	0.38 U
ENDOSULFAN SULFATE	450,000	7,600,000	3,800	370,000	3,700,000	2.1 J	3 J	0.66 UJ	0.66 UJ
ENDRIN KETONE	25,000	510,000	1,000	18,000	180,000	1.6 J	2 J	0.69 UJ	0.69 UJ
GAMMA-BHC (LINDANE)	700	2,500	9	440	1,700	0.78 J	1.1 J	0.45 U	0.45 U
HEPTACHLOR	200	1,000	23,000	110	380	0.67 U	1.6 J	0.69 U	0.69 U
Petroleum Hydrocarbons (mg/kg)									
TPH (C08-C40)	460	2,700	340	NA	NA	40	34	31	2.5 J

TABLE 4-1

ORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 2 of 4

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB02			
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	PEN44SB0201	PEN44SB0201D	PEN44SB0202	PEN44SB0203
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	Field Duplicate	0.5 - 2	2 - 4
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	9/19/2005	9/19/2005	9/19/2005	9/19/2005
			FLORIDA GCTL	USEPA MCL	TAPWATER PRG				
SPLP Volatile Organics(ug/L)									
2-HEXANONE			280	NA	NA	2 UJ	2 UJ	2 UJ	2 UJ
4-METHYL-2-PENTANONE			560	NA	NA	3 UJ	64 J	3 UJ	3 UJ
STYRENE			100	100	1,600	0.6 U	0.6 U	0.6 U	0.6 U
TOLUENE			40	1,000	720	0.2 U	0.3 J	0.3 J	0.2 U

Notes:
SCTL- Florida soil cleanup target level
GCTL - Florida groundwater cleanup target leve
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary remediation goals
ft - feet
ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NA - Not applicable
Values in bold exceed screening criteria
U - Analyte concentration less than the value showr
J - Estimated concentration less than the method quantitation limi
ug/L - micrgorams per liter
DDD - dichlorodiphynyldichloroethane
TPH - Total Petroleum Hydrocarbons

TABLE 4-1

ORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 3 of 4

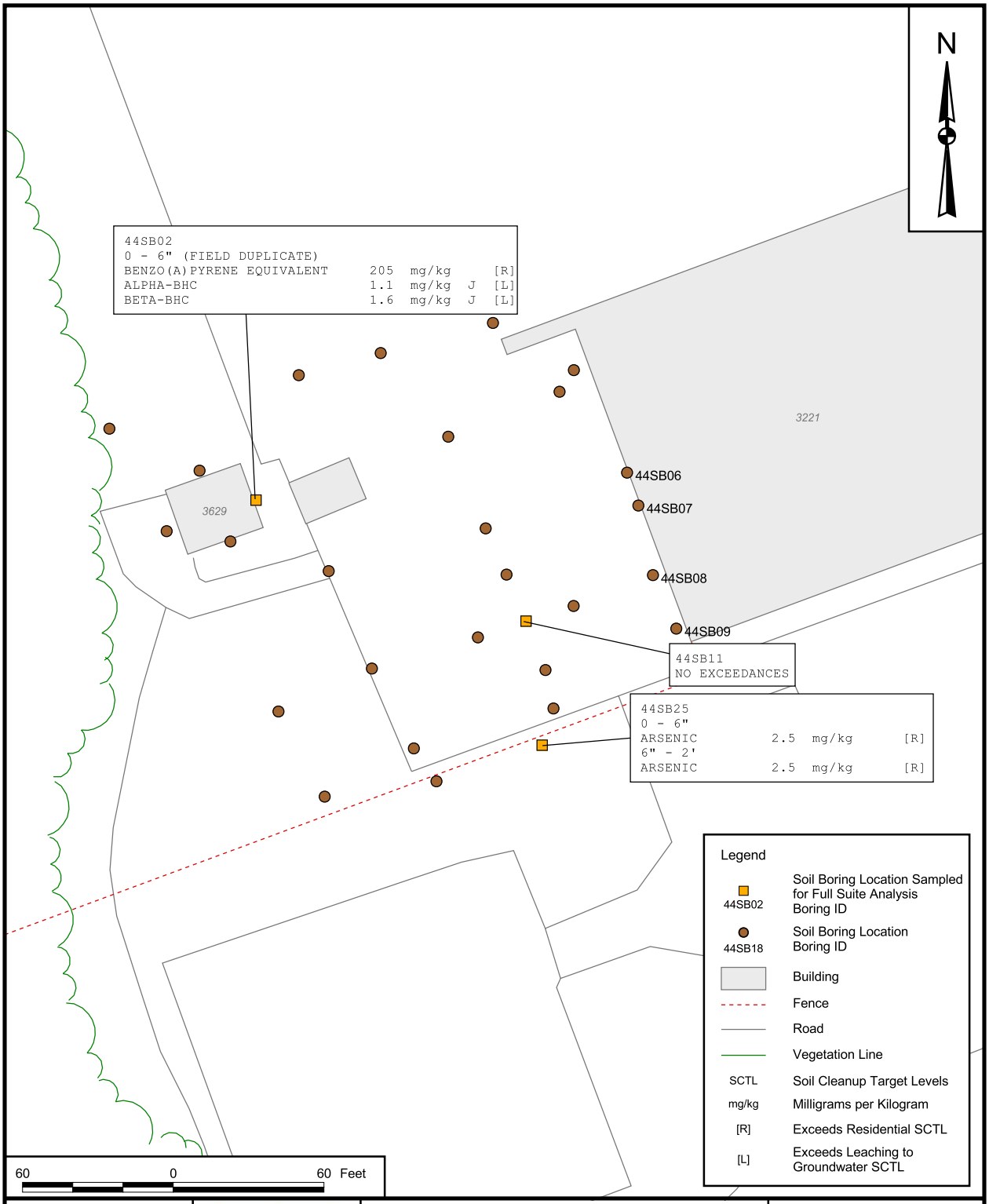
LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB11			44SB25			Rinsate	Trip Blank
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	PEN44SB1101	PEN44SB1102	PEN44SB1103	PEN44SB2501	PEN44SB2502	PEN44SB2503	PEN44RB0919	PEN44TB0919
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	2 - 4	0 - 0.5	0.5 - 2	2 - 4	QA/QC	QA/QC
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005
Volatile Organics (ug/kg)												ug/L	ug/L
ACETONE	11,000,000	68,000,000	25,000	14,000,000	54,000,000	16 U	22 U	31 U	8 U	72 U	11 U	30 J	4 J
Semivolatile Organics (ug/kg)													
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.06 U	
ACENAPHTHENE	2,400,000	20,000,000	2,100	3,700,000	29,000,000	0.8 U	0.8 U	0.7 U	0.7 U	0.7 U	0.8 U	0.08 U	
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	NA	NA	0.6 U	0.6 U	0.5 U	0.5 U	0.6 U	0.6 U	0.04 U	
ANTHRACENE	21,000,000	300,000,000	2,500,000	22,000,000	100,000,000	0.9 U	0.9 U	0.8 U	1 J	0.8 U	0.9 U	0.07 U	
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	NA	NA	2 UJ	2 UJ	2 UJ	23 J	2 UJ	12 J	0.1 UJ	
BIS(2-ETHYLHEXYL)PHTHALATE	72,000	390,000	3,600,000	35,000	120,000	85 UJ	82 U	77 U	330 J	78 U	80 U	7 U	
BUTYL BENZYL PHTHALATE	17,000,000	380,000,000	310,000	12,000,000	100,000,000	78 UJ	74 U	70 U	130 J	71 U	73 U	3 U	
FLUORANTHENE	3,200,000	59,000,000	1,200,000	2,300,000	22,000,000	2 U	2 U	2 U	13 J	3 J	7 J	0.07 U	
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	1 U	1 U	0.9 U	0.9 U	0.9 U	1 U	0.05 U	
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	2 U	2 U	2 U	3 J	2 U	2 J	0.08 U	
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	2 U	2 U	2 U	15 J	2 J	7 J	0.08 U	
Carcinogenic PAHs (ug/kg)													
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	9 J	1 U	1 U	20 J	9 J	13 J	0.08 UJ	
BENZO(A)PYRENE	100	700	8,000	62	210	0.8 U	0.8 UJ	0.8 U	29	3 J	12 J	0.08 U	
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	2 U	2 UJ	2 U	52	2 U	21 J	0.08 U	
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	2 U	1 UJ	1 U	15 J	1 U	8 J	0.09 UJ	
CHRYSENE	NA	NA	77,000	62,000	210,000	1 U	1 U	1 U	11 J	1 U	1 U	0.05 UJ	
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	0.1 UJ	
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	2 UJ	2 UJ	2 UJ	31 J	2 UJ	11 J	0.07 U	
BENZO(A)PYRENE EQUIVALENT	100	700	NA	NA	NA	2.5			40.5	5.1	17.6		
Pesticides/PCBs (ug/kg)													
4,4'-DDD	4,200	22,000	5,800	2,400	10,000	0.49 U	0.47 U	0.45 U	0.45 UJ	3.4 UJ	0.47 U	0.015 UJ	
ALDRIN	60	300	200	29	100	0.61 U	0.58 U	0.55 U	0.55 UJ	0.56 UJ	0.58 U	0.025 UJ	
ALPHA-BHC	100	600	0.3	90	360	1.1 U	1.1 U	1 U	1 UJ	1 UJ	1.1 U	0.018 UJ	
ALPHA-CHLORDANE	NA	NA	NA	NA	NA	0.53 U	0.51 U	0.48 U	0.48 UJ	0.49 UJ	0.5 U	0.022 UJ	
GAMMA-CHLORDANE	NA	NA	NA	NA	NA	0.53 U	0.51 U	0.48 U	0.48 UJ	0.49 UJ	0.5 U	0.05 UJ	
TOTAL CHLORDANE	2,800	14,000	9,600	1,600	6,500	1.06 U	1.02 U	0.96 U	0.96 UJ	0.98 UJ	1.0 U		
BETA-BHC	500	2,400	1	320	1,300	0.68 U	0.66 U	0.62 U	0.62 UJ	0.62 UJ	0.65 U	0.024 UJ	
DIELDRIN	60	300	2	30	110	0.42 U	0.4 U	0.38 U	0.38 UJ	3.4 UJ	0.4 U	0.1 UJ	
ENDOSULFAN SULFATE	450,000	7,600,000	3,800	370,000	3,700,000	0.72 UJ	0.69 UJ	0.66 UJ	0.65 UJ	0.66 UJ	0.68 UJ	0.012 UJ	
ENDRIN KETONE	25,000	510,000	1,000	18,000	180,000	0.76 UJ	0.73 UJ	0.69 UJ	0.69 UJ	0.69 UJ	0.72 UJ	0.017 UJ	
GAMMA-BHC (LINDANE)	700	2,500	9	440	1,700	0.49 U	0.47 U	0.45 U	0.45 UJ	0.45 UJ	0.47 U	0.016 UJ	
HEPTACHLOR	200	1,000	23,000	110	380	0.76 U	0.73 U	0.69 U	0.69 UJ	0.69 UJ	0.72 U	0.017 UJ	
Petroleum Hydrocarbons (mg/kg)													
TPH (C08-C40)	460	2,700	340	NA	NA	1.9 U	1.3 U	0.81 U	47	5.1 J	5 J	210 U	

TABLE 4-1

ORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB11			44SB25			Rinsate	Trip Blank
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	PEN44SB1101	PEN44SB1102	PEN44SB1103	PEN44SB2501	PEN44SB2502	PEN44SB2503	PEN44RB0919	PEN44TB0919
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	2 - 4	0 - 0.5	0.5 - 2	2 - 4	QA/QC	QA/QC
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005
			FLORIDA GCTL	USEPA MCL	TAPWATER PRG								
SPLP Volatile Organics(ug/L)													
2-HEXANONE			280	NA	NA	2 UJ	3 J	2 UJ	2 UJ	2 UJ	2 UJ	3 J	2 UJ
4-METHYL-2-PENTANONE			560	NA	NA	3 UJ	61 J	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
STYRENE			100	100	1,600	0.6 U	0.6 U	0.6 U	0.6 U	2 R	0.8 J	0.6 U	0.6 U
TOLUENE			40	1,000	720	0.4 J	0.3 J	0.2 U	0.2 U	2 R	0.2 U	0.2 U	0.2 U

Notes:
SCTL- Florida soil cleanup target level
GCTL - Florida groundwater cleanup target leve
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary remediation goals
ft - feet
ug/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
NA - Not applicable
Values in bold exceed screening criteria
U - Analyte concentration less than the value showr
J - Estimated concentration less than the method quantitation limi
ug/L - micrgorams per liter
DDD - dichlorodiphynyldichloroethane
TPH - Total Petroleum Hydrocarbons



DRAWN BY C. SPEHAR	DATE 2/07/06	SOIL CHARACTERIZATION SCTL EXCEEDANCES SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER —
CHECKED BY B. OLSON	DATE 5/03/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 2 / REV 0

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR SITE 44 SCTL EXCEED LAYOUT 5/03/07 JEE

The benzo(a)pyrene equivalent concentrations of the detected cPAHs are summed for each sample and the sum is compared to the direct exposure SCTLs established for benzo(a)pyrene in 62-777, FAC. Table 4-1 summarizes the detected concentrations of cPAHs and the calculated benzo(a)pyrene equivalent concentrations.

cPAHs were detected in each of the 3 surface soil samples collected at Site 44. The field duplicate of sample 44SB0201 (Figure 4-2) had a benzo(a)pyrene equivalent concentration of 205 μg/kg, which is greater than the residential SCTL of 100 μg/kg.

4.2.2.4 Pesticides

Eleven pesticides were reported in surface soil sample 44SB0201 (Figure 4-2). Concentrations of these pesticides were less than the direct exposure SCTLs. Alpha-BHC (estimated at 1.1 μg/kg) and Beta-BHC (estimated at 1.6 μg/kg) were detected in the field duplicate sample 44SB0201D at concentrations greater than the leaching to groundwater SCTLs of 0.3 μg/kg and 1 μg/kg, respectively (Table 4-1). An additional soil sample, 44SB3001, was collected at the 44SB02 location for SPLP extraction and analysis for selected pesticides. The pesticide concentrations reported for the SPLP extraction were less than the standard laboratory detection limits.

Positive detections of pesticides were limited to this soil boring location. Pesticide and PCB concentrations were less than the standard laboratory detection limits in the other soil characterization samples collected at Site 44.

4.2.2.5 Petroleum Hydrocarbons

Total petroleum hydrocarbons were detected in the soil characterization samples collected at the 44SB02 and 44SB25 locations at concentrations less than the SCTL for TRPH (Table 4-1). TRPH concentrations were less than the standard laboratory detection limits in the soil characterization samples collected at the 44SB11 location.

4.2.2.6 Metals

The soil samples collected for full suite analysis were analyzed for TAL inorganics. Table 4-2 summarizes the inorganic analytes detected in the characterization soil samples and the analytical results for the SPLP samples.

Arsenic was detected in the two soil characterization samples at concentrations greater than the residential SCTL for arsenic, 2.1 mg/kg (Table 4-3):

TABLE 4-2

INORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 1 of 3

LOCATION SAMPLE DEPTH RANGE (feet) SAMPLE DATE	RESIDENTIAL DIRECT EXPOSURE SCTL	INDUSTRIAL DIRECT EXPOSURE SCTL	LEACHABILITY TO GROUNDWATER SCTL	RESIDENTIAL DIRECT CONTACT PRG	INDUSTRIAL DIRECT CONTACT PRG	NAS PENSACOLA REFERENCE CONCENTRATION	44SB02			
							PEN44SB0201 0 - 0.5 9/19/2005	PEN44SB0201D Field Dup. 9/19/2005	PEN44SB0202 0.5 - 2 9/19/2005	PEN44SB0203 2 - 4 9/19/2005
Inorganics (mg/kg)										
ALUMINUM	80,000	NA	NA	76,000	100,000	3,833	3,240	2,920	3,780	997
ARSENIC	2.1	12	NA	0.39	1.6	1.6	0.9	0.89	0.30 U	0.28 U
BARIUM	120	130,000	1,600	5,400	67,000	4.6	11.2	8.2	7	1.9
CADMIUM	82	1,700	7.5	37	450	1	2.1	2	1.3	0.14 U
CALCIUM	NA	NA	NA	NA	NA	912	1,050 J	4,290 J	1,120 J	188 J
CHROMIUM	210	470	NA	30	64	6.1	10.5	10.1	7	2.7
COBALT	1,700	42,000	NA	900	1,900	1.9	0.32	0.55	0.31	0.11
COPPER	150	89,000	NA	3,100	41,000	5.7	7.9 J	8.5 J	3.8 J	0.77 J
IRON	53,000	NA	NA	23,000	100,000	2,745	2,680	2,580	1,700	408
LEAD	400	1,400	NA	400	800	7.3	26.8	27.6	26.3	2.7
MAGNESIUM	NA	NA	NA	NA	NA	133	144	118	208	56.3
MANGANESE	3,500	43,000	NA	1,800	19,000	21.3	20.5	16.5	8.4	1.8
MERCURY	3	17	2.1	23	310	0.1	0.02	0.01	0.01 U	0.01 U
NICKEL	340	35,000	130	1,600	20,000	6.4	2.3	2.3	2.2	1
POTASSIUM	NA	NA	NA	NA	NA	461	90.7	29.66 U	54.5	50.8
SODIUM	NA	NA	NA	NA	NA	108	2.61 U	29.7	3.1	2.62 U
VANADIUM	67	10,000	980	78	1,000	5.8	6.3	6	5.4	1.5
ZINC	26,000	630,000	NA	23,000	100,000	16.9	39.4	38.3	16.7	2.8 U
			FLORIDA GCTL	USEPA MCL	TAPWATER PRG					
SPLP Inorganics (ug/L)										
ARSENIC			10	10	0.45	2.8	6.3	4	2.81 U	2.81 U
BARIUM			2,000	2,000	2,600	13	125	108	77	30.2
CADMIUM			5	5	18	3.4	3.8	5.4	2.4 U	1.4 U
CHROMIUM			100	100	1,100	35	31.2	33.3	29.4	7.1 U
COBALT			140	NA	730	4.1	1.19 U	1.19 U	1.19 U	1.19 U
COPPER			1,000	1,300	1,500	16	20.4 U	24.2	11.5 U	6.4 U
LEAD			15	15	NA	1.6	57.0 U	71.9 U	48.9 U	7.2 U
NICKEL			100	NA	730	40	8.8	8.2 U	10.5	4.9 U
VANADIUM			49	NA	36	9.6	36	35.6	36.5	8.4
ZINC			5,000	NA	11,000	153	113	125	72.6	26.6

NOTES:
SCTL- Florida Soil cleanup target level
GCTL - Florida groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary remediation goals
NAS Pensacola Reference Concentration - EnSafe 1994
mg/kg - milligrams per kilogram
µg/L - micrograms per liter
NA - Not Applicable

Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
J - Estimated concentration less than the method quantitation limit
QA/QC - Quality assurance/quality control

TABLE 4-2

INORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 2 of 3

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL		44SB11		
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	NAS PENSACOLA	PEN44SB1101	PEN44SB1102	PEN44SB1103
DEPTH RANGE (feet)	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	REFERENCE	0 - 0.5	0.5 - 2	2 - 4
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	CONCENTRATION	9/19/2005	9/19/2005	9/19/2005
Inorganics (mg/kg)									
ALUMINUM	80,000	NA	NA	76,000	100,000	3,833	1,360	1520	203
ARSENIC	2.1	12	NA	0.39	1.6	1.6	0.49	0.24	0.26 U
BARIUM	120	130,000	1,600	5,400	67,000	4.6	2.4	2.2	0.19
CADMIUM	82	1,700	7.5	37	450	1	0.03 UJ	0.03 U	0.03 U
CALCIUM	NA	NA	NA	NA	NA	912	36,900 J	8,180 J	290 J
CHROMIUM	210	470	NA	30	64	6.1	2.1	2.5	0.93 U
COBALT	1,700	42,000	NA	900	1,900	1.9	0.58	0.29	0.09
COPPER	150	89,000	NA	3,100	41,000	5.7	1.1 J	0.83 J	0.13 U
IRON	53,000	NA	NA	23,000	100,000	2,745	712	723	107
LEAD	400	1,400	NA	400	800	7.3	0.82 U	0.97	0.35 U
MAGNESIUM	NA	NA	NA	NA	NA	133	574	132	17.3 U
MANGANESE	3,500	43,000	NA	1,800	19,000	21.3	30.2	6.6	0.71 U
MERCURY	3	17	2.1	23	310	0.1	0.01 U	0.01 U	0.01 U
NICKEL	340	35,000	130	1,600	20,000	6.4	0.93 J	1.2	0.53 U
POTASSIUM	NA	NA	NA	NA	NA	461	71.2 J	57.2	26.38 U
SODIUM	NA	NA	NA	NA	NA	108	292 J	58.8	2.12 U
VANADIUM	67	10,000	980	78	1,000	5.8	1.9 J	2.2	0.36 U
ZINC	26,000	630,000	NA	23,000	100,000	16.9	1.8 U	1.8 U	0.53 U
			FLORIDA	USEPA	TAPWATER				
			GCTL	MCL	PRG				
SPLP Inorganics (ug/L)									
ARSENIC			10	10	0.45	2.8	2.81 U	3.45 U	3.45 U
BARIUM			2,000	2,000	2,600	13	40.1	2.1 U	2.0 U
CADMIUM			5	5	18	3.4	0.41 U	0.40 U	0.40 U
CHROMIUM			100	100	1,100	35	2.5 U	11.1	3.4 U
COBALT			140	NA	730	4.1	1.19 U	1.12 U	1.12 U
COPPER			1,000	1,300	1,500	16	1.16 U	2.6 U	2.2 U
LEAD			15	15	NA	1.6	2.5 U	2.3 U	3.9 U
NICKEL			100	NA	730	40	1.26 U	4.4 U	28.7
VANADIUM			49	NA	36	9.6	5.07 U	1.5	3
ZINC			5,000	NA	11,000	153	39	7.1 U	34.7

NOTES:
SCTL- Florida Soil cleanup target level
GCTL - Florida groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary remediation goals
NAS Pensacola Reference Concentration - EnSafe 1994
mg/kg - milligrams per kilogram
µg/L - micrograms per liter
NA - Not Applicable

Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
J - Estimated concentration less than the method quantitation limit
QA/QC - Quality assurance/quality control

TABLE 4-2

INORGANIC DETECTIONS IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 3 of 3

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL		44SB25			Rinsate
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	NAS PENSACOLA	PEN44SB2501	PEN44SB2502	PEN44SB2503	PEN44RB0919
DEPTH RANGE (feet)	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	REFERENCE	0 - 0.5	0.5 - 2	2 - 4	QA/QC
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	CONCENTRATION	9/19/2005	9/19/2005	9/19/2005	9/19/2005
Inorganics (mg/kg)										(ug/L)
ALUMINUM	80,000	NA	NA	76,000	100,000	3,833	7070	11700	10400	22.0 U
ARSENIC	2.1	12	NA	0.39	1.6	1.6	1.6	2.5	2.5	2.81 U
BARIUM	120	130,000	1,600	5,400	67,000	4.6	8.2	6.5	5.9	1.1
CADMIUM	82	1,700	7.5	37	450	1	1.8	0.13 U	0.19	0.41 U
CALCIUM	NA	NA	NA	NA	NA	912	4,030 J	2,950 J	321 J	250
CHROMIUM	210	470	NA	30	64	6.1	15.3	11.4	13	1.01 U
COBALT	1,700	42,000	NA	900	1,900	1.9	0.47	0.41	0.35	1.19 U
COPPER	150	89,000	NA	3,100	41,000	5.7	4.8 J	4.2 J	3.6 J	1.16 U
IRON	53,000	NA	NA	23,000	100,000	2,745	5,550	6,680	6,720	22.6
LEAD	400	1,400	NA	400	800	7.3	22.6	4.7	7.2	2.07 U
MAGNESIUM	NA	NA	NA	NA	NA	133	227	117	93.2	34.9
MANGANESE	3,500	43,000	NA	1,800	19,000	21.3	33.5	16.9	16.2	0.91 U
MERCURY	3	17	2.1	23	310	0.1	0.02	0.02	0.02	0.04
NICKEL	340	35,000	130	1,600	20,000	6.4	3.1	2.7	2.6	1.26 U
POTASSIUM	NA	NA	NA	NA	NA	461	247	129	78	621 U
SODIUM	NA	NA	NA	NA	NA	108	53.6	2.69 U	3.07 U	33.7
VANADIUM	67	10,000	980	78	1,000	5.8	11.6	16.9	18.2	5.07 U
ZINC	26,000	630,000	NA	23,000	100,000	16.9	36.3	7.8	11.7	9.4
			FLORIDA	USEPA	TAPWATER					
			GCTL	MCL	PRG					
SPLP Inorganics (ug/L)										
ARSENIC			10	10	0.45	2.8	3.45 U	3.45 U	3.45 U	
BARIUM			2,000	2,000	2,600	13	172	59.7	57.8	
CADMIUM			5	5	18	3.4	71.6	4.9	7	
CHROMIUM			100	100	1,100	35	15.5	10	9.6	
COBALT			140	NA	730	4.1	5.8	4.6 U	5.1 U	
COPPER			1,000	1,300	1,500	16	7.6 U	20.9 U	19.2 U	
LEAD			15	15	NA	1.6	43.8	47.3	93.1	
NICKEL			100	NA	730	40	14.8	5.4 U	7.2 U	
VANADIUM			49	NA	36	9.6	4.88 U	67.6	25.8	
ZINC			5,000	NA	11,000	153	851	106	158	

NOTES:
SCTL- Florida Soil cleanup target level
GCTL - Florida groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary remediation goals
NAS Pensacola Reference Concentration - EnSafe 1994
mg/kg - milligrams per kilogram
µg/L - micrograms per liter
NA - Not Applicable

Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
J - Estimated concentration less than the method quantitation limit
QA/QC - Quality assurance/quality control

TABLE 4-3

ARSENIC DELINEATION IN SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FL

	LOCATION	44SB02				44SB11			44SB25		
	SAMPLE	PEN44SB0201	PEN44SB0201D	PEN44SB0202	PEN44SB0203	PEN44SB1101	PEN44SB1102	PEN44SB1103	PEN44SB2501	PEN44SB2502	PEN44SB2503
	DEPTH RANGE	0 - 0.5	Field Dup.	0.5 - 2	2 - 4	0 - 0.5	0.5 - 2	2 - 4	0 - 0.5	0.5 - 2	2 - 4
	SAMPLE DATE	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005	9/19/2005
Inorganics (mg/kg)											
ARSENIC		0.9	0.89	0.30 U	0.28 U	0.49	0.24	0.26 U	1.6	2.5	2.5

	LOCATION	44SB3601		44SB3701		44SB38			44SB39		44SB40	
	SAMPLE	44SB3601	44SB3602	44SB3701	44SB3702	44SB3801	44SB3801D	44SB3802	44SB3901	44SB3902	44SB4001	44SB4002
	DEPTH RANGE	0.5 - 2	2 - 4	0.5 - 2	2 - 4	0.5 - 2	Field Dup.	2 - 4	0.5 - 2	2 - 4	0.5 - 2	2 - 4
	SAMPLE DATE	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006
Inorganics (mg/kg)												
ARSENIC		0.73 U	0.71 U	0.73 U	0.71 U	0.70 U	0.74 U	0.68 U	0.76 U	0.70 U	0.68 U	0.70 U

NOTES:

Residential SCTL	2.1 mg/kg
Industrial SCTL	12 mg/kg
Reference concentration- EnSafe 1994	1.6 mg/kg
Residential PRG	0.39 mg/kg
Industrial PRG	1.6 mg/kg

SCTL - Florida SCTL
PRG - Region IX Preliminary Remediation Goal
mg/kg - milligrams per kilogram
Values in bold exceed screening criteria
U - Analyte concentration less than the value shown - instrument detection limit

- 44SB2502 2.5 mg/kg
- 44SB2503 2.5 mg/kg

A statistical analysis of the distribution of arsenic and iron in soil at NAS Pensacola was prepared in order to identify sites where arsenic concentrations were elevated due to site activities (Appendix B). Arsenic and iron data from 653 soil samples collected base-wide were evaluated and 55 of these soil samples were determined to be outliers enriched in arsenic relative to the iron concentration. None of the soil samples from Site 44 were in this outlier group that was enriched in arsenic. The statistical analysis (Appendix B) indicated a range of background arsenic concentrations from 0.1 to 17.5 mg/kg in soils at NAS Pensacola, indicating that arsenic concentrations up to 17.5 mg/kg can be due to natural processes and not release of arsenic from site activities. The arsenic concentrations reported in soil samples from Site 44 (2.5 mg/kg) are within this background range.

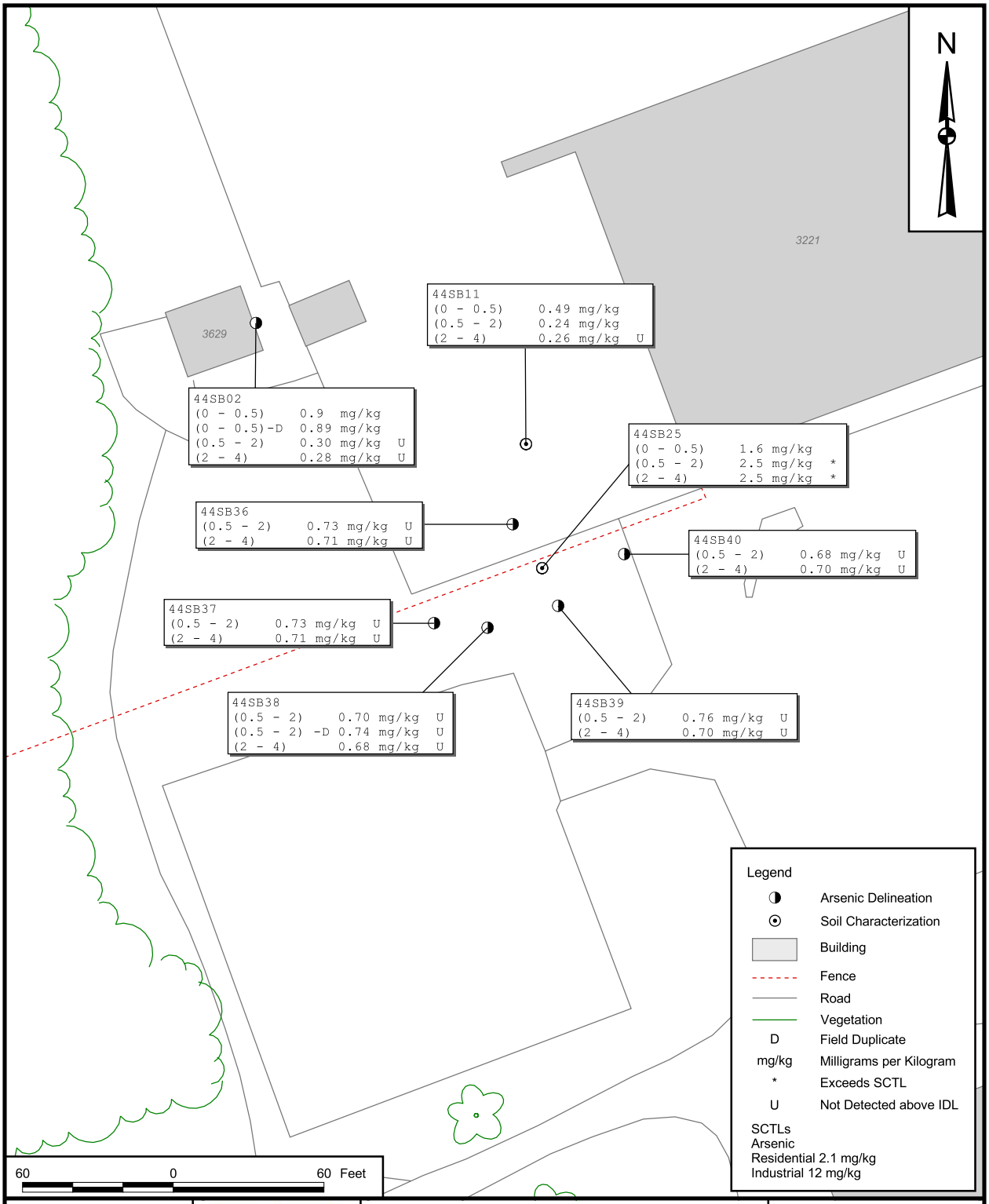
The soil boring 44SB25 characterization samples were collected at the former location of UST 3221 NW (Figure 4-3). A default leaching SCTL has not been established for arsenic, therefore results of the SPLP extraction and analysis were compared to the GCTL for arsenic of 10 μg/L. The arsenic concentrations reported for all SPLP samples were less than the arsenic GCTL (Table 4-2).

Lead concentrations reported for the site characterization soil samples were less than the residential SCTL. A default leaching SCTL has not been established for lead, therefore results of the SPLP extraction and analysis were compared to the GCTL for lead. The lead concentrations for soil samples extracted by SPLP and analyzed for metals were greater than the GCTL for lead (15 μg/L) in the following samples:

- 44SB2501 43.8 μg/L
- 44SB2502 47.3 μg/L
- 44SB2503 93.1 μg/L

The total lead concentrations for 44SB2502 (4.7 mg/kg) and 44SB2503 (7.2 mg/kg) were less than the NAS Pensacola reference concentration of 7.3 mg/kg.

Cadmium concentrations reported for all the soil characterization samples were less than the residential and default leaching SCTLs. The cadmium SPLP results for three samples were greater than the cadmium GCTL of 5 μg/L:



DRAWN BY S. STROZ	DATE 12/13/06	ARSENIC IN SOIL DELINEATION SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
CHECKED BY B. OLSON	DATE 4/25/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4-3 REV 0

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR ARSENIC IN SOIL DELINEATION TAG LAYOUT 4/25/07 JEE

- 44SB0201D 5.4 μg/L (field duplicate, associated sample, 44SB0201 had cadmium SPLP result of 3.8 μg/L)
- 44SB2501 71.6 μg/L
- 44SB2503 7 μg/L

Metals including barium, calcium, iron, magnesium, mercury, sodium, and zinc were reported in the rinsate blank collected during the soil sampling event (Table 4-2). The metals detections in the rinsate blank were below data validation action levels.

4.2.3 Arsenic Delineation

Arsenic was detected in two characterization sample intervals at the 44SB25 soil boring location at concentrations exceeding the residential SCTL. To delineate the extent of arsenic in this area, five additional soil borings designated 44SB36 to 44SB40 were sampled around the 44SB25 location (Figure 4-3). Arsenic concentrations in the delineation samples were less than standard laboratory detection limits (Table 4-3).

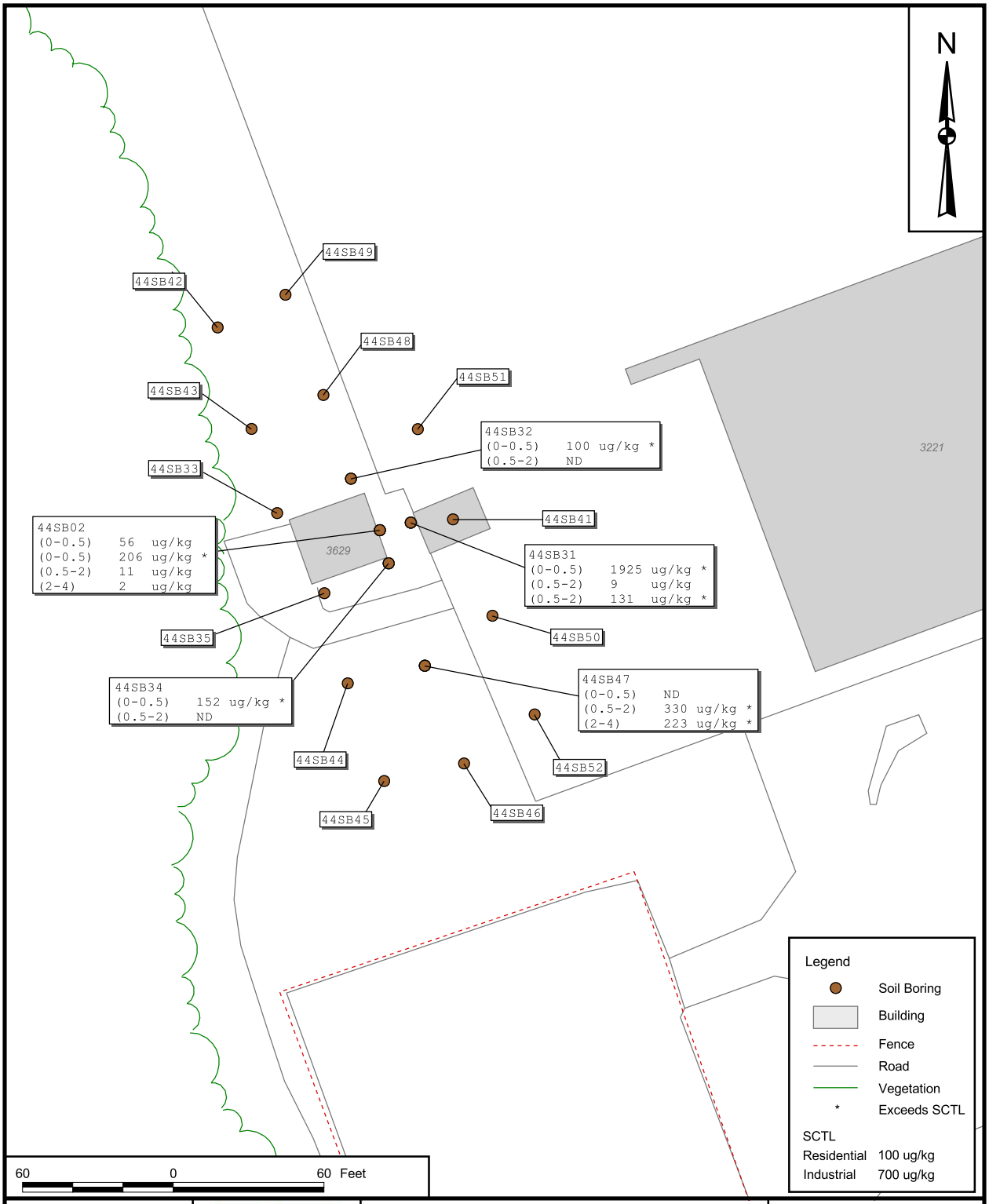
4.2.4 cPAH Delineation

The benzo(a)pyrene equivalent concentration reported for the field duplicate of one surface characterization soil sample collected at the 44SB02 soil boring location exceeded the residential SCTL. To delineate the extent of cPAHs in this area, 17 additional soil borings (44SB31 to 44SB35 and 44SB41 to 44SB52) were sampled around the 44SB02 location (Figure 4-4).

cPAH concentrations that exceeded the benzo(a)pyrene residential SCTL of 100 μg/kg were reported at three soil boring locations:

44SB3101 1,925 μg/kg
44SB3102D 131 μg/kg (field duplicate)
44SB3401 152 μg/kg
44SB4702 330 μg/kg
44SB4703 223 μg/kg

The surface soil sample collected at the 44SB32 location (44SB3201) had a benzo(a)pyrene equivalent concentration of 100 μg/kg, equal to the residential SCTL.



DRAWN BY S. STROZ — DATE 12/13/06		BENZO(A)PYRENE EQUIVALENT SCTL EXCEEDANCES IN SOIL SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	CONTRACT NUMBER CTO 0367
CHECKED BY B. OLSON — DATE 12/15/06			APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 4-4 — REV 0

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR SOIL PAH DELINEATION LAYOUT 3/28/07 JEE

Based on the results of the soil characterization and cPAH delineation sampling, one area of cPAH impact to soil has been identified (Figure 4-4). The area is located in the vicinity of the foundation of Building 3629 and is approximately 80 feet long and 20 feet wide.

4.2.5 Soil Investigation Summary

Soil screening for VOCs with the mobile laboratory identified one soil boring location, 44SB11 with a detectable concentration of PCE. The reported PCE concentration in the surface soil sample (0 to 6 inches beneath the pavement) from this location was less than the residential and leaching SCTLs.

The soil characterization sampling detected arsenic and cPAHs at concentrations greater than the residential SCTLs. The arsenic delineation sampling indicated that arsenic exceedances were limited to one soil boring location, 44SB25. Arsenic was reported in two soil samples at concentrations greater than the residential SCTL. These arsenic concentrations were within the background range determined by statistical analysis of arsenic and iron distribution at NAS Pensacola (Appendix B).

The cPAH delineation sampling identified an area of cPAH exceedances around the foundation of former Building 3629. Four soil boring locations, 44SB02, 44SB31, 44SB34, and 44SB47 had benzo(a)pyrene equivalent concentrations exceeding the residential SCTL (Table 4-4).

Lead and cadmium were reported at concentrations exceeding their GCTLs in SPLP. The total lead concentrations in all samples were less than the NAS Pensacola reference concentration. The total cadmium results in all samples were less than the default leaching SCTL.

4.3 GROUNDWATER

During previous groundwater sampling events at the site, samples were analyzed for petroleum constituents required by the Florida UST program; therefore, the groundwater characterization samples collected during the RI were analyzed for the full list of TCL and TAL analytes, as well as petroleum hydrocarbons. The CVOC delineation groundwater samples were analyzed for a select list of CVOCs.

Three groundwater sampling events were conducted. Groundwater analytical results were compared to the risk-based GCTLs established in 62-777 FAC and the NAS Pensacola background concentrations for metals. Table 4-5 provides a summary of analytes detected in groundwater.

TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 1 of 6

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB31			44SB32		44SB33	
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB3101	44SB3102	44SB3102D	44SB3201	44SB3202	44SB3301	44SB3302
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	Field Dup.	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/9/2006
Semivolatile Organics (ug/kg)												
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	13	1.2 U	1.4 J	1.3 U	1.2 U	1.2 U	1.3 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	24	2.7 J	2.3 J	1.3 U	1.3 U	1.3 U	1.3 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	5.2	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	140	5	5.6	4.1	1 U	1.2 J	1 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	200	8.1	10	5.7	1.1 U	2 J	1.2 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	3,000	78	95	53	0.41 U	36	0.42 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	240	7.1 J	55 J	20	0.72 U	5.7	0.74 U
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	6.3	0.96 U	0.99 U	0.98 U	0.96 U	0.96 U	0.98 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	20	4.4 U	5.5 U	4.9 U	2.9 U	3 U	2.1 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	36	1 J	5.4	2.9 J	0.89 U	1.6 J	0.91 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	390	12 J	59 J	24	0.69 U	7.4	0.7 U
Carcinogenic PAHs (ug/kg)												
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	420	11	54 J	24	0.86 U	12	0.88 U
BENZO(A)PYRENE	100	700	8,000	62	210	1,200	0.86 UJ	85 J	63	0.86 U	31	0.88 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	930	27 J	81 J	72	0.65 U	26	0.67 U
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	940	18 J	100 J	57	0.79 U	25	0.81 U
CHRYSENE	NA	NA	77,000	62,000	210,000	510	14 J	62 J	37	0.48 U	17	0.49 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	400	0.34 UJ	25 J	21	0.34 U	10	0.35 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	1,800	40	63	55	0.82 U	31	0.84 U
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	1,925	9	131	100	Nondetect	48	Nondetect

Notes:
SCTL- Florida soil cleanup target level
PRG - Region IX Preliminary remediation goals
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ug/kg - micrograms per kilogram
Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
J - Estimated concentration less than the method quantitation limit
NA - no criteria available

TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB34		44SB35		44SB41	
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB3401	44SB3402	44SB3501	44SB3502	44SB4101	44SB4102
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	5/9/2006	5/9/2006	5/9/2006	5/9/2006	5/11/2006	5/11/2006
Semivolatile Organics (ug/kg)											
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	1.4 U	1.3 U	1.3 U	1.3 U	1.4 U	1.4 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	1.2 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	5.5	0.98 U	4.1	1 U	1.1 U	1.1 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	7	1.1 U	4.5	1.1 U	1.2 U	1.2 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	110	0.41 U	56	0.42 U	0.44 U	0.43 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	22	0.71 U	12	0.73 U	0.78 U	0.75 U
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	1 U	0.95 U	0.98 U	0.97 U	1 U	1 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	3.2 U	2.2 U	2.9 U	2.2 U	1.9 U	1.8 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	4.3	0.88 U	2.1 J	0.9 U	0.96 U	0.93 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	29	0.68 U	13	0.69 U	0.74 U	0.72 U
Carcinogenic PAHs (ug/kg)											
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	33	0.85 U	20	0.86 U	0.92 U	0.9 U
BENZO(A)PYRENE	100	700	8,000	62	210	94	0.85 U	55	0.86 U	0.92 U	0.9 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	80	0.64 U	46	0.66 U	0.7 U	0.68 U
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	92	0.78 U	47	0.8 U	0.85 U	0.82 U
CHRYSENE	NA	NA	77,000	62,000	210,000	49	0.47 U	26	0.48 U	0.52 U	0.5 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	36	0.34 U	22	0.35 U	0.37 U	0.36 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	94	0.81 U	51	0.83 U	0.89 U	0.86 U
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	152	Nondetect	89	Nondetect	Nondetect	Nondetect

Notes:
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Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
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TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
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LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB42		44SB43		44SB44	
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB4201	44SB4202	44SB4301	44SB4302	44SB4401	44SB4402
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/7/2006
Semivolatile Organics (ug/kg)											
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	20 U	20 U	20 U	20 U	22 U	20 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	20 U	20 U	20 U	20 U	22 U	20 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	20 U	20 U	20 U	20 U	22 U	20 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	20 U	20 U	20 U	20 U	22 U	20 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	20 U	20 U	20 U	20 U	22 U	20 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	20 U	20 U	20 U	20 U	22 U	20 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	20 U	20 U	20 U	20 U	22 U	20 U
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	20 U	20 U	20 U	20 U	22 U	20 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	20 U	20 U	20 U	20 U	22 U	20 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	20 U	20 U	20 U	20 U	22 U	20 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	20 U	20 U	20 U	20 U	22 U	20 U
Carcinogenic PAHs (ug/kg)											
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	20 U	20 U	20 U	20 U	22 U	20 U
BENZO(A)PYRENE	100	700	8,000	62	210	20 U	20 U	20 U	20 U	22 U	20 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	20 U	20 U	20 U	20 U	22 U	20 U
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	20 U	20 U	20 U	20 U	22 U	20 U
CHRYSENE	NA	NA	77,000	62,000	210,000	20 U	20 U	20 U	20 U	22 U	20 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	20 U	20 U	20 U	20 U	22 U	20 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	20 U	20 U	20 U	20 U	22 U	20 U
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	Nondetect	Nondetect	Nondetect	Nondetect	Nondetect	Nondetect

Notes:
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Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
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TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB45		44SB46		44SB47		
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB4501	44SB4502	44SB4601	44SB4602	44SB4701	44SB4702	44SB4703
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2	2-4
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/11/2006
Semivolatile Organics (ug/kg)												
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	22 U	20 U	20 U	20 U	20 U	20 U	49 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	22 U	20 U	20 U	20 U	20 U	20 U	20 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	22 U	20 U	20 U	20 U	20 U	20 U	20 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	22 U	20 U	20 U	20 U	20 U	20 U	20 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	22 U	20 U	20 U	20 U	20 U	20 U	20 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	22 U	20 U	20 U	20 U	20 U	180	160
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	22 U	20 U	20 U	36 J	20 U	100	25 J
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	22 U	20 U	20 U	20 U	20 U	20 U	20 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	22 U	20 U	20 U	20 U	20 U	20 U	20 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	22 U	20 U	20 U	20 U	20 U	20 U	20 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	22 U	20 U	20 U	35 J	20 U	120	28 J
Carcinogenic PAHs (ug/kg)												
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	22 U	20 U	20 U	20 U	20 U	110	60 J
BENZO(A)PYRENE	100	700	8,000	62	210	22 U	20 U	20 U	73 J	20 U	260	170
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	22 U	20 U	20 U	20 U	20 U	260	180
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	22 U	20 U	20 U	20 U	20 U	210	130
CHRYSENE	NA	NA	77,000	62,000	210,000	22 U	20 U	20 U	20 U	20 U	160	82 J
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	22 U	20 U	20 U	20 U	20 U	20 U	20 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	22 U	20 U	20 U	20 U	20 U	210	180
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	Nondetect	Nondetect	Nondetect	86	Nondetect	330	223

Notes:
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TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB48		44SB49		44SB50	
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB4801	44SB4802	44SB4901	44SB4902	44SB5001	44SB5002
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	8/7/2006	8/7/2006	8/7/2006	8/7/2006	8/8/2006	8/8/2006
Semivolatile Organics (ug/kg)											
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	20 U	21 U	20 U	20 U	20 U	20 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	20 U	21 U	20 U	20 U	20 U	20 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	20 U	21 U	20 U	20 U	20 U	20 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	20 U	21 U	20 U	20 U	20 U	20 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	20 U	21 U	20 U	20 U	20 U	20 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	20 U	21 U	37 J	20 U	20 U	20 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	20 U	21 U	20 U	20 U	20 U	20 U
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	20 U	21 U	20 U	20 U	20 U	20 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	20 U	21 U	20 U	20 U	20 U	20 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	20 U	21 U	20 U	20 U	20 U	20 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	20 U	21 U	20 U	20 U	20 U	20 U
Carcinogenic PAHs (ug/kg)											
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	20 U	21 U	20 U	20 U	20 U	20 U
BENZO(A)PYRENE	100	700	8,000	62	210	20 U	21 U	54 J	20 U	20 U	20 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	20 U	21 U	53 J	20 U	20 U	20 U
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	20 U	21 U	47 J	20 U	20 U	20 U
CHRYSENE	NA	NA	77,000	62,000	210,000	20 U	21 U	20 U	20 U	20 U	20 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	20 U	21 U	20 U	20 U	20 U	20 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	20 U	21 U	45 J	20 U	20 U	20 U
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	Nondetect	Nondetect	75	Nondetect	Nondetect	Nondetect

Notes:
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TABLE 4-4

SOIL PAH DELINEATION RESULTS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	RESIDENTIAL	INDUSTRIAL	LEACHABILITY	RESIDENTIAL	INDUSTRIAL	44SB51		44SB52	
SAMPLE	DIRECT	DIRECT	TO	DIRECT	DIRECT	44SB5101	44SB5102	44SB5201	44SB5202
DEPTH RANGE	EXPOSURE	EXPOSURE	GROUNDWATER	CONTACT	CONTACT	0 - 0.5	0.5 - 2	0 - 0.5	0.5 - 2
SAMPLE DATE	SCTL	SCTL	SCTL	PRG	PRG	8/8/2006	8/8/2006	8/13/2006	8/13/2006
Semivolatile Organics (ug/kg)									
1-METHYLNAPHTHALENE	200,000	1,800,000	3,100	NA	NA	21 U	20 U	50 U	51 U
2-METHYLNAPHTHALENE	210,000	2,100,000	8,500	3,700,000	29,000,000	21 U	20 U	20 U	20 U
ACENAPHTHENE	2,400,000	20,000,000	2,100	NA	NA	21 U	20 U	20 U	20 U
ACENAPHTHYLENE	1,800,000	20,000,000	27,000	22,000,000	100,000,000	21 U	20 U	20 U	20 U
ANTHRACENE	21,000,000	300,000,000	2,500,000	NA	NA	21 U	20 U	20 U	20 U
BENZO(G,H,I)PERYLENE	2,500,000	52,000,000	32,000,000	35,000	120,000	21 U	20 U	20 U	20 U
FLUORANTHENE	3,200,000	59,000,000	1,200,000	12,000,000	100,000,000	21 U	20 U	20 U	20 U
FLUORENE	2,600,000	33,000,000	160,000	2,300,000	22,000,000	21 U	20 U	20 U	20 U
NAPHTHALENE	55,000	300,000	1,200	56,000	190,000	21 U	20 U	20 U	20 U
PHENANTHRENE	2,200,000	36,000,000	250,000	NA	NA	21 U	20 U	20 U	20 U
PYRENE	2,400,000	45,000,000	880,000	2,300,000	29,000,000	21 U	20 U	20 U	20 U
Carcinogenic PAHs (ug/kg)									
BENZO(A)ANTHRACENE	NA	NA	800	620	2,100	21 U	20 U	20 U	20 U
BENZO(A)PYRENE	100	700	8,000	62	210	21 U	20 U	20 U	20 U
BENZO(B)FLUORANTHENE	NA	NA	2,400	620	2,100	21 U	20 U	20 U	20 U
BENZO(K)FLUORANTHENE	NA	NA	24,000	6,200	21,000	21 U	20 U	20 U	20 U
CHRYSENE	NA	NA	77,000	62,000	210,000	21 U	20 U	20 U	20 U
DIBENZO(A,H)ANTHRACENE	NA	NA	700	62	210	21 U	20 U	20 U	20 U
INDENO(1,2,3-CD)PYRENE	NA	NA	6,600	620	2,100	21 U	20 U	20 U	20 U
Benzo(a)pyrene Equivalents (µg/kg)	100	700	NA	NA	NA	Nondetect	Nondetect	Nondetect	Nondetect

Notes:
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TABLE 4-5

GROUNDWATER CHARACTERIZATION SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	NAS PENSACOLA REFERENCE CONCENTRATION	PEN-3221-01	PEN-3221-02	PEN-3221-03		PEN-3221-04	PEN-3221-05	PEN-3221-06	PEN-3221-07
SAMPLE					3221GW0101	3221GW0201	3221GW0301	3321GW0302	3221GW0401	3221GW0501	3221GW0601	3221GW0701
SAMPLE DATE					12/14/2005	12/14/2005	12/14/2005	5/9/2006	12/13/2005	12/13/2005	12/14/2005	12/13/2005
DEPTH RANGE					6 - 14	6 - 14	6 - 14	6 - 14	6 - 15	6 - 15	4 - 14	6 - 15
Volatile Organics (ug/L)												
1,1-DICHLOROETHANE	70	NA	0.12	Reference Concentrations not calculated for organic analytes	0.4 U	0.4 U	0.4 U	Resampled for one analyte	0.4 U	0.4 U	0.4 U	0.4 U
CHLOROFORM	70	NA	0.17		0.4 U	0.4 U	0.4 U		0.4 U	0.4 U	0.4 U	0.4 U
CHLOROMETHANE	2.7	NA	1,600		0.3 J	0.3 U	0.7 J		0.3 U	0.3 U	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	70	70	61		0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	3	5	0.028		0.3 U	0.3 U	0.3 U		0.3 U	0.3 U	0.3 U	0.3 U
Semivolatile Organics (ug/L)												
BIS(2-ETHYLHEXYL)PHTHALATE	6	6	4.8		7 U	8 U	7 U		7 U	7 U	7 U	7 U
Polynuclear Aromatic Hydrocarbons (ug/L)												
2-METHYLNAPHTHALENE	28	NA	NA		0.06 U	0.06 U	0.06 U		0.06 U	0.3	0.4	0.06 U
FLUORENE	280	NA	2,400		0.06 U	0.06 U	0.06 U		0.06 U	0.06 U	0.06 J	0.06 U
NAPHTHALENE	14	NA	6.2		0.05 U	0.05 U	0.05 U		0.05 U	0.07 J	0.2 J	0.05 U
Petroleum Hydrocarbons (ug/L)												
TOTAL PETROLEUM HYDROCARBONS	5,000	NA	NA		210 U	220 U	220 UJ		220 U	240 U	270 U	210 U
Total Inorganics (ug/L)												
ALUMINUM	200	NA	3,600	3,883	466 U	711 U	2,720 J		999	782 U	111 U	195 U
BARIUM	2,000	2,000	2,600	13	7.5 U	5.5 U	9.5		8.3 U	9.8 U	4.6 U	4.8 U
CALCIUM	NA	NA	NA	17,560	25,200	22,800	24,700		24,700	22,500	32,400	34,800
CHROMIUM	100	100	1,100	35	1.6	24.1	8.3		1.5	17.4	2.4	1.01 U
IRON	300	300	11,000	1,708	384	710	1,670		577	678	123	132
LEAD	15	15	NA	2	1.65 U	1.65 U	3.8		1.65 U	1.65 U	1.65 U	1.65 U
MAGNESIUM	NA	NA	NA	2,873	2,020	1,830	1,670		1,600	1,740	2,070	2,050
MANGANESE	50	50	880	22	2.2 U	3.9 U	74.2	5.2 J	1.5	9.1	0.70 U	0.70 U
NICKEL	100	NA	730	40	11.7 U	18.2	11.7 U		11.7 U	11.7 U	11.7 U	11.7 U
POTASSIUM	NA	NA	NA	12,168	420 U	420 U	845 U		1,270 U	1,030 U	1,140 U	1,190 U
SELENIUM	50	50	180	4	3.59 U	3.6	3.59 U		3.59 U	3.59 U	3.59 U	3.59 U
SODIUM	160,000	NA	NA	18,345	11,900	11,100	12,100		19,000	15,000	7,050	9,270

NOTES:
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µg/L - micrograms per liter
Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
J - Estimated, between laboratory detection limit and quantitation limit

TABLE 4-5

GROUNDWATER CHARACTERIZATION SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	NAS PENSACOLA REFERENCE CONCENTRATION	PEN-3221-08	PEN-3221-09	PEN-3221-10		PEN-44-09	PEN-44-10	PEN-44-11	PEN-44-12
SAMPLE					3221GW0801	3221GW0901	3221GW1001	3221GW1001D	44GW0901	44GW1001	44GW1101	44GW1201
SAMPLE DATE					12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005
DEPTH RANGE					6 - 15	6 - 15	6 - 15	Field Duplicate	6 - 14	6 - 14	6 - 14	6 - 14
Volatile Organics (ug/L)												
1,1-DICHLOROETHANE	70	NA	0.12	Reference	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CHLOROFORM	70	NA	0.17	Concentrations	0.4 U	0.7 J	0.4 U	0.4 U	0.8 J	0.4 U	0.4 J	0.4 J
CHLOROMETHANE	2.7	NA	1,600	not calculated	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	70	70	61	for organic	0.3 U	1	0.3 U	0.3 U	0.3 U	0.3 U	2	0.3 U
TRICHLOROETHENE	3	5	0.028	analytes	0.3 U	**52**	0.3 U	0.3 U	0.3 U	0.3 U	**23**	1
Semivolatile Organics (ug/L)												
BIS(2-ETHYLHEXYL)PHTHALATE	6	6	4.8		7 U	7 U	7 U	7 U	7 U	7 U	7 U	8 U
Polynuclear Aromatic Hydrocarbons (ug/L)												
2-METHYLNAPHTHALENE	28	NA	NA		0.4	0.06 U	0.1 J	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
FLUORENE	280	NA	2,400		0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
NAPHTHALENE	14	NA	6.2		0.09 J	0.09 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Petroleum Hydrocarbons (ug/L)												
TOTAL PETROLEUM HYDROCARBONS	5,000	NA	NA		280 U	210 U	220 U	480 U	230 U	220 U	210 U	230 U
Total Inorganics (ug/L)												
ALUMINUM	200	NA	3,600	3,883	74.2 U	1,130	150 U	149 U	2,800 J	232 U	245 U	627 U
BARIUM	2,000	2,000	2,600	13	8.2 U	4.8 U	5.0 U	5.1 U	5.1 U	5.0 U	3.1 U	8.8 U
CALCIUM	NA	NA	NA	17,560	31,400	20,700	39,400	38,500	12,600	29,200	38,200	44,300
CHROMIUM	100	100	1,100	35	1.01 U	1.5	1.01 U	1.01 U	1.4	1.01 U	1.01 U	1.01 U
IRON	300	300	11,000	1,708	217	567	74.7 U	59.9 U	1,290 J	69.0 U	51.7 U	284
LEAD	15	15	NA	2	1.65 U	1.65 U	1.65 U	1.65 U	1.65 U	1.65 U	1.65 U	1.65 U
MAGNESIUM	NA	NA	NA	2,873	2,040	2,780	2,620	2,540	3,390	3,250	2,720	2,140
MANGANESE	50	50	880	22	4.1	1.6	0.70 U	0.70 U	1.4	0.70 U	0.70 U	1.6
NICKEL	100	NA	730	40	11.7 U	11.7 U	11.7 U	11.7 U	11.7 U	11.7 U	11.7 U	11.7 U
POTASSIUM	NA	NA	NA	12,168	1,600 U	1,800 U	2,440 U	2,680 U	898 U	2,400 U	2,160 U	5,360
SELENIUM	50	50	180	4	3.59 U	3.59 U	3.59 U	3.59 U	3.7 U	3.59 U	3.59 U	3.59 U
SODIUM	160,000	NA	NA	18,345	12,800	23,700	12,900	12,300	23,900	27,200	19,900	27,900

NOTES:
GCTL- Groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
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µg/L - micrograms per liter
Values in bold exceed screening criteria
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TABLE 4-5

GROUNDWATER CHARACTERIZATION SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
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LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	NAS PENSACOLA REFERENCE CONCENTRATION	PEN-44-13	PEN-44-14	PEN-44-15			PEN-44-18		PEN-
SAMPLE					44GW1301	44GW1401	44GW1501	44GW1501-D	44GW1502	44GW1801	44GW1802	44GW1901
SAMPLE DATE					12/14/2005	12/14/2005	12/14/2005	12/14/2005	5/9/2006	12/14/2005	5/9/2006	12/14/2005
DEPTH RANGE					4 - 14	4 - 14	4 - 14	Field Duplicate	4 - 14	64 - 74	64 - 74	64 - 74
Volatile Organics (ug/L)												
1,1-DICHLOROETHANE	70	NA	0.12	Reference Concentrations not calculated for organic analytes	0.4 U	0.4 U	0.4 U	0.4 U	Resampled for one analyte	2	Resampled for selected analytes	0.4 U
CHLOROFORM	70	NA	0.17		0.7 J	0.6 J	0.5 J	0.6 J		0.4 U		0.4 U
CHLOROMETHANE	2.7	NA	1,600		0.3 U	0.3 U	0.3 U	0.3 U		0.3 U		0.3 U
CIS-1,2-DICHLOROETHENE	70	70	61		0.3 U	2 J	0.3 U	0.3 U		0.9 J		1
TRICHLOROETHENE	3	5	0.028		0.3 U	**32 J**	4	3		0.3 U		0.3 U
Semivolatile Organics (ug/L)												
BIS(2-ETHYLHEXYL)PHTHALATE	6	6	4.8		7 U	7 U	10	7 U	5.1 U	7 U		11
Polynuclear Aromatic Hydrocarbons (ug/L)												
2-METHYLNAPHTHALENE	28	NA	NA		0.06 U	0.06 U	0.06 U	0.06 U		0.06 U		0.06 U
FLUORENE	280	NA	2,400		0.06 U	0.06 U	0.06 U	0.06 U		0.06 U		0.06 U
NAPHTHALENE	14	NA	6.2		0.05 U	0.05 U	0.05 U	0.05 U		0.05 U		0.05 U
Petroleum Hydrocarbons (ug/L)												
TOTAL PETROLEUM HYDROCARBONS	5,000	NA	NA		220 U	210 U	210 U	210 U		220 U		210 UJ
Total Inorganics (ug/L)												
ALUMINUM	200	NA	3,600	3,883	1,360	372 U	960	810 U		152 U		69.7 U
BARIUM	2,000	2,000	2,600	13	9.6 U	5.2 U	6.7 U	6.8 U		19.4		13.2
CALCIUM	NA	NA	NA	17,560	28,000	35,600	28,800	28,200		45,500		46,900
CHROMIUM	100	100	1,100	35	1.01 U	1.01 U	6.6	1.01 U		1.01 U		1.01 U
IRON	300	300	11,000	1,708	515	92.4 U	258	152		1,820	1,460	1,800
LEAD	15	15	NA	2	1.65 U	1.65 U	1.6	1.65 U		1.65 U		1.65 U
MAGNESIUM	NA	NA	NA	2,873	3,800	2,540	1,790	1,780		4,160		4,740
MANGANESE	50	50	880	22	1.3	1.2	1.3	0.70 U		55.3	25.4	71
NICKEL	100	NA	730	40	11.7 U	11.7 U	11.7 U	11.7 U		11.7 U		11.7 U
POTASSIUM	NA	NA	NA	12,168	1,410 U	2,070 U	1,980 U	2,200 U		1,930 U		1,780 U
SELENIUM	50	50	180	4	3.59 U	3.59 U	3.59 U	3.59 U		3.59 U		3.59 U
SODIUM	160,000	NA	NA	18,345	33,700	14,000	17,200	17,500		8,830		7,800

NOTES:
GCTL- Groundwater cleanup target level
USEPA - United States Environmental Protection Agency
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TABLE 4-5

GROUNDWATER CHARACTERIZATION SUMMARY
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA
Page 4 of 4

LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	NAS PENSACOLA REFERENCE CONCENTRATION	44-19	QA/QC Samples		
SAMPLE					44GW1902	44RB1214	44TB1213	44TB1214
SAMPLE DATE					5/9/2006	12/14/2005	12/13/2005	12/14/2005
DEPTH RANGE					64 - 74	Rinsate	Trip Blank	Trip Blank
Volatile Organics (ug/L)								
1,1-DICHLOROETHANE	70	NA	0.12	Reference Concentrations not calculated for organic analytes	Resampled for selected analytes	0.4 U	0.4 U	0.4 U
CHLOROFORM	70	NA	0.17			0.4 U	0.4 U	0.4 U
CHLOROMETHANE	2.7	NA	1,600			1 J	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	70	70	61			0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	3	5	0.028			0.3 U	0.3 U	0.3 U
Semivolatile Organics (ug/L)								
BIS(2-ETHYLHEXYL)PHTHALATE	6	6	4.8		5.2 U	7 U		
Polynuclear Aromatic Hydrocarbons (ug/L)								
2-METHYLNAPHTHALENE	28	NA	NA			0.06 U		
FLUORENE	280	NA	2,400			0.06 U		
NAPHTHALENE	14	NA	6.2			0.1 J		
Petroleum Hydrocarbons (ug/L)								
TOTAL PETROLEUM HYDROCARBONS	5,000	NA	NA			210 U		
Total Inorganics (ug/L)								
ALUMINUM	200	NA	3,600	3,883		13.5 J		
BARIUM	2,000	2,000	2,600	13		1.17 U		
CALCIUM	NA	NA	NA	17,560		155		
CHROMIUM	100	100	1,100	35		1.01 U		
IRON	300	300	11,000	1,708	1,040	3.79 U		
LEAD	15	15	NA	2	1.5 U	2.2		
MAGNESIUM	NA	NA	NA	2,873		76.2		
MANGANESE	50	50	880	22	48.5	0.7 U		
NICKEL	100	NA	730	40		11.7 U		
POTASSIUM	NA	NA	NA	12,168		434		
SELENIUM	50	50	180	4		3.59 U		
SODIUM	160,000	NA	NA	18,345		5260		

NOTES:
GCTL- Groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
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µg/L - micrograms per liter
Values in bold exceed screening criteria
U - Analyte concentration less than the value shown
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4.3.1 Groundwater Characterization

The groundwater characterization samples were collected from 19 monitoring wells. Seventeen of the wells were shallow wells screened at the water table. Two of the wells were deep wells screened at 65 to 75 feet. The groundwater characterization samples were analyzed for TAL metals, TCL VOCs, TCL SVOCs and PAHs, TCL pesticides and PCBs, and petroleum hydrocarbons. Data validation reports are included in Appendix C.

4.3.1.1 Volatile Organics

TCE was detected in five of the groundwater samples collected at Site 44 (Table 4-5). TCE was detected in four monitoring wells at concentrations greater than the GCTL of 3 μg/L (Figure 4-5):

- PEN-3221-09 52 μg/L
- PEN-44-11 23 μg/L
- PEN-44-14 32 μg/L
- PEN-44-15 4 μg/L

Note that only one of the UST wells, PEN-3221-09, that previously had a TCE concentration of 5 μg/L (ABB-ES, 1993), continues to exceed the GCTL. The TCE concentration in PEN-3221-09 has increased an order of magnitude since the UST investigation sample was collected.

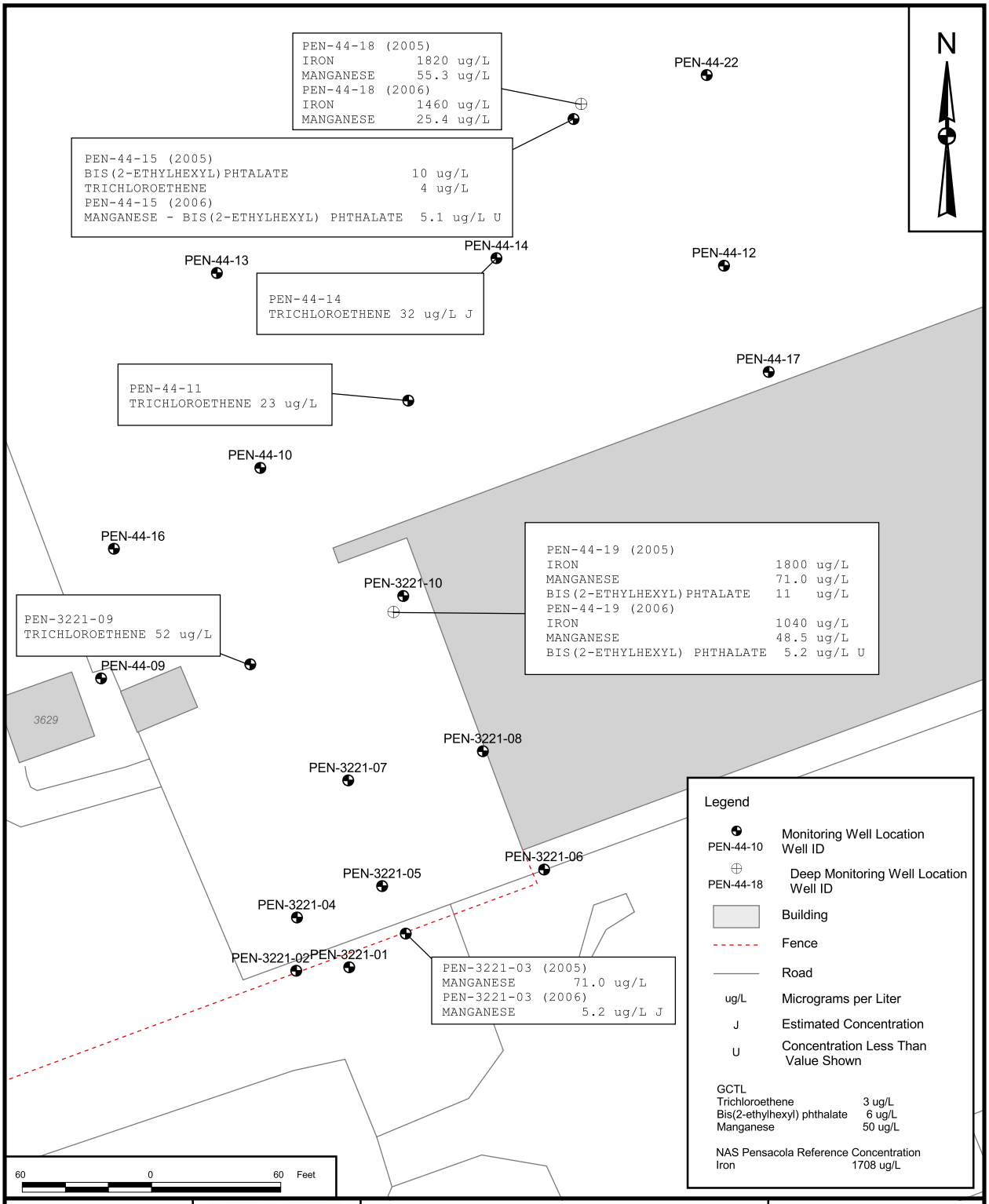
Four VOCs, including chloroform, chloromethane, 1,1-DCA, and cis 1,2-DCE were detected in groundwater samples at concentrations less than the GCTLs. Cis 1,2-DCE was reported in the rinsate blank collected during the groundwater characterization sampling event (Table 4-5). This detection was below data validation action levels. Concentrations of VOCs in the two trip blanks collected during the characterization sampling were less than laboratory detection limits.

4.3.1.2 Semivolatile Organics and PAHs

Bis(2-ethylhexyl)phthalate was detected in two of the groundwater samples collected at Site 44 (Table 4-5) at concentrations greater than the GCTL of 6 μg/L (Figure 4-5).

- PEN-44-15 10 μg/L
- PEN-44-19 11 μg/L

Each of these wells were resampled on May 9, 2006 with the following bis(2-ethylhexyl)phthalate concentrations reported:



DRAWN BY	DATE
C. SPEHAR	2/10/06
CHECKED BY	DATE
B. OLSON	5/03/07
COST/SCHEDULE-AREA	
SCALE	AS NOTED

GROUNDWATER CHARACTERIZATION RESULTS
SITE 44 RI REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CONTRACT NUMBER	
—	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
DRAWING NO.	REV
FIGURE 4 - 5	0

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR GROUNDWATER CHARACTERIZATION RESULTS LAYOUT 5/03/07 JEE

- PEN-44-15 5.1 U μg/L
- PEN-44-19 5.2 U μg/L

The results of the bis(2-ethylhexyl)phthalate resampling were less than the laboratory detection limit.

Two PAHs, 2-methylnaphthalene and fluorene were detected in groundwater samples at concentrations less than the GCTLs.

4.3.1.3 Metals

Sixteen metals were detected in the groundwater samples collected at Site 44. Three of the metals (aluminum, iron, and manganese) were detected at concentrations exceeding Florida GCTLs. The remaining metals (barium, calcium, chromium, copper, lead, magnesium, nickel, potassium, selenium, silver, sodium, vanadium, and zinc) were all detected at concentrations less than the Florida GCTLs. Metals reported at concentrations greater than screening criteria are discussed below.

Aluminum was detected in eight of the groundwater samples collected at Site 44 (Figure 4-5). The aluminum concentrations in these monitoring wells were greater than the GCTL of 200 μg/L, including:

- PEN-3221-01 466 J μg/L
- PEN-3221-02 711 J μg/L
- PEN-3221-03 2,720 J μg/L
- PEN-3221-04 999 μg/L
- PEN-3221-09 1,130 μg/L
- PEN-44-09 2,800 J μg/L
- PEN-44-13 1,360 μg/L
- PEN-44-15 960 μg/L

The aluminum concentrations reported for these samples were less than NAS Pensacola reference concentration for aluminum of 3,882 μg/L.

Iron was detected in 15 of the groundwater samples collected at Site 44 (Figure 4-5). The iron concentrations in 10 of the monitoring wells were greater than the GCTL of 300 μg/L, including:

- PEN-3221-01 384 μg/L
- PEN-3221-02 710 μg/L
- PEN-3221-03 1,670 μg/L

- PEN-3221-04 577 μg/L
- PEN-3221-05 678 μg/L
- PEN-3221-09 567 μg/L
- PEN-44-09 1,290 J μg/L
- PEN-44-13 515 μg/L
- PEN-44-18 1,820 μg/L
- PEN-44-19 1,800 μg/L

The iron concentrations reported for PEN-44-18 and PEN-44-19, the two deep wells installed at Site 44, were greater than NAS Pensacola iron reference concentration of 1,707 μg/L. Each of these wells were resampled on May 9, 2006 with the following iron concentrations reported:

- PEN-44-18 1,460 μg/L
- PEN-44-19 1,040 μg/L

The results of the iron resampling were less than the NAS Pensacola reference iron concentration.

Manganese was detected in 15 of the groundwater samples collected at Site 44 (Table 4-5). Manganese was detected in three monitoring wells at concentrations greater than the GCTL of 50 μg/L (Figure 4-5):

- PEN-3221-03 74.2 μg/L
- PEN-44-18 55.3 μg/L
- PEN-44-19 71.0 μg/L

Each of these wells were resampled on May 9, 2006 with the following manganese concentrations reported:

- PEN-3221-03 5.2 J μg/L
- PEN-44-18 25.4 μg/L
- PEN-44-19 48.5 μg/L

The results of the manganese resampling were less than the GCTL.

4.3.2 CVOC Delineation

Nine additional shallow monitoring wells were installed to delineate the CVOC plume detected during the groundwater characterization. Five monitoring wells, PEN-44-16, PEN-44-17, PEN-44-20, PEN-44-21,

and PEN-44-22 were installed and sampled in May 2006. Four more monitoring wells (PEN-44-23, PEN-44-24, PEN-44-25, and PEN-44-26) were installed and sampled in August 2006. Each of the delineation wells were sampled for selected CVOCs (Table 4-6).

TCE was detected in two delineation wells at concentrations greater than the GCTL of 3 μg/L (Figure 4-6):

- PEN-44-21 34 μg/L
- PEN-44-24 5 μg/L

Based on the results of the groundwater characterization and CVOC delineation sampling, two areas of TCE impact to groundwater have been identified (Figure 4-6). The first plume is located in the vicinity of PEN-3221-09 and is estimated to have a radius of approximately 50 feet. The second plume extends north of the west end of Building 3221 and is approximately 300 feet long and 120 feet wide. This plume includes monitoring wells PEN-44-11, PEN-44-14, PEN-44-15, PEN-44-21, and PEN-44-24. These plumes are considered separate because of the distance between PEN-3221-10 and PEN-44-10 is only 90 feet and because the TCE concentration in PEN-3221-10, which previously exceeded the GCTL, is now less than the laboratory detection limit.

4.3.3 Groundwater Investigation Summary

Groundwater samples collected at Site 44 were analyzed for the full suite of TCL and TAL analytes and petroleum hydrocarbons. Concentrations of pesticides, PCBs and TRPH were less than the laboratory detection limits.

TCE was detected at concentrations exceeding the GCTL in six shallow monitoring wells. One plume was identified in the vicinity of PEN-3221-09, which was installed as part of the UST investigation and previously had TCE exceedances. The second, larger plume extends north from the northwest corner of Building 3221, and includes monitoring wells PEN-44-11, PEN-44-14, PEN-44-15, PEN-44-21, and PEN-44-24.

Bis(2-ethylhexyl)phthalate was detected at concentrations greater than the GCTL in two of the monitoring wells sampled at Site 44, PEN-44-15 (shallow) and PEN-44-19 (deep). Each of these wells were resampled in May 2006 and the reported bis(2-ethylhexyl)phthalate concentrations were less than the laboratory detection limit.

TABLE 4-6

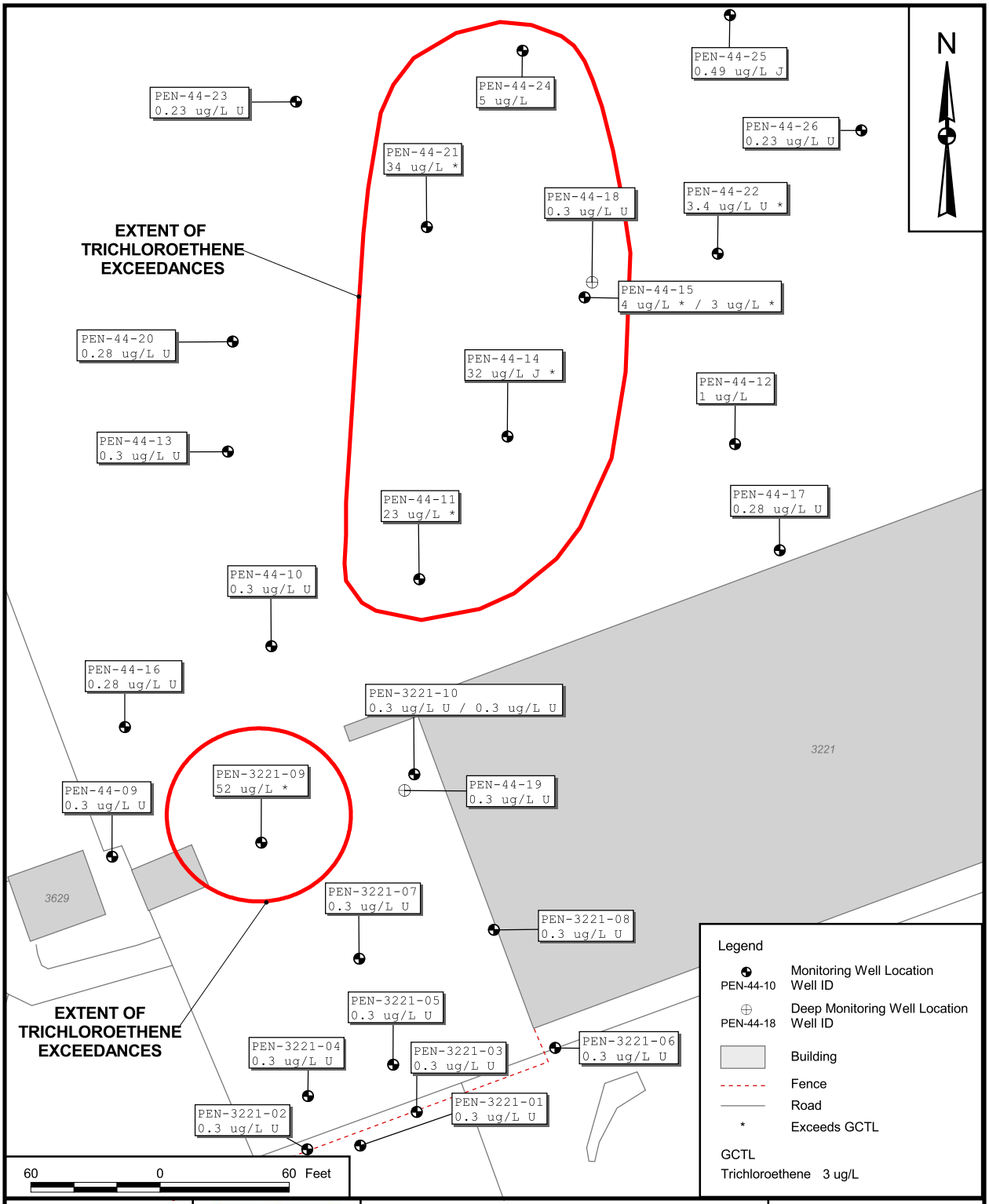
CVOC DELINEATION IN GROUNDWATER
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FL

LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	PEN-3221-01	PEN-3221-02	PEN-3221-03	PEN-3221-04	PEN-3221-05	PEN-3221-06	PEN-3221-07	PEN-3221-08	PEN-3221-09	PEN-3221-10		PEN-44-09
SAMPLE				3221GW0101	3221GW0201	3221GW0301	3221GW0401	3221GW0501	3221GW0601	3221GW0701	3221GW0801	3221GW0901	3221GW1001	3221GW1001-D	44GW0901
SAMPLE DATE				12/14/2005	12/14/2005	12/14/2005	12/13/2005	12/13/2005	12/14/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005
DEPTH RANGE				6 - 14	6 - 14	6 - 14	6 - 15	6 - 15	4 - 14	6 - 15	6 - 15	6 - 15	6 - 15	6 - 15	6 - 14
Volatile Organics (ug/L)															
1,1-DICHLOROETHANE	70	NA	0.12	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
CHLOROFORM	70	NA	0.17	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.7 J	0.4 U	0.4 U	0.8 J
CHLOROMETHANE	2.7	NA	1,600	0.3 J	0.3 U	0.7 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CIS-1,2-DICHLOROETHENE	70	70	61	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1	0.3 U	0.3 U	0.3 U
TRICHLOROETHENE	3	5	0.028	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	**52**	0.3 U	0.3 U	0.3 U

LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	PEN-44-10	PEN-44-11	PEN-44-12	PEN-44-13	PEN-44-14	PEN-44-15		PEN-44-16	PEN-44-17	PEN-44-18	PEN-44-19	PEN-44-20
SAMPLE				44GW1001	44GW1101	44GW1201	44GW1301	44GW1401	44GW1501	44GW1501-D	44GW1601	44GW1701	44GW1801	44GW1901	44GW2001
SAMPLE DATE				12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	5/12/2006	5/12/2006	12/14/2005	12/14/2005	5/12/2006
DEPTH RANGE				6 - 14	6 - 14	6 - 14	4 - 14	4 - 14	4 - 14	4 - 14	4 - 14	4 - 14	64 - 74	64 - 74	4 - 14
Volatile Organics (ug/L)															
1,1-DICHLOROETHANE	70	NA	0.12	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.15 U	0.15 U	2	0.4 U	0.15 U
CHLOROFORM	70	NA	0.17	0.4 U	0.4 J	0.4 J	0.7 J	0.6 J	0.5 J	0.6 J	1.6	0.26 J	0.4 U	0.4 U	0.15 U
CHLOROMETHANE	2.7	NA	1,600	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.18 U	0.18 U	0.3 U	0.3 U	0.18 U
CIS-1,2-DICHLOROETHENE	70	70	61	0.3 U	2	0.3 U	0.3 U	2 J	0.3 U	0.3 U	0.44 U	0.44 U	0.9 J	1	0.44 U
TRICHLOROETHENE	3	5	0.028	0.3 U	**23**	1	0.3 U	**32 J**	**4**	**3**	0.28 U	0.28 U	0.3 U	0.3 U	0.28 U

LOCATION	FLORIDA GCTL	USEPA MCL	TAPWATER PRG	PEN-44-21	PEN-44-22	PEN-44-23	PEN-44-24	PEN-44-25	PEN-44-26	QC	QC	QC	QC
SAMPLE				44GW2101	44GW2201	44GW2301	44GW2401	44GW2501	44GW2601	44TB1213	44TB1214	44TB0512	44TB0814
SAMPLE DATE				5/12/2006	5/12/2006	8/14/2006	8/14/2006	8/14/2006	8/14/2006	12/13/2005	12/14/2005	5/12/2006	8/14/2006
DEPTH RANGE				4 - 14	4 - 14	5 - 15	4 - 14	4 - 14	4 - 14	QC	QC	QC	QC
Volatile Organics (ug/L)													
1,1-DICHLOROETHANE	70	NA	0.12	0.15 U	0.15 U	0.13 U	0.13 U	0.13 U	0.13 U	0.4 U	0.4 U	0.42 U	0.13 U
CHLOROFORM	70	NA	0.17	0.68 J	0.34 J	0.32 J	0.22 J	0.13 U	0.13 U	0.4 U	0.4 U	0.15 U	0.13 U
CHLOROMETHANE	2.7	NA	1,600	0.18 U	0.18 U	0.28 U	0.28 U	0.28 U	0.28 U	0.3 U	0.3 U	0.43 J	0.28 U
CIS-1,2-DICHLOROETHENE	70	70	61	2.9	0.44 U	0.14 U	0.14 U	0.14 U	0.14 U	0.3 U	0.3 U	0.44 U	0.14 U
TRICHLOROETHENE	3	5	0.028	**34**	3.4 U	0.23 U	**5**	0.49 J	0.23 U	0.3 U	0.3 U	1.3	0.23 U

NOTES:
GCTL- Groundwater cleanup target level
USEPA - United States Environmental Protection Agency
MCL - Maximum Contaminant Level
PRG - Region IX Preliminary Remediation Goal
UG/L - micrograms per liter
Values in bold exceed screening criteria
U - Analyte concentration less than the value showr
J - Estimated, between laboratory detection limit and quantitation limi



DRAWN BY	DATE		CONTRACT NUMBER
C. SPEHAR	2/10/06	TRICHLOROETHENE RESULTS SITE 44 RI REPORT NAS PENSACOLA PENSACOLA, FLORIDA	—
CHECKED BY	DATE		APPROVED BY — DATE —
B. OLSON	5/03/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			DRAWING NO. FIGURE 4 - 6 / REV 0
SCALE AS NOTED			

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR SITE 44 TRICHLOROETHENE TAG MAP LAYOUT 5/03/07 JEE

Aluminum was detected in most of the monitoring wells sampled for the RI at concentrations exceeding the GCTL, which is a secondary standard, but less than the NAS Pensacola background aluminum concentration.

Iron was detected in most of the monitoring wells sampled for the RI at concentrations exceeding the GCTL, but less than the NAS Pensacola background iron concentration. Iron concentrations exceeded the background concentration in the two deep monitoring wells, PEN-44-18 and PEN-44-19. These wells were sampled again in May 2006 and the iron concentrations in each of the wells were less than the NAS Pensacola background iron concentration.

Manganese was detected in most of the groundwater samples collected at Site 44. The reported manganese concentrations in one shallow well (PEN-3221-03) and the two deep wells (PEN-44-18 and PEN-44-19) exceeded the GCTL during the first round of sampling in December 2005. These wells were sampled again in May 2006 and the manganese concentrations in each of the wells were less than the GCTL.

4.4 SURFACE WATER AND SEDIMENTS

Surface water and sediment samples were not collected for the RI at Site 44 because no surface water bodies are present at the site. The ground cover at the site is largely impermeable due to buildings and pavement, and precipitation is directed into the storm sewer system or rapidly infiltrates the sandy soil.

4.5 AIR

Air samples were not collected for the RI because the concentrations of volatile contaminants previously detected in soil and groundwater were low. Air monitoring was conducted during the site investigation to identify potential exposure to higher concentrations of volatile contaminants; however, no elevated readings in the breathing zone were documented during site activities.

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 RI report is limited to the groups of chemicals that were detected during the RI sampling event at concentrations greater than the CTLs established by the State of Florida.

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 44. 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

TABLE 5-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Chemical	Specific Gravity (@ 20/4°C)[1]	Vapor Pressure (mm Hg)[1]	Solubility (mg/L)[1]	Octanol/Water Partition Coefficient[1]	Organic Carbon Partition Coefficient[2]	Henry's Law Constant (atm-m3/mole)[1]	Bioconcentration Factor (mg/L/mg/kg)[2]	Mobility Index log((solubility*VP)/Koc)
HALOGENATED ALIPHATICS								
Trichloroethene	1.47	5.78E+01	1.10E+3 (25°C)	2.00E+02	1.10E+02 [3]	1.03E-02	8.10E+01	4.57E+00
PAHs								
Acenaphthene	1.07	5.00E-03	4.24E+02	8.32E+03	7.08E+03	1.55E-04	1.10E+03	-3.52E+00
Acenaphthylene	1.02	2.30E-02	1.61E+01	1.17E+04	2.00E+03	1.14E-04	3.80E+02	-3.73E+00
Anthracene	1.283 (25/4°C)	1.95E-4 (25°C)	1.29E+0 (25°C)	2.82E+04	2.95E+04 [3]	8.6E-5 (25°C)	4.70E+03	-8.07E+00
Benzo(a)anthracene	1.274	5.00E-09	1E-2 (24°C)	4.07E+05	3.98E+05 [3]	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 [3]	1.20E-05	1.40E+05	-1.53E+01
Benzo(k)fluoranthene	NA	9.59E-11	5.5E-4 (25°C)	6.92E+06	1.23E+06 [3]	1.04E-03	1.40E+05	-1.94E+01
Benzo(g,h,i)perylene	NA	1.00E-10	2.6E-4 (25°C)	1.70E+07	1.60E+06	1.4E-7 (25°C)	3.50E+05	-1.98E+01
Benzo(a)pyrene	1.351	5.00E-09	3.8E-3 (25°C)	9.55E+05	1.02E+06 [3]	4.9E-7 (25°C)	1.40E+05	-1.67E+01
Chrysene	1.274 (20°C)	6.3E-9 (25°C)	6E-3 (25°C)	4.07E+05	3.98E+05 [3]	1.05E-6 (25°C)	5.30E+04	-1.60E+01
Dibenzo(a,h)anthracene	1.282	1.00E-10	5E-4 (25°C)	9.33E+05	3.80E+06 [3]	7.3E-8 (25°C)	6.90E+05	-1.99E+01
Fluoranthene	1.252	5.0E-6 (25°C)	2.65E-1 (25°C)	2.14E+05	1.07E+05 [3]	6.5E-6 (25°C)	1.20E+04	-1.09E+01
Fluorene	1.202	1.00E+01	1.98E+00	1.62E+04	1.38E+04	6.36E-05	3.80E+03	-2.84E+00
Indeno(1,2,3-cd)pyrene	NA	1E-10 (25°C)	6.20E-02	4.57E+07	3.47E+06 [3]	6.95E-8 (25°C)	3.50E+05	-1.77E+01
1-Methylnaphthalene	1.0202	5.39E-02	2.58E+01	7.41E+03	7.30E+02	2.60E-04	1.3E+02-6.8E+02	-2.72E+00
2-Methylnaphthalene	1.0058	1E+1 (105°C)	2.6E+1 (25°C)	7.24E+03	7.27E+2 [4]	4.99E-4 (25°C)	5.10E+02	-4.47E-01
Naphthalene	1.162	8.2E-2 (25°C)	3E+1 (25°C)	2.34E+03	2.00E+03 [3]	4.83E-4 (25°C)	4.20E+02	-2.91E+00
Phenanthrene	0.980 (4°C)	1E+0 (118.2°C)	8.16E-1 (21°C)	2.88E+04	1.40E+04	3.93E-5 (25°C)	4.70E+03	-4.23E+00
Pyrene	1.271 (23/4°C)	2.5E+0 (200°C)	1.6E-1 (26°C)	1.51E+05	1.05E+05 [3]	5.1E-6 (25°C)	1.20E+04	-5.42E+00
PHTHALATE ESTERS								
Bis(2-ethylhexyl)phthalate	0.99 (20/20°C)	1.2E+0 (200°C)	4E-1 (25°C)	2.00E+05	1.51E+07 [3]	3.00E-07	2.30E+08	-7.50E+00
PESTICIDES								
alpha BHC	2.91	4.50E-05	2.00E+00	6.50E+03	1.90E+03	1.06E-05	1.10E+02	-7.32E+00
beta BHC	2.91	3.26E-05	2.40E-01	6.30E+03	2.90E+03	7.43E-07 (25°C)	4.00E+04	-8.57E+00

NA - Not Available

(1) EPA, September 1992, Handbook of RCRA Groundwater Monitoring Constituents: Chemical and Physical Properties.

(2) USEPA, December 1982, Aquatic Fate Process Data for Organic Priority Pollutants.

(3) EPA, July 1996, Soil Screening Guidance.

(4) Lyman et al., 1990; Equation 4-5, Handbook of Chemical Property Estimation Methods.

°C = degrees Celsius

mm Hg = millimeters mercury

m3/mole = cubic meters per mole

mg/L = milligrams per liter

TABLE 5-2

RELATIVE MOBILITIES OF METALS AS A FUNCTION OF ENVIRONMENTAL CONDITIONS (Eh,pH)
SITE 43 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Relative Mobility	Environmental Conditions			
	Oxidizing	**Acidic**	**Neutral/Alkaline**	**Reducing**
Very High			Selenium	
High	Selenium and Zinc	Selenium, Zinc, Copper, Nickel, Mercury, and Silver		
Medium	Copper, Nickel, Mercury, Silver, Arsenic, and Cadmium	Arsenic and Cadmium	Arsenic and Cadmium	
Low	Lead, Barium, and Beryllium	Lead, Barium, and Beryllium	Lead, Barium, and Beryllium	
Very Low	Iron and Chromium	Chromium	Chromium, Zinc, Copper, Nickel, Mercury, and Silver	Chromium, Selenium, Zinc, Copper, Nickel, Mercury, Lead, Barium, Beryllium, and Silver

Source: Swartzbaugh, et al. Remediating Sites Contaminated with Heavy Metals. Hazardous Materials Control, November/December 1992.

at Site 44, halogenated VOCs, phthalates, pesticides, 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 phthalates, pesticides, 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 (e.g.,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 PAHs are not especially water soluble.

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, Eh (redox potential), 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. PAHs and phthalates 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 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} atm-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} atm-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 PAHs will bioconcentrate at levels three to five orders of magnitude greater than those concentrations found in the water.

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 (McCall, 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 an MI close to 5 and is considered very mobile. Phthtalates and 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) 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 44, 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 44 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 in soil at Site 44 (metals and PAHs) 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 44 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 44. 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.

Most of the contaminants detected in soil and groundwater samples at Site 44 (metals and SVOCs, pesticides and phthalates) are not especially volatile and are not expected to vaporize into the air. Air monitoring was conducted during the soil investigation due to the potential for dust/particulate exposure. Because of the sandy soil at the site, little dust is 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 Halogenated VOCs

In general, halogenated aliphatic hydrocarbons 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. 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).

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 Phthalates

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

Biodegradation of bis(2-ethylhexyl) phthalate and di-n-butyl phthalate in water is an important fate mechanism. However, hydrolysis of bis(2-ethylhexyl) phthalate is very slow, with a calculated half-life of 2,000 years. Bioaccumulation is also a significant fate process. Photolysis and volatilization are considered to be insignificant degradation mechanisms.

5.2.3 Pesticides

Pesticides as a class of compounds are not considered to be very mobile in the environment.

5.2.4 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.

5.2.5 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., 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 Phthalates

Phthalates are generally considered to be fairly immobile chemicals in the environment. They are large molecules with high organic carbon partition coefficients and low solubilities. These compounds, when found in the soil, generally do not migrate vertically to a great extent. Instead, they are more likely to adhere to soil particles and be removed from the site via surface runoff and erosional processes. Their presence in the deep groundwater samples collected at Site 44 may be the result of turbidity (particulate matter) in the samples. Phthalates generally have large bioconcentration factors and bioconcentration of

phthalates in aquatic organisms is expected to be significant. Phthalates can be bioaccumulated from water, sediments, or lower organisms in the food chain.

5.3.3 Pesticides

Pesticides are typically released to the environment by spraying, dusting, or direct application to the soil. Many of the pesticides detected in environmental media are no longer licensed for general sale and use in the United States. These chemicals, upon application or disposal, tend to remain affixed to soil particles. Migration of pesticides generally occurs primarily by erosion via the action of wind or water. Surface soil runoff may carry pesticides to adjacent surface water bodies, although this is not considered to be an important transport mechanism at Site 44. Bioconcentration of pesticides in the food chain is another important fate mechanism. Hydrolysis, oxidation, and photolysis are not generally important fate mechanisms for pesticides in soil or water. Hydrolysis half-lives for several pesticides are reported in periods of months to years.

Benzene hexachloride (BHC) isomers are highly persistent in most soils; however, it shows a low affinity for soil binding and may be mobile in soils with especially low organic carbon or subject to high rainfall. Leaching to the groundwater may occur where there are high levels of organic solvents.

5.3.4 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 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.

5.3.5 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 of groundwater (Eh), 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.

6.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the human health risk assessment (HHRA) for soil and groundwater at Site 44. The objective of the risk assessment is to determine whether detected concentrations of chemicals in soil and groundwater pose significant threats to potential human receptors under current and/or future land use. The potential risks to receptors are estimated based on the assumption no further actions are taken to control contaminant releases or prevent receptor exposure.

6.1 HUMAN HEALTH RISK ASSESSMENT PROTOCOL

The following USEPA, FDEP, and Navy guidance documents and regulations were used to develop the HHRA methodology and to evaluate potential risks for each site:

- Conducting Human Health Risk Assessments under the Environmental Restoration Program, Department of the Navy, February 2001.
- Navy Policy on the Use of Chemical Background Levels, Department of the Navy, January 2004.
- Technical Report: Development of Soil Cleanup Target Levels for Chapter 62-777, FAC, Florida Department of Environmental Protection (FDEP), February 2005.
- State of Florida Chapter 62-780 FAC, Contaminated Site Cleanup Criteria, April 2005.
- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A), USEPA, December 1989.
- Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors, USEPA, March 1991.
- Guidance for Data Usability in Risk Assessment (Part A), USEPA, April 1992.
- Supplemental Guidance to RAGS: Calculating the Concentration Term, USEPA, May 1992.
- Preliminary Review Draft: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure, USEPA, May 1993.
- Soil Screening Guidance: Technical Background Document, USEPA, July 1996.

- Exposure Factors Handbook, USEPA, August 1997.

- Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, USEPA Region 4, May 2000.

- Role of Background in the CERCLA Cleanup Program, USEPA, April 2002.

- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, USEPA, December 2002a.

- Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, USEPA, December 2002b.

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

The components of a HHRA are addressed in the following sections:

- Data Evaluation Protocol [including data usability assessment; chemical of potential concern (COPC)] selection)
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis

The risk assessment presented in this report considers both USEPA and FDEP policies and guidelines available for conducting HHRAs. Quantitative risk estimates are developed for receptor exposure to surface soil, subsurface soil, and groundwater using the “risk-ratio” approach defined in Section 6.3.3. USEPA Region 4 supports the use of this technique. Additionally, comparisons of site soil and groundwater concentrations to FDEP CTLs recommended in FDEP Rule 62-780 are provided (Section 6.6). This rule presents a phased risk-based corrective action process (RBCAP) that is iterative and tailors site rehabilitation tasks to site-specific conditions and risks.

6.1.1 Data Evaluation Protocol

Data evaluation, the first component of a baseline HHRA, is a two-step, medium-specific task involving the compilation and evaluation of analytical data. The first step involves the compilation of the analytical database and an evaluation of data usability for purposes of HHRA. The second step of the data evaluation is the selection of a medium-specific list of COPCs which are used to quantitatively or qualitatively determine potential human health risks for site media. COPCs are selected primarily based on a toxicity screen (i.e., a comparison of site contaminant concentrations to conservative toxicity screening values) and a background screen (i.e., a comparison of site concentrations to background concentrations). In addition, as discussed below, factors such as frequency of detection are considered in some cases. The results of the COPC selection process are presented in Section 6.2.

6.1.1.1 Data Usability

Data collected from the field investigation conducted in March 2005 were used to assess risks to potential human and ecological receptors. The data were validated according to USEPA National Validation Functional Guidelines for Organic Data Review (October 1999), the Laboratory and Data Validation Functional Guidelines for Evaluation of Inorganic Analysis (February 1994), and TtNUS SOPs.

Fixed-based analytical results only from the field investigations were used in the quantitative risk evaluation. All detected concentrations with "J" qualifiers are considered positive detections and were used in the risk evaluation. Data with "U" and "UJ" qualifiers and data qualified because of blank contamination were retained and evaluated as nondetects. 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.

6.1.1.2 Selection of COPCs for Quantitative Risk Assessment

The selection of COPCs is a qualitative screening process used to limit the number of chemicals and exposure routes quantitatively evaluated in the baseline HHRA to those site-related constituents that dominate overall potential risks. Screening, primarily by risk-based concentrations and basewide background levels, is used to focus the risk assessment on meaningful chemicals and exposure routes.

In most cases, a chemical is selected as a COPC and retained for further quantitative risk evaluation if the maximum detection in a sampled medium exceeds the selected risk-based concentration(s) (i.e., the COPC screening level) and the chemical is determined to be present at concentrations exceeding background. This second condition applies only to those chemicals for which background comparison is possible and appropriate (e.g., metals). Background data are not available for organic chemicals.

Chemicals eliminated from further evaluation at this time are assumed to present minimal risks to potential human receptors.

6.1.1.2.1 COPC Screening Levels

Several types of screening concentrations were used to identify COPCs for soil and groundwater at Site 44. The screening concentrations are as follows:

Soil

Screening concentrations based on the following criteria were used to select COPCs for surface and subsurface soil:

- USEPA Region 9 PRGs for Residential Soil (USEPA Region 9, October 2004)
- Florida Soil Cleanup Target (SCTLs) for Direct Contact (FDEP, April 2005)
- Florida Soil Cleanup Target Levels (SCTLs) for Leachability Based on Groundwater Criteria (FDEP, April 2005)

Groundwater

Screening concentrations based on the following USEPA and State of Florida criteria were used to select COPCs for groundwater:

- USEPA Region 9 PRGs for Tap Water (USEPA Region 9, October 2004). The Region 9 Tap Water PRGs are based on the cumulative effects of ingestion, dermal contact, and inhalation (for volatiles).
- USEPA MCLs (USEPA, Winter 2004)
- Florida Groundwater CTLs (FDEP, April 2005). The Florida Groundwater CTLs are based on ingestion only. Note that some the Groundwater CTLs are calculated risk-based values while others are standards such as primary and secondary MCLs.

Most of the Region 9 PRGs and State of Florida SCTLs are based on a Hazard Quotient (HQ) of 1.0 (i.e., a no adverse non-carcinogenic effect level) or a cancer risk level of $1X10^{-6}$ (i.e., a one-in-one million

probability of developing cancer) but are adjusted (lowered) to reflect cumulative risk issues (e.g., Region 9 PRGs are typically adjusted to reflect a HQ of 0.1).

In the risk assessment conducted according to USEPA methodology, the screening levels for both carcinogens and non-carcinogens were developed using the guidance provided in the USEPA Region 4 Human Health Risk Assessment Bulletins -- Supplement to RAGS (USEPA Region 4, May 2000). In this approach, the risk-based USEPA Region 9 screening concentrations correspond to a HQ of 0.1 (for noncarcinogens) or an incremental lifetime cancer risk (ILCR) of 1×10^{-6} (for carcinogens). The Region 9 PRG values for noncarcinogens were multiplied by 0.1 to account for potential cumulative effects of several chemicals affecting the same target area or producing the same adverse non-carcinogenic health effect.

The screening levels used in the risk assessment conducted according to FDEP methodology were developed using the guidance provided in Appendices D and E of the Technical Report for Chapter 62-777 (FDEP, February 2005) and are presented in Section 6.6.

Because of the different exposure scenarios for potential human receptors, COPCs are identified separately for surface and subsurface soil. Surface soil is defined as soil collected from 0 to 0.5 feet bls and subsurface soil is defined as soil collected from depths of 0.5 to 9 feet bls.

Exposure to COPCs in subsurface soil is typically evaluated only for potential exposure during construction or excavation activities. Therefore, a construction/excavation worker is considered to be the receptor most likely exposed to COPCs in subsurface soil. However, subsurface soil could potentially be brought to the surface during future excavation projects resulting in exposure of other receptors such as future residents or workers. For this reason, potential exposure of residents and typical industrial workers to subsurface soils are also evaluated in the risk assessment.

Screening Levels for Lead

Limited criteria are available to evaluate the potential risks associated with lead. There are no strictly risk-based concentrations for this chemical because the USEPA has not derived toxicity values [i.e cancer slope factors (CSFs), reference doses (RfDs)] for lead. However, recommended screening levels are available for lead in soil and are frequently 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, July 1994). 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 is used as the screening level for COPC selection for both surface and subsurface soil.

Guidance for the USEPA Technical Review Workgroup (TRW) for Lead indicates that "a reasonable screening level for soil lead at commercial/industrial (i.e., non-residential) sites is 800 mg/kg" for a typical non-contact intensive worker (USEPA, online at, July 2005). This value is not used for COPC selection but may be used in the qualitative evaluation of lead. The current State of Florida commercial/industrial SCTL for lead in soil is 1,400 mg/kg (FDEP, April 2005).

The Florida CTL and Safe Drinking Water Act Action Level of 15 µg/L was used as the screening level for lead in groundwater.

Essential Nutrients and Chemicals without Toxicity Criteria

The essential nutrients calcium, magnesium, potassium, and sodium are not included in the COPC screening process. These inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses and, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for these chemicals in the Region 9 PRG table or FDEP CTL tables.

Risk-based screening levels are currently not available for several constituents detected at Site 44 [e.g., acenaphthylene, benzo(g,h,i)perylene, 1-methylnaphthalene, 2-methylnaphthalene, and phenanthrene]. Therefore, screening levels available for surrogate chemicals are used as screening levels for these constituents, as recommended, for example, by USEPA Region 1 (USEPA, August 1999). For example, in the COPC selection for soil at Site 44, the screening level for acenaphthene is used as a surrogate for acenaphthylene, pyrene for benzo(g,h,i)perylene and phenanthrene, and naphthalene for 1-methylnaphthalene and 2-methylnaphthalene.

6.1.1.2.2 Background Screen

Background concentrations are those that would exist in the absence of influence from site operations. The development of soil background datasets for NAS Pensacola is presented in the Site 1 — Sanitary Landfill Remedial Investigation Report (EnSafe/Allen & Hoshall, 1994). The background concentrations for soil were obtained from two reference locations presented in this report and the background concentrations for groundwater were obtained from four reference locations. The background comparisons were conducted according to USEPA Region 4 risk assessment guidance which states, "For naturally occurring inorganics and radionuclides, compare the on-site maximum detected concentration to 2 times the average site-specific background concentration. Eliminate the chemical as a COPC if it is less than 2 times the background level." (USEPA Region 4, May 2000). Therefore, if the detected site

concentrations of an analyte are less than 2 times the mean of the background levels, the analyte is not selected as a COPC. The background values used for COPC selection are presented in Tables 6-1 through 6-3. Note that no chemicals were eliminated solely on the basis of background in soil or groundwater at Site 44.

The elimination of chemicals as site-related COPCs on the basis of background comparisons follows Navy Policy on the Use of Background Chemical Levels (DON, January 2004). This document also presents the Navy's interpretation of the USEPA guidance provided in the document titled Role of Background in the CERCLA Cleanup Program (USEPA, April 2002) and details the methodology to be used in evaluating background under the Navy's Environmental Restoration and Base Realignment and Closure (BRAC) programs. Navy policy applies to both the screening-level and baseline risk assessments and requires the following:

1. A clear and concise understanding of chemicals released from a site thus ensuring the Navy is focusing on remediating the release.

2. The use of background data in the screening-level risk assessment.

    a. The comparison of site chemical levels to risk-based screening criteria.
    b. The comparison of site chemical levels to background concentrations.
    c. The identification of site-related COPCs based on screening criteria comparisons AND background comparisons. Site-related COPCs are those chemicals with concentrations exceeding risk-based screening criteria AND background concentrations. To the extent possible, site-related COPCs are further evaluated quantitatively in the baseline risk assessment. (Non-site-related COPCs are further discussed in the risk characterization sections of the baseline risk assessments.)

3. The consideration of background in the baseline risk assessment.

    a. The calculation of risk estimates for site-related COPCs only.
    b. The further evaluation of non-site-related COPCs in the risk characterization section only (e.g., the evaluation of chemicals detected at concentrations exceeding screening criteria, but less than background concentrations). The Navy considers this comparison to be consistent with USEPA's Role of Background in the CERCLA Cleanup Program (USEPA, April 2002).

TABLE 6-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondects[2]	Concentration Used for Screening[3]	Background Value[4]	EPA Region 9 PRG (Residential)[5]	EPA SSL Soil to Air Residential[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 44	**Volatile Organic Compounds**													
	67-64-1	Acetone	120 J	120 J	ug/kg	PEN44SB0201	1/3	8 - 24	120	NA	1400000 N	NA	No	BSL
	Semivolatile Organic Compounds													
	90-12-0	1-Methylnaphthalene	13	13	ug/kg	44SB3101	1/16	1.2 - 55	13	NA	5600 N[8]	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.9 J	24	ug/kg	44SB3101	2/19	0.6 - 22	24	NA	5600 N[8]	NA	No	BSL
	83-32-9	Acenaphthene	0.8 J	5.2	ug/kg	44SB3101	2/19	0.7 - 22	5.2	NA	370000 N	NA	No	BSL
	208-96-8	Acenaphthylene	1 J	140	ug/kg	44SB3101	6/19	0.5 - 22	140	NA	370000 N[9]	NA	No	BSL
	120-12-7	Anthracene	1 J	200	ug/kg	44SB3101	7/19	0.9 - 22	200	NA	2200000 N	NA	No	BSL
	56-55-3	Benzo(a)anthracene	9 J	420	ug/kg	44SB3101	8/19	20 - 22	420	NA	620 C	NA	No	BSL
	50-32-8	**Benzo(a)pyrene**	29	1200	ug/kg	44SB3101	8/19	0.8 - 22	1200	NA	**62 C**	NA	**Yes**	ASL
	205-99-2	**Benzo(b)fluoranthene**	26	930	ug/kg	44SB3101	8/19	2 - 22	930	NA	**620 C**	NA	**Yes**	ASL
	191-24-2	Benzo(g,h,i)perylene	22 J	3000	ug/kg	44SB3101	9/19	2 - 22	3000	NA	230000 N[10]	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	15 J	940	ug/kg	44SB3101	8/19	2 - 22	940	NA	6200 C	NA	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	99 J	330 J	ug/kg	PEN44SB2501	2/3	85 - 85	330	NA	35000 C	NA	No	BSL
	85-68-7	Butyl Benzyl Phthalate	90 J	130 J	ug/kg	PEN44SB2501	2/3	78 - 78	130	NA	1200000 N	NA	No	BSL
	218-01-9	Chrysene	11 J	510	ug/kg	44SB3101	7/19	1 - 22	510	NA	62000 C	NA	No	BSL
	53-70-3	**Dibenzo(a,h)anthracene**	10	400	ug/kg	44SB3101	5/19	2 - 22	400	NA	**62 C**	NA	**Yes**	ASL
	206-44-0	Fluoranthene	5.7	240	ug/kg	44SB3101	7/19	2 - 22	240	NA	230000 N	NA	No	BSL
	86-73-7	Fluorene	6.3	6.3	ug/kg	44SB3101	1/19	0.6 - 22	6.3	NA	270000 N	NA	No	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	31	1800	ug/kg	44SB3101	8/19	2 - 22	1800	NA	**620 C**	NA	**Yes**	ASL
	91-20-3	Naphthalene	1 J	20	ug/kg	44SB3101	2/19	0.9 - 22	20	NA	5600 N	17000 N	No	BSL
	85-01-8	Phenanthrene	1.6 J	36	ug/kg	44SB3101	7/19	2 - 22	36	NA	230000 N[10]	NA	No	BSL
	129-00-0	Pyrene	7.4	390	ug/kg	44SB3101	7/19	2 - 22	390	NA	230000 N	NA	No	BSL
		Carcinogenic PAHs	48.2	1925	ug/kg	44SB3101	9/19	---	1925	NA	**62 C**	NA	**Yes**	ASL
	Pesticides/PCBs													
	72-54-8	4,4'-DDD	1.4 J	1.4 J	ug/kg	PEN44SB0201-D	1/3	0.44 - 0.49	1.4	NA	2400 C	NA	No	BSL
	309-00-2	Aldrin	0.94 J	0.94 J	ug/kg	PEN44SB0201-D	1/3	0.54 - 0.61	0.94	NA	29 C	3400 C	No	BSL
	319-84-6	alpha-BHC	1.1 J	1.1 J	ug/kg	PEN44SB0201-D	1/3	1 - 1.1	1.1	NA	90 C	750 C	No	BSL
	5103-71-9	alpha-Chlordane	0.89 J	1.2 J	ug/kg	PEN44SB0201-D	1/3	0.48 - 0.53	1.2	NA	1600 C[11]	72000 C[11]	No	BSL
	319-85-7	beta-BHC	1.6 J	1.6 J	ug/kg	PEN44SB0201-D	1/3	0.61 - 0.68	1.6	NA	320 C	6000 C	No	BSL
	60-57-1	Dieldrin	1.2 J	1.5 J	ug/kg	PEN44SB0201-D	1/3	0.38 - 0.42	1.5	NA	30 C	1100 C	No	BSL
	1031-07-8	Endosulfan Sulfate	2.1 J	3 J	ug/kg	PEN44SB0201-D	1/3	0.65 - 0.72	3	NA	37000 N[12]	NA	No	BSL
	53494-70-5	Endrin Ketone	1.6 J	2 J	ug/kg	PEN44SB0201-D	1/3	0.69 - 0.76	2	NA	1800 N[13]	NA	No	BSL
	58-89-9	gamma-BHC (Lindane)	0.78 J	1.1 J	ug/kg	PEN44SB0201-D	1/3	0.45 - 0.49	1.1	NA	440 C	NA	No	BSL
	5103-74-2	gamma-Chlordane	3.1 J	3.1 J	ug/kg	PEN44SB0201-D	1/3	0.47 - 0.53	3.1	NA	1600 C[11]	72000 C[11]	No	BSL
	76-44-8	Heptachlor	1.6 J	1.6 J	ug/kg	PEN44SB0201-D	1/3	0.67 - 0.76	1.6	NA	110 C	4100 C	No	BSL
	Metals													
	7429-90-5	Aluminum	1360	7070	mg/kg	PEN44SB2501	3/3	- - -	7070	**3833**	7600 N	709000 N	No	BSL
	7440-38-2	**Arsenic**	0.49	1.6	mg/kg	PEN44SB2501	3/3	- - -	1.6	**1.56**	**0.39 C**	769 C	**Yes**	ASL
	7440-39-3	Barium	2.4	11.2	mg/kg	PEN44SB0201	3/3	- - -	11.2	**4.63**	540 N	70900 N	No	BSL
	7440-43-9	Cadmium	1.8	2.1	mg/kg	PEN44SB0201	2/3	0.03 - 0.03	2.1	**1**	3.7 N	1840 C	No	BSL
	7440-70-2	Calcium	1050 J	36900 J	mg/kg	PEN44SB1101	3/3	- - -	36900	**912**	NA	NA	No	NUT
	7440-47-3	Chromium	2.1	15.3	mg/kg	PEN44SB2501	3/3	- - -	15.3	**6.13**	22 N[14,15]	276 C[16]	No	BSL
	7440-48-4	Cobalt	0.32	0.58	mg/kg	PEN44SB1101	3/3	- - -	0.58	1.87	140 N[15]	1180 C	No	BSL, BKG
	7440-50-8	Copper	1.1 J	8.5 J	mg/kg	PEN44SB0201-D	3/3	- - -	8.5	**5.74**	310 N	NA	No	BSL
	7439-89-6	**Iron**	712	5550	mg/kg	PEN44SB2501	3/3	- - -	5550	**2745**	**2300 N**	NA	**Yes**	ASL

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Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondects(2)	Concentration Used for Screening(3)	Background Value(4)	EPA Region 9 PRG (Residential)(5)	EPA SSL Soil to Air Residential(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
	7439-92-1	Lead	22.6	27.6	mg/kg	PEN44SB0201-D	2/3	0.82 - 0.82	27.6	**7.32**	400	NA	No	BSL
	7439-95-4	Magnesium	118	574	mg/kg	PEN44SB1101	3/3	- - -	574	**133**	NA	NA	No	NUT
	7439-96-5	Manganese	16.5	33.5	mg/kg	PEN44SB2501	3/3	- - -	33.5	**21**	180 N	7090 N	No	BSL
	7439-97-6	Mercury	0.01	0.02	mg/kg	PEN44SB0201, PEN44SB2501	2/3	0.01 - 0.01	0.02	0.1	2.3 N	NA	No	BSL, BKG
	7440-02-0	Nickel	0.93 J	3.1	mg/kg	PEN44SB2501	3/3	- - -	3.1	6.38	160 N	NA	No	BSL, BKG
	7440-09-7	Potassium	71.2 J	247	mg/kg	PEN44SB2501	3/3	29.66 - 29.66	247	460.67	NA	NA	No	NUT, BKG
	7440-23-5	Sodium	29.7	292 J	mg/kg	PEN44SB1101	3/3	2.61 - 2.61	292	**107.85**	NA	NA	No	NUT
	7440-62-2	**Vanadium**	1.9 J	11.6	mg/kg	PEN44SB2501	3/3	- - -	11.6	**5.83**	**7.8 N**	NA	**Yes**	ASL
	7440-66-6	Zinc	36.3	39.4	mg/kg	PEN44SB0201	2/3	1.8 - 1.8	39.4	**16.9**	2300 N	NA	No	BSL
	Petroleum Hydrocarbons													
		Total Petroleum Hydrocarbons	34	47	mg/kg	PEN44SB2501	2/3	1.9 - 1.9	47	NA	NA	NA	No	NTX

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
5 - USEPA Region 9 Preliminary Remediation Goal Table. The noncarcinogenic values (denoted with a "N" flag) are the RBC divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (USEPA Region 9, November 2004, Update December 29, 2004).
6 - USEPA Soil Screening Levels. EPA Internet Site at http://rais.ornl.gov/calc_start.shtml. (Soil-to-air SSLs for noncarcinogens are divided by 10).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and is statistically determined to be greater than site background.
8 - The value for naphthalene is used as a surrogate for 2-methylnaphthalene.
9 - The value for acenaphthene is used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The value for chlordane is presented.
12 - The value for endosulfan is used as a surrogate for endosulfan sulfate.
13 - The value for endrin is used as a surrogate for endrin ketone.
14 - The PRG for hexavalent chromium is presented.
15 - One tenth of the noncarcinogenic PRG is less than the carcinogenic PRG, therefore the noncarcinogenic PRG is presented.
16 - Value is for total chromium.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

44SB3101	44SB4501	44SB5101
44SB3201	44SB4601	44SB5201
44SB3301	44SB4701	PEN44SB0201
44SB3401	44SB4801	PEN44SB0201-D
44SB3501	44SB4901	
44SB4201	44SB5001	
44SB4301	PEN44SB1101	
44SB4401	PEN44SB2501	

Definitions:
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen

NA = Not Applicable/Not Available
SSL = Soil Screening Level

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and site background.

For elimination as a COPC:
BKG = Less than Background Concentration
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration[1]	Maximum Concentration[1]	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondects[2]	Concentration Used for Screening[3]	Background Value[4]	EPA Region 9 PRG (Residential)[5]	EPA SSL Soil to Air Residential[6]	COPC Flag	Rationale for Contaminant Deletion or Selection[7]
Site 44	**Semivolatile Organic Compounds**													
	90-12-0	1-Methylnaphthalene	1.4 J	1.4 J	ug/kg	44SB3102-D	1/19	1.2 - 52	1.4	NA	5600 N[8]	NA	No	BSL
	91-57-6	2-Methylnaphthalene	0.6 J	2.7 J	ug/kg	44SB3102	2/25	0.6 - 21	2.7	NA	5600 N[8]	NA	No	BSL
	208-96-8	Acenaphthylene	5	5.6	ug/kg	44SB3102-D	1/25	0.5 - 21	5.6	NA	370000 N[9]	NA	No	BSL
	120-12-7	Anthracene	0.9 J	10	ug/kg	44SB3102-D	2/25	0.8 - 21	10	NA	2200000 N	NA	No	BSL
	56-55-3	Benzo(a)anthracene	9 J	110	ug/kg	44SB4702	6/25	0.85 - 21	110	NA	620 C	NA	No	BSL
	50-32-8	**Benzo(a)pyrene**	3 J	260	ug/kg	44SB4702	7/25	0.8 - 21	260	NA	**62 C**	NA	**Yes**	ASL
	205-99-2	Benzo(b)fluoranthene	4 J	260	ug/kg	44SB4702	6/25	0.64 - 21	260	NA	620 C	NA	No	BSL
	191-24-2	Benzo(g,h,i)perylene	8 J	180	ug/kg	44SB4702	5/25	0.41 - 21	180	NA	230000 N[10]	NA	No	BSL
	207-08-9	Benzo(k)fluoranthene	5 J	210	ug/kg	44SB4702	5/25	0.78 - 21	210	NA	6200 C	NA	No	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	240 J	240 J	ug/kg	PEN44SB0202	1/6	77 - 82	240	NA	35000 C	NA	No	BSL
	218-01-9	Chrysene	14 J	160	ug/kg	44SB4702	3/25	0.47 - 21	160	NA	62000 C	NA	No	BSL
	50-70-3	Dibenzo(a,h)anthracene	25 J	25 J	ug/kg	44SB3102-D	1/25	0.34 - 21	25	NA	62 C	NA	No	BSL
	206-44-0	Fluoranthene	3 J	100	ug/kg	44SB4702	7/25	0.71 - 21	100	NA	230000 N	NA	No	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	6 J	210	ug/kg	44SB4702	5/25	0.81 - 21	210	NA	620 C	NA	No	BSL
	85-01-8	Phenanthrene	1 J	5.4	ug/kg	44SB3102-D	3/25	0.88 - 21	5.4	NA	230000 N[10]	NA	No	BSL
	129-00-0	Pyrene	2 J	120	ug/kg	44SB4702	7/25	0.68 - 21	120	NA	230000 N	NA	No	BSL
		Carcinogenic PAHs	1.96	330	ug/kg	44SB4702	8/25	- - -	223	NA	**62 C**	NA	**Yes**	ASL
	Metals													
	7429-90-5	**Aluminum**	203	11700	mg/kg	PEN44SB2502	6/6	- - -	11700	**3833**	**7600 N**	709000 N	**Yes**	ASL
	7440-38-2	**Arsenic**	0.24	2.5	mg/kg	PEN44SB2502, PEN44SB2503	3/16	0.26 - 0.76	2.5	**1.56**	**0.39 C**	769 C	**Yes**	ASL
	7440-39-3	Barium	0.19	7	mg/kg	PEN44SB0202	6/6	- - -	7	**4.63**	540 N	70900 N	No	BSL
	7440-43-9	Cadmium	0.19	1.3	mg/kg	PEN44SB0202	2/6	0.03 - 0.14	1.3	**1**	3.7 N	1840 C	No	BSL
	7440-70-2	Calcium	188 J	8180 J	mg/kg	PEN44SB1102	6/6	- - -	8180	**912**	NA	NA	No	NUT
	7440-47-3	Chromium	2.5	13	mg/kg	PEN44SB2503	5/6	0.93 - 0.93	13	**6.13**	22 N[14,15]	276 C[16]	No	BSL
	7440-48-4	Cobalt	0.09	0.41	mg/kg	PEN44SB2502	6/6	- - -	0.41	1.87	140 N[15]	1180 C	No	BSL, BKG
	7440-50-8	Copper	0.77 J	4.2 J	mg/kg	PEN44SB2502	5/6	0.13 - 0.13	4.2	5.74	310 N	NA	No	BSL
	7439-89-6	**Iron**	107	6720	mg/kg	PEN44SB2503	6/6	- - -	6720	**2745**	**2300 N**	NA	**Yes**	ASL
	7439-92-1	Lead	0.97	26.3	mg/kg	PEN44SB0202	5/6	0.35 - 0.35	26.3	**7.32**	400	NA	No	BSL
	7439-95-4	Magnesium	56.3	208	mg/kg	PEN44SB0202	5/6	17.3 - 17.3	208	**133**	NA	NA	No	NUT
	7439-96-5	Manganese	1.8	16.9	mg/kg	PEN44SB2502	5/6	0.71 - 0.71	16.9	21	180 N	7090 N	No	BSL
	7439-97-6	Mercury	0.02	0.02	mg/kg	PEN44SB2502, PEN44SB2503	2/6	0.01 - 0.01	0.02	0.1	2.3 N	NA	No	BSL, BKG
	7440-02-0	Nickel	1	2.7	mg/kg	PEN44SB2502	5/6	0.53 - 0.53	2.7	6.38	160 N	NA	No	BSL, BKG
	7440-09-7	Potassium	50.8	129	mg/kg	PEN44SB2502	5/6	26.38 - 26.38	129	460.67	NA	NA	No	NUT, BKG
	7440-23-5	Sodium	3.1	58.8	mg/kg	PEN44SB1102	2/6	2.12 - 3.07	58.8	107.85	NA	NA	No	NUT
	7440-62-2	**Vanadium**	1.5	18.2	mg/kg	PEN44SB2503	5/6	0.36 - 0.36	18.2	**5.83**	**7.8 N**	NA	**Yes**	ASL
	7440-66-6	Zinc	7.8	16.7	mg/kg	PEN44SB0202	3/6	0.53 - 2.8	16.7	16.9	2300 N	NA	No	BSL
	Petroleum Hydrocarbons							-						
		Total Petroleum Hydrocarbons	2.5 J	31	mg/kg	PEN44SB0202	4/6	0.81 - 1.3	31	NA	NA	NA	No	NTX

TABLE 6-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondects(2)	Concentration Used for Screening(3)	Background Value(4)	EPA Region 9 PRG (Residential)(5)	EPA SSL Soil to Air Residential(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)

Footnotes
1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
5 - USEPA Region 9 Preliminary Remediation Goal Table. The noncarcinogenic values (denoted with a "N" flag) are the RBC divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag) (USEPA Region 9, November 2004, Update December 29, 2004).
6 - USEPA Soil Screening Levels. EPA Internet Site at http://rais.ornl.gov/calc_start.shtml. (Soil-to-air SSLs for noncarcinogens are divided by 10).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and is statistically determined to be greater than site background.
8 - The value for naphthalene is used as a surrogate for 1- and 2-methylnaphthalene.
9 - The value for acenaphthene is used as a surrogate for acenaphthylene.
10 - The value for pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 - The value for chlordane is presented.
12 - The value for endosulfan is used as a surrogate for endosulfan sulfate.
13 - The value for endrin is used as a surrogate for endrin ketone.
14 - The PRG for hexavalent chromium is presented.
15 - One tenth of the noncarcinogenic PRG is less than the carcinogenic PRG, therefore the noncarcinogenic PRG is presented.
16 - Value is for total chromium.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

44SB3102	44SB3801	44SB4302	44SB5202
44SB3102-D	44SB3801-D	44SB4402	PEN44SB0202
44SB3202	44SB3802	44SB4502	PEN44SB0203
44SB3302	44SB3901	44SB4602	PEN44SB1102
44SB3402	44SB3902	44SB4702	PEN44SB1103
44SB3502	44SB4001	44SB4703	PEN44SB2502
44SB3601	44SB4002	44SB4802	PEN44SB2503
44SB3602	44SB4101	44SB4902	
44SB3701	44SB4102	44SB5002	
44SB3702	44SB4202	44SB5102	

Definitions:
C = Carcinogen
COPC = Chemical Of Potential Concern
J = Estimated value
N = Noncarcinogen

NA = Not Applicable/Not Available
SSL = Soil Screening Level

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level and site background.

For elimination as a COPC:
BKG = Less than Background Concentration
BSL = Below COPC Screening Level
NUT = Essential nutrient
NTX = No toxicity criteria

TABLE 6-3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

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

Exposure Point	CAS Number	Chemical	Minimum Concentration(1)	Maximum Concentration(1)	Units	Sample of Maximum Concentration	Frequency of Detection	Range of Nondects(2)	Concentration Used for Screening(3)	Background Value(4)	USEPA Region 9 Tap Water PRG(5)	USEPA MCL(6)	COPC Flag	Rationale for Contaminant Deletion or Selection(7)
Site 44	**Volatile Organic Compounds**													
	75-34-3	1,1-Dichloroethane	2	2	ug/L	44GW1801	1/28	0.11 - 0.4	2	NA	81 N	NA	No	BSL
	67-66-3	**Chloroform**	0.22 J	1.6	ug/L	44GW1601	13/28	0.13 - 0.4	1.6	NA	**0.17 C**	80	**Yes**	ASL
	74-87-3	Chloromethane	0.3 J	0.7 J	ug/L	3221GW0301	2/28	0.18 - 0.3	0.7	NA	16 N	NA	No	BSL
	156-59-2	cis-1,2-Dichloroethene	0.9 J	2.9	ug/L	44GW2101	6/28	0.14 - 0.44	2.9	NA	6.1 N	70	No	BSL
	540-59-0	Total 1,2-Dichloroethene	0.9 J	2 J	ug/L	44GW1101, 44GW1401	5/19	0.6 - 0.6	2	NA	6.1 N(8)	100	No	BSL
	79-01-6	**Trichloroethene**	0.49 J	52	ug/L	3221GW0901	8/28	0.23 - 3.4	52	NA	**0.028 C**	**5**	**Yes**	ASL
	Semivolatile Organic Compounds													
	91-57-6	2-Methylnaphthalene	0.1 J	0.4	ug/L	3221GW0601, 3221GW0801	4/19	0.06 - 0.06	0.4	NA	0.62 N	NA	No	BSL
	117-81-7	**Bis(2-Ethylhexyl)phthalate**	10	11	ug/L	44GW1901	2/21	1 - 8	11	NA	**4.8 C**	**6**	**Yes**	ASL
	91-20-3	Naphthalene	0.07 J	0.2 J	ug/L	3221GW0601	4/19	0.05 - 0.05	0.2	NA	0.62 N	NA	No	BSL
	Metals													
	7429-90-5	Aluminum	960 J	2800 J	ug/L	44GW0901	6/19	69.7 - 810	2800	3883	3600 N	NA	No	BSL, BKG
	7440-39-3	Barium	9.5	19.4	ug/L	44GW1801	3/19	3.1 - 9.8	19.4	**13.2**	260 N	2000	No	BSL
	7440-70-2	Calcium	12600	46900	ug/L	44GW1901	19/19	- - -	46900	**17560**	NA	NA	No	NUT
	7440-47-3	Chromium	1.4	24.1	ug/L	3221GW0201	9/19	1.01 - 1.01	24.1	35	**11 N(10)**	100	No	BKG
	7439-89-6	**Iron**	123	1820	ug/L	44GW1801	17/21	51.7 - 92.4	1820	**1708**	**1100 N**	**300 (11)**	**Yes**	ASL
	7439-92-1	Lead	1.6	3.8	ug/L	3221GW0301	2/20	1.5 - 1.65	3.8	**1.6**	15	15	No	BSL
	7439-95-4	Magnesium	1600	4740	ug/L	44GW1901	19/19	- - -	4740	**2873**	NA	NA	No	NUT
	7439-96-5	**Manganese**	1.2	74.2	ug/L	3221GW0301	15/22	0.7 - 3.9	74.2	**21.9**	88 N	**50 (11)**	**Yes**	ASL
	7440-02-0	Nickel	18.2	18.2	ug/L	3221GW0201	1/19	11.7 - 11.7	18.2	40	73 N	NA	No	BSL, BKG
	7440-09-7	Potassium	5360	5360	ug/L	44GW1201	1/19	420 - 2680	5360	12168	NA	NA	No	NUT
	7782-49-2	Selenium	3.6	3.6	ug/L	3221GW0201	1/19	3.59 - 3.7	3.6	3.9	18 N	50	No	BSL, BKG
	7440-23-5	Sodium	7050	33700	ug/L	44GW1301	19/19	- - -	33700	**18345**	NA	NA	No	BSL

TABLE 6-3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUNDWATER
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

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

Notes:
1 - Sample and duplicate are counted as two separate samples when determining the minimum and maximum detected concentrations and as one sample when determining frequency of detection.
2 - Values presented are sample-specific quantitation limits.
3 - The maximum detected concentration is used for screening purposes.
4 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1.
If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
5 - The risk-based COPC screening level for tap water is presented. The value is based upon a target HQ of 0.1 for noncarcinogens (denoted with a "N" flag),
or an incremental cancer risk of 1×10^{-6} for carcinogens (denoted with a "C" flag) (EPA Region 9, October 2004, Updated December 28, 2004).
6 - U.S. EPA Primary Drinking Water Standard (U.S. EPA, Summer 2006).
7 - The chemical is selected as a COPC if the maximum detected concentration exceeds the COPC screening level and is greater than the concentration detected in the upgradient well.
8 - The PRG for cis-1,2-dichloroethene is used as a surrogate for total 1,2-dichloroethene.
10 - The PRG for hexavalent chromium is presented.
11 - No primary MCL available, secondary MCL is presented.

Shaded criterion indicates that the maximum detected concentration exceeds one or more screening criteria. Shaded chemical name indicates that the chemical was retained as a COPC.

Associated Samples

3221GW0101	44GW1502	3221GW1001	44GW2301
3221GW0201	44GW1601	3221GW1001-D	44GW2401
3221GW0301	44GW1701	44GW0901	44GW2501
3221GW0302	44GW1801	44GW1001	44GW2601
3221GW0401	44GW1802	44GW1101	
3221GW0501	44GW1901	44GW1201	
3221GW0601	44GW1902	44GW1301	
3221GW0701	44GW2001	44GW1401	
3221GW0801	44GW2101	44GW1501	
3221GW0901	44GW2201	44GW1501-D	

Definitions:
NA = Not Applicable
SQL = Sample Quantitation Limit
COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
MCL = Maximum Contaminant Level.
NA = Not applicable/not available.
N = Noncarcinogen.
SDWA = Safe Drinking Water Act.
SMCL = Secondary MCL.

Rationale Codes:
For selection as a COPC:
ASL = Above Screening Level

For elimination as a COPC:
BSL = Below Screening Level
NUT = Essential nutrient
BKG = Less than Background Concentration

4. The selection of site cleanup remedial goals at levels not less than background levels. Additionally, cleanup levels should not be developed for chemicals not identified as chemicals of concern (COCs). As defined in the Navy guidance, COCs are site-related COPCs found to be the risk drivers in the baseline risk assessment and that may pose unacceptable human or ecological risks.

The results of the background screens are presented in Tables 6-1 through 6-3.

6.1.1.2.3 Frequency Screen

If an analyte is detected in less than 5 percent of the samples, it may not be selected as a COPC (FDEP, February 2005). A frequency screen is conducted only when there are 20 or more samples of the medium of concern. The decision to eliminate a chemical because of low detection frequency is also based on site history (i.e., is there a reason to believe a chemical may or may not be related to historical site activities) and the magnitude of the concentration (i.e., does the concentration of a chemical indicate a potential hotspot area). Note that no chemicals were eliminated as COPCs on the basis of frequency alone.

6.1.1.2.4 Decision Rules for Establishing COPCs

The applicable decision rules for the selection of COPCs are as follows:

- A chemical is selected as a COPC for soil or groundwater if the maximum detected concentration exceeds the screening level and if the background screen indicates the site concentrations are greater than the corresponding background concentrations.

- Individual chemicals may be eliminated as COPCs if they are detected at a frequency of less than 5 percent in any given medium, but only if there are no other indications the chemical would pose an unacceptable risk to receptors (e.g., there is no evidence of a contaminant “hot spot”). Chemicals exhibiting unusually high concentrations or are clearly site-related may be retained as COPCs at the discretion of the human health risk assessor.

- If a chemical is not detected in any of the samples in a particular medium, and the detection limits exceeds the risk-based screening levels, the chemical is not selected as a COPC but is qualitatively discussed in the uncertainty analysis section.

- The essential nutrients (calcium, magnesium, potassium, and sodium) are not identified as COPCs.

- Chemicals with concentrations exceeding toxicity screening concentrations but determined to be less than background concentrations based on the background screen are not selected as COPCs. However, as stated previously, no chemicals were eliminated as COPCs on the basis of background alone.

6.2 SELECTION OF COPCS FOR HUMAN HEALTH RISK ASSESSMENT – USEPA METHODOLOGY

The direct contact, USEPA Region 9 risk-based screening levels and USEPA MCLs (for groundwater) defined in Section 6.1.1.2 were used to select COPCs for quantitative evaluation at Site 44. A discussion of the chemicals selected as COPCs (i.e., those chemicals detected at concentrations in excess of USEPA direct contact screening criteria and the rationale for COPC selection are provided in the following paragraphs. COPC selection tables for surface soil, subsurface soil, and groundwater are presented as Tables 6-1, 6-2, and 6-3, respectively.

6.2.1 Surface Soil

One VOC, 18 PAHs, 2 phthalate esters, 11 pesticides, 18 inorganics, and petroleum hydrocarbons were detected in surface soil samples collected at Site 44. A comparison of the maximum detected surface soil concentrations to screening levels based on USEPA Region 9 PRGs for residential exposures is presented in Table 6-1. Also presented in Table 6-1 are the results of the site data-to-background data comparisons. The following chemicals were detected in surface soils at maximum concentrations exceeding the direct contact, risk based COPC screening levels and background, and were retained as COPCs for surface soil:

- cPAHs
- Inorganics (arsenic, iron, and vanadium)

These constituents were retained for the quantitative evaluation presented in Section 6.5. The maximum concentrations of iron and vanadium exceeded the Region 9 PRG screening levels based on an HQ of 0.1 but were less than the non-adjusted PRG values based on an HQ of 1.0.

6.2.2 Subsurface Soil

Fifteen PAHs, 1 phthalate ester, 18 inorganics, and petroleum hydrocarbons were detected in subsurface soil samples collected at Site 44. A comparison of the maximum detected subsurface soil concentrations to screening levels based on USEPA Region 9 PRGs for residential exposures is presented in Table 6-2. Also presented in Table 6-2 are the results of the site data-to-background data

comparisons. The following chemicals were detected in subsurface soils at maximum concentrations exceeding the direct contact, risk based COPC screening levels and background, and were retained as COPCs for subsurface soil:

- cPAHs
- Inorganics (aluminum, arsenic, iron, and vanadium)

These constituents were retained for the quantitative evaluation presented in Section 6.4. The maximum concentration of aluminum, iron, and vanadium exceeded the Region 9 PRG screening concentration but were less than the non-adjusted PRG values.

6.2.3 Groundwater

Six VOCs, 3 SVOCs, and 12 inorganics were detected in groundwater samples collected at Site 44. A comparison of the maximum detected groundwater concentrations to screening levels based on USEPA Region 9 PRGs and USEPA MCLs for residential exposures is presented in Table 6-3. Also presented in Table 6-3 are the results of the site data-to-background data comparisons. The following chemicals were detected in groundwater at maximum concentrations exceeding the direct contact, risk based COPC screening levels and background, and were retained as COPCs for groundwater:

- Chloroform
- TCE
- Bis(2-ethylhexyl)phthalate
- Inorganics (iron and manganese)

Chloroform was detected in 13 of 28 samples at a maximum concentration that exceeded the screening levels based on the Region 9 PRG but was less than the USEPA MCL. TCE was detected in 8 of 28 samples at concentrations exceeding the USEPA MCL. The maximum concentrations of iron and manganese exceeded the Region 9 PRG screening levels but were less than the non-adjusted PRGs. The concentrations of iron and manganese also exceeded the USEPA Secondary MCLs, which are not based on health effects but on aesthetic effects, such as taste and odor. No chemicals in groundwater were eliminated as COPCs on the basis of background only.

6.3 EXPOSURE ASSESSMENT/ESTIMATION OF RISK

The exposure assessment defines and evaluates, quantitatively or qualitatively, the type and magnitude of human exposure to the chemicals present at or migrating from the site. The exposure assessment is designed to depict the physical setting of the site, to identify potentially exposed populations and

applicable exposure pathways, to determine concentrations of COPCs to which receptors might be exposed, and to estimate chemical intakes under the identified exposure scenarios. Actual or potential exposures at a site are determined based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: (1) a source of chemicals that can be released to the environment, (2) a route of contaminant transport through an environmental medium, and (3) an exposure or contact point for a human receptor. These components can be integrated and described by means of a conceptual site model (CSM), which is an essential element of the exposure assessment.

Current or potential human exposures identified by the CSM are evaluated using the "risk-ratio" approach defined in Section 6.3.3. As noted above, this approach is supported by USEPA Region 4. The approach uses exposure point concentrations (EPCs) for the COPCs in soil and groundwater and relevant risk-based concentrations to generate cancer and non-cancer risk estimates for receptors of concern. The risk-based concentrations for soil used to estimate risk are the FDEP SCTLs developed for the residential and industrial land use scenarios and risk-based concentrations developed for other receptors using USEPA and FDEP guidance documents. The risk-based concentrations for groundwater used to estimate risks are the USEPA Region 9 Tap Water PRGs (USEPA Region 9, October 2004). The Region 9 PRGs were used for groundwater (instead of the FDEP CTLs) because most of the FDEP groundwater CTLs are not risk-based values. The risk-based concentrations define and incorporate all the exposure factors (e.g., soil and water ingestion rates) used to determine chemical intake/exposure by receptors of concern.

6.3.1 Conceptual Site Model

The foundation of an exposure assessment is the CSM, which identifies site characteristics including potential contaminant sources, contaminant release mechanisms, transport routes, receptors under current and future land use scenarios, and other appropriate information. 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-defined CSM allows for a better understanding of the risks at a site and aids risk managers in the identification of the potential need for remediation. A general overview of CSM information relevant to Site 44 is provided below. Table 6-4 provides a general summary of the potential receptors and exposure routes evaluated in the risk assessment for Site 44.

TABLE 6-4

**EXPOSURE ROUTES FOR QUANTITATIVE EVALUATION
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA**

Receptors	Exposure Routes
Adult and Adolescent Trespassers / Recreational Users	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface soil)
Maintenance Workers	• Soil dermal contact (surface) • Soil ingestion (surface) • Inhalation of air/dust/emissions (surface)
Construction Workers	• Soil dermal contact (surface and subsurface) • Soil ingestion (surface and subsurface) • Inhalation of air/dust/emissions (surface and subsurface) • Groundwater ingestion • Groundwater inhalation
Occupational Workers	• Soil dermal contact (surface)[1] • Soil ingestion (surface)[1] • Inhalation of air/dust/emissions (surface)[1]
Residents (Adult/Children)	• Soil dermal contact (surface)[1] • Soil ingestion (surface)[1] • Inhalation of air/dust/emissions (surface)[1] • Groundwater ingestion • Groundwater inhalation

1 Occupational workers and residents are also evaluated for exposure to COPCs in subsurface soil. This scenario is included to account for the possibility that subsurface soil could be brought to the surface in future excavation projects.

As noted above, the CSM depicts the relationships among the following elements:

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

A general discussion of these elements is provided in following paragraphs.

Site Background and History

The background and history of Site 44 are discussed in Section 1.2.

Sources of Environmental Contamination

Sources of environmental contamination are discussed in Section 4.0.

Potential Contaminant Migration Routes

Assuming surface soil, subsurface soil, and groundwater contamination has occurred as a result of chemical usage/waste disposal and chemicals may migrate to deeper subsurface soils and groundwater, the primary plausible contaminant release and migration mechanisms at Site 44 are as follows:

- Migration of soil contaminants downward through the soil column with infiltrating precipitation. Chemicals may continue to migrate in groundwater via dispersion and advection in the downgradient direction. Depth to groundwater at the Site is approximately 6 feet bls. However, the COCs at the site (PAHs and metals) are not environmentally mobile and do not tend to leach through the soil column under typical environmental conditions (e.g., moderate pH). PAHs and metals in soil are much more likely to bind to soil and be transported via mass transport mechanisms rather than move in the dissolved phase. The presence of these chemicals in subsurface soil and groundwater at the site is more likely due to releases from buried drums than leaching from the surface.

- Migration of fugitive dusts from surface soils (and subsurface soils if construction/excavation activities occur) into ambient air. As indicated in COPC selection Tables 6-1 and 6-2, the site soil concentrations of all detected chemicals were less than USEPA inhalation soil screening levels (SSLs)

and, therefore, the soil-to-air inhalation pathway is not considered significant and is not further evaluated in the risk assessment.

A secondary release by stormwater runoff could affect the surface water in the surrounding area resulting in humans and both terrestrial and aquatic biota becoming potential receptors via ingestion and dermal contact. However, because no surface water bodies (other than intermittent streams) are present in the immediate vicinity of Site 44, the potential for runoff from surface soil to a surface water body is not addressed.

Potential Current and Future Receptors of Concern and Exposure Pathways

NAS Pensacola is an active facility and will remain active for the foreseeable future. However, for purposes of completeness, the baseline risk assessment prepared for Site 44 considers receptor exposure under residential, industrial, and recreational land use scenarios. Based on current and potential future land use, the following potential receptors are assumed to be exposed to contaminated environmental media at Site 44:

- **Site Maintenance Worker** – An on-site receptor under current/future land use. This includes adult military or civilian personnel assigned to work (primarily groundskeeping/outdoor maintenance activities) at a site. This receptor could be exposed to surface soil by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors) during groundskeeping or maintenance activities. This receptor would not be expected to be routinely exposed to subsurface soils. This receptor is expected to be exposed to surface soil for 30 days per year based on professional judgment. Maintenance workers are considered one of the more likely receptors under current land use.

- **Construction/Excavation Worker** – A plausible on-site receptor under future land use if major construction activities were to occur. This receptor could be exposed to surface and subsurface soils by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). Although exposure to groundwater by a construction worker is possible, the risk would be negligible relative to direct exposure to soil. The construction worker is assumed to be exposed to soil for 250 days per year (USEPA, December 2002b) assuming a Reasonable Maximum Exposure (RME) scenario.

- **Typical Occupational Worker** – An on-site receptor under future land use. Future occupational workers may work at the site if the facility were to close and be developed for commercial/industrial uses. To provide information for risk management decisions, potential risks to future occupational workers are quantified in the risk assessments. This receptor could be exposed to surface soil by incidental

ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). This receptor would not be expected to be routinely exposed to subsurface soils. The occupational worker is expected to be exposed to surface soils for 250 days per year (USEPA, May 1993 and December 2002) but less intensely than the maintenance or construction worker.

- **Adult and Adolescent Recreational User/Trespasser** – A plausible receptor under current and future land use. Although access to the base is controlled, once inside the base, access to Site 44 is not limited by any physical constraints. This receptor may be exposed to potentially contaminated surface soil by incidental ingestion, dermal contact, and inhalation (i.e., airborne particulates/vapors). Recreational users/trespassers are assumed to be exposed to COPCs in soil for 45 days per year, based on professional judgment. Direct contact with subsurface soils is not anticipated for this receptor. Recreational users are considered one of the more likely receptors under current land use.

- **On-Site Child and Adult Resident** – A hypothetical on-site receptor under future land use. The future residential scenario was quantitatively evaluated in the risk assessment for decision-making purposes although this scenario is unlikely for the NAS Pensacola. It is assumed a resident may be exposed to surface soils by incidental ingestion, dermal contract, and inhalation (i.e., airborne particulates/vapors). Future residents could also be exposed to groundwater only if drinking water wells were installed on the site in the future. This is very unlikely since the main source of water for the base is the Navy-owned well field located at NTTC Corry Station north of NAS Pensacola. However, the future residential drinking water scenario was evaluated for decision-making purposes. According to USEPA Region 4 and Region 9 guidance, a resident is assumed to be exposed to groundwater by ingestion and inhalation (i.e., airborne vapors). FDEP in Chapter 62-777 FAC assumes that a receptor is exposed to groundwater by ingestion only. Residential receptors are assumed to be exposed to groundwater 350 days per year (USEPA, May 1993) for a total of 30 years.

6.3.2 Calculation of Exposure Point Concentrations

The EPC, calculated for COPCs only, is a reasonable estimate of the chemical concentration likely to be contacted over time by a receptor and is used to calculate estimated exposure intakes. Calculation of EPCs considered guidance described in the USEPA's Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (December 2002a) and Florida's 62-780 FAC (FDEP, April 2005).

The 95-percent upper confidence limit (UCL), which is based on the distribution of a dataset, is considered to be the best estimate of the exposure concentration for datasets with 10 or more samples (USEPA, May 1992). For datasets with less than 10 samples, the UCL is considered to be a poor

estimate of the mean, and the EPC is defined as the maximum concentration. As specified in Chapter 62-780 FAC, the Florida UCL Calculator tool (Version 0.97) was used to calculate the UCLs.

The following decision rules were used to calculate EPCs:

- If a soil dataset contains fewer than 10 samples, the EPC is defined as the maximum detected concentration.
- If a soil dataset contains 10 or more samples, the 95-percent UCL on the arithmetic mean (calculated using the Florida UCL Calculator Tool), which is based on the distribution of the dataset, was selected as the EPC.
- If the calculated 95-percent UCL exceeded the maximum detected concentration, the maximum concentration was used as the EPC.
- Sample and duplicate analytical results were averaged before the EPC was calculated.
- A data value less than the sample-specific detection limit was substituted with one-half the detection limit.

The EPCs for groundwater used in the USEPA risk evaluation are the maximum detected concentrations.

6.3.3 Chemical Intake and Risk Estimation

To evaluate risks by USEPA methodology, cancer and non-cancer risk estimates for COPCs detected in soil and groundwater are determined using the following simple “risk ratio” technique, which involves the selection (or development) of risk-based concentrations established at the $1x10^{-6}$ cancer risk level or HQ of 1 and the calculation of cancer and non-cancer risks based on the EPC and the risk based concentration:

$$\frac{\text{Risk - based Concentration}}{\text{EPC for COPC}} = \frac{\text{HQ of 1 or Cancer Risk Estimate of 1E - 06}}{\text{HQ or Cancer Risk Estimate for COPC}}$$

This is a valid technique for estimating risk because all of the intake and risk characterization equations used to develop risk-based concentrations are linear. The risk-based concentrations used in the HHRAs for the evaluation of exposure to soil are the State of Florida SCTLs or risk-based concentrations based on the methodology for the development of residential and industrial SCTLs presented in the draft

Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777 (FDEP, April 2005). Since most Florida groundwater CTLs are not risk-based values, the risk-based Region 9 PRGs are used in the risk ratio calculations.

Cancer and non-cancer risk estimates for all other receptors evaluated in the HHRA (i.e., the construction worker, the maintenance worker, and the recreational user/trespasser) are based on risk-based concentrations developed using the exposure dose assumptions and the simple intake equations presented in the following sections and the toxicity criteria (slope factors and reference doses) discussed in Section 6.4. The simple intake equations are combined to produce one risk-based concentration per chemical that accounts for ingestion, dermal, and inhalation exposures. (The risk-based concentration calculations are presented in Appendix D.) The risk-based concentrations are established by setting the cancer and non-cancer risk levels at $1x10^{-6}$ or HI of 1, respectively, and solving for the associated contaminant concentration in soil as demonstrated in the USEPA Risk Assessment Guidance for Superfund, Part B (USEPA, December 1991). The exposure assumptions selected for the construction worker, the maintenance worker, the recreational user/trespasser were based on current USEPA risk assessment guidance (December 1989 and July 2004) and State of Florida guidance (FDEP, April 2005). Risk assessment spreadsheets for the calculation of the risk estimates are presented in Appendix D.

6.3.3.1 Incidental Ingestion of Soil

Incidental ingestion of soil by potential receptors coincides with dermal exposure. Exposures associated with incidental ingestion were estimated in the following manner (USEPA, December 1989):

$$\text{Intake}_{si} = (C_{si})(IR_s)(FI)(EF)(ED)(CF)/(BW)(AT)$$

where:

Intake_{si}	=	intake of contaminant "i" from soil (mg/kg/day)
C_{si}	=	concentration of contaminant "i" in soil (mg/kg)
IR_s	=	ingestion rate (mg/day)
FI	=	fraction ingested from contaminated source (dimensionless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
CF	=	conversion factor ($1x10^{-6}$ kg/mg)
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

As noted above, the State of Florida SCTLs are used to calculate cancer and non-cancer risk estimates for the hypothetical future resident and a typical industrial worker exposed to soil. Exposure assumptions for the other receptors are described below and were used to develop risk-based concentrations for the construction worker, the maintenance worker, and the recreational user/trespasser (Appendix D).

A default value of 1.0 (USEPA, December 1989) is recommended for the fraction of soil ingested from the contaminated source. The ingestion rates were 330 milligrams per day (mg/day) for the construction worker (USEPA, December 2002b), 50 mg/day for the maintenance workers (FDEP, February 2005), and 100 mg/day for adult and adolescent trespassers/recreational users (USEPA, May 1993). The exposure frequencies used to estimate intakes for incidental ingestion of soil are presented in Section 6.3.1.

6.3.3.2 Dermal Contact with Soil

Direct physical contact with soil may result in the dermal absorption of chemicals. Exposures associated with the dermal route were estimated in the following manner (USEPA, December 1989 and July 2004):

$$\text{Intake}_{si} = (C_{si})(SA)(AF)(ABS)(CF)EF)(ED)/(BW)(AT)$$

where:

Intake_{si}	=	amount of chemical "i" absorbed during contact with soil (mg/kg/day)
C_{si}	=	concentration of chemical "i" in soil (mg/kg)
SA	=	skin surface area available for contact (cm^2/day)
AF	=	skin adherence factor (mg/cm^2)
ABS	=	absorption factor (dimensionless)
CF	=	conversion factor ($1x10^{-6}$ kg/mg)
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

As noted above, the State of Florida SCTLs were used to calculate cancer and non-cancer risk estimates for the hypothetical future resident and a typical industrial worker. Exposure assumptions for the other receptors are described below and were used to develop risk-based concentrations for the construction worker, the maintenance worker, and the recreational user/trespasser.

The exposed surface areas of the body available for dermal contact are determined on a receptor-specific basis and are based on assumed human activities and clothing worn during exposure events. Current guidance (USEPA, August 1997 and July 2004) was used to develop the assumptions concerning the amount of skin surface area available for contact for a receptor. The rationales used to select the skin areas are as follows:

- The head, hands, and forearms of excavation/construction worker and maintenance workers were assumed to be exposed to soils (assuming the receptors wear a short-sleeved shirt, long pants, and shoes). As recommended in the Risk Assessment Guidance for Superfund (RAGS) Part E (USEPA, July 2004), the skin surface area for a worker was assumed to be 3,300 centimeters squared (cm^2). This value represents the average of the 50th-percentile areas of males and females more than 18 years old.

- For the adolescent trespassers/recreational user, 25 percent of the total body surface area for an adolescent (aged 7 to 16) was assumed to be available for surface soil contact. The RME value (3,280 cm^2) was derived from the 95th-percentile surface area data.

- For the adult trespasser/recreational user assumed to be exposed to surface soil, the exposed skin surface area available for contact was the value recommended for the adult resident in Exhibit 3-5 of RAGS Part E (USEPA, July 2004), 5,700 cm^2. This surface area assumes the head, hands, forearms, and lower legs of the receptor are available for contact.

The following values of soil adherence factors and chemical-specific dermal absorption factors provided in RAGS Part E (USEPA, July 2004) were used to evaluate risks from exposure to soil:

- Maintenance Worker - 0.2 mg/cm^2 (Exhibit 3.5; USEPA, July 2004).

- Construction workers - 0.3 mg/cm^2. This value is the 95th-percentile value for construction workers, (Exhibit 3.3; USEPA, July 2004).

- Adolescent Trespassers/Recreational Users - 0.3 mg/cm^2. This adherence factor is the 95th-percentile value presented for soccer players (teens) playing in moist conditions (Exhibit 3.3; USEPA, July 2004).

- Future adult trespassers/recreational users - 0.07 mg/cm^2 (Exhibit 3.5; USEPA, July 2004).

For the constituents identified as COPCs in soil, the following dermal absorption factors were used (USEPA, Exhibit 3-4, July 2004):

- PAHs - 0.13
- Aluminum – 0.001
- Arsenic - 0.03
- Iron – 0.001
- Vanadium – 0.001

The dermal absorption factors for PAHs and arsenic are based on USEPA guidance (USEPA, Exhibit 3-4, July 2004) and the dermal absorption factors for aluminum, iron, and vanadium are USEPA Region 4 values.

The same exposure frequencies and durations used in the estimation of ingestion intakes were used to estimate exposure via dermal contact.

6.3.3.3 Inhalation of Air and Fugitive Dust/Volatile Emissions

The amount of a chemical a receptor takes in as a result of breathing is determined using the concentration of the contaminant in air. Intakes of both particulates and vapors/gases are calculated using the same equation, as follows (USEPA, December 1991 and July 1996):

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

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/hour)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
PEF	=	Particulate Emission Factor (m^3/kg)
VF	=	Volatilization Factor (chemical-specific) (m^3/kg)
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

As noted above, the State of Florida SCTLs are used calculate cancer and non-cancer risk estimates for the hypothetical future resident and a typical industrial worker. Exposure assumptions for the other receptors are described below and were used to develop risk-based concentrations for the construction worker, the maintenance worker, and the recreational user/trespasser.

The same exposure frequencies and durations used in the estimation of ingestion and dermal intakes of soil were used to estimate exposure via inhalation of air and fugitive dust/volatile emissions. Additionally, for construction/excavation workers and maintenance workers, an inhalation rate of 2.5 cubic meters (m^3) per hour (USEPA, December 2002b) and an exposure time of 8 hours/day (i.e., 20 m^3 per day) were used to evaluate risks from inhalation of fugitive dusts and volatile emissions.

For adult and adolescent trespassers/recreational users, inhalation rates of 1.6 m^3 per hour and 1.2 m^3 per hour (USEPA, August 1997), respectively, and an exposure time of 4 hours per day were used to evaluate risks from inhalation of fugitive dusts and volatile emissions.

The concentrations of chemicals in air resulting from emissions from soil were developed following procedures presented in USEPA Soil Screening Guidance (July 1996 and December 2002b), as follows:

$$C_a = C_s \times \left[\frac{1}{PEF} + \frac{1}{VF} \right]$$

where:
- C_a = chemical concentration in air, mg/m^3
- C_s = chemical concentration in soil, mg/kg
- PEF = Particulate Emission Factor, 1.241×10^9 m^3/kg (FDEP, February 2005)
- VF = chemical-specific Volatilization Factor, m^3/kg

For chemicals in soil that are not classified as volatile, the above equation reduces to:

$$C_a = C_s \times \left[\frac{1}{PEF} \right]$$

The Particulate Emissions Factor (PEF) relates the concentration of the chemical in soil with the concentration of dust particles in air. The Volatilization Factor (VF) relates the concentration of the chemical in soil with the concentration in ambient air. The VFs used to calculate the alternate SCTLs were obtained from Table 4 of the 62-777 Technical Report (FDEP, February 2005). With the exception of the construction worker, the PEF value used to estimate risks from inhalation of fugitive dusts was 1.241×10^9 m^3/kg, which was developed by the State of Florida in FAC 62-777 (FDEP, February 2005). The PEF calculated for the construction worker was 2.43×10^6 m^3/kg (USEPA, December 2002).

6.3.3.4 Ingestion of Groundwater

Residents may be exposed to groundwater via direct ingestion. The Region 9 PRGS used in the risk calculations were derived using the following ingestion intake equation and exposure parameters (USEPA, 1989 and USEPA Region 9, October 2004):

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

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 groundwater (L/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

This scenario assumes that a receptor is exposed 350 days per year for 30 years using an adjusted intake factor (adult + child ingestion rates) of 1.1 L-year/kg-day for carcinogenic effects and an ingestion rate of 2 liters per day for noncarcinogens (USEPA, Region 9, October 2004).

6.3.3.5 Inhalation of Volatiles from Groundwater

One volatile chemical, chloroform, was identified as a COPC for groundwater. Future residents may be exposed to VOC vapors from groundwater while bathing or showering The Region 9 PRG used in the risk calculation for chloroform was derived using the following inhalation intake equation and exposure parameters (USEPA, Region 9, October 2004):

$$\text{Intake}_{winh} = \frac{(C_{wi})(VF_w)(InhF)(EF)(ED)}{(BW)(AT)}$$

where: Intake_{winh} = intake of chemical "i" from water by inhalation (mg/kg/day)
C_{wi} = concentration of chemical "i" in water (mg/L)
InhF = inhalation rate (m^3/day)

VF_w	=	volatilization factor for water (0.5 L/m^3)
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

The inhalation scenario assumes that a receptor is exposed 350 days per year for 30 years using an adjusted intake factor (adult + child ingestion rates) of 11 m^3-year/kg-day for carcinogenic effects and an inhalation rate of 20 m^3 per day for noncarcinogens (USEPA, Region 9, October 2004).

The ingestion and inhalation intake equations are combined to produce one risk-based concentration per chemical that accounts for ingestion and inhalation exposures (USEPA Region 9, October 2004).

6.4 TOXICITY ASSESSMENT PROTOCOL

The objective of a toxicity assessment is to identify the potential for human health hazards and adverse effects in exposed populations. A significant portion of the toxicity assessment of the HHRAs has been completed because CSFs and RfDs were selected by the State of Florida during the development of the residential and industrial soil SCTLs and groundwater CTLs. A CSF is an indicator of the potency of a chemical carcinogen (i.e., the greater the CSF, the more potent the carcinogen). An RfD is the dose at or below which adverse non-carcinogenic effects are not anticipated. These factors represent quantitative estimates of the relationship between the magnitude and types of exposures and the severity or probability of human health effects and were used to develop risk-based concentrations as described above.

6.4.1 Sources of Toxicity Criteria

Oral and inhalation RfDs and CSFs used in the HHRAs were obtained from the following primary recommended USEPA sources:

- Integrated Risk Information System (IRIS) (online).

- USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) – The Office of Research and Development/National Center for Environmental Assessment (NCEA) Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA's Superfund program.

- Tables 5a and 5b of the FDEP 62-777 Technical Report (FDEP, February 2005).

- Other Toxicity Values – These sources include, but are not limited to, California Environmental Protection Agency (Cal EPA) toxicity values, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Annual Health Effects Assessment Summary Tables (HEAST) (USEPA, July 1997).

Although RfDs and CSFs can be found in several toxicological sources, USEPA's IRIS online database, which is continuously updated, is the preferred source of toxicity values. The USEPA Region 9 PRG Tables (USEPA, October 2004) and Region 3 Risk-Based Concentration tables (USEPA, October 2006) are also used as sources of toxicity criteria when criteria are not available from the aforementioned references.

6.4.2 Toxicity Criteria for Dermal Exposure

RfDs and CSFs found in literature are frequently expressed as administered doses; therefore, these values are considered to be 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 comparisons to estimated dermal exposure intakes are made.

The adjustment from administered to absorbed dose was made using the following chemical-specific absorption efficiencies published in RAGS Part E:

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

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

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

6.4.3 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 the USEPA as a probable human carcinogen. Although CSFs are available for benzo(a)pyrene, insufficient data are available to calculate CSFs for other cPAHs. Toxic effects for these chemicals were evaluated using the concept of estimated orders of potential potency, as presented in USEPA Region 4 guidance (May 2000) and in the Rule 62-777 Technical Report. TEFs, which indicate the potency of each PAH compound relative to that of benzo(a)pyrene, are available for select cPAHs. The equivalent oral and inhalation CSFs for PAHs other

than benzo(a)pyrene are derived by multiplying the CSF for benzo(a)pyrene by the TEF for the PAH compounds (USEPA Region 4, May 2000 and FDEP, February 2005).

These TEFs were used to convert the individual cPAH concentrations to an equivalent concentration of benzo(a)pyrene. Both the COPC screening and quantitative risk estimates were based on an evaluation of the equivalent concentrations of benzo(a)pyrene. The cPAHs actually detected at least once in a soil dataset were used in the calculation. Non-detect results were assigned a value of ½ the sample quantitation limit prior to the calculation. However, those cPAHs not detected in any sample within the dataset were not considered in the calculation. If cPAHs were not detected in a sample, ½ the sample quantitation limit presented for benzo(a)pyrene was used to calculate the equivalent concentration of benzo(a)pyrene in that sample.

6.5 RISK CHARACTERIZATION (USEPA METHODOLOGY)

This section provides a characterization of the human health risks associated with the potential exposures to chemicals in surface soil, subsurface soil, and groundwater at Site 44. The results of the risk characterization are discussed below. Potential risks (non-carcinogenic and carcinogenic) for individual chemicals detected in soil and groundwater at Site 44 were estimated using the simple risk ratio technique presented in Section 6.3.3. As discussed in Section 6.3.1, potential risks were estimated for five receptors (the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the recreational user/trespasser) using USEPA and FDEP risk assessment guidance. The total risk from exposure to all COPCs was calculated in accordance with the risk assessment methods outlined in USEPA guidance (December 1989). Risks to human receptors are also characterized per FDEP guidelines/criteria established in Rule 62-780, FAC in Section 6.6. Supporting documentation for the site-specific HHRAs is presented in Appendix D.

6.5.1 Evaluation of Chemicals Other Than Lead

Quantitative estimates of risk for chemicals other than lead were calculated according to risk assessment methods outlined in Section 6.3.3. The methodology is based on standard USEPA guidance (December 1989). Lifetime cancer risks are expressed in the form of dimensionless probabilities referred to as ILCRs, which are based on CSFs. An ILCR of $1x10^{-6}$ indicates the exposed receptor has a one-in-one-million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million people. Cancer risk estimates developed for individual chemicals are summed and presented as the total cancer risk estimate for each receptor. Non-carcinogenic risk estimates for individual chemicals are presented as HQs, which are based on RfDs. An HQ is the ratio of the intake to the RfD and is an indicator of the potential for adverse non-carcinogenic health effects. An HI is generated by summing the

individual HQs for all COPCs. The HI is not a mathematical prediction of the severity of toxic effects and therefore is not a true "risk"; it is simply a numerical indicator of the possibility of the occurrence of non-carcinogenic (threshold) effects. As discussed below, HIs were calculated on a target organ/target effect basis.

6.5.2 Interpretation of Quantitative Risk Assessment Results

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 target range ($1x10^{-6}$ to$1x10^{-4}$) (i.e., a one-in-ten-thousand to one-in-one-million chance of developing cancer) and the State of Florida goal for a total cancer risk of $1x10^{-6}$. HIs are evaluated using a value of 1.0.

The USEPA has defined the range of $1x10^{-6}$ to$1x10^{-4}$ as the ILCR target range for hazardous waste facilities addressed under CERCLA and the Resource Conservation and Recovery Act (RCRA). Individual or cumulative ILCRs greater than $1x10^{-4}$ are generally not considered as protective of human health. The State of Florida has established a cumulative cancer goal of $1x10^{-6}$ for receptors exposed to contaminated environmental media at a site. These benchmarks are used in the interpretation of the risk characterization results.

An HI exceeding unity (1.0) indicates there may be potential non-carcinogenic health risks associated with exposure. However, when an HI exceeds unity, target organs effects associated with exposure to COPCs are considered. Only the HQs for those chemicals affecting 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 (i.e., the HIs developed on a target-organ-specific basis do not exceed 1). Individual target organ HIs for all receptors are presented in the risk calculation tables in Appendix D.

6.5.3 Risk Characterization Using USEPA Guidelines

This section contains a summary of the results of the risk characterization for Site 44 conducted according to USEPA guidance. Quantitative risk estimates for potential human receptors were developed for those chemicals identified as COPCs in Section 6.2. Potential cancer risks and HIs were calculated using the methodology presented in Section 6.3 and are summarized in Table 6-5. The results are discussed below. Chemical-specific risks are presented in Appendix D.

TABLE 6-5
SUMMARY OF CANCER RISKS AND HAZARD INDICES
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Receptor	Media	Cancer Risk	Chemicals with Cancer Risks $> 10^{-4}$	Chemicals with Cancer Risks $> 10^{-5}$ and $\leq 10^{-4}$	Chemicals with Cancer Risks $> 10^{-6}$ and $\leq 10^{-5}$	Hazard Index	Chemicals with HI > 1
Industrial Workers	Surface Soil	3E-06	- -		Carcinogenic PAHs	0.008	- -
	Subsurface Soil	7E-07	- -	- -		0.007	- -
Construction Workers	Surface Soil	1E-06	- -	- -	- -	0.08	- -
	Subsurface Soil	4E-07	- -	- -	- -	0.2	- -
Maintenance Workers	Surface Soil	9E-07	- -	- -		0.004	- -
Adolescent Recreational Users	Surface Soil	9E-07	- -	- -	- -	0.003	- -
Adult Recreational Users	Surface Soil	1E-06	- -	- -	- -	0.006	- -
Lifelong Recreational Users	Surface Soil	2E-06	- -	- -	Carcinogenic PAHs	NA	- -
Hypothetical Future Residents	Surface Soil	2E-05	- -	Carcinogenic PAHs	- -	0.2	- -
	Subsurface Soil	4E-06	- -	- -	Carcinogenic PAHs	0.4	- -
	Groundwater	2E-03	Trichloroethene	- -	Chloroform, Bis(2-ethylhexyl)phthalate	8	Trichloroethene

Notes:
1. No carcinogenic COPCs were detected in the deep groundwater samples.
NA - Not applicable.
HI - Hazard Index.

Non-Carcinogenic Risk

Cumulative HIs estimated for exposures to surface soil and subsurface soil by all receptors were less than 1, indicating that adverse non-carcinogenic effects are not anticipated for these receptors under the conditions established in the exposure assessment. However, the HI for exposure to groundwater by the hypothetical future resident is greater than 1.

Carcinogenic Risk

Cumulative ILCRs for exposure to surface soil and subsurface soil were within USEPA's target risk range of 10^{-4} to 10^{-6} for all receptors. However, the ILCR for exposure to groundwater by the hypothetical future resident is greater than the target risk range.

ILCRs exceeded the State of Florida's target risk level of 1 x 10^{-6} for exposure to surface soil by hypothetical future residents, lifelong recreational users, and industrial workers. ILCRs exceeded the target risk level for exposure to subsurface soil by hypothetical future residents. ILCRs exceeded the target risk level for exposure to groundwater by hypothetical future residents. These exceedances of the Florida target risk level are due to cPAHs in surface and subsurface soil and to chloroform, TCE, and bis(2-ethylhyexyl)phthalate in groundwater. Also, although the ILCR for chloroform in groundwater (shallow aquifer) was 9 x10^{-6}, the maximum detected concentration of chloroform (1.6 ug/L) is less than the USEPA MCL (80 ug/L) and the Florida groundwater CTL (70 ug/L).

6.6 RISK CHARACTERIZATION USING FDEP RULES 62-777 AND 62-780, FAC

This section describes the State of Florida methodology used to evaluate risks for soil and groundwater at Site 44. The risk assessment methodology is based on guidance provided in Rule 62-780 FAC which makes use of a phased risk-based corrective action process that is iterative and tailors site rehabilitation to site-specific conditions and risks. Rule 62-780 is used in conjunction with Rule 62-777 FAC, which provides the methodology used to establish the FDEP CTLs for the residential, commercial/industrial, or alternate land use scenarios. The methodologies described in the following paragraphs are presented in Appendix D and Appendix E of the Technical Report for Chapter 62-777 FAC (FDEP, February 2005)

The FDEP risk characterization is performed, in part, through a series of tables in which concentrations of chemicals detected at a site are compared to various FDEP soil and groundwater criteria or to criteria developed according to guidelines presented in Chapter 62-777 FAC. The soil criteria include SCTLs for direct contact (i.e., ingestion, dermal contact, and inhalation), SCTLs for leachability to groundwater, soil saturation concentrations (C_{sat}) for an evaluation of free product, and background levels for metals. The groundwater criteria include CTLs for direct contact with groundwater (based on ingestion), water

solubility values for evaluating the potential for the presence of free product (for organic chemicals), and background levels for metals.

6.6.1 Florida Methodology for Evaluating Soil

Using the guidance provided in Rules 62-780 and 62-777, soil at Site 44 was evaluated for the following land use scenarios:

- Residential land use [Risk Management Option (RMO)Level I]
- Commercial/industrial land use (RMO Level II)
- Recreational land use (RMO Level III)

The evaluation of the hypothetical future residential and commercial/industrial land use of a site is described under RMO Levels I and II, respectively, of Rule 62.780.680. RMO Level III of the rule allows for the development and use of alternative SCTLs based on, for example, a site-specific risk assessment. In this risk assessment, alternative SCTLs were calculated for a recreational user/trespasser using the equations provided in Chapter 62-777 FAC, the most recent toxicological information presented in IRIS, and the exposure factors presented in Section 6.3.3.

A site is first evaluated for residential land use (Level I) for surface and subsurface soil. If the concentrations of chemicals detected at the site are less than their respective criteria, the site is not evaluated further. However, if any of the Level I criteria are exceeded, the site is evaluated for commercial/industrial land use (Level II). The process is then repeated for potential recreational land use (Level III), if necessary. The comparisons conducted for each level are presented in a Tables 6-6 through 6-13 with the chemicals exceeding the relevant screening levels (i.e., the potential COCs) highlighted. Supporting documentation is presented in Appendix D, as necessary. Using the guidance provided in Chapters 62-777 and 62-780 the following evaluations were performed for Site 44:

- ***Comparison with Direct Contact SCTLs***. According to the FDEP guidance documents, under RMOs Level I and Level II, the maximum detected concentration of each contaminant may be compared with the respective default SCTL listed in Chapter 62-777, FAC or, the 95% UCL of the mean of the site concentrations can be compared with apportioned chronic toxicity-based SCTLs. Under RMO Level III, UCLs may be compared with apportioned chronic toxicity-based SCTLs only.

TABLE 6-6
FLORIDA LEVEL 1 (RESIDENTIAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value[1]	Non-Apportioned Florida Residential SCTL-Direct Contact[2]	Ratio of Maximum Concentration/ Non-Apportioned Residential SCTL	Is Chemical a Potential Level 1 COC?[3]	Rationale/Comments
Volatile Organic Compounds (ug/kg)									
67-64-1	Acetone	1/3	120 J	PEN44SB0201	NA	11000000 N	0.00001	No	maximum < SCTL
Semivolatile Organic Compounds (ug/kg)									
90-12-0	1-Methylnaphthalene	1/16	13	44SB3101	NA	200000 N	0.00007	No	maximum < SCTL
91-57-6	2-Methylnaphthalene	2/19	24	44SB3101	NA	210000 N	0.0001	No	maximum < SCTL
83-32-9	Acenaphthene	2/19	5.2	44SB3101	NA	2400000 N	0.000002	No	maximum < SCTL
208-96-8	Acenaphthylene	6/19	140	44SB3101	NA	1800000 N	0.00008	No	maximum < SCTL
120-12-7	Anthracene	7/19	200	44SB3101	NA	21000000 N	0.00001	No	maximum < SCTL
191-24-2	Benzo(g,h,i)perylene	9/19	3000	44SB3101	NA	2500000 N	0.001	No	maximum < SCTL
117-81-7	Bis(2-ethylhexyl)phthalate	2/3	330 J	PEN44SB2501	NA	72000 C	0.005	No	maximum < SCTL
85-68-7	Butyl Benzyl Phthalate	2/3	130 J	PEN44SB2501	NA	17000000 N	0.000008	No	maximum < SCTL
206-44-0	Fluoranthene	7/19	240	44SB3101	NA	3200000 N	0.00008	No	maximum < SCTL
86-73-7	Fluorene	1/19	6.3	44SB3101	NA	2600000 N	0.000002	No	maximum < SCTL
91-20-3	Naphthalene	2/19	20	44SB3101	NA	55000 N	0.0004	No	maximum < SCTL
85-01-8	Phenanthrene	7/19	36	44SB3101	NA	2200000 N	0.00002	No	maximum < SCTL
129-00-0	Pyrene	7/19	390	44SB3101	NA	2400000 N	0.0002	No	maximum < SCTL
	Carcinogenic PAHs	9/19	1925	44SB3101	NA	100 C	**19**	**Yes**	maximum > SCTL
Pesticides/PCBs (ug/kg)									
72-54-8	4,4'-DDD	1/3	1.4 J	PEN44SB0201-D	NA	4200 C	0.0003	No	maximum < SCTL
309-00-2	Aldrin	1/3	0.94 J	PEN44SB0201-D	NA	60 C	0.02	No	maximum < SCTL
319-84-6	alpha-BHC	1/3	1.1 J	PEN44SB0201-D	NA	100 C	0.01	No	maximum < SCTL
5103-71-9	alpha-Chlordane	1/3	1.2 J	PEN44SB0201-D	NA	2800 C[4]	0.0004	No	maximum < SCTL
319-85-7	beta-BHC	1/3	1.6 J	PEN44SB0201-D	NA	500 C	0.003	No	maximum < SCTL
60-57-1	Dieldrin	1/3	1.5 J	PEN44SB0201-D	NA	60 C	0.03	No	maximum < SCTL
1031-07-8	Endosulfan Sulfate	1/3	3 J	PEN44SB0201-D	NA	450000 N	0.000007	No	maximum < SCTL
53494-70-5	Endrin Ketone	1/3	2 J	PEN44SB0201-D	NA	25000 N[5]	0.00008	No	maximum < SCTL
58-89-9	gamma-BHC (Lindane)	1/3	1.1 J	PEN44SB0201-D	NA	700 C	0.002	No	maximum < SCTL
5103-74-2	gamma-Chlordane	1/3	3.1 J	PEN44SB0201-D	NA	2800 C[4]	0.001	No	maximum < SCTL
76-44-8	Heptachlor	1/3	1.6 J	PEN44SB0201-D	NA	200 C	0.008	No	maximum < SCTL
Metals (mg/kg)									
7429-90-5	Aluminum	3/3	7070	PEN44SB2501	**3833**	80000 N	0.09	No	maximum < SCTL
7440-38-2	Arsenic	3/3	1.6	PEN44SB2501	**1.56**	2.1 C	0.8	No	maximum < SCTL
7440-39-3	Barium	3/3	11.2	PEN44SB0201	**4.63**	120 N	0.09	No	maximum < SCTL
7440-43-9	Cadmium	2/3	2.1	PEN44SB0201	**1**	82 N	0.03	No	maximum < SCTL
7440-47-3	Chromium	3/3	15.3	PEN44SB2501	**6.13**	210 N	0.07	No	maximum < SCTL
7440-48-4	Cobalt	3/3	0.58	PEN44SB1101	1.87	1700 N	0.0003	No	maximum < SCTL
7440-50-8	Copper	3/3	8.5 J	PEN44SB0201-D	**5.74**	150 N	0.06	No	maximum < SCTL
7439-89-6	Iron	3/3	5550	PEN44SB2501	**2745**	53000 N	0.1	No	maximum < SCTL
7439-92-1	Lead	2/3	27.6	PEN44SB0201-D	**7.32**	400	0.07	No	maximum < SCTL
7439-96-5	Manganese	3/3	33.5	PEN44SB2501	**21**	3500 N	0.010	No	maximum < SCTL

TABLE 6-6
FLORIDA LEVEL 1 (RESIDENTIAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value[1]	Non-Apportioned Florida Residential SCTL-Direct Contact[2]	Ratio of Maximum Concentration/ Non-Apportioned Residential SCTL	Is Chemical a Potential Level 1 COC?[3]	Rationale/Comments
7439-97-6	Mercury	2/3	0.02	PEN44SB0201, PEN44SB2501	0.1	3 N	0.007	No	maximum < SCTL
7440-02-0	Nickel	3/3	3.1	PEN44SB2501	6.38	340 N	0.009	No	maximum < SCTL
7440-62-2	Vanadium	3/3	11.6	PEN44SB2501	**5.83**	67 N	0.2	No	maximum < SCTL
7440-66-6	Zinc	2/3	39.4	PEN44SB0201	**16.9**	26000 N	0.002	No	maximum < SCTL
Petroleum Hydrocarbons (mg/kg)									
	Total Petroleum Hydrocarbons	2/3	47	PEN44SB2501	NA	460 N	0.1	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

Footnotes:
1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
3 - A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL and, for metals, if the site concentrations exceed background levels.
4 - Value is for chlordane.
5 - Value is for endrin.
NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-7
FLORIDA LEVEL 2 (INDUSTRIAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value[1]	Non-Apportioned Florida Industrial SCTL-Direct Contact[2]	Ratio of Maximum Concentration/ Non-Apportioned Industrial SCTL	Is Chemical a Potential Level 2 COC?[3]	Rationale/Comments
Volatile Organic Compounds (ug/kg)									
67-64-1	Acetone	1/3	120 J	PEN44SB0201	NA	68000000 N	0.000002	No	maximum < SCTL
Semivolatile Organic Compounds (ug/kg)									
90-12-0	1-Methylnaphthalene	1/16	13	44SB3101	NA	1800000 N	0.000007	No	maximum < SCTL
91-57-6	2-Methylnaphthalene	2/19	24	44SB3101	NA	2100000 N	0.00001	No	maximum < SCTL
83-32-9	Acenaphthene	2/19	5.2	44SB3101	NA	20000000 N	0.0000003	No	maximum < SCTL
208-96-8	Acenaphthylene	6/19	140	44SB3101	NA	20000000 N	0.000007	No	maximum < SCTL
120-12-7	Anthracene	7/19	200	44SB3101	NA	300000000 N	0.0000007	No	maximum < SCTL
191-24-2	Benzo(g,h,i)perylene	9/19	3000	44SB3101	NA	52000000 N	0.00006	No	maximum < SCTL
117-81-7	Bis(2-ethylhexyl)phthalate	2/3	330 J	PEN44SB2501	NA	390000 C	0.0008	No	maximum < SCTL
85-68-7	Butyl Benzyl Phthalate	2/3	130 J	PEN44SB2501	NA	380000000 N	0.0000003	No	maximum < SCTL
206-44-0	Fluoranthene	7/19	240	44SB3101	NA	59000000 N	0.000004	No	maximum < SCTL
86-73-7	Fluorene	1/19	6.3	44SB3101	NA	33000000 N	0.0000002	No	maximum < SCTL
91-20-3	Naphthalene	2/19	20	44SB3101	NA	300000 N	0.00007	No	maximum < SCTL
85-01-8	Phenanthrene	7/19	36	44SB3101	NA	36000000 N	0.000001	No	maximum < SCTL
129-00-0	Pyrene	7/19	390	44SB3101	NA	45000000 N	0.000009	No	maximum < SCTL
	Carcinogenic PAHs	9/19	1925	44SB3101	NA	700 C	**3**	**Yes**	maximum > SCTL
Pesticides/PCBs (ug/kg)									
72-54-8	4,4'-DDD	1/3	1.4 J	PEN44SB0201-D	NA	22000 C	0.00006	No	maximum < SCTL
309-00-2	Aldrin	1/3	0.94 J	PEN44SB0201-D	NA	300 C	0.003	No	maximum < SCTL
319-84-6	alpha-BHC	1/3	1.1 J	PEN44SB0201-D	NA	600 C	0.002	No	maximum < SCTL
5103-71-9	alpha-Chlordane	1/3	1.2 J	PEN44SB0201-D	NA	14000 C[4]	0.00009	No	maximum < SCTL
319-85-7	beta-BHC	1/3	1.6 J	PEN44SB0201-D	NA	2400 C	0.0007	No	maximum < SCTL
60-57-1	Dieldrin	1/3	1.5 J	PEN44SB0201-D	NA	300 C	0.005	No	maximum < SCTL
1031-07-8	Endosulfan Sulfate	1/3	3 J	PEN44SB0201-D	NA	7600000 N	0.0000004	No	maximum < SCTL
53494-70-5	Endrin Ketone	1/3	2 J	PEN44SB0201-D	NA	510000 N[5]	0.000004	No	maximum < SCTL
58-89-9	gamma-BHC (Lindane)	1/3	1.1 J	PEN44SB0201-D	NA	2500 C	0.0004	No	maximum < SCTL
5103-74-2	gamma-Chlordane	1/3	3.1 J	PEN44SB0201-D	NA	14000 C[4]	0.0002	No	maximum < SCTL
76-44-8	Heptachlor	1/3	1.6 J	PEN44SB0201-D	NA	1000 C	0.002	No	maximum < SCTL
Metals (mg/kg)									
7429-90-5	Aluminum	3/3	7070	PEN44SB2501	**3833**	(5)	---	No	(5)
7440-38-2	Arsenic	3/3	1.6	PEN44SB2501	**1.56**	12 C	0.1	No	maximum < SCTL
7440-39-3	Barium	3/3	11.2	PEN44SB0201	**4.63**	130000 N	0.00009	No	maximum < SCTL
7440-43-9	Cadmium	2/3	2.1	PEN44SB0201	**1**	1700 N	0.001	No	maximum < SCTL
7440-47-3	Chromium	3/3	15.3	PEN44SB2501	**6.13**	470 N	0.03	No	maximum < SCTL
7440-48-4	Cobalt	3/3	0.58	PEN44SB1101	1.87	42000 N	0.00001	No	maximum < SCTL
7440-50-8	Copper	3/3	8.5 J	PEN44SB0201-D	**5.74**	89000 N	0.0001	No	maximum < SCTL
7439-89-6	Iron	3/3	5550	PEN44SB2501	**2745**	(5)	---	No	(5)
7439-92-1	Lead	2/3	27.6	PEN44SB0201-D	**7.32**	1400	0.02	No	maximum < SCTL
7439-96-5	Manganese	3/3	33.5	PEN44SB2501	**21**	43000 N	0.0008	No	maximum < SCTL

TABLE 6-7
FLORIDA LEVEL 2 (INDUSTRIAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value[1]	Non-Apportioned Florida Industrial SCTL-Direct Contact[2]	Ratio of Maximum Concentration/ Non-Apportioned Industrial SCTL	Is Chemical a Potential Level 2 COC?[3]	Rationale/Comments
7439-97-6	Mercury	2/3	0.02	PEN44SB0201, PEN44SB2501	0.1	17 N	0.001	No	maximum < SCTL
7440-02-0	Nickel	3/3	3.1	PEN44SB2501	6.38	35000 N	0.00009	No	maximum < SCTL
7440-62-2	Vanadium	3/3	11.6	PEN44SB2501	**5.83**	10000 N	0.001	No	maximum < SCTL
7440-66-6	Zinc	2/3	39.4	PEN44SB0201	**16.9**	630000 N	0.00006	No	maximum < SCTL
Petroleum Hydrocarbons (mg/kg)									
	Total Petroleum Hydrocarbons	2/3	47	PEN44SB2501	NA	2700 N	0.02	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

Footnotes:

1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
3 - A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL and, for metals, if the site concentrations exceed background levels.
4 - Value is for chlordane.
5 - Value is for endrin.
6 - Chemical is not a health concern for this exposure scenario.
NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-8
FLORIDA LEVEL 3 (RECREATIONAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Exposure Point Concentration[1]	Sample of Maximum Concentration	Background Value[2]	Non-Apportioned Florida Recreational SCTL-Direct Contact[3]	Ratio of Maximum Concentration/ Non-Apportioned Recreational SCTL	Target Organ[4]	Simple Apportioned Florida Recreational SCTL-Direct Contact[5]	Is Maximum Concentration /Apportioned Recreational SCTL Ratio > 3?	Is Chemical a Potential Level 3 COC?[6]	Rationale/Comments
Volatile Organic Compounds (ug/kg)													
67-64-1	Acetone	1/3	120 J	120	PEN44SB0201	NA	800000000 N	0.0000002	Kidney, Liver, Neurological	800000000	No	No	Maximum < SCTL
Semivolatile Organic Compounds (ug/kg)													
90-12-0	1-Methylnaphthalene	1/16	13	13	44SB3101	NA	12000000 N	0.000001	Nasal	12000000	No	No	Maximum < SCTL
91-57-6	2-Methylnaphthalene	2/19	24	24	44SB3101	NA	12000000 N	0.000002	Nasal	12000000	No	No	Maximum < SCTL
83-32-9	Acenaphthene	2/19	5.2	22	44SB3101	NA	190000000 N	0.0000000	Liver	190000000	No	No	Maximum < SCTL
208-96-8	Acenaphthylene	6/19	140	50	44SB3101	NA	190000000 N	0.0000007	Liver	190000000	No	No	Maximum < SCTL
120-12-7	Anthracene	7/19	200	62	44SB3101	NA	1000000000 N	0.0000002	Liver	1000000000	No	No	Maximum < SCTL
191-24-2	Benzo(g,h,i)perylene	9/19	3000	870	44SB3101	NA	110000000 N	0.00003	Neurological	110000000	No	No	Maximum < SCTL
117-81-7	Bis(2-ethylhexyl)phthalate	2/3	330 J	330	PEN44SB2501	NA	480000 C	0.0007	Carcinogen, Liver	480000	No	No	Maximum < SCTL
85-68-7	Butyl Benzyl Phthalate	2/3	130 J	130	PEN44SB2501	NA	370000000 N	0.0000004	Liver	370000000	No	No	Maximum < SCTL
206-44-0	Fluoranthene	7/19	240	85	44SB3101	NA	64000000 N	0.000004	Blood, Kidney. Liver	64000000	No	No	Maximum < SCTL
86-73-7	Fluorene	1/19	6.3	22	44SB3101	NA	140000000 N	0.0000000	Blood	4400000	No	No	Maximum < SCTL
91-20-3	Naphthalene	2/19	20	22	44SB3101	NA	4400000 N	0.000005	Nasal	4400000	No	No	Maximum < SCTL
85-01-8	Phenanthrene	7/19	36	17	44SB3101	NA	110000000 N	0.0000003	Kidney	110000000	No	No	Maximum < SCTL
129-00-0	Pyrene	7/19	390	130	44SB3101	NA	110000000 N	0.000004	Kidney	110000000	No	No	Maximum < SCTL
	Carcinogenic PAHs	9/19	1925	310	44SB3101	NA	830 C	**2.3**	Carcinogen	830	No	**Yes**	Maximum > SCTL
Pesticides/PCBs (ug/kg)													
72-54-8	4,4'-DDD	1/3	1.4 J	1.4	PEN44SB0201-D	NA	39000 C	0.00004	Carcinogen	39000	No	No	Maximum < SCTL
309-00-2	Aldrin	1/3	0.94 J	0.94	PEN44SB0201-D	NA	400 C	0.002	Carcinogen, Liver	400	No	No	Maximum < SCTL
319-84-6	alpha-BHC	1/3	1.1 J	1.1	PEN44SB0201-D	NA	1300 C	0.0008	Carcinogen	1300	No	No	Maximum < SCTL
5103-71-9	alpha-Chlordane	1/3	1.2 J	1.2	PEN44SB0201-D	NA	19000 C[4]	0.00006	Carcinogen, Liver	19000	No	No	Maximum < SCTL
319-85-7	beta-BHC	1/3	1.6 J	1.6	PEN44SB0201-D	NA	4800 C	0.0003	Carcinogen	4800	No	No	Maximum < SCTL
60-57-1	Dieldrin	1/3	1.5 J	1.5	PEN44SB0201-D	NA	420 C	0.004	Carcinogen, Liver	420	No	No	Maximum < SCTL
1031-07-8	Endosulfan Sulfate	1/3	3 J	3	PEN44SB0201-D	NA	11000000 N	0.0000003	Cardiovascular, Kidney	11000000	No	No	Maximum < SCTL
53494-70-5	Endrin Ketone	1/3	2 J	2	PEN44SB0201-D	NA	550000 N[5]	0.000004	Liver	550000	No	No	Maximum < SCTL
58-89-9	gamma-BHC (Lindane)	1/3	1.1 J	1.1	PEN44SB0201-D	NA	6300 C	0.0002	Carcinogen, Kidney, Liver	6300	No	No	Maximum < SCTL
5103-74-2	gamma-Chlordane	1/3	3.1 J	3.1	PEN44SB0201-D	NA	19000 C[4]	0.0002	Carcinogen, Liver	19000	No	No	Maximum < SCTL
76-44-8	Heptachlor	1/3	1.6 J	1.6	PEN44SB0201-D	NA	1500 C	0.001	Carcinogen, Liver	1500	No	No	Maximum < SCTL
Metals (mg/kg)													
7429-90-5	Aluminum	3/3	7070	7070	PEN44SB2501	**3833**	3510000 N	0.002	Body Weight	3510000	No	No	Maximum < SCTL
7440-38-2	Arsenic	3/3	1.6	1.6	PEN44SB2501	**1.56**	6.2 C	0.3	Carcinogen, Cardiovascular, Skin	6.2	No	No	Maximum < SCTL
7440-39-3	Barium	3/3	11.2	11.2	PEN44SB0201	**4.63**	251000 N	0.00004	Cardiovascular	251000	No	No	Maximum < SCTL
7440-43-9	Cadmium	2/3	2.1	2.1	PEN44SB0201	**1**	1310 N	0.002	Carcinogen, Kidney	1310	No	No	Maximum < SCTL
7440-47-3	Chromium	3/3	15.3	15.3	PEN44SB2501	**6.13**	10900 N	0.001	Carcinogen, Respiratory	10900	No	No	Maximum < SCTL
7440-48-4	Cobalt	3/3	0.58	0.58	PEN44SB1101	1.87	64300 N	0.000009	Cardiovascular, Immunological, Neurological, Reproductive	64300	No	No	Maximum < SCTL
7440-50-8	Copper	3/3	8.5 J	8.5	PEN44SB0201-D	**5.74**	146000 N	0.00006	Gastrointestinal	146000	No	No	Maximum < SCTL
7439-89-6	Iron	3/3	5550	5550	PEN44SB2501	**2745**	1090000 N	0.005	Gastrointestinal	1090000	No	No	Maximum < SCTL
7439-92-1	Lead	2/3	27.6	27.6	PEN44SB0201-D	**7.32**	3000	0.009	Neurological	3000	No	No	Maximum < SCTL
7439-96-5	Manganese	3/3	33.5	33.5	PEN44SB2501	**21**	69300 N	0.0005	Neurological	69300	No	No	Maximum < SCTL
7439-97-6	Mercury	2/3	0.02	0.02	PEN44SB0201, PEN44SB2501	0.1	1100 N	0.00002	Neurological	1100	No	No	Maximum < SCTL
7440-02-0	Nickel	3/3	3.1	3.1	PEN44SB2501	6.38	73000 N	0.00004	Body Weight	73000	No	No	Maximum < SCTL
7440-62-2	Vanadium	3/3	11.6	11.6	PEN44SB2501	**5.83**	3650 N	0.003	Hair Loss	3650	No	No	Maximum < SCTL
7440-66-6	Zinc	2/3	39.4	39.4	PEN44SB0201	**16.9**	1090000 N	0.00004	Blood	1090000	No	No	Maximum < SCTL
Petroleum Hydrocarbons (mg/kg)													
	Total Petroleum Hydrocarbons	2/3	47	47	PEN44SB2501	NA	25400 N	0.002	Multiple Endpoints	25400	No	No	Maximum < SCTL

TABLE 6-8
FLORIDA LEVEL 3 (RECREATIONAL) DIRECT CONTACT EVALUATION - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Exposure Point Concentration(1)	Sample of Maximum Concentration	Background Value(2)	Non-Apportioned Florida Recreational SCTL-Direct Contact(3)	Ratio of Maximum Concentration/ Non-Apportioned Recreational SCTL	Target Organ(4)	Simple Apportioned Florida Recreational SCTL-Direct Contact(5)	Is Maximum Concentration /Apportioned Recreational SCTL Ratio > 3?	Is Chemical a Potential Level 3 COC?(6)	Rationale/Comments

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

Footnotes:
1 - Exposure point concentrations (EPCs) are maximum concentrations or 95 % upper confidence limits (UCLs) on the arithmetic mean as determined by statistical tests and calculations performed by Florida's UCL Calculator.
2 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
3 - SCTLs for recreational users were developed using the methods presented in Chapter 62-777, F.A.C., April 2005 and the most current toxicological data available in IRIS. The recreational users are assumed to be exposed 45 days per year by ingestion, inhalation, and dermal contact. Calculations of the recreational SCTLs are presented in Appendix D.
4 - Target organs are obtained from Table II, Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
5 - Values of the simple apportioned SCTLs are determined by dividing the non-apportioned SCTL by the number carcinogenic chemicals or by the number of chemicals impacting the same target organ for noncarcinogens as defined by Chapter 62-777 F.A.C. Chemicals with maximum concentrations less than 0.1 of the non-apportioned SCTL are not included in the apportionment process.
6 - A chemical is selected as a potential COC if the maximum concentration is greater than 3 times the non-apportioned SCTL or if the EPC is greater than the apportioned SCTL, and, for metals, if the site concentrations exceed background levels.
NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-9
COMPARISON WITH SCTLS FOR LEACHABILITY TO GROUNDWATER AND C_{SAT} LIMITS - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value[1]	Florida Leachability to Groundwater[2]	Soil Saturation Limit, C_{SAT}[3]
Volatile Organic Compounds (ug/kg)							
67-64-1	Acetone	1/3	120 J	PEN44SB0201	NA	25000	10000000
Semivolatile Organic Compounds (ug/kg)							
90-12-0	1-Methylnaphthalene	1/16	13	44SB3101	NA	3100	---
91-57-6	2-Methylnaphthalene	2/19	24	44SB3101	NA	8500	---
83-32-9	Acenaphthene	2/19	5.2	44SB3101	NA	2100	
208-96-8	Acenaphthylene	6/19	140	44SB3101	NA	27000	---
120-12-7	Anthracene	7/19	200	44SB3101	NA	2500000	---
191-24-2	Benzo(g,h,i)perylene	9/19	3000	44SB3101	NA	32000000	---
117-81-7	Bis(2-ethylhexyl)phthalate	2/3	330 J	PEN44SB2501	NA	3600000	31000000
85-68-7	Butyl Benzyl Phthalate	2/3	130 J	PEN44SB2501	NA	310000	890000
206-44-0	Fluoranthene	7/19	240	44SB3101	NA	160000	---
86-73-7	Fluorene	1/19	6.3	44SB3101	NA	160000	---
91-20-3	Naphthalene	2/19	20	44SB3101	NA	1200	---
85-01-8	Phenanthrene	7/19	36	44SB3101	NA	250000	---
129-00-0	Pyrene	7/19	390	44SB3101	NA	880000	---
	Carcinogenic PAHs	9/19	1925	44SB3101	NA	8000	---
Pesticides/PCBs (ug/kg)							
72-54-8	4,4'-DDD	1/3	1.4 J	PEN44SB0201-D	NA	11000	---
309-00-2	Aldrin	1/3	0.94 J	PEN44SB0201-D	NA	200	---
319-84-6	alpha-BHC	1/3	1.1 J	PEN44SB0201-D	NA	**0.3**	---
5103-71-9	alpha-Chlordane[4]	1/3	1.2 J	PEN44SB0201-D	NA	9600	---
319-85-7	beta-BHC	1/3	1.6 J	PEN44SB0201-D	NA	**1**	---
60-57-1	Dieldrin	1/3	1.5 J	PEN44SB0201-D	NA	2	---
1031-07-8	Endosulfan Sulfate	1/3	3 J	PEN44SB0201-D	NA	3800	---
53494-70-5	Endrin Ketone[5]	1/3	2 J	PEN44SB0201-D	NA	**1**	---
58-89-9	gamma-BHC (Lindane)	1/3	1.1 J	PEN44SB0201-D	NA	9	---
5103-74-2	gamma-Chlordane[4]	1/3	3.1 J	PEN44SB0201-D	NA	9600	---
76-44-8	Heptachlor	1/3	1.6 J	PEN44SB0201-D	NA	23	---

TABLE 6-9
COMPARISON WITH SCTLS FOR LEACHABILITY TO GROUNDWATER AND C_{SAT} LIMITS - SURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value(1)	Florida Leachability to Groundwater(2)	Soil Saturation Limit, C_{SAT}(3)
Metals (mg/kg)							
7429-90-5	Aluminum	3/3	7070	PEN44SB2501	**3833**	---	---
7440-38-2	Arsenic	3/3	1.6	PEN44SB2501	**1.56**	---	---
7440-39-3	Barium	3/3	11.2	PEN44SB0201	**4.63**	1600	---
7440-43-9	Cadmium	2/3	2.1	PEN44SB0201	**1**	7.5	---
7440-47-3	Chromium	3/3	15.3	PEN44SB2501	**6.13**	38	---
7440-48-4	Cobalt	3/3	0.58	PEN44SB1101	1.87	---	---
7440-50-8	Copper	3/3	8.5 J	PEN44SB0201-D	**5.74**	---	---
7439-89-6	Iron	3/3	5550	PEN44SB2501	**2745**	---	---
7439-92-1	Lead	2/3	27.6	PEN44SB0201-D	**7.32**	---	---
7439-96-5	Manganese	3/3	33.5	PEN44SB2501	**21**	---	---
7439-97-6	Mercury	2/3	0.02	PEN44SB0201, PEN44SB2501	0.1	2.1	---
7440-02-0	Nickel	3/3	3.1	PEN44SB2501	6.38	130	---
7440-62-2	Vanadium	3/3	11.6	PEN44SB2501	**5.83**	980	---
7440-66-6	Zinc	2/3	39.4	PEN44SB0201	**16.9**	---	---
Petroleum Hydrocarbons (mg/kg)							
	Total Petroleum Hydrocarbons	2/3	47	PEN44SB2501	NA	340	---

Shaded cells indicate that the specified criterion or background level has been exceeded.

Footnotes:

1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Soil Cleanup Target Levels (SCTLs) for Leachability Based on Groundwater Criteria, Table 2, Chapter 62-777 Technical Report (FDEP, February 2005).
3 - Soil Saturation Limits (C_{SAT}), Table 8, Chapter 62-777 Technical Report (FDEP, February 2005).
4 - Chlordane is used as a surrogate for alpha- and gamma-chlordane.
5 - Endrin is used as a surrogate for endrin ketone.
NA - Not Applicable. According to proposed Florida Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-10
FLORIDA LEVEL 1 (RESIDENTIAL) DIRECT CONTACT EVALUATION - SUBSURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration(1)	Sample of Maximum Concentration	Background Value(1)	Non-Apportioned Florida Residential SCTL-Direct Contact(2)	Ratio of Maximum Concentration/ Non-Apportioned Residential SCTL	Is Chemical a Potential Level 1 COC?(3)	Rationale/Comments
Semivolatile Organic Compounds (ug/kg)									
90-12-0	1-Methylnaphthalene	1/19	1.4 J	44SB3102-D	NA	200000 N	0.000007	No	maximum < SCTL
91-57-6	2-Methylnaphthalene	2/25	2.7 J	44SB3102	NA	210000 N	0.00001	No	maximum < SCTL
208-96-8	Acenaphthylene	1/25	5.6	44SB3102-D	NA	1800000 N	0.000003	No	maximum < SCTL
120-12-7	Anthracene	2/25	10	44SB3102-D	NA	21000000 N	0.0000005	No	maximum < SCTL
191-24-2	Benzo(g,h,i)perylene	5/25	180	44SB4702	NA	2500000 N	0.00007	No	maximum < SCTL
117-81-7	Bis(2-ethylhexyl)phthalate	1/6	240 J	PEN44SB0202	NA	72000 C	0.003	No	maximum < SCTL
206-44-0	Fluoranthene	7/25	100	44SB4702	NA	3200000 N	0.00003	No	maximum < SCTL
85-01-8	Phenanthrene	3/25	5.4	44SB3102-D	NA	2200000 N	0.000002	No	maximum < SCTL
129-00-0	Pyrene	7/25	120	44SB4702	NA	2400000 N	0.00005	No	maximum < SCTL
	Carcinogenic PAHs	8/25	330	44SB4702	NA	100 C	**3**	**Yes**	maximum > SCTL
Metals (mg/kg)									
7429-90-5	Aluminum	6/6	11700	PEN44SB2502	**3833**	80000 N	0.1	No	maximum < SCTL
7440-38-2	**Arsenic**	3/16	2.5	PEN44SB2502, PEN44SB2503	**1.56**	2.1 C	**1.2**	**Yes**	maximum > SCTL
7440-39-3	Barium	6/6	7	PEN44SB0202	**4.63**	120 N	0.06	No	maximum < SCTL
7440-43-9	Cadmium	2/6	1.3	PEN44SB0202	**1**	82 N	0.02	No	maximum < SCTL
7440-47-3	Chromium	5/6	13	PEN44SB2503	**6.13**	210 N	0.06	No	maximum < SCTL
7440-48-4	Cobalt	6/6	0.41	PEN44SB2502	1.87	1700 N	0.0002	No	maximum < SCTL
7440-50-8	Copper	5/6	4.2 J	PEN44SB2502	5.74	150 N	0.03	No	maximum < SCTL
7439-89-6	Iron	6/6	6720	PEN44SB2503	**2745**	53000 N	0.1	No	maximum < SCTL
7439-92-1	Lead	5/6	26.3	PEN44SB0202	**7.32**	400	0.07	No	maximum < SCTL
7439-96-5	Manganese	5/6	16.9	PEN44SB2502	21	3500 N	0.005	No	maximum < SCTL
7439-97-6	Mercury	2/6	0.02	PEN44SB2502, PEN44SB2503	0.1	3 N	0.007	No	maximum < SCTL
7440-02-0	Nickel	5/6	2.7	PEN44SB2502	6.38	340 N	0.008	No	maximum < SCTL
7440-62-2	Vanadium	5/6	18.2	PEN44SB2503	**5.83**	67 N	0.3	No	maximum < SCTL
7440-66-6	Zinc	3/6	16.7	PEN44SB0202	16.9	26000 N	0.0006	No	maximum < SCTL
Petroleum Hydrocarbons (mg/kg)									
	Total Petroleum Hydrocarbons	4/6	31	PEN44SB0202	NA	460 N	0.07	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

Footnotes:
1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
3 - A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL and, for metals, if the site concentrations exceed background levels.
NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-11
FLORIDA LEVEL 2 (INDUSTRIAL) DIRECT CONTACT EVALUATION - SUBSURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value(1)	Non-Apportioned Florida Industrial SCTL-Direct Contact(2)	Ratio of Maximum Concentration/ Non-Apportioned Industrial SCTL	Is Chemical a Potential Level 2 COC?(3)	Rationale/Comments
Semivolatile Organic Compounds (ug/kg)									
90-12-0	1-Methylnaphthalene	1/19	1.4 J	44SB3102-D	NA	1800000 N	0.0000008	No	maximum < SCTL
91-57-6	2-Methylnaphthalene	2/25	2.7 J	44SB3102	NA	2100000 N	0.000001	No	maximum < SCTL
208-96-8	Acenaphthylene	1/25	5.6	44SB3102-D	NA	20000000 N	0.0000003	No	maximum < SCTL
120-12-7	Anthracene	2/25	10	44SB3102-D	NA	300000000 N	0.000000	No	maximum < SCTL
191-24-2	Benzo(g,h,i)perylene	5/25	180	44SB4702	NA	52000000 N	0.000003	No	maximum < SCTL
117-81-7	Bis(2-ethylhexyl)phthalate	1/6	240 J	PEN44SB0202	NA	390000 C	0.0006	No	maximum < SCTL
206-44-0	Fluoranthene	7/25	100	44SB4702	NA	59000000 N	0.000002	No	maximum < SCTL
85-01-8	Phenanthrene	3/25	5.4	44SB3102-D	NA	36000000 N	0.0000002	No	maximum < SCTL
129-00-0	Pyrene	7/25	120	44SB4702	NA	45000000 N	0.000003	No	maximum < SCTL
	Carcinogenic PAHs	8/25	330	44SB4702	NA	700 C	0.5	No	maximum < SCTL
Metals (mg/kg)									
7429-90-5	Aluminum	6/6	11700	PEN44SB2502	**3833**	(4)	---	No	(4)
7440-38-2	Arsenic	3/16	2.5	PEN44SB2502, PEN44SB2503	**1.56**	12 C	0.2	No	maximum < SCTL
7440-39-3	Barium	6/6	7	PEN44SB0202	**4.63**	130000 N	0.00005	No	maximum < SCTL
7440-43-9	Cadmium	2/6	1.3	PEN44SB0202	**1**	1700 N	0.0008	No	maximum < SCTL
7440-47-3	Chromium	5/6	13	PEN44SB2503	**6.13**	470 N	0.03	No	maximum < SCTL
7440-48-4	Cobalt	6/6	0.41	PEN44SB2502	1.87	42000 N	0.00001	No	maximum < SCTL
7440-50-8	Copper	5/6	4.2 J	PEN44SB2502	5.74	89000 N	0.00005	No	maximum < SCTL
7439-89-6	Iron	6/6	6720	PEN44SB2503	**2745**	(4)	---	No	(4)
7439-92-1	Lead	5/6	26.3	PEN44SB0202	**7.32**	1400	0.02	No	maximum < SCTL
7439-96-5	Manganese	5/6	16.9	PEN44SB2502	21	43000 N	0.0004	No	maximum < SCTL
7439-97-6	Mercury	2/6	0.02	PEN44SB2502, PEN44SB2503	0.1	17 N	0.001	No	maximum < SCTL
7440-02-0	Nickel	5/6	2.7	PEN44SB2502	6.38	35000 N	0.00008	No	maximum < SCTL
7440-62-2	Vanadium	5/6	18.2	PEN44SB2503	**5.83**	10000 N	0.002	No	maximum < SCTL
7440-66-6	Zinc	3/6	16.7	PEN44SB0202	16.9	630000 N	0.00003	No	maximum < SCTL
Petroleum Hydrocarbons (mg/kg)									
	Total Petroleum Hydrocarbons	4/6	31	PEN44SB0202	NA	2700 N	0.01	No	maximum < SCTL

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

Footnotes:

1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.

2 - Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.

3 - A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned SCTL and, for metals, if the site concentrations exceed background levels.

4 - Chemical is not a health concern for this exposure scenario.

NA - Not Applicable. According to Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-12
COMPARISON WITH SCTLS FOR LEACHABILITY TO GROUNDWATER AND C_{SAT} LIMITS - SUBSURFACE SOIL
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration	Sample of Maximum Concentration	Background Value(1)	Florida Leachability to Groundwater(2)	Soil Saturation Limit, C_{SAT}(3)
Semivolatile Organic Compounds (ug/kg)							
90-12-0	1-Methylnaphthalene	1/19	1.4 J	44SB3102-D	NA	3100	---
91-57-6	2-Methylnaphthalene	2/25	2.7 J	44SB3102	NA	8500	---
208-96-8	Acenaphthylene	1/25	5.6	44SB3102-D	NA	27000	---
120-12-7	Anthracene	2/25	10	44SB3102-D	NA	2500000	---
191-24-2	Benzo(g,h,i)perylene	5/25	180	44SB4702	NA	32000000	---
117-81-7	Bis(2-ethylhexyl)phthalate	1/6	240 J	PEN44SB0202	NA	3600000	31000000
206-44-0	Fluoranthene	7/25	100	44SB4702	NA	1200000	---
85-01-8	Phenanthrene	3/25	5.4	44SB3102-D	NA	250000	---
129-00-0	Pyrene	7/25	120	44SB4702	NA	880000	---
	Carcinogenic PAHs	8/25	330	44SB4702	NA	8000	---
Metals (mg/kg)							
7429-90-5	Aluminum	6/6	11700	PEN44SB2502	**3833**	---	---
7440-38-2	Arsenic	3/16	2.5	PEN44SB2502, PEN44SB2503	**1.56**	---	---
7440-39-3	Barium	6/6	7	PEN44SB0202	**4.63**	1600	---
7440-43-9	Cadmium	2/6	1.3	PEN44SB0202	**1**	7.5	---
7440-47-3	Chromium	5/6	13	PEN44SB2503	**6.13**	---	---
7440-48-4	Cobalt	6/6	0.41	PEN44SB2502	1.87	---	---
7440-50-8	Copper	5/6	4.2 J	PEN44SB2502	5.74	---	---
7439-89-6	Iron	6/6	6720	PEN44SB2503	**2745**	---	---
7439-92-1	Lead	5/6	26.3	PEN44SB0202	**7.32**	---	---
7439-96-5	Manganese	5/6	16.9	PEN44SB2502	21	---	---
7439-97-6	Mercury	2/6	0.02	PEN44SB2502, PEN44SB2503	0.1	2.1	---
7440-02-0	Nickel	5/6	2.7	PEN44SB2502	6.38	130	---
7440-62-2	Vanadium	5/6	18.2	PEN44SB2503	**5.83**	980	---
7440-66-6	Zinc	3/6	16.7	PEN44SB0202	16.9	---	---
Petroleum Hydrocarbons (mg/kg)							
	Total Petroleum Hydrocarbons	4/6	31	PEN44SB0202	NA	340000	---

Shaded cells indicate that the specified criterion or background level has been exceeded.

Footnotes:

1 - To determine whether metal concentrations were within background levels, soil concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Soil Cleanup Target Levels (SCTLs) for Leachability Based on Groundwater Criteria, Table 2, Chapter 62-777 Technical Report (FDEP, February 2005).
3 - Soil Saturation Limits (C_{SAT}), Table 8, Chapter 62-777 Technical Report (FDEP, February 2005).
NA - Not Applicable. According to proposed Florida Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

TABLE 6-13
FLORIDA LEVEL 1 (RESIDENTIAL) DIRECT CONTACT EVALUATION - GROUNDWATEF
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

CAS Number	Chemical	Frequency of Detection	Maximum Concentration(1)	Sample of Maximum Concentration	Background Value(4)	Non-Apportioned Florida Groundwater CTL(2)	Ratio of Maximum Concentration/ Non-Apportioned Residential SCTL	Is Chemical a Potential Level 1 COC?(3)	Rationale for Contaminant Deletion or Selection
Volatile Organic Compounds (ug/L)									
75-34-3	1,1-Dichloroethane	1/28	2	44GW1801	NA	70 C	0.03	No	maximum < CLT
67-66-3	Chloroform	13/28	1.6	44GW1601	NA	70 C	0.02	No	maximum < CLT
74-87-3	Chloromethane	2/28	0.7 J	3221GW0301	NA	2.7 C	0.3	No	maximum < CLT
156-59-2	cis-1,2-Dichloroethene	6/28	2.9	44GW2101	NA	70 S	0.04	No	maximum < CLT
540-59-0	Total 1,2-Dichloroethene	5/19	2 J	44GW1101, 44GW1401	NA	63 N	0.03	No	maximum < CLT
79-01-6	Trichloroethene	8/28	52	3221GW0901	NA	**3 S**	17	**Yes**	maximum > CLT
Semivolatile Organic Compounds (ug/L)									
91-57-6	2-Methylnaphthalene	4/19	0.4	3221GW0601, 3221GW0801	NA	28 N	0.01	No	maximum < CLT
117-81-7	Bis(2-Ethylhexyl)phthalate	2/21	11	44GW1901	NA	**6 S**	2	**Yes**	maximum > CLT
91-20-3	Naphthalene	4/19	0.2 J	3221GW0601	NA	14 N	0.01	No	maximum < CLT
Metals (ug/L)									
7429-90-5	Aluminum	6/19	2800 J	44GW0901	3883	**200 S**	14	No	maximum < background
7440-39-3	Barium	3/19	19.4	44GW1801	**13.2**	2000 S	0.01	No	maximum < CLT
7440-47-3	Chromium	9/19	24.1	3221GW0201	35	100 S	0.2	No	maximum < CLT
7439-89-6	Iron	17/21	1820	44GW1801	**1708**	**300 S**	6	**Yes**	maximum > CTL maximum/CTL ratio > 3
7439-92-1	Lead	2/20	3.8	3221GW0301	**1.6**	15 S	0.3	No	maximum < CLT
7439-96-5	Manganese	15/22	74.2	3221GW0301	**21.9**	**50 S**	1	**Yes**	maximum > CTL
7440-02-0	Nickel	1/19	18.2	3221GW0201	40	100 S	0.2	No	maximum < CLT, background
7782-49-2	Selenium	1/19	3.6	3221GW0201	3.9	50 S	0.07	No	maximum < CLT, background
7440-23-5	Sodium	19/19	33700	44GW1301	**18345**	160000 S	0.2	No	maximum < CLT

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a potential COC.

1 - To determine whether metal concentrations were within background levels, groundwater concentrations were compared to facility background levels described in Section 6.1.1.1. If the maximum concentration of a chemical is less than the background value, that chemical was not selected as a COPC.
2 - Groundwater Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C., Florida Department of Environmental Protection (FDEP), April 2005.
3 - A chemical is selected as a potential COC if the maximum concentration exceeds the non-apportioned CTL and, for metals, if the site concentrations exceed background levels.
NA - Not Applicable. According to proposed Florida Rule 62-780 only naturally occurring (inorganic) constituents are considered in the background evaluation.

Definitions:

C = Carcinogen.	N = Noncarcinogen.
COC = Chemical of concern.	NUT = Essential nutrient
J = Estimated value.	S = Primary or secondary standard

In this risk assessment, for RMO Levels I and II, maximum detected surface and subsurface soil concentrations are compared to the default (non-apportioned) SCTLs because an initial review of the analytical data, the maximum detected concentrations, and the EPCs (calculated as described in Section 6.3.3) indicated the list of potential COCs would not increase if the maximum detected concentration versus the EPC were evaluated using the default SCTLs.) Therefore, if the maximum detected concentration for a chemical exceeds the direct contact SCTL for RMO Levels I and II (and background levels for metals), the constituent is identified as a potential COC and may be further evaluated using various apportionment approaches described in the following sections.

Methods of Apportioning the SCTLs

Simple Apportionment. For situations in which apportionment is applicable, several methods of apportionment are available, as described in Appendix E of the Technical Report. The most straightforward method is simple apportionment. For simple apportionment, the default SCTL for each chemical is divided by the number of chemicals that produce the same type of toxicity. For carcinogens, the value of the simple apportioned SCTL is calculated by dividing the non-apportioned SCTL (residential, commercial/industrial, or recreational) by the number carcinogenic chemicals detected in a surface or subsurface soil dataset. For example, if five carcinogens were detected in a surface soil dataset for a site, the simple apportioned SCTLs for carcinogens are the non-apportioned SCTLs divided by 5 (FDEP, February 2005). For noncarcinogens, the simple apportioned SCTL is determined by dividing the non-apportioned SCTL by the number of chemicals impacting the same target organ. If the liver, for example, is identified as the target organ for seven noncarcinogens in a dataset, the simple apportioned SCTLs for those chemicals are the non-apportioned values divided by 7.

Not all SCTLs should be apportioned. The Technical Report (FDEP, February 2005) lists the following exceptions to apportioning:

1. Do not apportion an SCTL based on natural background concentration or practical quantitation limit. These are criteria that are not directly risk-based, and therefore are not subject to apportionment.

2. Do not apportion an SCTL based on acute toxicity. These SCTLs are always regarded as not-to-exceed values, and the default value should be compared with the maximum concentration on site. (Note that acute toxicity SCTLs are applicable only in situations where small children might be present, such as a residence, playground, or school.) Of the chemicals detected in soil at Site 44, the residential SCTLs for barium, copper, and vanadium are acute values.

3. Do not apportion lead (Pb) SCTLs. Both residential and commercial/industrial lead SCTLs are based on a unique type of toxicological analysis that is not amenable to the standard apportionment process.

4. Do not apportion the SCTLs for chemicals present in low concentrations. Eliminate from consideration at a site chemicals whose maximum concentration is less than or equal to 1/10 the default SCTL. Chemicals present in low concentrations are unlikely to contribute substantially to risk and unnecessarily complicate the apportionment process. As shown in Tables 6-6 through 6-12, the maximum concentrations of most detected chemicals (all except cPAHs, arsenic, barium, copper, lead, and vanadium) were less than 1/10 of the default SCTLs for surface and subsurface soil. Therefore, the SCTLs for most chemicals detected in soil at Site 44 were not apportioned.

5. Do not apportion the SCTLs for chemicals detected infrequently. A chemical can be eliminated from consideration at a site if it is detected a) in only 1 out of 10 or more samples, or 5 percent or fewer out of 20 or more samples, and in only one environmental medium; b) in low concentrations (no more than the default SCTL); and c) there is no reason to believe that the chemical may be present due to historical site activities. These criteria are intended to eliminate chemical detections that are artifacts from sampling, analytical, or other problems. They are not intended to eliminate chemicals present due to site activities in localized areas of contamination.

Weighted Apportionment. In most situations, simple apportionment will be overly conservative in that the sum of the risks represented by the individual chemical SCTLs are likely to be below FDEP target risks of $1x10^{-6}$ and a HI (for each target organ/system or effect) of 1. This can be avoided by weighted apportioning. One method of weighted apportioning involves calculation of ratios of the 95% UCLs for chemicals to their SCTLs. The 95% UCL for each chemical subject to apportionment is divided by its default SCTL. If the sum of the ratios is less than 1, the chemicals have met the FDEP's risk goals. If the sum is greater than 1, dividing the concentration of each by the sum of the ratios will yield apportioned SCTLs that match exactly the risk goals. In this approach, steps to achieve the apportioned SCTLs are expected to produce proportional decreases in the concentrations of each chemical. This approach makes sense if the chemicals are co-located, such that removal of one chemical results in similar reduction in others.

Non-Proportional Weighted Apportionment. Another method of weighted apportionment is non-proportional reductions in default SCTLs among chemicals with additive effects. As with other methods, the objective of the reduction in default SCTLs is to achieve a situation in which the sum of the risks posed by apportioned SCTLs does not exceed FDEP's risk goals for any health effect. However, in this

approach, the reduction may be taken unevenly among the chemicals. This approach is useful if the chemicals are not co-located, and removal of one or more chemicals can be achieved more easily or more economically than the others. Risks can be distributed optimally among the apportioned SCTLs based on site conditions, as long as the sums of the risks they represent meet the goals of $1x10^{-6}$ excess cancer risk and a HI of 1.

Weighted apportionment is performed on a chemical by chemical basis when it is feasible and appropriate, as determined by the human health risk assessor. In practice, weighted apportionment is often an option when cumulative quantitative risk assessment results derived as described in preceding sections are less than FDEP risk benchmarks (i.e., a cancer risk estimate of $1x10^{-6}$ for carcinogens and an HI of 1 for noncarcinogens).

When the 95% UCL approach is used to develop exposure concentrations, two criteria must be satisfied when comparing site concentrations to the SCTLs, either default or alternative:

1. The 95% UCL must meet or be below the apportioned SCTL; and

2. The maximum concentration remaining on site must meet or be below a concentration three-times the unapportioned SCTL in RMO Levels I and II, and below three-times the apportioned SCTL in RMO Level III. Using the 95% UCL as the basis to determine whether the SCTL has been achieved for a site means that some areas can have concentrations above the SCTL, as long as other areas are below. In this context, it is important to insure that concentrations above the SCTL allowed to remain do not constitute an unacceptable health risk.

In the risk assessment for Site 44, SCTLs were apportioned (by simple apportionment) for RMO Level III. In the Level III evaluations, only the maximum concentrations of cPAHs and lead were more than 3 times their respective non-apportioned SCTLs and these constituents were selected as potential COCs for soil.

Comparison with Leachability-based SCTLs

The potential for leaching was addressed through comparisons with SCTLs for Leachability Based on Groundwater Criteria (FDEP, February 2005). Unlike direct contact SCTLs, which are based primarily on long-term exposure covering a specified area, leachability-based default SCTLs are intended to protect water resources at all locations. Consequently, maximum rather than average (or 95% UCL) concentrations are compared with leaching criteria. If the maximum concentration of a chemical exceeds its respective leachability SCTL, that chemical is identified as a potential COC.

Evaluation of Free Product in Soil.

The potential for the presence of free product (for organic chemicals) was evaluated by comparing maximum site concentrations to C_{sat} limits. The C_{sat} values are provided in Table 8 of Chapter 62-777 FAC (FDEP, February 2005). The C_{sat} comparisons indicated the concentrations of all organic chemicals detected in soil at the sites evaluated in this report were significantly less than the C_{sat} levels. Therefore, it is unlikely these chemicals are present as free product at any of the sites.

6.6.2 Florida Methodology for Evaluating Groundwater

This section describes the methodology used to evaluate groundwater at Site 44 using guidelines presented in Rules 62-780 and 62-777, FAC. A detailed discussion of the FDEP approach for evaluating groundwater is presented in Appendix E of the Rule 62-777 Technical Report (FDEP, February 2005).

As with soil, the FDEP risk characterization for groundwater is performed by comparing concentrations of chemicals detected in groundwater with FDEP groundwater criteria (or to criteria developed according to guidelines presented in Chapters 62-777, if necessary). The groundwater CTLs are based on primary and secondary standards (e.g., MCLs) or on human health risk-based criteria, assuming that the groundwater is used as a potable water source (and are based on ingestion only). For contaminants that do not produce cancer, the risk-based CTLs are calculated based on a HI of 1 and incorporate a default relative source contribution factor of 0.2. The relative source contribution factor means, in effect, that no more than 20 percent of the total allowable intake of the contaminant can come from contaminated water. For carcinogens, the default groundwater CTL is based on an excess cancer risk of 1×10^{-6}.

For groundwater at Site 44, only the CTLs for acetone and chloroform are risk-based values. The CTLs for all other detected chemicals are primary or secondary standards. The guidance presented in 62-777 Technical Report states that CTLs based on primary or secondary standards should not be apportioned. As with soils, if alternative CTLs are developed, the default values should be apportioned. However, the alternate CTLs should not be lower than the primary or secondary standard.

Using the guidance provided in Rules 62-780 and 62-777, groundwater at Site 44 was evaluated for residential land use (RMO Level I). In RMO Level I, the applicable CTL is usually the default value for that contaminant in the groundwater as presented in Table 1 of the Technical Report. If groundwater has the potential to impact surface water, demonstrated by monitoring well data, groundwater flow rate and direction, or fate and transport modeling, the appropriate marine surface water or freshwater surface water CTL also applies to groundwater. However, based on information presented in the Site Characterization Report, (TtNUS, 2004), groundwater at Site 44 has little potential to impact a surface water body. Therefore, the groundwater evaluation is based on comparison to groundwater CTLs only.

The following evaluations for Site 44 were performed according to Rules 62-777 and 62-780:

- ***Comparison of maximum detected concentrations to groundwater CTLs***. Comparing the groundwater CTLs to maximum detected groundwater concentrations is appropriate for Site 44 because, as stated previously, the CTLs for all but two detected chemicals are primary or secondary standards and the list of potential COCs would not change if CTLs were apportioned. If the maximum detected concentration for a chemical exceeds the CTL (and background levels for metals), the constituent is identified as a potential COC for the site.

- ***Evaluation of Free Product in Groundwater***. The potential for the presence of free product (for organic chemicals) was evaluated by comparing maximum site concentrations to water solubility values presented in Table 4, Chapter 62-777 FAC (FDEP, April 2005). The water solubility comparisons indicated the concentrations of the few organic chemicals detected in groundwater at Site 44 in 2005 were significantly less than their respective water solubilities. Therefore, it is unlikely these chemicals are present as free product in groundwater at the site.

6.6.3 Risk Characterization Using State of Florida Guidelines

This section contains a summary of the results of the risk characterization for Site 44 conducted using guidelines presented in Florida Rule 62-780 FAC and the Rule 62-777 Technical Report. The results are summarized in Tables 6-6 through 6-13 and are discussed below.

6.6.3.1 Results of Surface Soil Evaluation – Florida Methodology

Level 1 Evaluation (Residential)

Table 6-6 presents a comparison of the maximum detected concentrations for surface soil to the FDEP residential SCTLs. The following chemicals were identified as exceeding the Level 1 SCTLs and were retained as potential COCs for residential exposures to surface soil at Site 44:

- cPAHs (expressed as benzo(a)pyrene equivalents)

Level 2 (Industrial)

The results of the Level 1 evaluation identified cPAHs as a COC; therefore, a Level 2 evaluation was conducted. A comparison of the maximum concentrations in surface soil to the FDEP industrial SCTLs is

presented in Table 6-7. cPAHs were identified as exceeding the Level 2 SCTL, and was retained as a potential COC for industrial exposures to surface soil at Site 44.

Level 3 (Recreational)

The results of the Level 2 evaluation identified cPAHs as a COC; therefore, a Level 3 evaluation was conducted assuming a future recreational land use scenario for Site 44. Alternative SCTLs for recreational exposures were derived following the methodology presented in Section 6.3.3. A comparison of the maximum detected concentrations and EPCs for surface soil to the alternative CTLs is presented in Table 6-8. As shown in the table, the maximum cPAHs concentration exceeded the alternative SCTL, but the EPC was less than the apportioned alternate SCTLs and the maximum concentration were less than three times the non-apportioned Level 3 alternative SCTLs. Therefore, no constituents were retained as potential COCs for recreational exposure to surface soil at Site 44.

Comparison of Chemicals in Surface Soil with Leachability SCTLs

Table 6-9 presents comparisons of maximum detected concentrations in surface soil with Florida criteria based on leachability to groundwater. As shown in the table, maximum concentrations of alpha-BHC, beta-BHC, and endrin ketone were greater than the leachability criteria indicating that there is minimal potential for contaminants detected in surface soil to adversely impact groundwater. However, none of these constituents were detected in groundwater. Table 6-9 also presents comparisons of maximum concentrations with soil saturation concentrations to evaluate the potential for presence of free product. As shown in the table, the concentrations of organic compounds in surface soil were significantly less than the C_{sat} concentrations, indicating that free product is not present in surface soil.

6.6.3.2 Results of Subsurface Soil Evaluation – Florida Methodology

Level 1 Evaluation (Residential)

Table 6-10 presents a comparison of the maximum detected concentrations for subsurface soil to the FDEP residential SCTLs. The following chemicals were identified as exceeding the Level 1 SCTLs and were retained as potential COCs for residential exposures to subsurface soil at Site 44:

- cPAHs (expressed as benzo(a)pyrene equivalents)
- Inorganics (arsenic)

Level 2 (Industrial)

The results of the Level 1 evaluation identified two potential COCs; therefore, a Level 2 evaluation was conducted. A comparison of the maximum concentrations for subsurface soil to the FDEP industrial SCTLs is presented in Table 6-11. No constituents were identified as exceeding the Level 2 SCTLs.

Level 3 (Recreational)

The results of the Level 2 evaluation identified no potential COCs; therefore, a Level 3 evaluation was not conducted.

Comparison of Chemicals in Subsurface Soil with Leachability SCTLs

Table 6-12 presents comparisons of maximum detected concentrations in subsurface soil with Florida criteria based on leachability to groundwater. No constituents were detected at concentrations that exceeded the leachability SCTLs.

6.6.3.3 Results of Groundwater Evaluation – Florida Methodology

Level 1 Evaluation (Residential)

Groundwater was evaluated for future residential use (Level 1). Table 6-13 presents a comparison of the maximum detected concentrations in groundwater to the FDEP groundwater CTLs. The following chemicals were identified as exceeding the Level 1 CTLs and were retained as potential COCs for residential exposures to groundwater at Site 44:

- TCE
- Bis(2-ethylhexyl)phthalate
- Inorganics (iron and manganese)

The maximum detected concentrations of iron also exceeded 3 times the groundwater CTLs. Note that groundwater CTLs for iron (300 ug/L) and manganese (50 ug/L) are secondary standards which are not based on health effects but on aesthetic effects, such as taste and odor. The maximum detected concentration of aluminum exceeded 3 times the groundwater CTL but was within background levels; therefore, aluminum was not retained as a COC for groundwater.

6.7 HUMAN HEALTH RISK UNCERTAINTY ANALYSIS

This section presents a 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. The baseline HHRA for Site 44 was performed in accordance with current USEPA and Florida guidance. However, there are varying degrees of uncertainty associated with the baseline HHRA. The following sections discuss general uncertainties in risk assessment and uncertainties specific to the risk assessment for Site 44.

Uncertainty in the selection of COPCs was related to the current status of the predictive databases, the grouping of samples, the numbers, types and distributions of samples, data quality, and the procedures used to include or exclude constituents as COPCs. Uncertainty associated with the exposure assessment included 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 included 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 was 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 were various sources of random uncertainty and bias, the magnitude of bias and uncertainty and the direction of bias was 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 considered safety factors were made so that the final calculated risks were overestimated.

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

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

Once the risk assessment is complete, the results must be reviewed and evaluated to identify the type and magnitude of uncertainty involved. Reliance on results from a risk assessment without consideration of uncertainties, limitations, and assumptions inherent in the process can be misleading. For example, to

account for uncertainties in the development of exposure assumptions, conservative estimates were made to ensure that the particular assumptions were protective of sensitive subpopulations or the maximum exposed individuals. If a number of conservative assumptions are combined in an exposure model, the resulting calculations can propagate the uncertainties associated with those assumptions, thereby producing a much larger uncertainty for the final results. This uncertainty is biased toward overpredicting both carcinogenic and noncarcinogenic risks. Thus, both the results of the risk assessment and the uncertainties associated with those results must be considered when making risk management decisions.

This interpretation of uncertainty 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 an acceptable risk level (i.e., 10^{-4}), a conclusion can be difficult unless uncertainty is considered.

6.7.1 Uncertainty in Selection of COPCs

The most significant issues related to uncertainty in COPC selection were the usability of existing databases [i.e., the use of validated and unvalidated sample results (only validated data were used in this risk assessment) and the completeness, precision, and accuracy of the data set], the inclusion of chemicals potentially attributable to background in the quantitative risk assessment, the screening levels used, 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.

Chemicals Potentially Attributable to Background

No chemicals in soil were eliminated from the risk assessment on the basis of background only. It is possible that risks for may be overestimated by the inclusion of some metals as COPCs. Note that the background concentrations for soil are based on data from only two locations and background levels for groundwater are based on four locations. Therefore, the background data for NAS Pensacola may not be adequately characterized. For example, arsenic was selected as a COPC for surface and subsurface soil because the maximum detected concentrations in these media (8 and 14.6 mg/kg, respectively) exceeded the arsenic screening level and the background reference concentration (1.56 mg/kg). USEPA Region 9 indicates that background levels of arsenic in the United States range from 0.1 to 97 mg/kg and ATSDR indicates a background range of 1 to 40 mg/kg. The maximum detections of arsenic in soil at NAS Pensacola are at the low end of these concentrations ranges and it possible that levels of arsenic at Site 44 are naturally occurring.

Aluminum in groundwater was eliminated from the risk assessment on the basis of background. It was present at concentrations greater than the FDEP GCTL, but the HQ associated with the concentrations was less than the target of 1.0. The FDEP GCTL is based on a secondary standard, which is not health-based. Therefore, the elimination of aluminum from the evaluation of risk would be negligible.

COPC Screening Levels

The use of risk-based screening values (for the USEPA analysis) based on conservative land use scenarios (i.e., residential land use for soil and groundwater) corresponding to an ILCR of 10^{-6} and HI of 0.1 ensured that all the significant contributors to risk from a site were evaluated. The elimination of chemicals 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 those chemicals are not expected to cause a potential health concern at the detected concentrations.

Chemicals without Established Screening Levels

Region 9 PRGs are currently not available for some constituents (e.g., 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, and phenanthrene). Appropriate surrogates were selected for these chemicals based on similar chemical structures, if available. For example, naphthalene was used as a surrogate for 2-methylnaphthalene, and pyrene was used as a surrogate for benzo(g,h,i)perylene and phenanthrene. Applying toxicity values of one compound to another increases the uncertainty in the risk assessment both in regard to the selection of COPCs and the calculated risks. The direction of the uncertainty is not known. Note that the State of Florida does provide CTLs for these compounds and they were evaluated in the analysis using FDEP methodology. Therefore, the uncertainty associated with the use of surrogates is likely to be minimal.

6.7.2 Uncertainty in the Exposure Assessment

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

Land Use

The current land use patterns at NAS Pensacola well established, thereby limiting the uncertainty associated with land use assumptions. Land use at Site 44 is currently limited and is expected to be limited in the future, as long as NAS Pensacola remains open. To be conservative, risks to potential and future construction workers, maintenance workers, occupational workers, recreational users, and on-site

residents were estimated for the site. Maintenance workers and recreational users are considered to be the most likely receptors under current land use.

Exposure Point Concentrations

EPCs for soil were calculated using the Florida UCL Calculator (Version 0.97). Uncertainty is associated with the use of the 95 % UCL on the mean concentration as the EPC. As a result of using the 95 % UCL, the estimations of potential risk for the RME scenario were most likely overstated because this is a representation of the upper limit that potential receptors would be exposed to over the entire exposure period. In some cases (e.g., arsenic in soil), the maximum concentration was used as the EPC. 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 was also introduced when the nondetects results were assigned a value of one-half the nondetect quantitation limit in the calculation of the EPC. This may either overstate or understate the risks to potential receptors.

As discussed in Section 6.3.2, the calculated risks for groundwater in the USEPA risk evaluation were based on the assumption that EPCs for groundwater were the maximum detected concentrations. Using the maximum detected concentrations may result in an overestimation of risks. Note that maximum groundwater concentrations were used in the risk assessment performed according the FDEP methodology.

There was also uncertainty in assuming that current groundwater concentrations will not change in the future and this introduces additional uncertainty in the EPCs and risks for groundwater COPCs. Concentrations in groundwater may diminish over time due to natural attenuation processes involving source depletion and dilution.

Exposure Routes and Receptor Identification

The determination of various receptor groups and exposure routes of potential concern was based on current land use observed at the site and the anticipated future land use. Therefore, the uncertainty associated with the selection of exposure routes and potential receptors was minimal because they were considered to be well defined. Although residential use of groundwater was evaluated as an exposure scenario, groundwater is not currently used at the site nor is it expected to be used in the future (Three water wells located on NAS Pensacola provide emergency backup potable water supply. The backup water supply wells obtain groundwater from the sand and gravel aquifer at depths ranging from 224 to 250 feet bls). The nearest potable water well to Site 44 is located approximately 1,600 feet west-

southwest of the site. The evaluation of direct exposure to groundwater in the HHRA was included primarily to aid in risk management decision making.

Exposure Parameters

The risk-based concentrations used to estimate risks by the USEPA methodology were calculated by the equations and exposure factors presented in Section 6.3.3. Each exposure factor selected for use in the risk assessment has some associated uncertainty. Generally, exposure factors were 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. The exposure factors used in this report, in most cases, were obtained from USEPA or Florida guidance documents for the Reasonable RME, which generally specify the use of the 95th percentile value for most parameters. Therefore, the selected values for the RME receptor represented an upper bound of the observed or expected habits of the majority of the population.

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

For many parameters for which limited information exists (i.e., dermal absorption of chemicals from soil), greater uncertainty exists. For example, current USEPA dermal guidance (USEPA, July 2004) does not provide dermal absorption factors for exposure to most metals (except arsenic and cadmium) in soil. Therefore, risks for dermal contact from soil were not evaluated for most metals in this risk assessment. Consequently, risks from exposure to soil may have been underestimated.

6.7.3 Uncertainty in the Toxicological Evaluation

The risk-based concentrations used to assess risk were also developed using the toxicity criteria discussed in Section 6.4. Uncertainties associated with the toxicity assessment (determination of RfDs and CSFs and use of available criteria) are presented in this section.

Derivation of Toxicity Criteria

Uncertainty associated with the toxicity assessment was associated with hazard assessment and dose-response evaluations for the COPCs. The hazard assessment dealt 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 was evaluated as a weight-of-evidence determination using 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 arose from the nature and quality of the animal and human data. Uncertainty was reduced when similar effects were observed across species, strain, sex, and exposure route; when the magnitude of the response was clearly dose related; when pharmacokinetic data indicated a similar fate in humans and animals; when postulated mechanisms of toxicity were similar for humans and animals; and when the COC was structurally similar to other chemicals for which the toxicity is more completely characterized.

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

For noncancer effects, additional uncertainty factors may have been applied in the derivation of the RfD to mitigate poor quality of the key study or gaps in the database. Additional uncertainty for noncancer effects arose from the use of an effect level in the estimation of an RfD, because this estimation was

predicated on the assumption of a threshold less than which adverse effects were not expected. Therefore, an uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arose in estimation of an RfD for chronic exposure from subchronic data. Unless empirical data indicated that effects did not worsen with increasing duration of exposure, an additional uncertainty factor was applied to the no-effect level in the subchronic study. Uncertainty in the derivation of RfDs was mitigated by the use of uncertainty and modifying factors that normally ranged between 3 and 10. The resulting combination of uncertainty and modifying factors may have reached 1,000 or more.

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

Uncertainty Associated with Evaluation of the Dermal Exposure Pathway

According to RAGS Part E (USEPA, July 2004), risks for dermal absorption of chemicals in soil are quantitatively evaluated for arsenic, cadmium, chlordane, 2,4-dichlorophenoxyacetic acid, dichlorodiphenlytrichloroethane (DDT), TCDD (and other dioxins), PAHs, PCBs, pentachlorophenol, and SVOCs only because of the limited information guidance available to evaluate dermal exposure to other constituents. However, risks associated with dermal exposure to other metals in soil (except for arsenic and cadmium) were also evaluated in the risk assessment using the dermal absorption factors provided in FDEP guidance (FDEP, April 2005). Generally, potential risks associated with the metals may result in an overestimation of risk because metals do not readily desorb from soil and become available for absorption through the skin.

The Region 9 PRGs used to assess risks for groundwater are based on ingestion and inhalation (for volatiles) but dermal effects are not considered in the PRG calculations. For some chemicals (e.g., PCBs and PAHs) the omission of the aqueous dermal pathway can be significant. However, for the types of chemicals detected in groundwater at Site 44 (i.e., VOCs and metals), the aqueous dermal pathway is generally not important. Therefore, the effects of omitting dermal contact from the PRG calculations is expected to be negligible.

Use of Iron Toxicity Criteria

An NCEA provisional RfD was used to evaluate noncarcinogenic effects from exposure to iron. The provisional RfD for iron is based on allowable intakes rather than adverse effect levels. Therefore, there was some degree of uncertainty associated with the use of the RfD used to calculate risk-based

concentrations for iron. 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.

Alternate RfD for Manganese

The oral RfD for manganese listed in the Region 9 PRG table (0.024 mg/kg/day) was used to calculate the PRG for evaluating risks for residential exposure to groundwater. This value includes a modification factor of 3 and an adjustment factor for the dietary contribution which is applied to the non-dietary reference dose (0.14 mg/kg/day) presented in IRIS. IRIS indicates that an adjustment for the dietary contribution should be subtracted from this allowable intake. Using the modified and adjusted RfD results in risk estimates 6 times higher than if the non-dietary reference dose were used.

6.7.4 Uncertainty in the Risk Characterization

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

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

Finally, the risk characterization did not consider antagonistic or synergistic effects. Little or no information was available to determine the potential for antagonism or synergism for the COPCs. Because chemical-specific interactions could not be predicted, the likelihood for risks to be overpredicted or underpredicted could not be defined, but the methodology used was based on current USEPA guidance.

6.8 SUMMARY AND CONCLUSIONS

An HHRA was conducted for the chemical concentrations detected in surface soil, subsurface soil, and groundwater samples collected at Site 44. The evaluation was conducted using both USEPA and State of Florida regulations and guidelines for HHRA. The results of the USEPA and Florida risk assessments are summarized in the following sections.

6.8.1 Summary of USEPA Risk Assessment

The USEPA risk assessment considered five receptors, the hypothetical future resident, the typical industrial worker, the construction worker, the maintenance worker, and the trespasser/recreational user, assuming exposure via the ingestion, dermal contact, and inhalation route of exposures. However, maintenance workers and trespassers/recreational users are considered to be the most likely receptors at Site 44 under current land use.

The list of COPCs for Site 44 included the following:

- Surface Soil – cPAHs, arsenic, iron, and vanadium
- Subsurface Soil – cPAHs, aluminum, arsenic, iron, and vanadium
- Groundwater – chloroform, iron, and manganese, TCE, bis(2-ethylhexyl)phthalate

Quantitative estimates of noncarcinogenic and carcinogenic risks (HIs and ILCRs, respectively) were developed for potential human receptors. Results of these evaluations are summarized below.

Noncarcinogenic risks are below the target HI of 1.0 to satisfy USEPA and FDEP requirements for exposure to surface soil, subsurface soil, and groundwater.

Carcinogenic risks exceed 1×10^{-4} for exposure to groundwater by the hypothetical future resident. Carcinogenic risks for exposure to surface and subsurface soil are within the USEPA's target risk range of 10^{-4} to 10^{-6} for all receptors. However, risks associated with exposure to surface soil exceed FDEP's target risk level of 10^{-6} for the hypothetical future resident, lifelong recreational users, and industrial worker. Carcinogenic risks associated with exposure to subsurface soil exceed FDEP's target risk level for the hypothetical future resident.

6.8.2 Summary of Florida Risk Assessment

The risk assessment conducted per the State of Florida regulations and guidelines evaluated risks to a hypothetical future resident and a typical industrial worker using the published SCTLs for the residential and industrial land use scenario, respectively. Risks to a hypothetical future recreational user were evaluated using SCTLs specifically developed for this risk assessment as stipulated in the State of Florida regulations and guidelines. The following chemicals were identified as potential COCs for surface soils based on a comparison of maximum concentrations or EPCs to these SCTLs:

FLORIDA SURFACE SOIL EVALUTION

Residential SCTLs	Industrial SCTLs	Recreational SCTLs
cPAHs	cPAHs	

The following chemicals were identified as potential COCs for subsurface soils based on a comparison of maximum concentrations or EPCs to the SCTLs:

FLORIDA SUBSURFACE SOIL EVALUTION

Residential SCTLs	Industrial SCTLs	Recreational SCTLs
cPAHs		
Arsenic		

The following chemicals were identified as potential COCs for groundwater based on a comparison of maximum concentrations to groundwater CTLs:

FLORIDA GROUNDWATER EVALUATION

Residential SCTLs
Iron
Manganese
TCE
Bis(2-ethylhexyl)phthalate

Note that iron and manganese were identified as potential COCs for groundwater because the maximum concentrations exceeded CTLs which are, in effect, USEPA Secondary MCLs. Secondary MCLs are criteria based not on health effects but rather on aesthetic effects such as taste and odor. Also, note that HQs for iron and manganese calculated in the USEPA evaluation were less than the USEPA and Florida goal of unity for noncarcinogenic health effects.

Chemicals detected in soil were also evaluated for the potential to impact groundwater quality at the site by comparing maximum concentrations with FDEP SSLs for migration from soil to groundwater. This evaluation indicated that that the concentrations of constituents detected in soil were unlikely to adversely impact groundwater.

7.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

7.1 INTRODUCTION

This screening-level ecological risk assessment was conducted in accordance with USEPA Ecological Risk Assessment Guidance for Superfund (USEPA, 1997), USEPA Amended Guidance on Ecological Risk Assessment at Military Bases (USEPA, 2000a), and the Navy Policy for Conducting Ecological Risk Assessments (DON, 1999). The risk assessment for IR Site 44 consists of Steps 1 through 3A of USEPA's 8-step ecological risk assessment process. Steps 1 through 3A consist of the following:

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

Section 7.2.1 provides the environmental setting and summarizes the site history for Site 44. The fate and transport characteristics of the chemicals detected in surface soil and groundwater are provided in Section 7.2.2. The ecotoxicity of site contaminants and potential ecological receptors are described in Section 7.2.3. Section 7.2.4 describes complete exposure pathways and preliminary assessment and measurement endpoints are discussed in Section 7.2.5. Sections 7.3, 7.4, and 7.5 describe the screening level ecological effects evaluation, exposure estimates, and risk characterization, respectively. Section 7.6 describes the refinement of preliminary COPCs. Uncertainties inherent with the ecological risk assessment are discussed in Section 7.7. The summary and conclusions of this ecological risk assessment are provided in Section 7.8.

7.2 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.

7.2.1 Environmental Setting

The site history for Site 44 is discussed in Section 1.2 and the environmental setting is discussed in Section 3.0.

7.2.2 Contaminant Fate and Transport

Potential contaminant release mechanisms at Site 44 include the mobilization of contaminants discharged directly to surface soil during aircraft maintenance and cleaning operations. These materials might impact surface soils, subsurface soils, and 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 migrating downgradient. Chlorinated solvent contamination in groundwater may have migrated from adjacent sites such as the flammable storage area located west of Site 44 and the former UST at Site 44.

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 44 due to the developed nature of 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 transport and deposition.

The following discussions address classes of contaminants detected in surface soil and groundwater that might be associated with Site 44.

7.2.2.1 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.

7.2.2.2 SVOCs

Most SVOCs detected in Site 44 media were PAHs and phthalates. 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. The fate and transport characteristics of PAHs are dependent on their molecular weights. Low molecular weight PAHs are more soluble and volatile,

and therefore more mobile. 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). 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, and food-chain biomagnification of PAHs is typically minimal (ATSDR, 1989). 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).

Two phthalates (bis[2-ethylhexyl]phthalate, butyl benzyl phthalate) were detected at Site 44. 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. Phthalates are not expected to significantly volatilize or appreciably leach from soil into groundwater (Spectrum, 2003). Biomagnification of phthalates does not occur.

7.2.2.3 Pesticides

Chlorinated pesticides are highly persistent in the environment, and tend to tightly sorb to organic matter and be immobile in most soils. Although organic carbon was not analyzed in soil samples from Site 44, the sandy soils of northwest Florida are typically low in organic carbon content, which is presumably a major contributing factor in the migration of pesticides from soil into groundwater at the site. 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 surface soil at Site 44.

7.2.2.4 Metals

Metals released to soils will tend to remain in soils but may impact groundwater through infiltration and surface water through run off and erosion. Leaching of metals is more apt to occur under acid conditions in sandy soils with low organic matter content. Many metals occur naturally in soil, surface water, and

sediment due primarily to chemical weathering of rocks. Factors such as pH, clay content, and organic matter content influence the bioavailability of metals to potential receptors. 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, silver, and zinc have the potential to bioaccumulate in biota (USEPA, 2000b).

7.2.3 Ecotoxicity

VOCs, SVOCs, pesticides, and metals were detected in either surface soil or groundwater samples collected at Site 44. The following abstracts from the literature provide general discussions of each group's ecotoxicity.

7.2.3.1 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.

7.2.3.2 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 4 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.

7.2.3.3 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.

7.2.3.4 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.

7.2.4 <u>Complete Exposure Pathways</u>

Soil invertebrates and plants are exposed to soil contaminants through ingestion and direct contact. No complete exposure pathways to higher trophic level animals are present at Site 44. Ground cover at the site is predominantly paved concrete and asphalt surfaces with little undisturbed native soils. The current land use and adjacent airfield operations discourage use of the site by birds and mammals except as occasional transients. The exposure of higher trophic level animals such as birds and mammals to site-related contamination through ingestion of contaminated food items is therefore considered unlikely due to the absence of habitat and site operations at and adjacent to Site 44. Consequently, this is not considered to be a complete exposure pathway. Similarly, the incidental ingestion of soil contaminants

while preening feathers is not considered a significant source of potential exposure as birds are not anticipated to reside at the site or be present for extended periods of time. Exposure to contaminants in soil 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 consequently the inhalation pathway is not significant. Exposure to contaminants in groundwater is not anticipated to occur at Site 44.

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 ecological risk assessment guidance (USEPA, 1997), if an exposure pathway is not complete, that exposure pathway does not need to be evaluated. In summary, complete exposure pathways and routes of entry into biota at Site 44 consist of:

- Direct contact with surface soil by invertebrates and plants
- Ingestion of surface soil by invertebrates

7.2.5 Preliminary Assessment and Measurement Endpoints

USEPA Region 4 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 terrestrial biota including soil invertebrates and plants 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, 1997). The preliminary measurement endpoints were chemical concentrations in surface soil that are associated with no adverse effects on growth, survival, and reproduction of terrestrial organisms. The measurement endpoints are represented by USEPA Region 4 ecological screening values (ESVs) for surface soil. USEPA Ecological Soil Screening Levels (Eco-SSLs) were used in place of the USEPA Region 4 ESVs as the measurement endpoints for chemicals when Eco-SSLs were available.

The USEPA Region 4 ESVs for surface soil are based on conservative endpoints and sensitive ecological effects data, and thus, the screening values represent chemical concentrations associated with a low probability of unacceptable risks to ecological receptors. For this reason, USEPA Region 4 considers their soil ESVs to be protective of terrestrial invertebrates and plants as well as upper level receptors such as birds and mammals. Additionally, the lowest of the plant, invertebrate, mammal, and avian Eco-SSL was used for chemicals when Eco-SSLs were available. In the screening level ecological risk

assessment, therefore, a distinction is not made between measurement endpoints associated with direct toxicity to invertebrates and plants versus measurement endpoints associated with food chain effects.

7.3 SCREENING-LEVEL ECOLOGICAL EFFECTS EVALUATION

For the screening level ecological risk assessment, maximum concentrations of chemicals detected in surface soil were compared to Eco-SSLs for chemicals which Eco-SSLs are available and to USEPA Region 4 ESVs (USEPA, 2001) for all other detected chemicals. Additionally per FDEP recommendation, Canadian Soil Quality Guidelines (SQGs) (CCME, 2006) were used as ESVs for specific PAHs in the absence of EPA values. If the maximum concentration was less than the Eco-SSL (or the ESV), the chemical was eliminated from further consideration. If the maximum concentration equaled or exceeded the screening level, or if a screening level was not available, the chemical was then considered to be an ecological COPC and was retained for further study in the ecological risk assessment.

Groundwater concentrations were compared to USEPA Region 4 surface water screening levels as a very conservative measure of potential impacts to ecological receptors from contaminated groundwater. Analytes in groundwater that exceed surface water ESVs or lack ESVs are not selected as COPCs but are listed for informational purposes. This analysis is considered extremely conservative as it does not take into account dilution at the discharge point(s), which may be substantial, the amount of discharge, location of the point(s) of discharge, or direction of groundwater flow.

7.4 SCREENING-LEVEL EXPOSURE ESTIMATE

Exposure point chemical concentrations were obtained from surface soil samples collected in September 2005, and May and August 2006, and groundwater samples collected in December 2005 and May and August 2006. The data are presented in Section 4.0 (Tables 4-3 through 4-8).

The surface soil data base consisted of three samples (and one duplicate sample) analyzed for VOCs, pesticides and PCBs, inorganics, and petroleum hydrocarbons, in addition to 19 soil screening samples analyzed for PAHs. All samples were collected from a depth of 0 to 0.5 feet bls. Figure 2-1 in Section 2.0 illustrates where surface soil samples were collected.

The groundwater data base consisted of 32 samples and 2 duplicate samples analyzed for VOCs, SVOCs, pesticides and PCBs, inorganics, and petroleum hydrocarbons. Figure 2-3 in Section 2.0 illustrates the locations of the groundwater samples.

All analytes (except calcium, magnesium, potassium, and sodium) detected in surface soil and groundwater 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.

7.5 SCREENING-LEVEL RISK CALCULATION

The preliminary risk calculation step compared maximum concentrations of chemicals in surface soil to USEPA Eco-SSLs and USEPA Region 4 ESVs. The ratio of the maximum concentration to the ESV is called the screening HQ. Analytes whose maximum concentrations equaled or exceeded ESVs (i.e., HQ $\geq$ 1.0), or did not have ESVs, were retained as ecological COPCs. Although ecological receptors are not directly exposed to groundwater contaminants (and therefore were not considered to be COPCs), groundwater data were compared to surface water screening values as a conservative measure of potential impacts to aquatic media from contaminated groundwater discharge. USEPA Region 4 fresh water ESVs were used for the comparison. ESVs were adjusted for fresh water hardness-dependent metals based on a site-specific hardness value (88 mg/L as calcium carbonate) calculated from the average reported concentrations of calcium and magnesium in groundwater.

7.5.1 Surface soil

In surface soil, the VOC acetone was retained as a COPC because an ESV is not available. Four PAHs (anthracene, benzo(a)pyrene, fluoranthene, and pyrene) were retained as COPCs because their maximum concentrations exceeded their respective Region 4 ESVs. Five PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were retained as COPCs because their maximum concentrations exceeded the applicable Canadian SQGs. The maximum concentration of total PAHs (the total of anthracene, benzo(a)anthracene, benzo(k)fluoroanthene, benzo(a)pyrene, chrysene, phenanthrene, fluoroanthene, indeno(1,2,3-cd)pyrene, naphthalene and benzo(g,h,i)perylene) exceeded its corresponding USEPA Region 4 ESV. Six PAHs (1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, chrysene, fluorene,) were retained as COPCs because ESVs were not available. Two phthalates (bis(2-ethylhexyl)phthalate, butyl benzyl phthalate) were retained as COPCs because ESVs were not available (Table 7-1).

The pesticides beta-BHC and gamma-BHC (Lindane) were retained as COPCs because their maximum concentrations exceeded their respective USEPA Region 4 ESVs.

Five metals (aluminum, cadmium, iron, lead, and vanadium) were retained as COPCs because their maximum concentrations exceeded their respective Region 4 ESVs or Eco SSLs.

TABLE 7-1
OCCURENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SURFACE SOIL
SITE 44
NAS PENSACOLA, FLORIDA

Chemical	Detection Frequency (1)	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Surface Soil Screening Values (4) mg/kg	Hazard Quotient (5)	COPC Yes/No	Notes
Volatile Organics (mg/kg)												
ACETONE	1/3	0.12	J	0.12	J	PEN44SB0201	0	0.12	NA	NA	**Yes**	
Semivolatile Organics (mg/kg)												
1-METHYLNAPHTHALENE	1/16	0.013		0.013		44SB3101	.0012-0.055	0.013	NA	NA	**Yes**	
2-METHYLNAPHTHALENE	2/19	0.0009	J	0.024		44SB3101	0.0006-0.022	0.024	NA	NA	**Yes**	
ACENAPHTHENE	2/19	0.0008	J	0.0052		44SB3101	0.0007-0.022	0.0052	20	0.0003	No	
ACENAPHTHYLENE	6/19	0.001	J	0.14		44SB3101	0.0005-0.022	0.14	NA	NA	**Yes**	
ANTHRACENE	7/19	0.001	J	0.2		44SB3101	0.0009-0.022	0.2	0.1	**2**	**Yes**	
BENZO(A)ANTHRACENE	8/19	0.009	J	0.42		44SB3101	0.020-0.022	0.42	0.1[6]	**4**	**Yes**	
BENZO(A)PYRENE	8/19	0.029		1.2		44SB3101	0.0008-0.022	1.2	0.1	**12**	**Yes**	
BENZO(B)FLUORANTHENE	8/19	0.026		0.93		44SB3101	0.002-0.022	0.93	0.1[6]	**9**	**Yes**	
BENZO(G,H,I)PERYLENE	9/19	0.022	J	3		44SB3101	0.002-0.022	3	NA	NA	**Yes**	
BENZO(K)FLUORANTHENE	8/19	0.015	J	0.94		44SB3101	0.002-0.022	0.94	0.1[6]	**9**	**Yes**	
BIS(2-ETHYLHEXYL)PHTHALATE	2/3	0.099	J	0.33	J	PEN44SB2501	0.085-0.085	0.33	NA	NA	**Yes**	
BUTYL BENZYL PHTHALATE	2/3	0.09	J	0.13	J	PEN44SB2501	0.078-0.078	0.13	NA	NA	**Yes**	
CHRYSENE	7/19	0.011	J	0.51		44SB3101	0.001-0.022	0.51	NA	NA	**Yes**	
DIBENZO(A,H)ANTHRACENE	5/19	0.01		0.4		44SB3101	0.002-0.022	0.4	0.1[6]	**4**	**Yes**	
FLUORANTHENE	7/19	0.006		0.24		44SB3101	0.002-0.022	0.24	0.1	**2**	**Yes**	
FLUORENE	1/19	0.006		0.006		44SB3101	0.0006-0.022	0.006	NA	NA	**Yes**	
INDENO(1,2,3-CD)PYRENE	8/19	0.031	J	1.8		44SB3101	0.002-0.022	1.8	0.1[6]	**18**	**Yes**	
NAPHTHALENE	2/19	0.001	J	0.02		44SB3101	0.0009-0.022	0.02	0.1	0.2	No	
PHENANTHRENE	7/19	0.002	J	0.036		44SB3101	0.002-0.022	0.036	0.1	0.4	No	
PYRENE	7/19	0.007		0.39		44SB3101	0.002-0.022	0.39	0.1	**4**	**Yes**	
Total PAH	12/19	0.009		8.366		44SB3101		8.366	1.1[7]	**7.6**	**Yes**	
Pesticides/PCBs (mg/kg)												
4,4'-DDD	1/3	0.001	J	0.001	J	PEN44SB0201-D	0.00044-0.00049	0.001	0.0025	0.6	No	
ALDRIN	1/3	0.0009	J	0.0009	J	PEN44SB0201-D	0.00054-0.00061	0.0009	0.0025	0.4	No	
ALPHA-BHC	1/3	0.001	J	0.001	J	PEN44SB0201-D	0.001-0.0011	0.001	0.0025	0.4	No	
ALPHA-CHLORDANE	1/3	0.0009	J	0.001	J	PEN44SB0201-D	0.00048-0.00053	0.001	0.1	0.01	No	OC Each
BETA-BHC	1/3	0.002	J	0.002	J	PEN44SB0201-D	0.00061-0.00068	0.002	0.001	**2**	**Yes**	
DIELDRIN	1/3	0.001	J	0.002	J	PEN44SB0201-D	0.00038-0.00042	0.002	0.1	0.0	No	OC Each
ENDOSULFAN SULFATE	1/3	0.002	J	0.003	J	PEN44SB0201-D	0.00065-0.00072	0.003	0.1	0.0	No	OC Each
ENDRIN KETONE	1/3	0.002	J	0.002	J	PEN44SB0201-D	0.00069-0.00076	0.002	0.1	0.0	No	OC Each
GAMMA-BHC (LINDANE)	1/3	0.001	J	0.001	J	PEN44SB0201-D	0.00045-0.00049	0.001	0.00005	**22**	**Yes**	
GAMMA-CHLORDANE	1/3	0.003	J	0.003	J	PEN44SB0201-D	0.00047-0.00053	0.003	0.1	0.03	No	OC Each
HEPTACHLOR	1/3	0.002	J	0.002	J	PEN44SB0201-D	0.00067-0.00076	0.002	0.1	0.02	No	OC Each

TABLE 7-1
OCCURENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SURFACE SOIL
SITE 44
NAS PENSACOLA, FLORIDA

Chemical	Detection Frequency (1)	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Range of Nondetects (2)	Concentration Used for Screening (3)	EPA Region 4 Surface Soil Screening Values (4) mg/kg	Hazard Quotient (5)	COPC Yes/No	Notes
Inorganics (mg/kg)												
ALUMINUM	3/3	1360		7070		PEN44SB2501	0	7070	50	**141**	**Yes**	
ARSENIC	3/3	0.49		1.6		PEN44SB2501	0	1.6	18	0.1	No	Eco SSL P
BARIUM	3/3	2.4		11.2		PEN44SB0201	0	11.2	330	0.03	No	Eco SSL I
CADMIUM	2/3	1.8		2.1		PEN44SB0201	0.03-0.03	2.1	0.36	**6**	**Yes**	Eco SSL M
CALCIUM	3/3	1050	J	36900	J	PEN44SB1101		36900	NA	NA	No	NUT
CHROMIUM	3/3	2.1		15.3		PEN44SB2501		15.3	26	0.6	No	EcoSSL for Cr^{+3}
COBALT	3/3	0.32		0.58		PEN44SB1101		0.58	13	0.04	No	Eco SSL P
COPPER	3/3	1.1	J	8.5	J	PEN44SB0201-D		8.5	28	0.3	No	Eco SSL A
IRON	3/3	712		5550		PEN44SB2501		5550	200	**28**	**Yes**	
LEAD	2/3	22.6		27.6		PEN44SB0201-D	0.82-0.82	27.6	11	**2.5**	**Yes**	Eco SSL A
MAGNESIUM	3/3	118		574		PEN44SB1101		574	NA	NA	No	NUT
MANGANESE	3/3	16.5		33.5		PEN44SB2501		33.5	220[8]	0.2	No	
MERCURY	2/3	0.01		0.02		PEN44SB2501&44SB02	0.01-0.01	0.02	0.1	0.2	No	
NICKEL	3/3	0.93	J	3.1		PEN44SB2501		3.1	30	0.1	No	
POTASSIUM	3/3	71.2	J	247		PEN44SB2501	29.66-29.66	247	NA	NA	No	NUT
SODIUM	3/3	29.7		292	J	PEN44SB1101	2.61-2.61	292	NA	NA	No	NUT
VANADIUM	3/3	1.9	J	11.6		PEN44SB2501		11.6	7.8	**1.5**	**Yes**	Eco SSL A
ZINC	2/3	36.3		39.4		PEN44SB0201	1.8-1.8	39.4	50	0.8	No	
Petroleum Hydrocarbons (mg/kg)												
TPH (C08-C40)	2/3	34		47		PEN44SB2501	1.9-1.9	47	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 Based on Region 4 Waste Management Division, Soil Screening Values for Hazardous Waste Sites
5 Hazard quotient = maximum detected concentration ÷ ecological screening value
6 CCME (2006) per FDEP
7 USEPA Ecological Soil Screening Level for total PAHs (June 2007)
8 USEPA Ecological Soil Screening Level for manganese (April 2007)

Definitions
COPC = Chemical of Potential Concern
mg/kg = milligrams per kilogram
J = Estimated Value
NA = Not Applicable/Not Available.
ESV = Ecological Screening Value
Eco SSL - EPA Ecological Soil Screening Level: I -invertebrate, P - plant, A - avian, M- mammal
NUT = Essential Nutrient
OC = ESV for Organochlorinated (each)

Associated Samples:

44SB3001	NORMAL	44SB4801	NORMAL
44SB3101	NORMAL	44SB4901	NORMAL
44SB3201	NORMAL	44SB5001	NORMAL
44SB3301	NORMAL	44SB5101	NORMAL
44SB3401	NORMAL	44SB5201	NORMAL
44SB3501	NORMAL	PEN44SB0201	ORIG
44SB4201	NORMAL	PEN44SB0201-AVG	AVG
44SB4301	NORMAL	PEN44SB0201-D	DUP

Total petroleum hydrocarbons were retained as a COPC because no Region 4 ESV is available.

7.5.2 Groundwater

Surface (fresh) water ESVs were not available for four of the VOCs detected in groundwater (1,1-DCA, cis-1,2-dichlorethene, total 1,2-DCE, and TCE). The two remaining VOCs had maximum concentrations in groundwater less than their corresponding ESVs (Table 7-2). One SVOC (bis(2-ethylhexyl)phthalate) had a maximum groundwater concentration that exceeded the ESV. Two SVOCs (2-methylnaphthalene, fluorene) had no ESV. Four metals (aluminum, hexavalent chromium, iron, and lead) had maximum groundwater concentrations in excess of corresponding ESVs. Two inorganic compounds detected in groundwater (barium and manganese) had no surface water ESVs. No Region 4 ESV is available for TPH.

7.6 REFINEMENT OF PRELIMINARY COPCS

At this point, the first two steps of the ecological risk assessment have been completed. The ecological risk assessment process includes a series of scientific/management decision points (SMDPs) (USEPA, 1997). 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 4 recognizes that most ecological risk assessments will proceed into Step 3, and facilities are encouraged to submit the results of Steps 1-3 as a single deliverable document (USEPA, 2000a). With this in mind, and since the screening level ecological risk assessment indicates a potential for adverse effects, a more thorough assessment is warranted. Therefore, the risk assessment process for Site 44 will proceed into Step 3 (Baseline Risk Assessment Problem Formulation).

The baseline ecological risk assessment begins with a more balanced evaluation of the conservativeness inherent in the first two steps of the risk assessment process (USEPA, 1997; 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 and invertebrates). Examples of factors considered during Step 3A include toxicological evaluation of COPCs, frequency of detection and spatial distribution of contaminants, comparison to background, and consideration of habitat quality (USEPA, 1997; USEPA 2000a, DON, 1999).

Food-chain modeling was not conducted for the Site 44 screening level ecological risk assessment due to the absence of upper trophic level receptors resulting from the poor habitat quality found at the site. The area of investigation is industrial in nature with disturbed soils classified as urban that have been paved or built upon. Wildlife receptors are unlikely to reside or feed at Site 44 and are more likely to be transient in route to more suitable habitat.

TABLE 7-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF COPCs
GROUNDWATER
SITE 44 REMEDIAL INVESTIGATION REPORT
NAS PENSACOLA
PENSACOLA, FLORIDA

Chemical	Detection Frequency (1)	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Location of Maximum Concentration	Range of Nondetects (2)	Concentration Used for Screening (3)	USEPA Region 4 Fresh Surface Water Screening Values (4) ug/L	Hazard Quotient (5)	Notes
Volatile Organics (ug/L)											
1,1-DICHLOROETHANE	1/28	2		2		44GW1801	0.11-0.4	2	NA	NA	
CHLOROFORM	13/28	0.22	J	1.6		44GW1601	0.13 - 0.4	1.6	289	0.01	
CHLOROMETHANE	2/28	0.3	J	0.7	J	3221GW0301	0.18-0.3	0.7	5500	0.0001	
CIS-1,2-DICHLOROETHENE	6/28	0.9	J	2.9		44GW2101	0.14-0.44	2.9	NA	NA	
TOTAL 1,2-DICHLOROETHENE	5/28	0.9	J	2	J	44GW1101&1401	0.6 - 0.6	2	NA	NA	
TRICHLOROETHENE	8/28	0.49	J	52		3221GW0901	0.23 - 3.4	52	NA	NA	
Semivolatile Organics (ug/L)											
2-METHYLNAPHTHALENE	4/19	0.1	J	0.4		3221GW0801&GW0601	0.06 - 0.06	0.4	NA	NA	
BIS(2-ETHYLHEXYL)PHTHALATE	2/21	10		11		44GW1901	1-8	11	0.3	**37**	
FLUORENE	1/19	0.06	J	0.06	J	3221GW0601	0.06 - 0.06	0.06	NA	NA	
NAPHTHALENE	4/19	0.07	J	0.2	J	3221GW0601	0.05 - 0.05	0.2	62	0.003	
Inorganics (ug/L)											
ALUMINUM	6/19	960		2800	J	44GW0901	69.7-810	2800	87	**32.2**	
BARIUM	3/19	9.5		19.4		44GW1801	3.1-9.8	19.4	NA	NA	
CALCIUM	19/19	12600		46900		44GW1901		46900	NA	NA	NUT
CHROMIUM	9/19	1.4		24.1		3221GW0201	1.01-1.01	24.1	11	**2.2**	As Cr^{+6}
IRON	17/21	123		1820		44GW1801	51.7-92.4	1820	1000	**1.8**	
LEAD	2/20	1.6		3.8		3221GW0301	1.5-1.65	3.8	2.7	**1.4**	Hardness[6]
MAGNESIUM	19/19	1600		4740		44GW1901		4740	NA	NA	NUT
MANGANESE	15/22	1.2		74.2		3221GW0301	0.7-3.9	74.2	NA	NA	
NICKEL	1/19	18.2		18.2		3221GW0201	11.7-11.7	18.2	141	0.1	Hardness[6]
POTASSIUM	1/19	5360		5360		44GW1201	420-2680	5360	NA	NA	NUT
SELENIUM	1/19	3.6		3.6		3221GW0201	3.59-3.7	3.6	5	0.7	
SODIUM	19/19	7050		33700		44GW1301		33700	NA	NA	NUT

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 4 Water Management Division, Water Quality Standards
5 Hazard quotient = maximum detected concentration ÷ ecological screening value
6 Hardness Dependent ESV calculated based on hardness (as CaCO3) = 88 mg/L

Definitions
ug/L = micrograms per liter
J = Estimated Value
NA = Not Applicable/Not Available.
ESV = Ecological Screening Value
NUT = Essential Nutrient

Associated Samples:

3221GW0101	NORMAL	44GW1001	NORMAL	44GW1902	NORMAL
3221GW0201	NORMAL	44GW1101	NORMAL	44GW2001	NORMAL
3221GW0301	NORMAL	44GW1201	NORMAL	44GW2101	NORMAL
3221GW0302	NORMAL	44GW1301	NORMAL	44GW2201	NORMAL
3221GW0401	NORMAL	44GW1401	NORMAL	44GW2301	NORMAL
3221GW0501	NORMAL	44GW1501	ORIG	44GW2401	NORMAL
3221GW0601	NORMAL	44GW1501-AVG	AVG	44GW2501	NORMAL
3221GW0701	NORMAL	44GW1501-D	DUP	44GW2601	NORMAL
3221GW0801	NORMAL	44GW1502	NORMAL		
3221GW0901	NORMAL	44GW1601	NORMAL		
3221GW1001	ORIG	44GW1701	NORMAL		
3221GW1001-AVG	AVG	44GW1801	NORMAL		
3221GW1001-D	DUP	44GW1802	NORMAL		
44GW0901	NORMAL	44GW1901	NORMAL		

7.6.1 Step 3A Discussion

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

7.6.1.1 VOCs

One VOC (acetone) was retained as a COPC in surface soil because an USEPA Region 4 ESV was not available. Acetone is a common laboratory contaminant. The toxicity of acetone to animals is in the parts-per-thousand range (Opresko, 1995). Acetone was detected in only one sample at a low concentration (0.12 mg/kg). Although toxicity data is sparse regarding its effects to invertebrates and plants, the presence of acetone at relatively low concentrations in soil probably poses negligible risk.

Four VOCs detected in groundwater had no USEPA Region 4 ESVs for comparison (1,1-DCA, cis-1,2-DCE, total 1,2-DCE, TCE). All of these compounds were detected at low concentrations. In the absence of USEPA Region 4 ESVs, supplemental surface water screening values were researched. Additional sources for surface water guidelines include secondary chronic and acute values calculated by the Oak Ridge National Laboratory (ORNL) (Suter and Tsao, 1996), using methods developed by the USEPA (USEPA,1993) for the Great Lakes. The methods developed for calculating secondary, or Tier II, values were designed for instances were there were some acceptable toxicity data for a chemical, but not enough to satisfy the requirements for calculating water quality criteria, or Tier I values. "The Tier II methodology generally produces more stringent values than the Tier I methodology, to reflect greater uncertainty in the absence of additional toxicity data (USEPA, 1993)." ORNL used methods similar to the USEPA in qualifying toxicological data for inclusion in the Tier II calculations. Both the USEPA and ORNL used primarily effect level values from 48- and 96-hour acute tests to set water quality criteria and secondary values. Chronic values are usually developed from acute values using acute-chronic ratios based on tests incorporating both types of endpoints and performed in a similar manner. It should be noted that the secondary chronic values (SCVs) are freshwater values. The following SCVs were identified for VOCs detected in groundwater that have no USEPA Region 4 ESVs:

- 1,1-DCA SCV 47ug/L
- 1,2 DCE SCV 590ug/L
- TCE SCV 47ug/L

All detected concentrations in groundwater of 1,1-DCA, cis-1,2-DCE, and total 1,2-DCE are less than the corresponding SCVs above. Only the maximum detected concentration of TCE (52 ug/L) was greater than its SCV. The low detected VOC concentrations in groundwater should become even more dilute upon discharge and are not expected to be associated with unacceptable risk.

TPH was retained as a COPC in surface soil as no USEPA Region 4 ESV is available. No surface water ESV is available for TPH either. It should be noted that TPH is a general term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Because there are so many different chemicals in crude oil and in other petroleum products, it is not practical to measure each one separately (ATSDR, 1999). TPH is therefore a general parameter used to evaluate potential soil and groundwater contamination from petroleum products such as gasoline, fuel oils, mineral oils, and jet fuel. As a gross measure of petroleum contamination, TPH results simply show that petroleum hydrocarbons are present in the sampled media. Many of the individual components of TPH have been evaluated for potential ecological risk at Site 44 such as VOCs, SVOCs, and PAHs. TPH is therefore not considered a COPC at Site 44.

7.6.1.2 SVOCs

Six PAHs (1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, benzo(g,h,i)perylene, chrysene, and fluorene), were retained as COPCs in surface soil because USEPA Region 4 ESVs or Canadian SQGs were not available. Ecologically-based toxicity values are sparse for PAHs in soil, and USEPA Region 4 has established screening values for only 8 of the 17 individual PAHs detected at the site. The USEPA Region 4 screening values for six of these eight PAHs are based on Dutch values established in the Netherlands during the 1980s (MHSPE, 1994).

The Dutch guidelines contain a range of values including Target, Intervention, and Intermediate. The Dutch Target values represent clean soil, the Intervention value represents seriously contaminated soil, and the concentration midway between the target value and the intervention value is designated as an Intermediate value. The Dutch guidelines specify that concentrations greater than the target value but less than the intermediate value require no further investigation (but minor restrictions may be applied on soil use), while further investigation is required when concentrations exceed the intermediate value but are less than the intervention value (Swartjes, 1999).

The Dutch screening values for total PAHs include a Target value of 1 mg/kg and an Intervention value of 40 mg/kg for total PAHs (MHSPE, 1994). The Intermediate value for total PAHs in soil (i.e., the concentration midway between the target value and the intervention value) is 20 mg/kg.

An ecological screening value of 20.8 mg/kg for total PAHs was calculated by Lingenfelser (2000) for assessing risk to soil invertebrates. Lingenfelser's screening value was derived using toxicity equivalency factors and was based on a study by Neuhauser et al (1986) in which the effects of fluorene were evaluated using four species of earthworms. The similarity of Lingenfelser's screening value relative to

the Dutch intermediate value provides credence for use of the Dutch value as a conservative screening value for total PAHs.

The toxicity of PAHs is often assumed to be additive, so evaluating PAH toxicity in soil by examining total PAH concentrations is especially useful when, as at Site 44, several PAHs were detected for which ecological screening values do not exist. The maximum concentration of total PAHs at Site 44 (8.4 mg/kg) exceeds the USEPA Region 4 ESV of 1 mg/kg, but was below both the 20 mg/kg Dutch intermediate value and the Lingenfelser (2000) soil invertebrate toxicity threshold value of 20.8 mg/kg. Only one sample (44SB3101) had a total PAH concentration that exceeded the USEPA Region 4 ESV. The range of total PAHs in all other samples (0 mg/kg – 0.5 mg/kg) are well below the USEPA Region 4 ESV. Thus, risks to plants and soil invertebrates from PAHs are negligible.

USEPA Region 4 surface water ESVs were not available for the PAHs 2-methylnaphthalene and fluorene. In the absence of USEPA Region 4 ESVs, Tier II SCVs (Suter and Tsao, 1996) were reviewed for applicable screening values. The following SCVs were identified:

- 1-Methylnaphthalene SCV 2.1 ug/L
- Fluorene SCV 3.9 ug/L

All detected concentrations of 2-methylnaphthalene in groundwater are below the SCV for 1-methylnaphthalene. All detected concentrations of fluorene in groundwater are below the SCV. Potential risks from these PAHs in groundwater are therefore considered negligible.

Bis(2-ethylhexyl)phthalate was detected in 2 of 21 groundwater samples (44GW1501 and 44GW1901) at concentrations in excess of the USEPA Region 4 ESV. There is uncertainty associated with the result of sample 44GW1501 as its duplicate sample (44GW1501-D) was reported as non-detect for bis(2-ethylhexyl)phthalate. Phthalates are common environmental contaminants due to their use in plastics. Phthalates can also be an artifact of the sampling and/or analytical methods. Even though the maximum reported concentration of bis(2-ethylhexyl)phthalate (11 ug/L) exceeds the USEPA Region 4 ESV, potential risk is considered negligible.

7.6.1.3 Pesticides

Two pesticides (beta- and gamma-BHC) were detected in surface soil at concentrations that exceeded their applicable USEPA Region 4 ESVs. Both beta and gamma-BHC were detected in only one of three samples (PEN44SB0201-D). There is uncertainty regarding the result for beta-BHC as the original sample (PEN44SB0201) was reported as non-detect for beta-BHC. Samples PEN44SB0201 and 0201-D

were collected at the eastern edge of Building 3629. While minimal risk may be present at this location, it is mitigated by the limited areas of exposed soil available to soil invertebrates and plants.

Pesticides were not detected in groundwater.

7.6.1.4 Metals

Aluminum, cadmium, iron, lead, and vanadium were retained as COPCs in surface soil because their maximum concentrations exceeded their respective Region 4 ESVs or Eco SSLs. As previously discussed, where Eco SSLs were available, the lowest value for invertebrate, plant, avian, or mammal was used. Three metals (cadmium, lead, and vanadium) were identified as COPCs based on comparisons to Eco SSLs for avian or mammalian endpoints. The preliminary assessment endpoint for the screening level ecological risk assessment is the protection of plants and soil invertebrates from adverse effects of chemicals on their growth, survival, and reproduction. The use of Eco SSLs based on avian or mammalian endpoints may be overly conservative when Eco SSLs for the specified assessment endpoints are available.

Cadmium was detected in two of three surface soil samples. A mammalian Eco SSL of 0.36 mg/kg was used as the ESV for cadmium (USEPA, 2005a). The soil invertebrate Eco SSL is 140 mg/kg and the plant Eco SSL is 32 mg/kg. The maximum surface soil concentration (2.1 mg/kg) is much less than the invertebrate and plant values so risk from cadmium is considered negligible.

Lead was detected in two of three surface soil samples. Lead exceeded the USEPA Region 4 ESV in both of these samples. The ESV (11 mg/kg) is based on an Eco SSL for avian receptors (USEPA, 2005b). The corresponding Eco SSL for soil invertebrates is 1700 mg/kg while the Eco SSL for plants is 120 mg/kg. No surface soil concentrations exceeded the Eco SSL for invertebrates or plants. Overall, potential risk to plants and soil invertebrates from lead in surface soil is negligible.

Vanadium was detected in three of three surface soil samples but exceeded the USEPA Region 4 ESV (7.8 mg/kg) in only one sample (44SB2501), at 11.6 mg/kg. The USEPA Region 4 ESV for vanadium is based on an Eco SSL for avian receptors (USEPA, 2005c). The only other available Eco SSL is for mammalian receptors (280 mg/kg). No Eco SSLs were available for plants or soil invertebrates. To further evaluate potential risk, detected vanadium concentrations were compared to the following toxicity guidelines:

- Canadian Soil Quality Guidelines (SQG) for vanadium 130 mg/kg agricultural use (CCME, 1999)
- Dutch Target Value for vanadium 42 mg/kg (MVROM, 2000)

The derivation of the Canadian SQG is based on toxicological data for vascular plants and soil invertebrates. Sufficient toxicological data were available to derive a Threshold Effects Concentration (TEC) based on a test on seedling emergence in lettuce (*Latuca* sativa). Out of 14 data points, the 25th percentile corresponded to a TEC of 127 mg/kg which was rounded up to the SQG of 130 mg/kg. The maximum concentration of vanadium did not exceed the Canadian SQG. The maximum concentration of vanadium also did not exceed the Dutch Target Value. Based on the comparisons to these benchmarks, potential risk from vanadium to plants and soil invertebrates is considered to be minimal.

Aluminum exceeded the USEPA Region 4 ESV (50 mg/kg) in three of three surface soil samples and iron exceeded its USEPA Region 4 ESV (200 mg/kg) in three of three samples. The USEPA Region 4 ESVs for aluminum and iron are from the ORNL screening benchmarks (Efroymson et al., 1997a; Efroymson, Will, and Suter 1997b). The ESV for aluminum is based on toxicity to plants, while the ESV for iron is based on toxicity to soil microorganisms and microbial processes. USEPA Eco SSLs for aluminum and iron are not available. The Eco SSL document for aluminum (USEPA, 2003a) indicates that the typical range of aluminum in soils is from 1 percent to 30 percent (10,000 to 300,000 mg/kg) with naturally occurring concentrations varying over several orders of magnitude. The detected concentrations of aluminum at Site 44 range from 1,360 mg/kg to 7,070 mg/kg which is below the bottom end of the cited range. Additionally, all Site 44 surface soil samples except the maximum had aluminum concentrations less than the NAS Pensacola Reference Concentration for aluminum in surface soil (3,883 mg/kg). The Eco SSL further states that because the measurement of total aluminum in soils is not considered suitable or reliable for the prediction of potential toxicity and bioaccumulation, an alternative (not concentration-based) procedure is recommended for screening aluminum in soils. The conclusion in the Eco SSL document is that aluminum is a COPC only at sites where the soil pH is less than 5.5. In the absence of soil pH data, there is uncertainty regarding potential ecological risk from aluminum; however, based on the typical range of aluminum in surface soil cited in the Eco SSL (USEPA, 2003a), and the comparison to the NAS Pensacola Reference concentration, any risk from aluminum is considered to be negligible .

The USEPA Eco SSL document for iron states that identifying a specific benchmark for iron in soils is difficult because iron's bioavailability to plants and resulting toxicity are dependent upon site-specific soil conditions (USEPA, 2003b). The document indicates that typical iron concentrations in soils range from 0.2 to 55 percent (2,000 to 550,000 mg/kg) and concentrations can vary significantly, even within localized areas, due to soil types and the presence of other sources. Iron concentrations at Site 44 ranged from 712 mg/kg to 5,550 mg/kg which is at the lower end of the cited range. Only the maximum concentration was greater than the NAS Pensacola Reference concentration for iron in surface soil (2,745 mg/kg). As discussed in the Eco SSL document, iron is essential for plant growth and is generally considered to be a micronutrient and is considered the key metal in energy transformations needed for

syntheses and other life processes of the cells. In well-aerated soils between pH 5 and 8, the iron demand of plants is higher than the amount available. Because of this limitation, plants have evolved various mechanisms to enhance iron uptake. Under these soil conditions, iron is not expected to be toxic to plants. In the absence of soil pH data, there is uncertainty regarding potential ecological risk from iron however, based on the typical range of iron in surface soil cited in the Eco SSL (USEPA, 2003b) and comparison to the NAS Pensacola Reference concentration, any risk from iron is considered to be negligible.

Four metals (aluminum, chromium, iron, and lead) had maximum groundwater concentrations in excess of corresponding USEPA Region 4 fresh water ESVs. Each of these metals is addressed individually below.

Aluminum was detected in 6 of 19 samples and all six samples had concentrations in excess of the USEPA Region 4 ESV. There is uncertainty associated with sample 44GW1501 as its duplicate sample (44GW1501-D) was reported as non-detect for aluminum. There is also uncertainty regarding potential risk due to the fact that detection limits are greater than the USEPA Region 4 ESV (87 ug/L). No pH data is available for the sampled groundwater. The NAS Pensacola Reference Concentration for aluminum in groundwater is 3,883 ug/L. All groundwater samples had concentrations less than the reference concentration. Considering the comparison to the reference concentration and dilution upon discharge, potential risk from aluminum in groundwater is considered to be negligible.

Chromium was detected in 9 of 19 groundwater samples. Of these nine samples, only two samples had chromium concentrations that exceeded the USEPA Region 4 ESV for hexavalent chromium (11 ug/L). The HQ for the maximum concentration was low (2.2). Hexavalent chromium is the form of chromium typically considered in screening level ecological risk assessments due to its toxicity. The USEPA Region 4 ESV for trivalent chromium (adjusted for a maximum site-specific hardness of 137 mg/L) is 287.86 ug/L. All detected concentrations of chromium are much less than this ESV. Groundwater samples were analyzed for total chromium so there is uncertainty as to the specific species (i.e. trivalent, hexavalent) present. Based on the low concentrations detected, the low HQ for hexavalent chromium, the fact that site concentrations are well below the USEPA Region 4 ESV for trivalent chromium, and potential effects of dilution upon discharge, potential risk from chromium in groundwater is negligible.

Iron was detected in 17 of 21 groundwater samples of which six samples had an iron concentration in excess of the USEPA Region 4 ESV (1,000 ug/L). The screening value for iron 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). The NAS Pensacola Reference

Concentration for iron in groundwater is 1,708 ug/L. Only two groundwater samples had iron concentrations greater than the NAS Pensacola Reference Concentration. Although iron was detected in a low number of samples at concentrations above the USEPA Region 4 ESV, based on a comparison to the NAS Pensacola Reference Concentration and consideration of potential dilution effects upon discharge, potential risk from iron in groundwater is considered to be negligible.
Lead was detected in 2 of 20 groundwater samples (3221GW0301, 44GW1501). Of these two samples, only the sample with the maximum concentration (321GW0301) exceeded the USEPA Region 4 ESV (HQ = 1.4). There is uncertainty associated with the results of sample 44GW1501 because its duplicate sample (44GW1501-D) was reported as non-detect for lead. Due to the low frequency of detection, low detected concentrations, and potential dilution effects upon discharge, potential risk from lead in groundwater is considered negligible.

USEPA Region 4 fresh water ESVs were not available for the metals barium and manganese. Therefore, alternate screening benchmarks were used for comparisons to groundwater concentrations.

An ORNL Tier II SCV (Suter and Tsao, 1996) is available for barium (4.0 ug/L). Barium was detected in 3 of 19 groundwater samples exceeding the SCV in all samples. Only one sample had a barium concentration greater than the NAS Pensacola Reference Concentration (13.22 ug/L). Although barium was detected at concentrations above the fresh water SCV, based on the low frequency of detection and potential dilution effects upon discharge, potential risk from barium in groundwater is considered to be negligible..

Manganese was detected in 15 of 22 groundwater samples with no concentrations exceeding the ORNL (Suter and Tsao, 1996) SCV (120 ug/L). Based on this information and potential dilution effects upon discharge, potential risk from manganese is considered negligible.

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

There is uncertainty in the extent that wildlife receptors are present at Site 44. The site provides poor habitat comprised of paved surfaces, buildings, and disturbed soils and as a result, significant habitation and foraging probably does not occur at the site. The current land use and adjacent airfield operations most likely further discourages the use of this site. The precise extent of overestimation is uncertain.

7.7.2 Uncertainty in the Ecological Effects Characterization

The ESVs used in the assessment might not adequately represent toxicity thresholds for receptors under field conditions. In addition, the ESVs might not adequately represent toxicity thresholds for other species. These uncertainties may overestimate or underestimate potential risks.

There is uncertainty regarding the specific species of some chemicals present at the site (i.e trivalent or hexavalent chromium). This uncertainty is most likely negligible for this site due to the low detected concentrations.

Data for investigating toxicity to reptiles and amphibians from oral ingestion of contaminants are sparse. Thus, potential risks were not evaluated for reptiles and amphibians. Due to the lack of habitats for reptiles and amphibians at the site, however, the resulting uncertainty is minor.

7.7.3 Uncertainty in the Exposure Assessment

Detection limits reported for non-detected aluminum in groundwater exceeded the ESV (Table 7-2). While the high detection limits prevents a complete evaluation of the presence of this metal in these samples, the overall impact of this uncertainty is not considered significant.

The dermal exposure for upper-level receptors was not evaluated, potentially underestimating risks. However, because few upper-level receptors probably use Site 44, this exposure route is considered negligible.

Soil samples evaluated in this risk assessment consisted of samples no deeper than 1 foot below the soil surface. However, tree roots extend deeper than 1 foot below the surface, and mammals such as moles could burrow deeper than 1 foot. With the exception trees, terrestrial species at the site would rarely (if ever) be exposed to soils deeper than 1 foot below the surface. The uncertainty resulting in evaluating only surface soils is negligible.

7.7.4 Uncertainty in the Risk Characterization

This uncertainty results from the combination of the above uncertainties. 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 COPCs 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 surface soil exceeded conservative screening levels that are associated with potential risk to ecological receptors. Contaminants detected in groundwater may be associated with Site 44 or upgradient source(s) such as the flammable storage area or removed USTs. When conservative assumptions used in the ecological risk assessment are re-evaluated and factors that affect potential exposures such as quality of the habitat, and potential use of the site by ecological receptors are considered, the overall level of ecological risk associated with detected contaminants is considered to be minimal. The following conclusions are discussed by the groups of chemical contaminants identified at Site 44.

Overall risk to soil invertebrates and plants from VOC contaminants at Site 44 is considered negligible.

Potential risk associated with VOCs in groundwater is considered to be negligible.

There is uncertainty regarding potential risk associated with PAHs for which no surface soil ESVs are available; however, all but one of the total PAH concentrations were less than the USEPA Region 4 ESV and the other cited benchmarks. Thus, risks to plants and soil invertebrates from PAHs are negligible.

Potential risk from PAHs in groundwater is considered negligible.

Potential risk from bis(2-ethylhexyl)phthalate detected in groundwater is considered negligible. A minimal level of risk to soil invertebrates and plants may be present at location PEN44SB0201; however, it is mitigated by the limited areas of exposed soil available to soil invertebrates and plants.

Pesticides were not detected in groundwater.

Potential risk to plants and soil invertebrates from metals in surface soil appears negligible.

While no pH data is available for surface soil at Site 44, potential risk to plants and soil invertebrates from aluminum and iron is considered negligible.

Potential risk from metals detected in groundwater at Site 44 is considered negligible.

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 44. In order to achieve this primary objective, samples from various media were collected and analyzed to fill data gaps from previous investigations. Samples from various media were used to evaluate the extent of contamination previously documented at the site and current site conditions.

8.1 SITE HYDROLOGY

The depth to groundwater at Site 44 ranges is approximately 6 feet in the shallow monitoring wells and is controlled primarily by surface topography. Groundwater flow direction in the shallow groundwater interval is to the northeast. The estimated average groundwater velocity for the shallow zone at the site was calculated at 0.48 feet/day. An downward vertical gradient of 0.06 to 0.07 feet/foot was observed in adjacent pairs of shallow and deep monitoring wells.

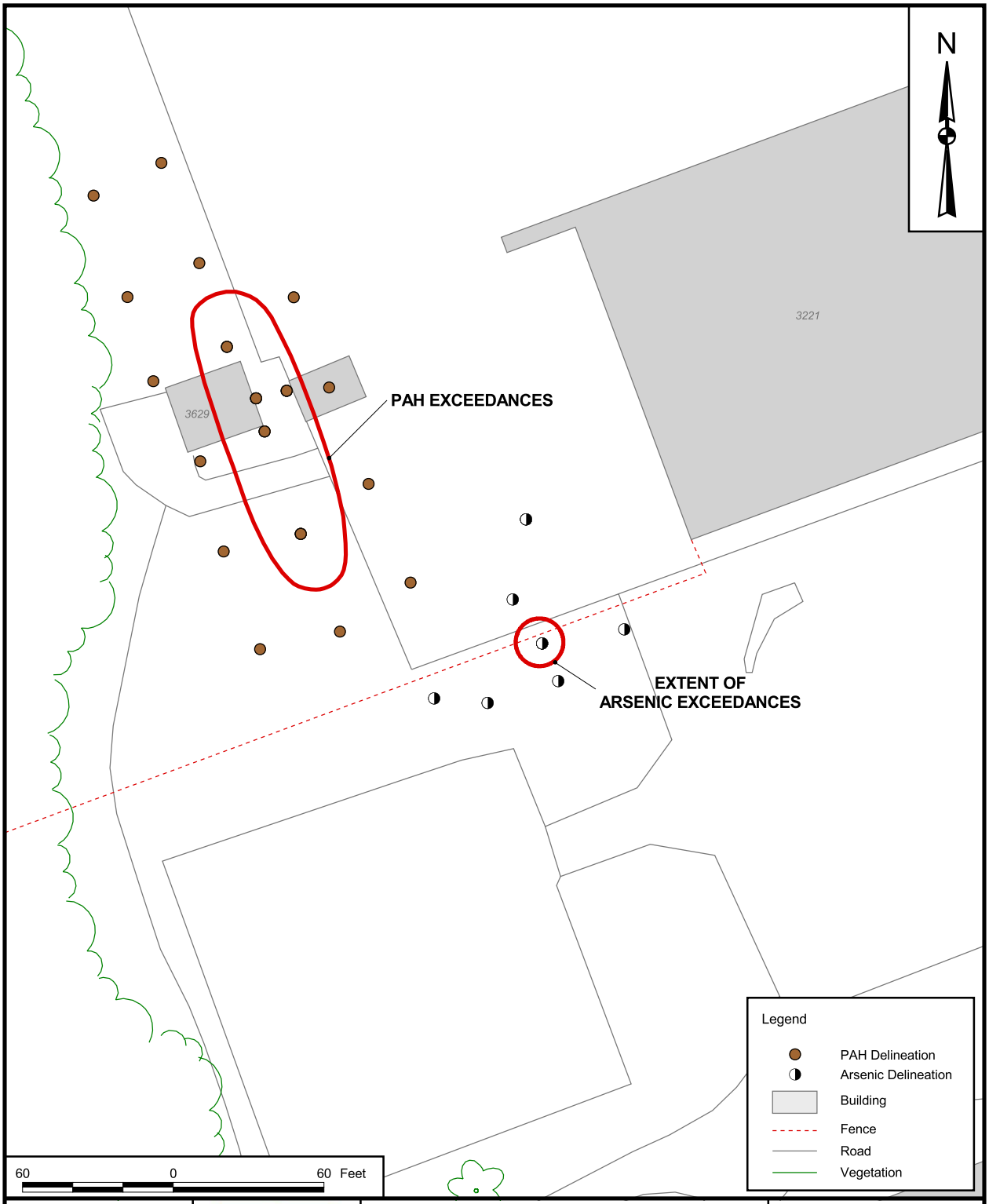
8.2 SOIL ASSESSMENT

The release of contaminants at Site 44 may to have resulted from routine aircraft maintenance activities and storage of materials used in these activities. The source and nature of materials, as well as the time of disposal, are undocumented. Soil screening for VOCs with the mobile laboratory identified one soil boring location with a detectable concentration of PCE.

Arsenic delineation sampling indicated that arsenic exceedances were limited to one soil boring location, 44SB25 (Figure 8-1). Arsenic was reported in two soil samples at concentrations greater than the residential SCTL. These arsenic concentrations were within the background range determined by statistical analysis of arsenic and iron distribution at NAS Pensacola (discussed in Appendix B).

cPAH delineation sampling identified an area of cPAH exceedances around the foundation of former Building 3629 (Figure 8-1). Four soil boring locations, 44SB02, 44SB31, 44SB34, and 44SB47 had benzo(a)pyrene equivalent concentrations exceeding the residential SCTL.

Lead and cadmium were reported at concentrations exceeding their GCTLs in SPLP. The total lead concentrations in all samples were less than the NAS Pensacola Reference Concentration. The total cadmium results in all samples were less than the default leaching SCTL.



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CHECKED BY B. OLSON	DATE 4/25/07		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 8-1 REV 0

P:\GIS\PENSACOLA_NAS\MAPDOCS\APR\SITE44_45_46.APR SITE 44 SOIL INVESTIGATION SUMMARY LAYOUT 4/25/07 JEE

8.3 GROUNDWATER ASSESSMENT

Groundwater samples collected at Site 44 were analyzed for the full suite of TCL and TAL analytes and petroleum hydrocarbons. Concentrations of Pesticides, PCBs, and TRPH were less than the laboratory detection limits.

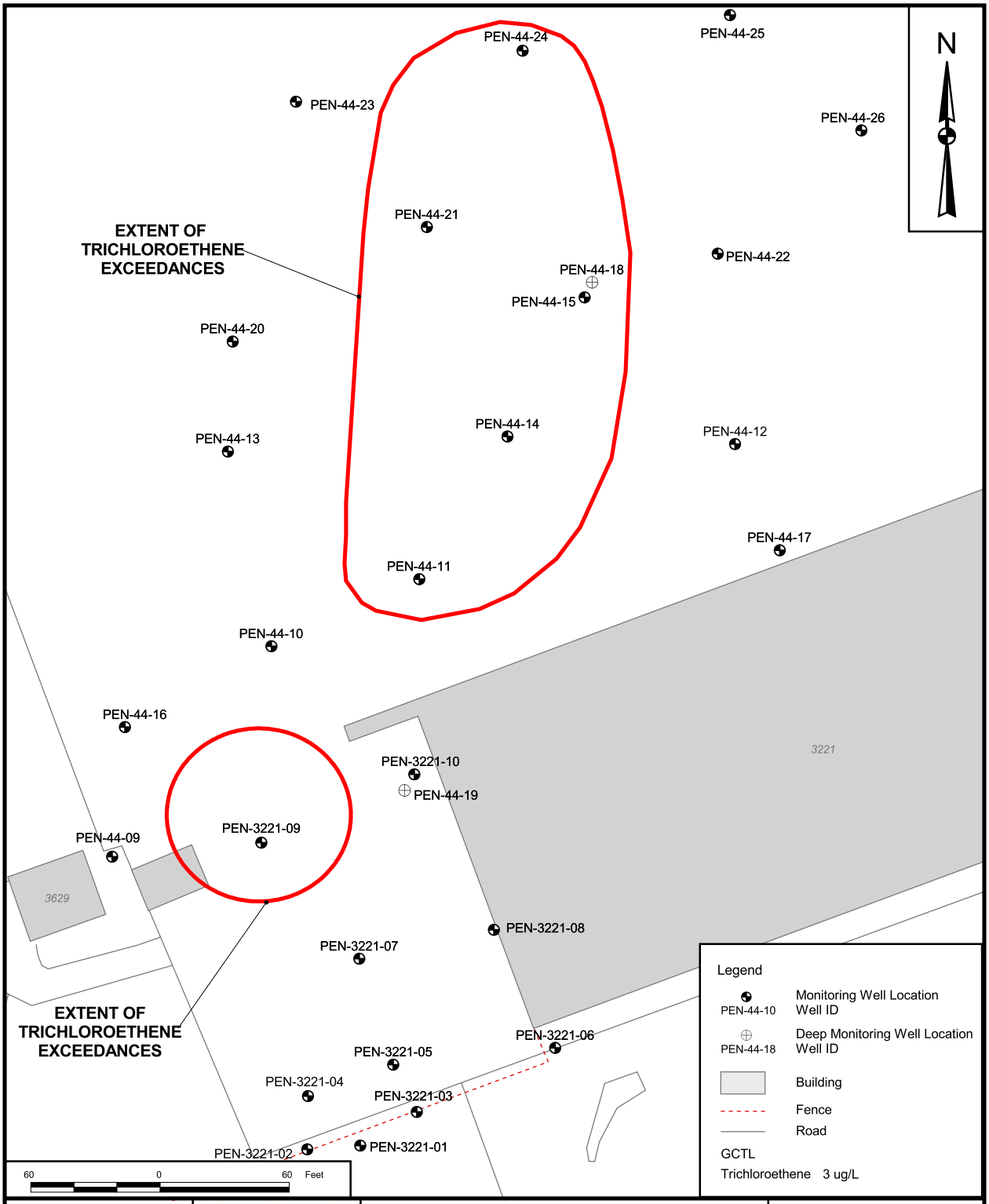
TCE was detected at concentrations exceeding the GCTL in six shallow monitoring wells (Figure 8-2). One plume was identified in the vicinity of PEN-3221-09, which was installed as part of the UST investigation and previously had TCE exceedances. The second, larger plume extends north from the northwest corner of Building 3221, and includes monitoring wells PEN-44-11, PEN-44-14, PEN-44-15, PEN-44-21, and PEN-44-24.

Bis(2-ethylhexyl)phthalate was detected concentrations greater than the GCTL in two of the monitoring wells. Each of these wells were resampled in May 2006 and the reported bis(2-ethylhexyl)phthalate concentrations were less than the laboratory detection limit.

Aluminum was detected in most of the monitoring wells sampled for the RI at concentrations exceeding the GCTL, but less than the NAS Pensacola background aluminum concentration. Iron and manganese were detected monitoring wells sampled for the RI at concentrations exceeding the GCTL, but less than the NAS Pensacola Background Concentration.

8.4 HUMAN HEALTH RISK ASSESSMENT

The risk assessment considered five receptor scenarios; however, maintenance workers and trespassers/recreational users are considered to be the most likely receptors at Site 44 under current land use. Noncarcinogenic risks are below the target HI of 1.0 to satisfy USEPA and FDEP requirements for exposure to surface soil, subsurface soil, and groundwater. Carcinogenic risks exceed 1×10^{-4} for exposure to groundwater by the hypothetical future resident. Carcinogenic risks for exposure to surface and subsurface soil are within the USEPA's target risk range of 10^{-4} to 10^{-6} for all receptors. However, risks associated with exposure to surface soil exceed FDEP's target risk level of 10^{-6} for the hypothetical future resident, lifelong recreational users, and industrial worker. Carcinogenic risks associated with exposure to subsurface soil exceed FDEP's target risk level for the hypothetical future resident. In soil the primary driver of risk are cPAHs, and in groundwater the primary driver of risk is TCE.



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B. OLSON	5/03/07		PENSACOLA, FLORIDA	APPROVED BY — DATE —
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8.5 ECOLOGICAL RISK ASSESSMENT

The ecological risk assessment evaluated factors that affect potential exposures such as quality of the habitat, and potential use of the site by ecological receptors. The overall level of ecological risk associated with detected contaminants is considered to be negligible.

8.6 CONCLUSIONS

cPAHs were detected in surface soil and subsurface soil samples at concentrations exceeding risk-based screening criteria (Figure 8-1). TCE in groundwater samples exceeded risk-based screening criteria (Figure 8-2). Arsenic concentrations in soil, although greater than the risk based criteria, are within the background range for arsenic at NAS Pensacola.

The contaminants in Site 44 soil and groundwater will require measures to eliminate or minimize exposure by active cleanup, engineering controls, and/or institutional controls. To achieve no further action for residential or industrial criteria, exposure to soil in the vicinity of the foundation of former Building 3629 will have to be prevented. Exposure to groundwater at the site will also require control or remediation. A detailed evaluation of alternatives to achieve these goals should be presented in a Feasibility Study for Site 44.

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APPENDIX A

FIELD DATA SHEETS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW site 44B
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Supply
DRILLING RIG: DPT

BORING NUMBER: SB01
DATE: 9/14/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
						TAN	FS		44SB01 0-6"				
1													
									44SB01 6"-2'				
2						BRN	FS						
									44SB01				
3													
						off white	FS						
4													
									44SB01				
5													
6							wet @ 6'						
TD													
7													
8													
0 TD													

* 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: PEW 44 RI
PROJECT NUMBER: RJ 00007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB02
DATE: 9/14/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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**
							TAN FS		Sampling 0-6"				
1									6"-2'				
							orange FS						
2							Tan FS wet @ 2'						
							trace Clay		2'-4'				
3													
4							offwhite FS		4-6'				
5													
							wet @ 6'						
6	TD												
7													
8													

* 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: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB03
DATE: 9/14/07
GEOLOGIST: W.D. Olson
DRILLER: B. Cordell

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**
						TAN	FS		SAMPLES 0-6"				
1									6"-2'				
2									2-4'				
3													
4							off wht FS		4-6				
5													
6							wet @ 6'						
TD													
7													
8													

* 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: PEW 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB04
DATE: 9/14/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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 Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							red clayey sand		0-6"				
1-							Brn FS						
									6"-2'				
2-							TAN FS						
3-									2-4'				
4-													
									4-6'				
5-													
6-							White FS		wet @ 6'				
7-													
8-													
TD													

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB05
DATE: 9/14/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Tan FS		0-6"				
1													
									6"-2'				
2													
									2-4'				
3													
4							White FS		4-6'				
5													
6									wet @ 6'				
TD													

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB06
DATE: 9/15/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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**
						TAN	FS		Samples 0-6"				
1									6"-2				
2													
									2-4				
3													
4													
							off wht FS						
5									4-6				
6							wet @ 6'						
TD													

* 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): 5.2

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB07
DATE: 9/15/05
GEOLOGIST: W.D. Olson
DRILLER: R. Cornell

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 Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1							Some oyster shell						
							Brown FS						
2									6"-2'				
3													
									2-4'				
4							some dark mottles						
5									4-6'				
							White FS						
6							wet @ 6'						
	TD												

* 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: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB 08
DATE: 9/15/05
GEOLOGIST: W.D. Olson
DRILLER: B. Comer

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**
									Samples				
							TAN FS		0-6"				
1													
							Brown FS		6"-2'				
							some oyster shell						
2													
3													
									2'-4'				
4													
							White FS						
5									4'-6'				
6									wet @ 6'				
	TD												

* 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 X Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB09
DATE: 9/15/06
GEOLOGIST: Bill Olson
DRILLER: B. Cornell

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**
							Tan FS w/well		Sample 0-6"				
1							rnd fine grnd						
									6"-2'				
2													
3									2'-4'				
4													
5									4'-6'				
							wlwb FS						
6									wet @ 6'				
TD													

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEN 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Samples
DRILLING RIG: PPT

BORING NUMBER: SB10
DATE: 9/15/05
GEOLOGIST: W.D. Olson
DRILLER: R. Cornell

	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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
								TAN FS		0-6"				
1														
								Oyster shells		6"-2'				
2														
								White FS						
3										2-4'				
4														
5										4-6'				
6								wet @ 6'						
	TD													

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB 11
DATE: 9/16/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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**
							TAN FS		Samples 0-6"				
1							Brown FS						
									6"-2'				
							TAN FS						
2							white FS						
3									2-4				
4													
5									4-6'				
6							wet @ 6'						
	TD												

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB12
DATE: 9/16/02
GEOLOGIST: W.D. Olson
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**
							TAN FS		samples 0-6"				
1-							Brown FS						
							oyster shells		6"-2'				
2-							↓						
3-									2'-4'				
4-													
							White FS						
5-									4'-6'				
6-							wet @ 6'						
	TD												

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEN U4R1
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Samplers
DRILLING RIG: DPT
BORING NUMBER: SB13
DATE: 9/16/05
GEOLOGIST: W.D. Olsen
DRILLER: B. Cornoll

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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1-							Brown FS						
							w/oyster shell		6"-2'				
2-							↓						
3-							TAN FS						
							trace silt/clay		2'-4'				
4-							↓						
5-							white FS		4'-6'				
6-													
	TD						wet @ 6'						

* 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: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB14
DATE: 9/16/05
GEOLOGIST: W.D. Olson
DRILLER: R. Cooney

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**
							Brown FS		0-6"				
1 -									6"-2'				
							Some gravel						
2 -							TANFS						
									2-4				
3 -							White FS						
4 -													
5 -									4-6				
6 -													
	TD						wet @ 6'						

* 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: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB15
DATE: 9/16/05
GEOLOGIST: W. D. Osborn
DRILLER: B. Corey

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**
							Brown FS		Sample 0-6"				
1									6"-2'				
2									2-4'				
3							White FS						
4									4'-6'				
5													
6							wet @ 6'						
	TD	-6'											

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: DEN44R1
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB16
DATE: 9/16/05
GEOLOGIST: R. Cornett L.D. Olsen
DRILLER: R. Lovell

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**
							TAN FS		0-6"				
1							↓		6"-24"				
2							BROWN FS						
							↓						
3									2-4'				
							WHITE FS						
4													
5									4-6'				
6							wet @ 5.5'						
TD													

* 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: PEN 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB17
DATE: 9/17/05
GEOLOGIST: W. Olson
DRILLER: B. Cornell

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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1									6"-2'				
2							white FS		2-4'				
3													
4													
									4-6'				
5													
							wet @ 6'						
6	TD												

* 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): 0.5

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 42 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB18
DATE: 9/18/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

	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**
								DARK TAN FS		Samples 0-6"				
1														
										6"-2'				
2														
3										2-4'				
4														
5														
								White FS		4-6'				
6														
	TD							wet @ 6'						

* 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 X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision sampling
DRILLING RIG: DPT
BORING NUMBER: SB19
DATE: 9/17/07
GEOLOGIST: W.D. Olsen
DRILLER: B. Cornell

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**
							TAN FS		Samples 0-6"				
1													
									6"-2'				
2													
3													
									2-4 (not analyzed)				
4													
							White FS						
5									4-6				
6													
7													
									6-8				
8													
							wet @ 8'						
9													
10													

* 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

Page ___ of ___

PROJECT NAME: PBW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB20
DATE: 9-17-05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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: Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1-													
							some oyster shells		6"-2'				
2-													
							white FS						
3-													
									2-4'				
4-													
5-													
6-							wet @ 6'		4-6'				
	TD												

* 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: PEW 44 R1
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision sampling
DRILLING RIG: DPT
BORING NUMBER: SB21
DATE: 9/18/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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**
							TAN FS		Sample 0-6"				
1													
									6" - 2'				
2							gray FS						
3							white FS		2-4'				
4													
5													
									4-6'				
6													
	TD						wet @ 5.5'						

* 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: PEN 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB 22
DATE: 9/18/05
GEOLOGIST: WD Olson
DRILLER: B Cornell

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**
							TAN FS		Samples 0-6"				
1													
									6"-2'				
2							white FS						
3									2'-4'				
4													
5									4'-6'				
6	TD						wet @ 6'						

* 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: PCW 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB 23
DATE: 9/18/05
GEOLOGIST: W.D. Olsen
DRILLER: B. Cornell

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**
							TAWFS		0-6"				
1							↓						
									6"-2'				
2							↓						
							White FS						
3									2-4'				
4													
5													
									4-6'				
6							↓						
	TD						wet @ 6'						

* 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: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB 24
DATE: 9/19/05
GEOLOGIST: W.D. Olson
DRILLER: B. Coward

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**
							TAN FS		Samples 0'-6"				
1							Some oyster shell						
									6"-2'				
2													
									2-4'				
3													
							White FS						
4													
									4-6'				
5													
							wet @ 6'						
6	TD												

* 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: PEN 44 RI
PROJECT NUMBER: W0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT HAND Auger
BORING NUMBER: SB 25
DATE: 9/19/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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 Samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							Red FS + Silt		0-6"				
1													
									6"-2'				
2													
3									2-4'				
4													
5									4-6'				
							TAN FS						
6							not @ 5.5'						
VD													

* 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): 0.6

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW 44 RI
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT
BORING NUMBER: SB26
DATE: 9/19/05
GEOLOGIST: W.A. Olson
DRILLER: R. Connell

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: Sample's	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1							↓						
							gray FS / oyster shell		6"-2'				
2													
							TAN FS						
3							↓						
									2'-4'				
4							↓						
							White FS						
5							↓						
									4-6'				
6							↓						
	TD						wet @ 5.5'						

* 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): 0.8

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: DEN 44 RI
PROJECT NUMBER: N00007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB 27
DATE: 9/19/05
GEOLOGIST: W.D. Olson
DRILLER: R. Cornell

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 samples	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							TAN FS		0-6"				
1-							↓						
							gray FS sand		6"-2'				
2-							red clayey sand						
							↓						
3-									2'-4'				
4-							↓						
							white FS						
5-													
									4'-6'				
6-							wet @ 5.5'						
	TD												

* 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): 0.3

Converted to Well: Yes ____ No X Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: PEW UHR/
PROJECT NUMBER: N0007
DRILLING COMPANY: Precision Sampling
DRILLING RIG: DPT

BORING NUMBER: SB28
DATE: 9/19/05
GEOLOGIST: W.D. Olson
DRILLER: B. Cornell

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**
							TAN FS		Samples 0-0.2'				
1-							↓						
							Gray FS, oyster		6"-2'				
2-							shell						
							TAN FS						
3-							↓		2-4'				
4-							↓						
							white FS						
5-							↓		4-6'				
6-													
	TD						wet @ 5.5'						

* 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. #: ____

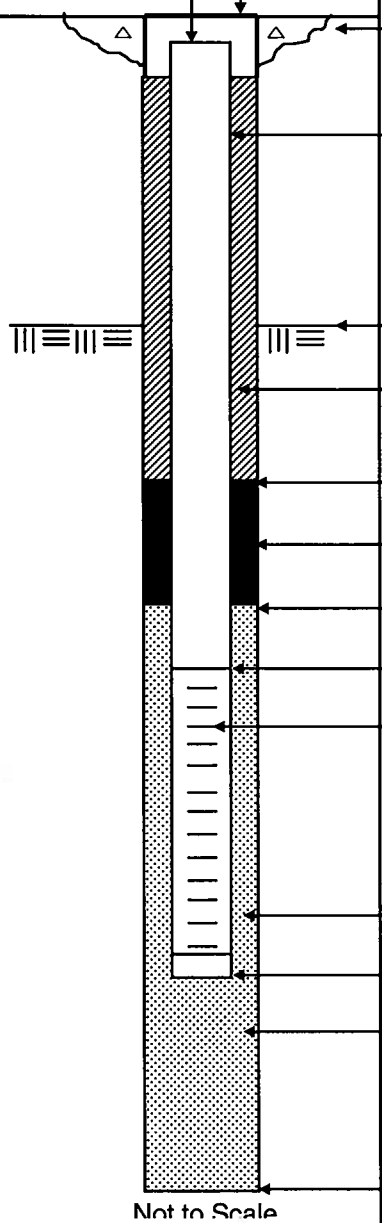
Tetra Tech NUS, Inc.

WELL No.: PEN-44-09

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-09
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /FM

I.D. of Surface Casing: 8 inch

Type of Surface Casing: bolt down

Type of Surface Seal: 2X2 pad

I.D. of Riser: 2 inch

Type of Riser: Sched. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: / NA

Type of Backfill: Grout

Elevation / Depth of Seal: / 6 inches

Type of Seal: 30/65 sand

Elevation / Depth of Top of Filter Pack: / 2 feet

Elevation / Depth of Top of Screen: / 4 feet

Type of Screen: Sched. 40 PVC

Slot Size x Length: 0.010 inch X 10 feet

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 14 feet

Elevation / Depth of Bottom of Filter Pack: / 14 feet

Type of Backfill Below Well:
NA

Elevation / Total Depth of Borehole: / 14 feet

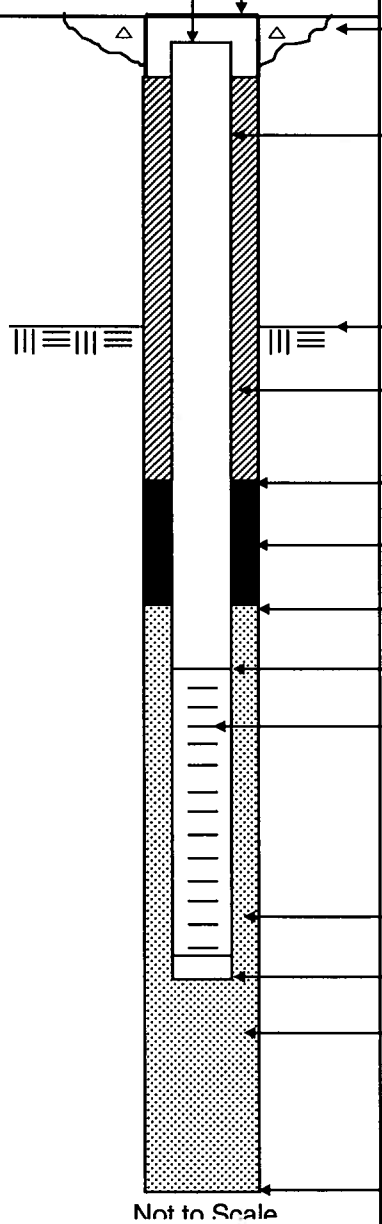
Tetra Tech NUS, Inc.

WELL No.: PEN-44-10

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-10
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /FM

I.D. of Surface Casing: 8 inch

Type of Surface Casing: bolt down

Type of Surface Seal: 2X2 pad

I.D. of Riser: 2 inch

Type of Riser: Sched. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: / NA

Type of Backfill: Grout

Elevation / Depth of Seal: / 6 inches

Type of Seal: 30/65 sand

Elevation / Depth of Top of Filter Pack: / 2 feet

Elevation / Depth of Top of Screen: / 4 feet

Type of Screen: Sched. 40 PVC

Slot Size x Length: 0.010 inch X 10 feet

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 14 feet

Elevation / Depth of Bottom of Filter Pack: / 14 feet

Type of Backfill Below Well:
NA

Elevation / Total Depth of Borehole: / 14 feet

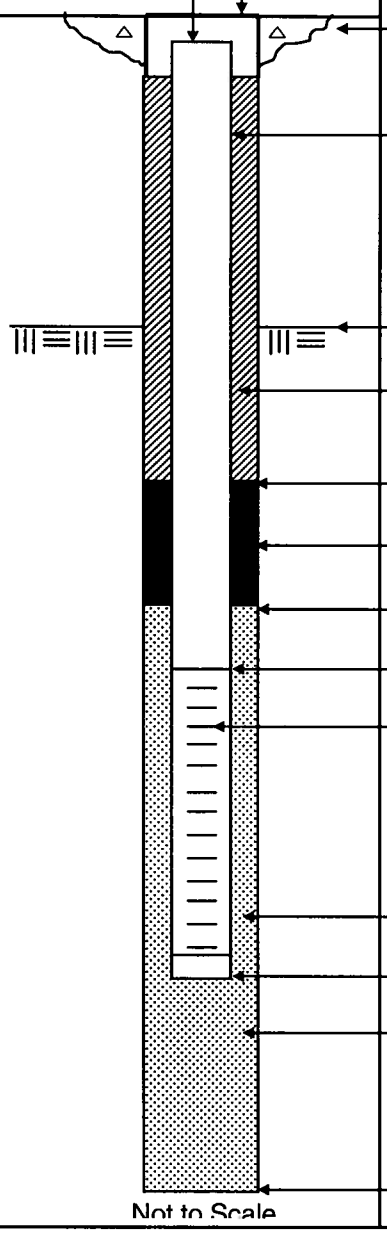
Tetra Tech NUS, Inc.

WELL No.: PEN-44-11

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-11
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /FM

I.D. of Surface Casing: 8 inch

Type of Surface Casing: bolt down

Type of Surface Seal: 2X2 pad

I.D. of Riser: 2 inch

Type of Riser: Sched. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: / NA

Type of Backfill: Grout

Elevation / Depth of Seal: / 6 inches

Type of Seal: 30/65 sand

Elevation / Depth of Top of Filter Pack: / 2 feet

Elevation / Depth of Top of Screen: / 4 feet

Type of Screen: Sched. 40 PVC

Slot Size x Length: 0.010 inch X 10 feet

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 14 feet

Elevation / Depth of Bottom of Filter Pack: / 14 feet

Type of Backfill Below Well:
NA

Elevation / Total Depth of Borehole: / 14 feet

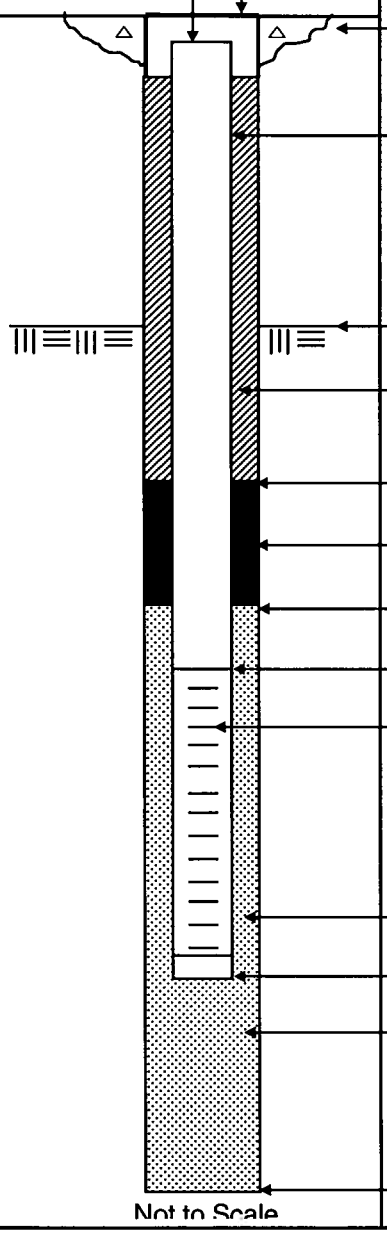
Tetra Tech NUS, Inc.

WELL No.: PEN-44-12

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-12
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

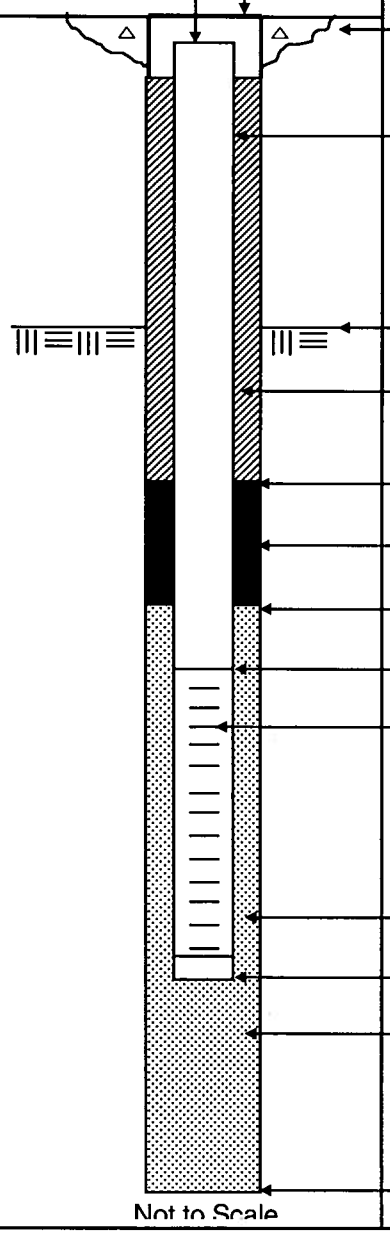
Tetra Tech NUS, Inc.

WELL No.: PEN-44-13

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-13
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

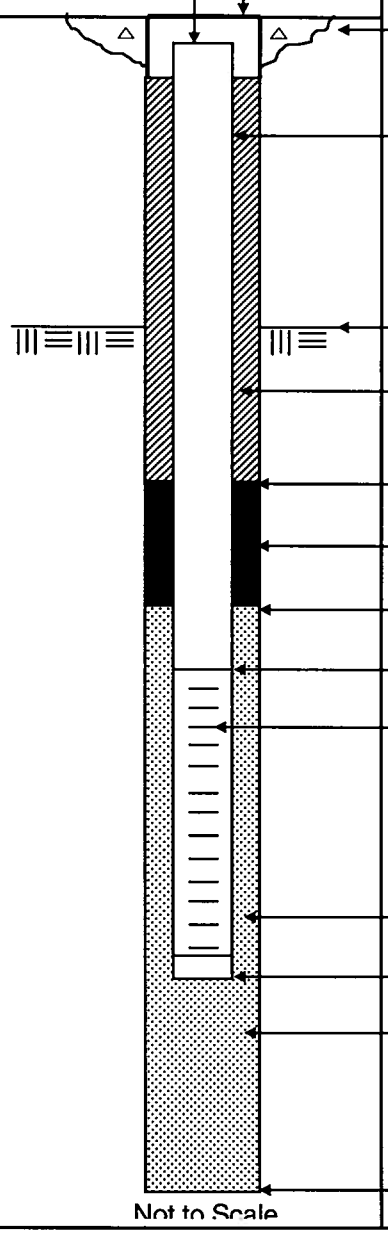
Tetra Tech NUS, Inc.

WELL No.: PEN-44-14

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-14
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /FM

I.D. of Surface Casing: 8 inch

Type of Surface Casing: bolt down

Type of Surface Seal: 2X2 pad

I.D. of Riser: 2 inch

Type of Riser: Sched. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: / NA

Type of Backfill: Grout

Elevation / Depth of Seal: / 6 inches

Type of Seal: 30/65 sand

Elevation / Depth of Top of Filter Pack: / 2 feet

Elevation / Depth of Top of Screen: / 4 feet

Type of Screen: Sched. 40 PVC

Slot Size x Length: 0.010 inch X 10 feet

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 14 feet

Elevation / Depth of Bottom of Filter Pack: / 14 feet

Type of Backfill Below Well:
NA

Elevation / Total Depth of Borehole: / 14 feet

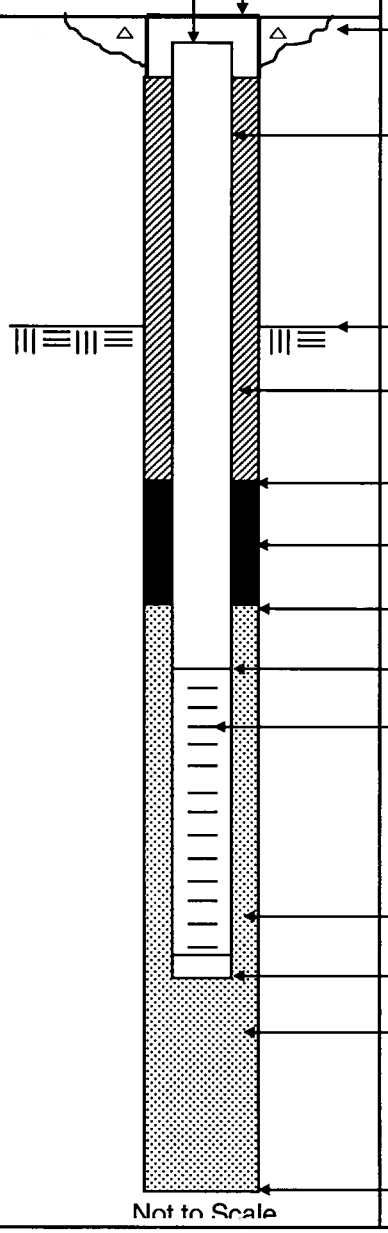
Tetra Tech NUS, Inc.

WELL No.: PEN-44-15

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Precision	BORING No.:	PEN-44-15
PROJECT No.:	112G00007	DRILLER:	R.Lebron	DATE COMPLETED:	10/03/05
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

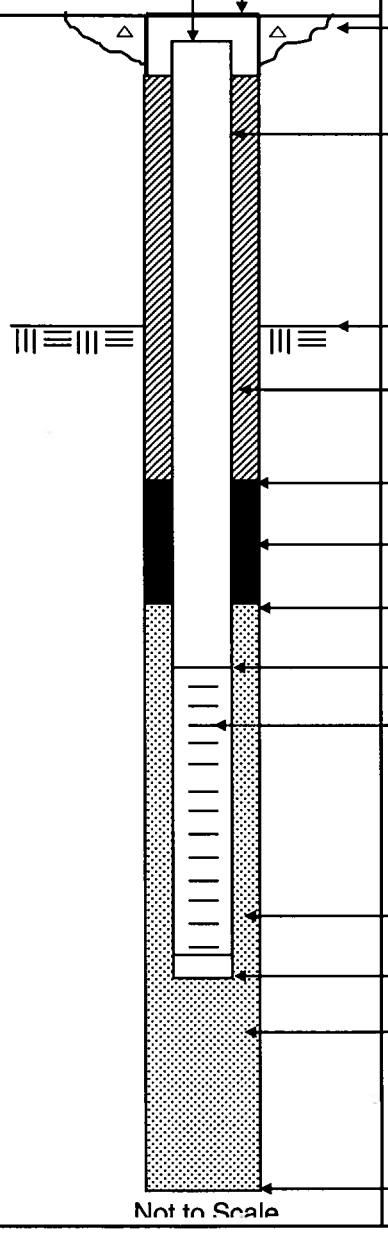
Tetra Tech NUS, Inc.

WELL No.: PEN-44-16

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Miller	BORING No.:	PEN-44-16
PROJECT No.:	112G00007	DRILLER:	D. Gerome	DATE COMPLETED:	05/09/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

Tetra Tech NUS, Inc.

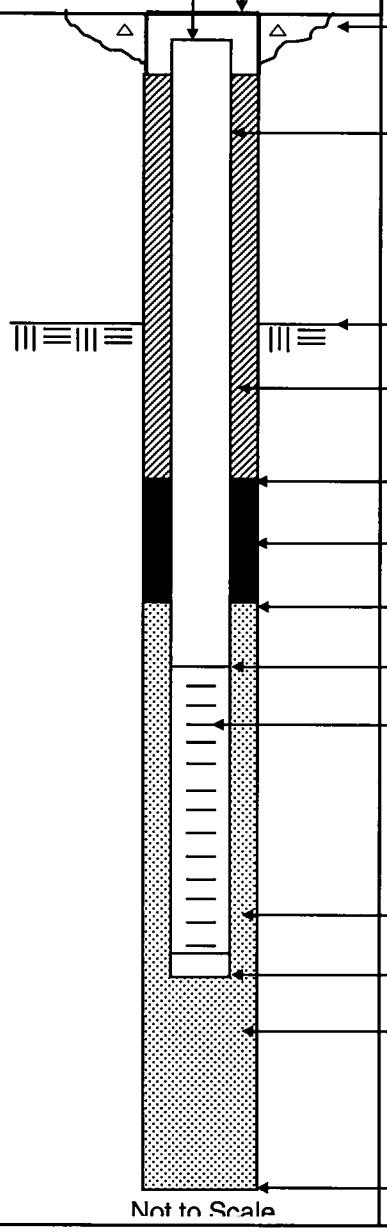
WELL No.: PEN-44-17

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Miller	BORING No.:	PEN-44-17
PROJECT No.:	112G00007	DRILLER:	D. Gerome	DATE COMPLETED:	05/10/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

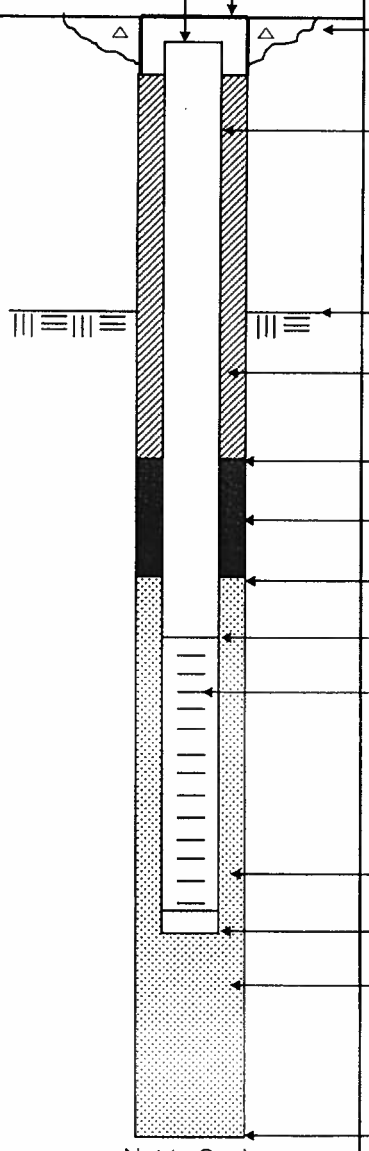
Tetra Tech NUS, Inc.

WELL No.: Pen-44-18

MONITORING WELL SHEET

PROJECT:	Pen-RI	DRILLING Co.:	Precision	BORING No.:	Pen-44-18
PROJECT No.:	N00007	DRILLER:	Phil McKay	DATE COMPLETED:	12/05/05
SITE:	44	DRILLING METHOD:	HSA/Sonic	NORTHING:	
GEOLOGIST:	Bcaldwell	DEV. METHOD:	Overpump	EASTING:	

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		NA/
I.D. of Surface Casing:	NA	
Type of Surface Casing:	NA	
Type of Surface Seal:	Flush Mount finish	
I.D. of Riser:	2-inch	
Type of Riser:	Sch 40 PVC	
Borehole Diameter:	8-inch	
Elevation / Depth Top of Rock:		NA/
Type of Backfill:	Portland grout	
Elevation / Depth of Seal:		/ NA
Type of Seal:		
Elevation / Depth of Top of Filter Pack:		/ 58.0
Elevation / Depth of Top of Screen:		/ 65.0
Type of Screen:	Sch 40 PVC	
Slot Size x Length:	.01-inch 10 ft	
I.D. of Screen:	2-inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 75.0
Elevation / Depth of Bottom of Filter Pack:		/ 75.0
Type of Backfill Below Well:	Formation collapse (sand)	
Elevation / Total Depth of Borehole:		/ 75.0

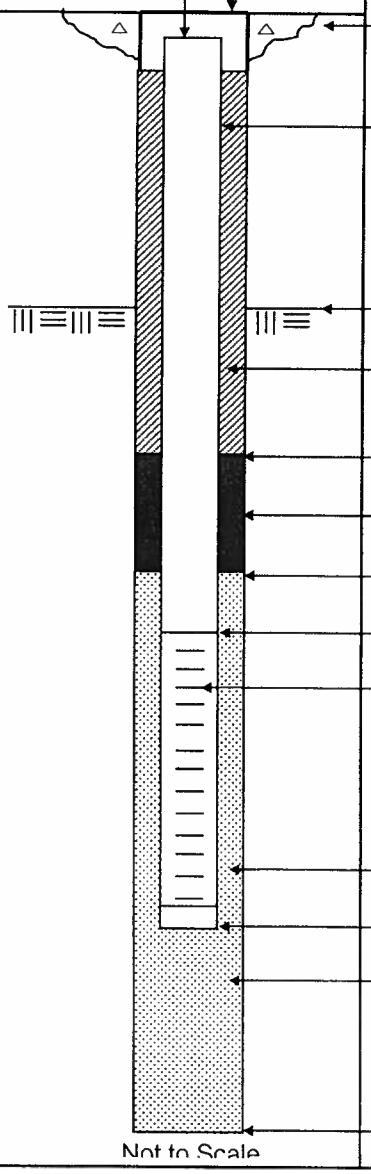
Tetra Tech NUS, Inc.

WELL No.: Pen-44-19

MONITORING WELL SHEET

PROJECT:	Pen-RI	DRILLING Co.:	Precision	BORING No.:	Pen-44-19
PROJECT No.:	N00007	DRILLER:	Phil McKay	DATE COMPLETED:	12/05/05
SITE:	44	DRILLING METHOD:	HSA/Sonic	NORTHING:	
GEOLOGIST:	Bcaldwell	DEV. METHOD:	Overpump	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: NA/

I.D. of Surface Casing: NA

Type of Surface Casing: NA

Type of Surface Seal: Flush Mount finish

I.D. of Riser: 2-inch

Type of Riser: Sch 40 PVC

Borehole Diameter: 8-inch

Elevation / Depth Top of Rock: NA/

Type of Backfill: Portland grout

Elevation / Depth of Seal: / NA

Type of Seal:

Elevation / Depth of Top of Filter Pack: / 58.0

Elevation / Depth of Top of Screen: / 65.0

Type of Screen: Sch 40 PVC

Slot Size x Length: .01-inch 10 ft

I.D. of Screen: 2-inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 75.0

Elevation / Depth of Bottom of Filter Pack: / 75.0

Type of Backfill Below Well: Formation collapse (sand)

Elevation / Total Depth of Borehole: / 75.0

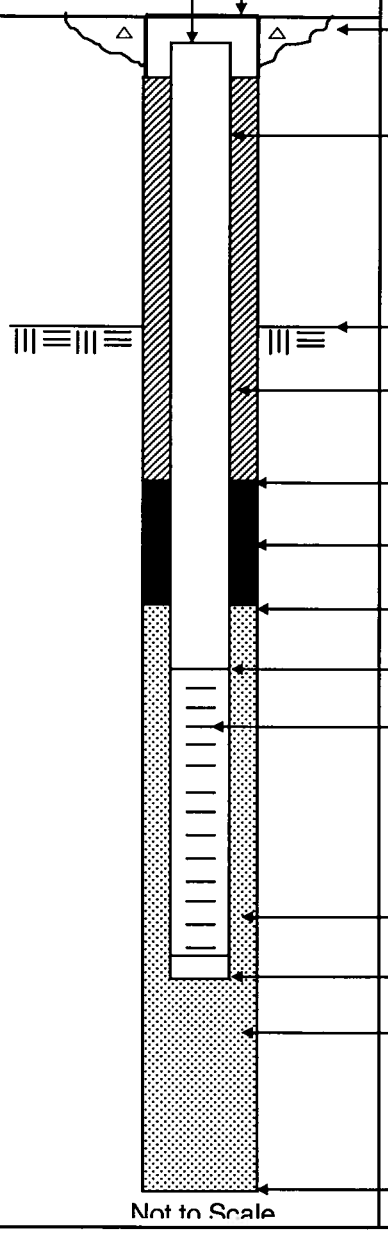
Tetra Tech NUS, Inc.

WELL No.: PEN-44-20

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Miller	BORING No.:	PEN-44-20
PROJECT No.:	112G00007	DRILLER:	D. Gerome	DATE COMPLETED:	05/09/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /FM

I.D. of Surface Casing: 8 inch

Type of Surface Casing: bolt down

Type of Surface Seal: 2X2 pad

I.D. of Riser: 2 inch

Type of Riser: Sched. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: / NA

Type of Backfill: Grout

Elevation / Depth of Seal: / 6 inches

Type of Seal: 30/65 sand

Elevation / Depth of Top of Filter Pack: / 2 feet

Elevation / Depth of Top of Screen: / 4 feet

Type of Screen: Sched. 40 PVC

Slot Size x Length: 0.010 inch X 10 feet

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 sand

Elevation / Depth of Bottom of Screen: / 14 feet

Elevation / Depth of Bottom of Filter Pack: / 14 feet

Type of Backfill Below Well:
NA

Elevation / Total Depth of Borehole: / 14 feet

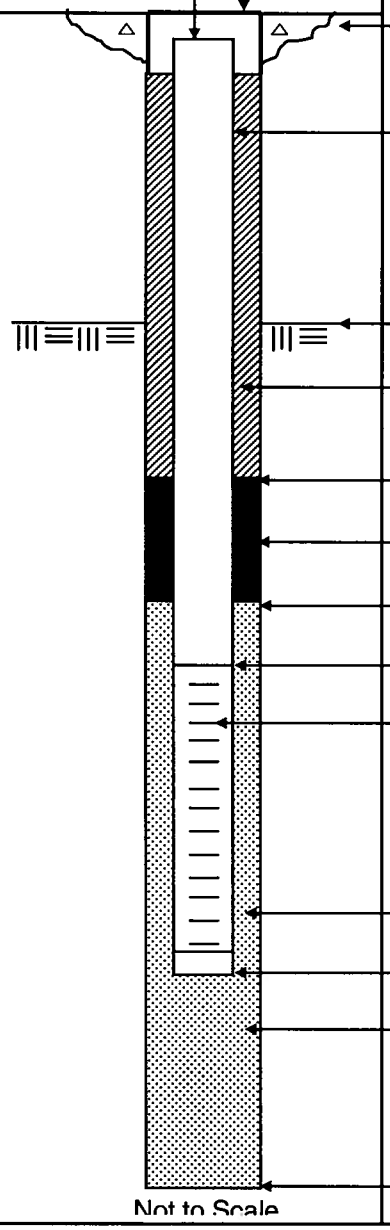
Tetra Tech NUS, Inc.

WELL No.: PEN-44-21

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Miller	BORING No.:	PEN-44-21
PROJECT No.:	112G00007	DRILLER:	D. Gerome	DATE COMPLETED:	05/10/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

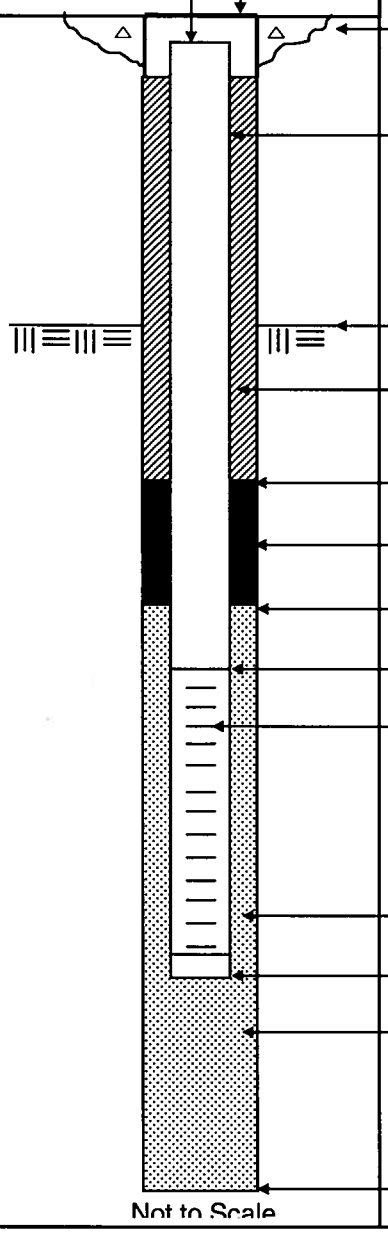
Tetra Tech NUS, Inc.

WELL No.: PEN-44-22

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	Miller	BORING No.:	PEN-44-22
PROJECT No.:	112G00007	DRILLER:	D. Gerome	DATE COMPLETED:	05/10/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

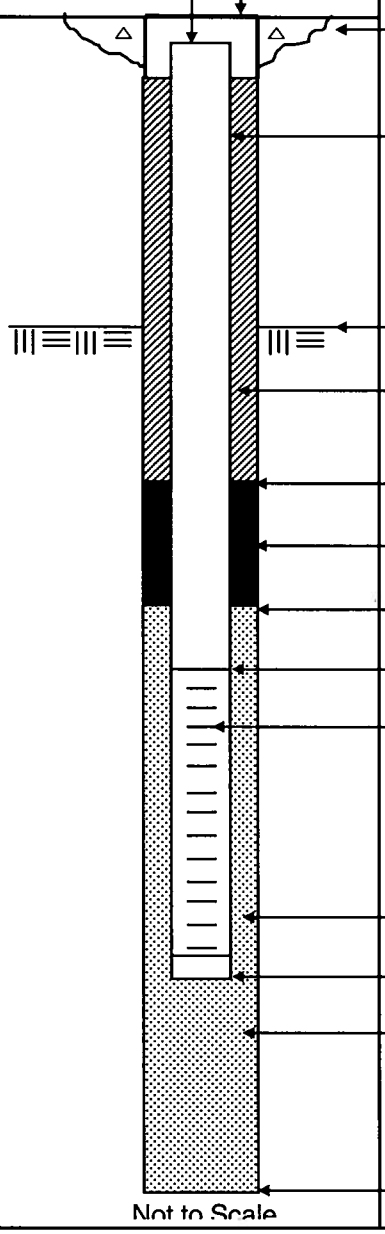
Tetra Tech NUS, Inc.

WELL No.: PEN-44-23

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	M&W	BORING No.:	PEN-44-23
PROJECT No.:	112G00007	DRILLER:	R. Huston	DATE COMPLETED:	08/13/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 1 foot
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 3 feet
Elevation / Depth of Top of Screen:		/ 5 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 15 feet
Elevation / Depth of Bottom of Filter Pack:		/ 15 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 15 feet

Tetra Tech NUS, Inc.

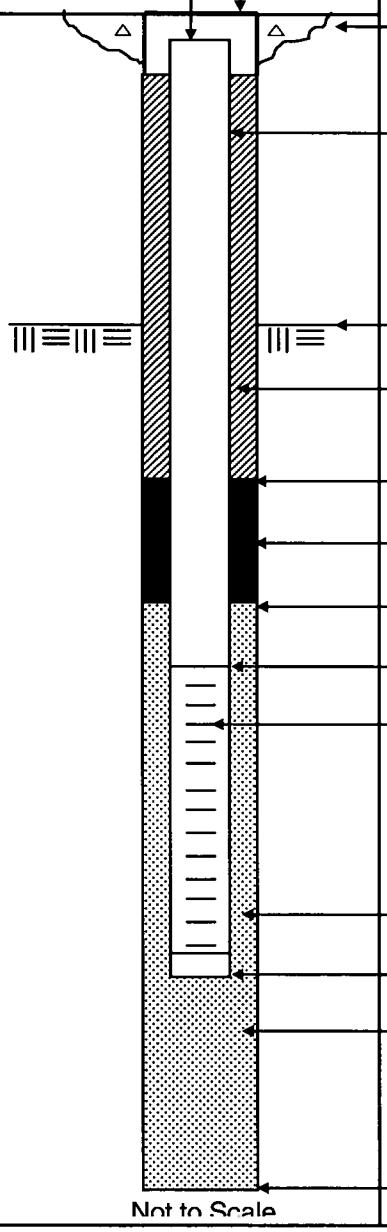
WELL No.: PEN-44-24

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	M&W	BORING No.:	PEN-44-24
PROJECT No.:	112G00007	DRILLER:	R. Huston	DATE COMPLETED:	08/13/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

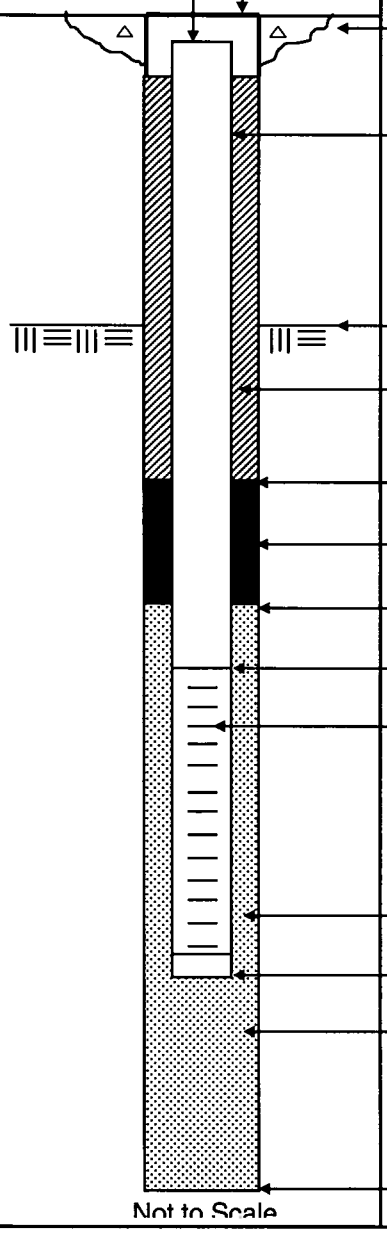
Tetra Tech NUS, Inc.

WELL No.: PEN-44-25

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	M&W	BORING No.:	PEN-44-25
PROJECT No.:	112G00007	DRILLER:	R. Huston	DATE COMPLETED:	08/13/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

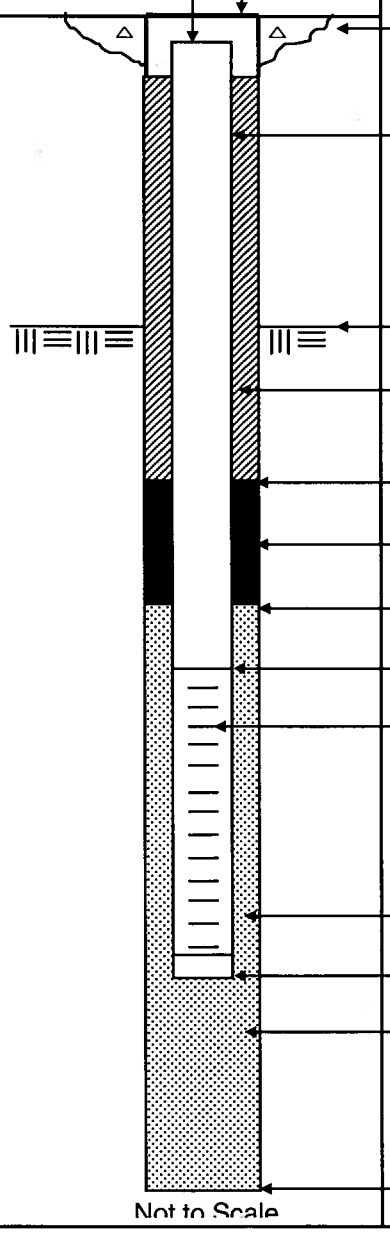
Tetra Tech NUS, Inc.

WELL No.: PEN-44-26

MONITORING WELL SHEET

PROJECT:	PEN-RI	DRILLING Co.:	M&W	BORING No.:	PEN-44-26
PROJECT No.:	112G00007	DRILLER:	R. Huston	DATE COMPLETED:	08/13/06
SITE:	44	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	W.D. Olson	DEV. METHOD:	Surge/Purge	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser:		/
Elevation / Height of Top of Surface Casing:		/FM
I.D. of Surface Casing:	8 inch	
Type of Surface Casing:	bolt down	
Type of Surface Seal:	2X2 pad	
I.D. of Riser:	2 inch	
Type of Riser:	Sched. 40 PVC	
Borehole Diameter:	8 inch	
Elevation / Depth Top of Rock:		/ NA
Type of Backfill:	Grout	
Elevation / Depth of Seal:		/ 6 inches
Type of Seal:	30/65 sand	
Elevation / Depth of Top of Filter Pack:		/ 2 feet
Elevation / Depth of Top of Screen:		/ 4 feet
Type of Screen:	Sched. 40 PVC	
Slot Size x Length:	0.010 inch X 10 feet	
I.D. of Screen:	2 inch	
Type of Filter Pack:	20/30 sand	
Elevation / Depth of Bottom of Screen:		/ 14 feet
Elevation / Depth of Bottom of Filter Pack:		/ 14 feet
Type of Backfill Below Well:	NA	
Elevation / Total Depth of Borehole:		/ 14 feet

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEW-44-MW09
Site: site 44 Pew NAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method: ___
Pump Type: submersible

Depth to Bottom (ft.): 15.01
Static Water Level Before (ft.): 6.18
Static Water Level After (ft.): 6.20
Screen Length (ft.): 10.0
Specific Capacity: ___
Casing ID (in.): 2.0

Responsible Personnel: C. Odom, B. Olson
Drilling Co.: Precision Sampling
Project Name: ___
Project Number: ___

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks
1634								start
1700								flush purge ≈ 52 gal

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEN-44-MW10
Site: Site 44 Pens NAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method:
Pump Type: Submersible

Depth to Bottom (ft.): 14.69
Static Water Level Before (ft.): 6.56
Static Water Level After (ft.): 6.58
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0"

Responsible Personnel: C. Dolan, B. Olson
Drilling Co.: Precision Sampling
Project Name:
Project Number:

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
[redacted]								
0955								start
1020								finish
								pumped ≈ 53 gals.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEN-44-MW11
Site: Site 44 Pen NAS
Date Installed: 10/08/05
Date Developed: 10/08/05
Dev. Method: ___
Pump Type: submersible

Depth to Bottom (ft.): 14.80
Static Water Level Before (ft.): 6.65
Static Water Level After (ft.): ___
Screen Length (ft.): 10.0
Specific Capacity: ___
Casing ID (in.): 2.0

Responsible Personnel: Carlson B. Olson
Drilling Co.: Precision Sampling
Project Name: ___
Project Number: ___

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks
1201								start
1238								end Pigeda 53 gals

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PFW-44-MW12
Site: site 44 PFW NAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method: ___
Pump Type: submersible

Depth to Bottom (ft.): 14.69
Static Water Level Before (ft.): 6.77
Static Water Level After (ft.): 6.81
Screen Length (ft.): 10.0
Specific Capacity: ___
Casing ID (in.): 2.0

Responsible Personnel: Clodon B Olson
Drilling Co.: Precision Sampling
Project Name: ___
Project Number: ___

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks
1506								start

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEW-44-MW13
Site: Site 44 PEWNAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method: ___
Pump Type: submersible

Depth to Bottom (ft.): 14.75
Static Water Level Before (ft.): 6.20
Static Water Level After (ft.): ___
Screen Length (ft.): 10.0
Specific Capacity: ___
Casing ID (in.): 2.0

Responsible Personnel: C. Odom B. Olson
Drilling Co.: Precision Sampling
Project Name: ___
Project Number: ___

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks
1100								start
1137								finish purged ≈ 50 gal's

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEN-44-MW14
Site: Site 44 Pro MAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method:
Pump Type: Submersible

Depth to Bottom (ft.): 14.79
Static Water Level Before (ft.): 6.67
Static Water Level After (ft.): 6.67
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0

Responsible Personnel: C. Odom, B. Olson
Drilling Co.: Blackhawk Sampling
Project Name:
Project Number:

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1312								start
1352								finish purged ≈55 gals

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PFW-44-MW15
Site: Site 44 Pen. NAS
Date Installed: 10/03/05
Date Developed: 10/03/05
Dev. Method: ___
Pump Type: Submersible

Depth to Bottom (ft.): 14.67
Static Water Level Before (ft.): 7.20
Static Water Level After (ft.): ___
Screen Length (ft.): 10.0
Specific Capacity: ___
Casing ID (in.): 2.0

Responsible Personnel: C. Odom B. Olson
Drilling Co.: Precision Sampling
Project Name: ___
Project Number: ___

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____)	Turbidity (NTU)	Remarks
1412								start
1444								flush purge ≈ 53 gals

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: MEW-44-16
Site: 44 NASP
Date Installed: 5-9-06
Date Developed: 5-10-06
Dev. Method: surge/purge
Pump Type: submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.):
Static Water Level After (ft.):
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0"

Responsible Personnel: C. Odom
Drilling Co.: Miller
Project Name: site 44 RI
Project Number: 112G00007

500 mL / 8 sec = 3.75 L/min

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume L	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1350								start
1400		37.5	10.33	27.30	6.11	0.0	86	
1410		75.0	10.38	26.15	5.91	0.0	94.2	
1420		112.5	10.35	25.90	6.02	0.0	97.5	
1424		127.5	10.35	25.64	6.00	0.0	84.9	end
1435			10.25					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Well: PEN-44-17
Site: NASP site 44
Date Installed: 5-10-06
Date Developed: 5-11-06
Dev. Method: Surge/pump
Pump Type: submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.): 9.22
Static Water Level After (ft.): 9.22
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0

Responsible Personnel: C. Odom
Drilling Co.: Miller
Project Name: site 44 RI
Project Number: 112G00007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1412								start ≈1 gal/min
1419		7	9.30	22.98	7.14	.238	>100	
1429		17	9.34	22.98	6.94	.215	>100	
1436		24	9.37	22.99	6.98	.210	>100	
1443			9.22					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEN-44-18
Site: Site 44
Date Installed: 12/5/05
Date Developed: 12/05/05
Dev. Method: Overpump
Pump Type: Rig

Depth to Bottom (ft.): 75
Static Water Level Before (ft.): NA
Static Water Level After (ft.): 13.05
Screen Length (ft.): 10
Specific Capacity: 0.09
Casing ID (in.): 2

Responsible Personnel: BEC
Drilling Co.: Precision
Project Name: PEN RI
Project Number: N0000 7

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
0	0	0	NA					
20 min	0	30	29.4	Stable	pumping RATE	= 1.5 gpm		Stable pumping WL

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of ___

Well: PEW-44-19
Site: Site 44
Date Installed: 12/5/05
Date Developed: 12/5/05
Dev. Method: Overpump
Pump Type: Rig

Depth to Bottom (ft.): 75
Static Water Level Before (ft.): NA
Static Water Level After (ft.): 12.95
Screen Length (ft.): 10
Specific Capacity: 0.07
Casing ID (in.): 2"

Responsible Personnel: BEC
Drilling Co.: Precision
Project Name: PEW RI
Project Number: N0000 7

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
0	0	0	~~0~~ NA					
32m	0	35gals	29.4	Stable	pumping	rate =	1.1gpm	Stable pumping WL.

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Well: PEN-44-20
Site: 44 NASV
Date Installed: 5-9-06
Date Developed: 5-10-06
Dev. Method: surge/pump
Pump Type: submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.): 8.82
Static Water Level After (ft.): 8.81
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0"

Responsible Personnel: C. Dolan
Drilling Co.: Miller
Project Name: Site 44 RI
Project Number: 112600007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (~~Gal.~~) L	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1433								start
1443		37.5	9.00	26.12	6.36	0.00	90.9	
1453		75.0	9.00	26.05	6.14	0.00	105.0	
1503		112.5	9.02	26.06	6.17	0.00	107.0	
1513		150	9.02	26.28	6.23	0.00	107	
1523		~~53~~ 187.5	9.02	26.23	6.21	0.00	104	53 gals / 50 min
			9.02	26.17	6.19	0.00	107	~~[illegible]~~ correct rate
								~~[illegible]~~
								~~[illegible]~~ 1 gal/min
1533								
1547			8.81					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Well: PEN-44-21
Site: 44 NAXP
Date Installed: 5-10-06
Date Developed: 5-10-06
Dev. Method: Surge/pump
Pump Type: submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.): 9.26
Static Water Level After (ft.): 9.33
Screen Length (ft.): 10.0
Specific Capacity:
Casing ID (in.): 2.0"

Responsible Personnel: C. Odom
Drilling Co.: Miller
Project Name: Site 44 RI
Project Number: 112G00007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1545								start
1555		10	9.41	27.48	6.56	0.00	110.0	
1605		20	9.41	27.46	6.54	0.00	116.0	
1615		30	9.42	27.44	6.59	0.00	135.0	
1618	0"	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	drum full
1625		40	9.43	27.43	6.51	0.00	137.0	
1635		50	9.41	27.41	6.50	0.00	138.0	
1645		60	9.41	27.42	6.48	0.00	138.0	
1655		70	9.45	27.43	6.50	0.00	137	
1705		80	9.44	27.40	6.47	0.00	139	
1710			9.33					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ___ of _____

Well: PEN-44-22
Site: NASP 44
Date Installed: 5-10-06
Date Developed: 5-11-06
Dev. Method: Surge Purge
Pump Type: Submersible

Depth to Bottom (ft.): 14
Static Water Level Before (ft.): 8.00
Static Water Level After (ft.): 8.04
Screen Length (ft.): 10.0
Specific Capacity: _____
Casing ID (in.): 2.0

Responsible Personnel: C. Dolan
Drilling Co.: Miller
Project Name: Site 44 RI
Project Number: 112G000047

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units _____)	Turbidity (NTU)	Remarks
1337								start 1gal/min
1347		10	8.15	26.60	6.39	.178	834	
1355		18	8.15	26.58	6.51	.173	950	end
1401			8.04					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Not Final TOC

Well: PEN 44 - 23
Site: 44
Date Installed: 8-13/06
Date Developed: 8-13/06
Dev. Method: Surge/Pump
Pump Type: Sub

Depth to Bottom (ft.): 15
Static Water Level Before (ft.): 8.10
Static Water Level After (ft.):
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: WD Olson
Drilling Co.: MPW
Project Name: PEW RI
Project Number: 112G-00007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks
1415		0	8.39	33.01	6.71	0.125	71000	
1420		12.5	8.36	32.01	6.42	0.127	71000	
1425		25	8.38	31.80	6.64	0.155	71000	
1430		37.5	8.38	31.77	6.72	0.164	71000	
1435		50	8.39	31.79	6.66	0.160	7100	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

not final toc

Well: PEW-44-24
Site: 44
Date Installed: 8-13/06
Date Developed: 8-13/06
Dev. Method: Surge/Purge
Pump Type: Sub

Depth to Bottom (ft.): 14.5
Static Water Level Before (ft.): 9.14
Static Water Level After (ft.):
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: W.D. Olson
Drilling Co.: MPW
Project Name: PEW RI
Project Number: 112G00007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ____) m S/cm	Turbidity (NTU)	Remarks
1325	—	0	9.50	33.09	6.94	0.250	71000	Start
1330		10	9.55	31.65	7.01	0.253	894	
1335		20	9.55	31.48	6.95	0.253	383	Horiba
1340		30	9.56	31.39	6.88	0.254	~~32~~ 81.2	Lamotte
1345		40	9.57	31.42	6.90	0.255	38.1	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PEN-44-25
Site: W4
Date Installed: 8-12/06
Date Developed: 8-13/06
Dev. Method: Surge/Purge
Pump Type: Sub

Depth to Bottom (ft.): W4 14' not Final TOC
Static Water Level Before (ft.): 9.32
Static Water Level After (ft.): 9.31
Screen Length (ft.): 10'
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: W.A.OGEN
Drilling Co.: MPW
Project Name: PEN RI
Project Number: 112G00007

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks
1010	—	0	9.64	32.49	5.73	0.307	>1000	
1015		12.5	9.63	31.31	6.49	0.234	>1000	
1020		20	9.63	31.09	6.88	0.257	>1000	
1025		28	9.63	31.05	7.10	0.268	798	
1030		~~36~~ 40	9.63	30.86	7.20	0.276	183	
1035		50	9.63	[illegible]	7.21	0.279	99.2	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: PEW-44-26
Site: PEW 44
Date Installed: 8-13-06
Date Developed: 8-13-06
Dev. Method: Surge/Purge
Pump Type: Sub

Depth to Bottom (ft.): 14'
Static Water Level Before (ft.): 10.27
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity:
Casing ID (in.): 2"

Responsible Personnel: W.D. Olson
Drilling Co.: MPW
Project Name: PEW RI
Project Number: 112G00002

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks
1822	—	0	10.70	32.54	6.74	0.176	>1000	INIT water DK brown
1827		10	10.69	31.84	6.58	0.194	>1000	
1832		20	10.69	31.53	6.60	0.207	>1000	water milky lt. tan
1837		30	10.68	31.40	6.58	0.213	>1000	
1842		40	10.68	31.33	6.59	0.215	>1000	
1847		50	10.68	31.11	6.66	0.218	>1000	

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASP
Project No.: Site 44

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0101
Sample Location:
Sampled By: B Caldwell
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/14/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Time: 1625	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Time
Method: Low Flow	Clear	6.57	.181	23.85	12	1.47	169.3	1622

PURGE DATA:

Date: 12/14/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	Initial	6.46	.147	24.01	30	1.94	113.7	1600
Monitor Reading (ppm):	1 gal	6.47	.156	23.97	22	2.03	153.2	1604
Well Casing Diameter & Material	2 gal	6.51	.166	23.92	24	1.83	160.4	1608
Type: 2" PVC	3 gal	6.53	.173	23.91	23	1.68	164.9	1612
Total Well Depth (TD): 14.81	4 gal	6.55	.180	23.83	14	1.74	167.9	1618
Static Water Level (WL): 5.90	5 gal	6.57	.181	23.85	12	1.47	169.3	1622
One Casing Volume(gal/L): 2								
Start Purge (hrs): 1600								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

1 qt / 1 min / 15 sec

Pump WL 5.92

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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): B Caldwell

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASP
Project No.: 474

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0201
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/17/05 Time: 1530	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Method:								

PURGE DATA:

Date: 12/17/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	SWL
Method:								1500	—
Monitor Reading (ppm):	2.5	6.58	.159	23.56	39	3.05	99.3	1505	5.91
Well Casing Diameter & Material	5.0	6.55	.162	23.51	28	2.80	89.5	1510	
Type: 2.0" PVC	7.5	6.55	.167	23.45	22.7	2.40	107.1	1515	5.84
Total Well Depth (TD): 14.61	10.0	6.56	.170	23.42	14.7	2.38	113.1	1520	
Static Water Level (WL): 5.81									
One Casing Volume(gal/L): 5.35									
Start Purge (hrs): 1500									
End Purge (hrs): 1520									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: N 45P
Project No.: 2121

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0301
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/14/05 Time: 1620	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Method: low flow	clear	6.54	.182	22.91	18	3.06	210.5	1610

PURGE DATA:

Date: 12/14/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: low flow	1st	6.58	.169	23.39	270	2.86	307.2	1534
Monitor Reading (ppm): Ø		6.47	.168	23.36	160	3.14	231.5	1543
Well Casing Diameter & Material								
Type: 2" PVC		6.51	.172	23.24	85	3.08	213.5	1552
Total Well Depth (TD): 16.25		6.53	.183	22.91	38	3.20	214.5	1558
Static Water Level (WL): 6.35		6.54	.182	22.88	23	3.11	211.5	1605
One Casing Volume(gal/L): 1.6		6.54	.182	22.91	18	3.06	210.5	1610
Start Purge (hrs): 1530								
End Purge (hrs): 1610								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 2.9								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: NASP
Project No.: 421

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0401
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/13/05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1530								
Method: Grab								

PURGE DATA:

Date: 12/13/05	Volume	pH	~~S.C.~~ Cond	Temp. (C)	Turbidity	DO	ORP	Time	SWL
Method: low flow		6.67	.254	23.91	21	13.12	147.8	1500	5.72
Monitor Reading (ppm):	2.5	6.71	.246	24.10	17	13.68	140.3	1505	5.75
Well Casing Diameter & Material	5.0	6.73	.257	24.04	14	12.37	136.9	1510	5.76
Type: 2.0 PVC	7.5	6.74	.257	24.05	14	12.12	133.3	1515	
Total Well Depth (TD): 15.17	10.02	6.74	.262	24.05	12	11.93	130.0	1520	5.74
Static Water Level (WL): 5.71									
One Casing Volume(gal/L): ~~7.46~~ 1.51									
Start Purge (hrs): 1520									
End Purge (hrs): 1500									
Total Purge Time (min): 20									
Total Vol. Purged (gal/L): 10.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	4.5
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: NASP
Project No.: WL

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0501
Sample Location:
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/13/05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1540								
Method: peristaltic	clear	5.99	.196	23.97	9	1.85	-111.4	1535

PURGE DATA:

Date: 12/13/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: low flow	1st	5.95	.177	24.15	23	2.14	-59.0	1516
Monitor Reading (ppm): Ø		5.97	.185	24.09	21	1.80	-92.0	1519
Well Casing Diameter & Material		5.98	.188	24.16	18	1.80	-101.8	1522
2" PVC Type: ~~peristaltic~~		5.98	.190	24.09	16	1.85	-103.5	1527
Total Well Depth (TD): 14.86		5.98	.193	23.97	13	1.79	-109.8	1531
Static Water Level (WL): 6.16		5.99	.196	23.97	9	1.85	-111.4	1535
One Casing Volume(gal/L): 1.39								
Start Purge (hrs): 1500								
End Purge (hrs): 1535								
Total Purge Time (min): 35								
Total Vol. Purged (gal/L): 3.7								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: FEW LLL RI
Project No.: N00007

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0601
Sample Location: 3221 MW06
Sampled By: VKO
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: 12-14-05								
Time: 1450								
Method: Low Flow								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Date: 12-14-05									
Method: Low Flow	INIT	7.13	0.181	25.12	11.8	0.71	14.4	1430	350 ml
Monitor Reading (ppm): ~	1 gal	7.02	0.185	25.07	8.45	1.08	-27.7	1437	6.61
Well Casing Diameter & Material	1.3 gal	7.00	0.186	24.96	5.27	1.39	-30.9	1441	6.61
Type: 2" PVC	1.6 gal	7.01	0.188	24.92	4.64	1.60	-36.5	1445	6.61
Total Well Depth (TD): 14.70	2 gal	7.01	0.189	24.89	3.23	1.65	-36.9	1449	6.61
Static Water Level (WL): 6.60									
One Casing Volume (gal/L): 1.50									
Start Purge (hrs): 1428									
End Purge (hrs): 1449									
Total Purge Time (min): 21									
Total Vol. Purged (gal/L): 2									

8.10
.81
41
.08
.30

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Pet. odor

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: NASP
Project No.: Site 44

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0701
Sample Location: 44
Sampled By: B Caldwell
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Time:	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Time
Method:								

PURGE DATA:

Date: 12-13	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	1 gal	7.10	.252	24.43	650	1.85	176.1	1612
Monitor Reading (ppm):	2 gal	7.07	.240	24.42	270	1.82	157.2	1618
Well Casing Diameter & Material	3 gals	7.07	.238	24.42	7.5	1.83	151.4	1624
Type: 2" PVC	3.5 gals	7.07	.241	24.44	6.9	1.79	150.6	1626
Total Well Depth (TD): 14.75								
Static Water Level (WL): 6.17								
One Casing Volume(gal/L): 1.6								
Start Purge (hrs): 1604								
End Purge (hrs): 1630								
Total Purge Time (min): 26								
Total Vol. Purged (gal/L): 4.3								

1gal 1qt/ 90sec

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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): B Caldwell

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PEW 44 RI
Project No.: N00007

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0801
Sample Location: 3221 MW08
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: 1530								
Method:								

PURGE DATA:

Date: 12-13/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: LOW FLOW	INIT	6.71	0.260	25.30	9.71	1.46	83.4	1305
Monitor Reading (ppm): —	1 Gal	6.64	0.245	25.69	4.38	1.95	28.8	1315
Well Casing Diameter & Material	1.5 gal	6.68	0.243	25.58	2.96	2.17	1.5	~~1318~~ 1321
Type: 2" PVC	1.75 gal	6.66	0.240	25.68	1.63	2.19	-3.3	1324
Total Well Depth (TD): 15.25	2.0 gal	6.69	0.241	25.67	1.57	2.12	-14.1	1327
Static Water Level (WL): 7.07								
One Casing Volume (gal/L): 1.31								
Start Purge (hrs): 1500								
End Purge (hrs): 1528								
Total Purge Time (min): 28								
Total Vol. Purged (gal/L): 2 gal								

DD 7.10 500 ml min

15.25
7.07
8.18
.82
.41
.08
.31

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results
Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

had to change batt. in YSI

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: NASA
Project No.: 421

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0901
Sample Location:
Sampled By: JB
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/13/05	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Time: 1700	Visual	Standard	mS/cm	°C	NTU	mg/l	mV	Time
Method: Low Flow	Clear	5.99	.236	23.90	11	3.61	81.7	1700

PURGE DATA:

Date: 12/13/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	1st	5.92	.232	23.99	22	3.80	72.6	1643
Monitor Reading (ppm): Ø		5.97	.233	23.98	17	3.86	74.1	1647
Well Casing Diameter & Material		5.99	.235	23.89	13	3.57	78.6	1651
Type: 2" PVC		5.99	.236	23.90	11	3.61	81.7	1654
Total Well Depth (TD): 14.80								
Static Water Level (WL): 6.50								
One Casing Volume(gal/L): 1.3								
Start Purge (hrs): 1630								
End Purge (hrs): 1657								
Total Purge Time (min): 27								
Total Vol. Purged (gal/L): 1.5								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: NASA
Project No.: 412

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW1001
Sample Location:
Sampled By:
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: 1700								
Method:								

PURGE DATA: (cont)

Date:	Volume	pH	~~S.C.~~	Temp. (C)	Turbidity	DO	ORP	Time	SWL
Method:		6.96	.308	25.09	11	EE	128.9	1632	6.9
Monitor Reading (ppm):	2.5	6.89	.307	25.30	12		124.3	1637	6.95
Well Casing Diameter & Material	5.0	6.90	.311	25.31	10		120.3	1642	6.95
Type: 2.0 PVC									
Total Well Depth (TD): 15.00									
Static Water Level (WL): 6.89									
4.9L One Casing Volume(gal/L): 1.3									
Start Purge (hrs): 1632									
End Purge (hrs):									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen	3.5
Ferrous Iron	
Hydrogen Sulfide	
Carbon Dioxide	
Alkalinity	
Sulfide	

15.00
6.89
8.11
x .16
1.3

Cir le if App icable:

MS/MSD	Duplicate ID No.:

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASA
Project No.: W4

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW0901
Sample Location:
Sampled By:
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/14/05 Time: 1030	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Method: low flow	clear	6.37	.214	23.14	19	3.35	147.8	1030

PURGE DATA:

Date: 12/14/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: low flow	1st	6.41	.197	23.28	55	2.97	114.8	0927
Monitor Reading (ppm): Ø		6.40	.201	23.26	40	3.07	118.2	0931
Well Casing Diameter & Material		6.39	.200	23.22	34	3.23	122.7	0935
Type: 2" PVC		6.39	.203	23.15	29	3.02	127.5	0943
Total Well Depth (TD): 13.85		6.39	.204	23.16	27	3.34	132.6	0950
Static Water Level (WL): 6.05		6.40	.205	23.22	25	3.02	138.2	0957
One Casing Volume(gal/L): 1.2		6.40	.206	23.26	23	2.97	140.5	1002
Start Purge (hrs): 0915		6.39	.204	23.30	23	3.54	141.6	1008
End Purge (hrs): 1025		6.38	.213	23.28	21	3.32	143.8	1016
Total Purge Time (min): 70		6.37	.214	23.14	19	3.35	147.8	1024
Total Vol. Purged (gal/L): 7.4								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL A ENUATION 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:
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1001
Sample Location:
Sampled By:
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: 0935								
Method:								

PURGE DATA:

Date: 12/14	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	
Method:		7.09	.450	22.57	18	3.99	185.5	0910	SWL
Monitor Reading (ppm):	3.5	6.84	.301	25.14	14	4.12	188.4	0915	SWL
Well Casing Diameter & Material	6.5	6.85	.303	25.16	13	3.80	188.8	0920	6.89
Type: 2.0 PVC	9.52	6.87	.302	25.17	11	3.68	187.5	0925	6.84
Total Well Depth (TD): 14.00									6.84
Static Water Level (WL): 6.90									
4.4L One Casing Volume(gal/L): 1.1									
Start Purge (hrs): 0910									
End Purge (hrs): 0925									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: PEN 44 RI
Project No.: N00007

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1101
Sample Location: PEW-44-11
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: 0920								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 12-14-09								
Method: low flow	INIT	6.98	0.287	22.56	158	4.22	169.8	0850
Monitor Reading (ppm): –	1 gal	7.02	0.278	22.87	136	3.65	156.7	0858
Well Casing Diameter & Material	1.5 gal	7.00	0.279	22.96	100.1	3.63	100.1	0902
Type: 2" PVC	2 gal	6.96	0.282	23.00	61.2	3.48	151.3	0906
Total Well Depth (TD): 14' BTOC	2.5 gal	6.95	0.283	22.96	33.5	3.70	150.0	0910
Static Water Level (WL): 6.81	3 gal	6.93	0.284	23.04	23.8	3.62	149.3	0914
One Casing Volume(gal/L): 1.15	3.5 gal	6.94	0.282	23.08	14.6	1	147.2	0918
Start Purge (hrs): 0848								
End Purge (hrs): 0918								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

500 ml min

DD 6.81

DD 6.8

3.00
6.81
7.19

72
36
07
1.15

SAMPLE COLLECTI NFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Field Test Kit Results

Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

D.O. high on meter
1 mg/L on chemets

Circle if Applicable:

MS/MSD | **Duplicate ID No.:**

TBD: To Be Determined

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASD
Project No.: 421

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1201
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: 12/14/05								
Time: 1425								
Method: low flow	clear	6.58	.377	23.13	13	1.31	99.8	1425

PURGE DATA:

	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Date: 12/14/05								
Method: low flow	1st	6.58	.378	23.51	30	1.99	89.0	1406
Monitor Reading (ppm): Ø		6.58	.378	23.29	17	1.57	94.1	1413
Well Casing Diameter & Material		6.58	.377	23.13	13	1.31	99.8	1418
Type: 2" PVC								
Total Well Depth (TD): 13.88								
Static Water Level (WL): 6.93								
One Casing Volume(gal/L): 1.1								
Start Purge (hrs): 1350								
End Purge (hrs): 1420								
Total Purge Time (min): 30								
Total Vol. Purged (gal/L): 2.6								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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: NASP
Project No.: WCJ

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1301
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: 1350								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time	SWL
Method:								1327	6.17
Monitor Reading (ppm):	3.0	6.70	.354	24.44	34	2.54	141.0	1332	
Well Casing Diameter & Material	5.5	6.72	.341	24.40	27	2.73	147.9	1337	6.19
Type: 2.0" PVC	8.0	6.67	.333	24.40	18	2.77	156.8	1342	6.19
Total Well Depth (TD): 13.89									
Static Water Level (WL): 6.17									
One Casing Volume(gal/L): 4.72									
Start Purge (hrs): 1327									
End Purge (hrs): 1342									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 8.2									

SAMPLE CO LECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	YES / NO

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

****Field Test Kit Results****
Dissolved Oxygen
Ferrous Iron
Hydrogen Sulfide
Carbon Dioxide
Alkalinity
Sulfide

13.89
-6.17

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: NASP
Project No.: Site 44

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1401
Sample Location:
Sampled By: BCaldwell
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/14/05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: ~~0945~~ 0910								
Method: Low Flow	clear	6.72	.241	23.87	6.3	0.60	146.0	0910

PURGE DATA:

Date: 12/14/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	Initial	6.38	.237	22.16	23	1.65	180.5	0850
Monitor Reading (ppm): 0	1 gal	6.71	.243	23.87	14	~~[illegible]~~	~~[illegible]~~	0856
Well Casing Diameter & Material	2.5 gal	6.72	.241	23.84	7.3	~~[illegible]~~	145.5	0905
Type: 2" PVC	3 gal	6.72	.241	23.87	6.3	0.60	146.0	0910
Total Well Depth (TD): 14.15								
Static Water Level (WL): 6.95								
One Casing Volume(gal/L): 2g								
Start Purge (hrs): 0850								
End Purge (hrs): 0910								
Total Purge Time (min):								
Total Vol. Purged (gal/L): 3 gal								

1gt / 1 min 25 sec

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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): BCaldwell

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NASP
Project No.: Site 44

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1501
Sample Location:
Sampled By: B Caldwell
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/14/05	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Time
Time: 1400								
Method: Low Flow								

PURGE DATA:

Date: 12/14/05	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Time
Method: Low Flow	Initial	7.16	.234	23.94	40	1.59	136.0	1337
Monitor Reading (ppm): 0	1 gal	6.68	.236	24.76	15	1.06	130.5	1344
Well Casing Diameter & Material	2 gal	6.66	.239	24.75	13	1.03	137.4	1350
Type: 2" PVC 13.02	3 gal	6.65	.238	24.78	14	1.05	141.0	1355
Total Well Depth (TD): ~~14.84~~	3.3 gal	6.66	.238	24.79	12	1.10	142.9	1400
Static Water Level (WL): 6.95								
One Casing Volume(gal/L): 2								
Start Purge (hrs): 1337								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

1gt
1min
25sec

ΔWL
-.15
during
pump

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 8260B - TCL VOCs	HCL	3 - 40mL VOA	YES / NO
USEPA 504.1 - EDB	HCL	2 - 40mL VOA	YES / NO
SW-846 8270C - TCL SVOCs/PAHs	4degC	2 - 1L Amber	YES / NO
FDEP FL-PRO - TRPH	HCL	2 - 1L Amber	YES / NO
SW-846 6010B - TAL Metals	HN03	1 - 500mL Plastic	YES / NO
SW-846 8081/8082 - TCL Pest/PCBs	4degC	2 - 1L Amber	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): B Caldwell

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

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Project Site Name: NASP site 44
Project No.: 112600007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1601
Sample Location: PEN-44-16
Sampled By: C. Dolan
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)	ORP (mV)	Other
Date: 5-12-06								
Time: 1250								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~	SWC
Date: 5-12-06									
Method:	2.0	6.61	.127	25.25	25	5.58	135	1235	8.42
Monitor Reading (ppm):	4.0	6.65	.125	25.20	24	5.70	138	1240	8.43
Well Casing Diameter & Material	6.0	6.65	.125	25.22	19	5.47	142	1245	8.43
Type: 2.0" PVC									
Total Well Depth (TD): 13.58									
Static Water Level (WL): 8.41									
One Casing Volume(gal/L): 3.14									
Start Purge (hrs): 1230									
End Purge (hrs): 1245									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 6.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3x40mL glass vials	Y

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: NASP site 44
Project No.: 112600007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1701
Sample Location: PGW-44-17
Sampled By: C.Ode
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 5-12-06	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	ORP (mV)	Other
Time: 1520								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ Time	SWL
Method:	2.0	7.03	.229	23.62	46	1.65	106	1456	8.73
Monitor Reading (ppm):	4.0	7.00	.229	23.62	42	1.56	105	1501	8.74
Well Casing Diameter & Material	6.0	6.97	.228	23.65	34	1.58	105	1506	8.74
Type: 2.0" PVC	8.0	6.95	.228	23.66	24	1.61	105	1511	8.74
Total Well Depth (TD): 13.88	10.0	6.96	.227	23.66	16	1.61	105	1516	8.74
Static Water Level (WL): 8.73									
One Casing Volume(gal/L): 3.13									
Start Purge (hrs): 1451									
End Purge (hrs): 1516									
Total Purge Time (min): 25									
Total Vol. Purged (gal/L): 10.0									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3x40 mL vials (glass)	✓

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: PEN 44 RI
Project No.: 112G-000007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW2001
Sample Location: PEN-44-20
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. (^{0}C)	Turbidity (NTU)	DO (mg/l)	ORP (mV)	Other
Date: 5-12-05								
Time: 1330								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ Time	SW
Method:	2.5	5.82	.125	25.99	22	0.0	123	1316	7.39
Monitor Reading (ppm):	5.0	5.70	.129	25.95	18	0.01	125	1321	7.39
Well Casing Diameter & Material	7.5	5.67	.135	26.01	16	0.05	127	1326	7.40
Type: 2.0" PVC									
Total Well Depth (TD): 13.93									
Static Water Level (WL): 7.37									
One Casing Volume(gal/L): 3.98									
Start Purge (hrs): 1311									
End Purge (hrs): 1326									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 7.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3 x 40mL glass vials	Y

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 44 NASP
Project No.: 112G00007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW2101
Sample Location: PEW-44-21
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. (^{0}C)	Turbidity (NTU)	DO (mg/l)	ORP (mV)	Other
Date: 5-12-06								
Time: 1412								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ Time	SWL
Method:	2.0	6.24	.121	27.90	40	0.02	63	1356	7.43
Monitor Reading (ppm):	~~2.0~~ 3.0	6.26	.134	27.81	37	0.00	57	~~0~~ 1401	7.43
Well Casing Diameter & Material	4.0	6.29	.146	27.73	45	0.00	55	1406	7.43
Type: 2.0" PVC								~~1411~~	
Total Well Depth (TD): 13.46									
Static Water Level (WL): 7.40									
One Casing Volume(gal/L): 3.68									
Start Purge (hrs): 1351									
End Purge (hrs):									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3 x 40mL glass vials	Y

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 44 NASP
Project No.: 112G00007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW2201
Sample Location: PEW-44-22
Sampled By: C. Odom
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	ORP (mV)	Other
Date: 5-12-06								
Time: 1440								
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ Time	SWL
Method:	1.5	6.64	.204	27.58	29	1.21	96	1426	7.55
Monitor Reading (ppm):	3.0	6.61	.190	27.28	19	1.56	102	1431	7.55
Well Casing Diameter & Material	4.5	6.60	.189	27.20	20	1.62	103	1436	7.55
Type: 2.0" PVC									
Total Well Depth (TD): 13.85									
Static Water Level (WL): 7.55									
One Casing Volume(gal/l): 3.83									
Start Purge (hrs): 1421									
End Purge (hrs): 1436									
Total Purge Time (min): 15									
Total Vol. Purged (gal/l): 4.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	~~4x3~~ 3x40mL glass vial	Y

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name:
Project No.:

[X] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 446-W 2301
Sample Location: PEW-44-23
Sampled By: LWO
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)	ORP (mV)	Other
Date: 8-14/06								
Time: 1255								
Method: Low Flow	brown	6.49	0.156	31.50	102.6	3.17	46	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	Other	
Date: 8-14/06									6 cont/min
Method: Low Flow	1 pint	6.61	0.156	31.55	80.2	3.76	40	7.83	1240
Monitor Reading (ppm): 0.0	1 gal	6.44	0.155	31.59	95.1	3.49	48	7.83	1246
Well Casing Diameter & Material	1.5	6.48	0.156	31.52	99.0	3.32	47	7.84	1249
Type: 2" PVC	2	6.49	0.156	31.50	102.6	3.17	46	7.84	1252
Total Well Depth (TD): 15.00									
Static Water Level (WL): 7.81									
One Casing Volume (gal/L): 0.83									
Start Purge (hrs): 1240									
End Purge (hrs): 1252									
Total Purge Time (min): 12									
Total Vol. Purged (gal/L): 2									

4.91
5.00
7.81
5.19
1
.52
.26
.05
.83

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCL	3x 40ml	X

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PEW RI 44
Project No.: 112 C00007

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44G-W 2401
Sample Location: PEW-44-24
Sampled By: WMD
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)	ORP (mV)	Other
Date: 8-14-06								
Time: 1353								
Method: Low Flow	Clear	6.93	0.269	31.59	2.48	4.14	20	

500ml/hr

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	Other	Time
Date: 8-14-06									
Method: Low Flow	INIT	6.88	0.269	31.62	24.1	5.05	23	8.36	1335
Monitor Reading (ppm): 0.0	1gal	6.91	0.264	31.60	3.95	4.51	21	8.36	1343
Well Casing Diameter & Material	1.5	6.93	0.270	31.57	1.93	4.22	20	8.35	1347
Type: 2" PVC	2.0	6.93	0.269	31.59	2.48	4.14	20	8.35	1351
Total Well Depth (TD): 14.43									
Static Water Level (WL): 8.53									
One Casing Volume (gal/L): 0.97									
Start Purge (hrs): 1335									
End Purge (hrs): 1351									
Total Purge Time (min): 16									
Total Vol. Purged (gal/L): 2									

6.10
.61
.30
1.06
0.97

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCL	3 X 40ml	✓

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature]

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PEW RI
Project No.: 112G00004

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44G-W2501
Sample Location: PEW-44-25
Sampled By: WPO
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)	ORP (mV)	Other
Date: 8-14-06								
Time: 1427								
Method: Low Flow	Clear	6.96	0.297	30.92	1.77	3.95	19	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	Other	
Date: 8-14-06									50ml/m
Method: Low Flow	INIT	7.09	0.297	31.26	2.73	4.63	4	7.90	1410
Monitor Reading (ppm): 0.0	1 gal	7.01	0.301	31.04	2.23	4.14	14	7.90	1418
Well Casing Diameter & Material	1.5	6.96	0.301	30.97	2.09	3.98	18	7.90	1422
Type: 2" PVC	2.0	6.96	0.298	30.92	1.77	3.95	19	7.91	1426
Total Well Depth (TD): 13.80									
Static Water Level (WL): 7.88									
One Casing Volume (gal/L): 0.95									
Start Purge (hrs): 1410									
End Purge (hrs): 1425									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 2									

14
3.80
7.88
5.92
1
.59
.30
.06
0.95

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
CVOC	HCL	3x40ml	X

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: PEW RI
Project No.:

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW2601
Sample Location: PEW-44-26
Sampled By: WRD
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)	ORP (mV)	Other
Date: 8-14-06								
Time: 1500								
Method: Low Flow								

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	Other	
Date: 8-14-06									500ml min
Method: Low Flow	INIT	6.98	0.249	31.62	7.51	3.20	16	8.65	1445
Monitor Reading (ppm): 0.0	1.5L	7.02	0.240	31.54	0.42	2.60	13	8.65	1453
Well Casing Diameter & Material	1.5	7.03	0.245	31.51	0.66	2.53	12	8.65	1456
Type: 2" PVC	2.5L	7.06	0.248	31.48	0.44	2.40	11	8.65	1459
Total Well Depth (TD): 13.60									
Static Water Level (WL): 8.62									
One Casing Volume (gal/L): 0.80									
Start Purge (hrs): 1445									
End Purge (hrs):									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

23.5
13.60
8.62
4.98

.50
.25
.05
0.80

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
C&VOC	HCL	3 x 40ml	X

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: PEW 42 RI
Project No.: 112G000 X

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 3221GW0302
Sample Location: 3221-03
Sampled By: C. Dan
C.O.C. No.:
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (^{0}C)	Turbidity (NTU)	DO (mg/l)	ORP (mV)	Other
Date: 5-9-06								
Time: 1610								
Method:								

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~	SWL
Date:									
Method:	2.5	7.01	.121	23.30	11	1.02	110	1557	7.96
Monitor Reading (ppm):	5.0	6.98	.120	23.40	8	1.08	110	1602	7.95
Well Casing Diameter & Material	7.5	6.91	.117	23.43	7	1.12	112	1607	7.96
Type: 2.0" PVC									
Total Well Depth (TD): 15.00									
Static Water Level (WL): 7.95									
One Casing Volume(gal/L):									
Start Purge (hrs): 1552									
End Purge (hrs): 1607									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 7.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Mn	HNO_3	1 x 250 mL Poly	Y

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: PEW 44R1
Project No.: 112G0000 7

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1502
Sample Location: 44MW15
Sampled By: C. Odom
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)	ORP (mV)	Other
Date: 5-9-06								
Time: 1520								
Method:	clear	6.79	.158	26.13	6	1.22	63	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~	SWL
Date: 5-9-06									
Method:	2.5	6.84	0.154	26.11	14	1.61	15	1505	7.95
Monitor Reading (ppm):	5.0	6.80	.157	26.12	8	1.21	48	1510	7.95
Well Casing Diameter & Material	7.5	6.79	.158	26.13	6	1.22	63	1515	7.95
Type: 2.0" PVC									
Total Well Depth (TD): 13.90									
Static Water Level (WL): 7.92									
One Casing Volume(gal/L): 3.98									
Start Purge (hrs): 1500									
End Purge (hrs): 1515									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 7.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
DeHP	None	2 X 1.0L Amber glass	Y

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: PEWULIR1
Project No.: 112G00007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1802
Sample Location: 44MW18
Sampled By: CDL
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)	ORP (mV)	Other
Date: 5-9-06								
Time: 1450								
Method:	clear	6.54	.145	25.00	2.0	0.0	-81	

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~	SWL
Method:	2.5	6.58	.175	25.19	6.7	0.00	-63	1439	13.54
Monitor Reading (ppm):	5.0	6.55	.159	25.10	3.5	0.00	-76	1444	13.6[illegible]
Well Casing Diameter & Material	7.5	6.54	.145	25.00	2.0	0.00	-81	1449	13.7[illegible]
Type: 2.0" PVC									
Total Well Depth (TD): 50.0									
Static Water Level (WL): 11.88									
One Casing Volume(gal/L):									
Start Purge (hrs): 1434									
End Purge (hrs): 1449									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L) 7.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Mn + Fe	HNO_3	1 x 250 mL poly	Y

OBSERVATIONS / NOTES:

La Motte used for turbidity
Horiba for all others

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NASP site 44 RI
Project No.: 112G00007

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: 44GW1902
Sample Location: PEN-44-19
Sampled By: C. Odom
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)	ORP (mV)	Other
Date: 5-10-06								
Time: 0900								
Method:	clear	7.57	0.198	24.24	5	0.0	-177	

PURGE DATA:

	Volume	pH	S.C.	Temp.	Turbidity	DO	ORP	~~Other~~ Time	SWL
Date:									
Method:	2.5	7.56	.223	24.21	12	0.00	-174	0844	14.72
Monitor Reading (ppm):	4.0	7.56	.195	24.25	7	0.00	-175	0849	14.40
Well Casing Diameter & Material	5.5	7.57	.198	24.24	5	0.00	-177	0854	14.21
Type: 2.0" PVC									
Total Well Depth (TD): 75									
Static Water Level (WL): 13.63									
One Casing Volume(gal/L):									
Start Purge (hrs): 0839									
End Purge (hrs): 0854									
Total Purge Time (min): 15									
Total Vol. Purged (gal/L): 5.5									

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
Mn + Fe	HNO_3	1 x 250 mL Poly	Y
BehP	—	2 x 1L Amber glass	Y

OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Site 44 TOC Survey
12/12/2005

STA	BS	HI	FS	ELEV	Comments
3221-09	5.53	30.53	---	25.00	Arbitrary datum
44-09	---	30.53	5.87	24.66	
44-11	---	30.53	5.35	25.18	
44-14	---	30.53	5.69	24.84	
44-12	---	30.53	5.45	25.08	
44-15	---	30.53	5.99	24.54	
44-18	---	30.53	6.05	24.48	
44-13	---	30.53	6.09	24.44	
44-10	---	30.53	5.27	25.26	
44-10	5.27	30.53	---	25.26	
3221-09	---	30.53	5.53	25.00	
3221-09	5.82	30.82	---	25.00	
44-19	---	30.82	5.45	25.37	
3221-10	---	30.82	5.38	25.44	
3221-08	---	30.82	5.41	25.41	
3221-05	---	30.82	6.00	24.82	
3221-04	---	30.82	6.40	24.42	
3221-07	---	30.82	6.01	24.81	
3221-06	---	30.82	5.61	25.21	
3221-02	---	30.82	6.33	24.49	
3221-01	---	30.82	6.21	24.61	
3221-03	---	30.82	5.93	24.89	
3221-07	---	30.82	6.01	24.81	
3221-07	5.97	30.78	---	24.81	
3221-09	---	30.78	5.78	25.00	

SURVEYING DATA SHEET

Project Name: PEW 44R1

Project No.: N00007 **Date:** 5-12/06

Personnel: W.D. Olson / C. Odom

Station ID	Backsight (BS)	Height of Instrument (HI)	Foresight (FS)	Elevation	Comments
PEW 44 12 Bench Mark	5.37	30.45	—	25.08	Previously surveyed
PEW 44 17	—	30.45	4.96	25.49	
PEW 44 16	—	30.45	5.08	25.37	
PEW 44 20	—	30.45	6.41	24.04	
PEW 44 21	—	30.45	6.49	23.96	
PEW 44 22	—	30.45	6.32	24.13	
PEW 44 27	6.39	30.52	—	24.13	
PEW 44 12	—	30.52	5.45	25.07	

HI = BM Elevation + BM Backsight
Station Elevation = HI - Station FS

To create a Turning Point (TP):
1. Shoot a FS to the TP
2. HI - FS = the TP Elevation
3. Move the insturment to the new location
4. Shoot a BS to the TP
5. The BS + TP Elevation = the new HI

25.08 + 5.37 = 30.45

29.13 + 4.96 = 25.49

30.45 + 5.08 = 25.37

30.45 + 6.32 = 24.13

30.45 − 6.41 = 24.04

29.13 + 6.49 = 23.96

24.13 + 6.39 = 30.52

30.52 + 5.45 = 25.07

30.52 − 25.08 = 5.44

SURVEYING DATA SHEET

Project Name: PEW Site 44

Project No.: 112000007 **Date:** 8-14/06

Personnel: W. A. Olson

Station ID	Backsight (BS)	Height of Instrument (HI)	Foresight (FS)	Elevation	Comments
PEW-44-21 ~~Bench Mark~~	5.42	29.38	—	23.96	
44-25	—	29.38	6.07	23.31	
44-24	—	29.38	5.76	23.62	
44-23	—	29.38	6.10	23.28	
44-23	6.16	29.44	—	23.28	
44-21	—	29.44	5.48	23.96	
44-15	5.73	30.27	—	24.54	
44-26	—	30.27	6.23	24.04	
44-26	6.25	30.29	—	24.04	
44-15	—	30.29	5.74	24.55	

HI = BM Elevation + BM Backsight
Station Elevation = HI - Station FS

To create a Turning Point (TP):
1. Shoot a FS to the TP
2. HI - FS = the TP Elevation
3. Move the insturment to the new location
4. Shoot a BS to the TP
5. The BS + TP Elevation = the new HI

~~30.29~~
~~24.55~~

28
29.38
5.76
23.62

281
29.44
5.48
23.96

1
23.96
5.42
29.38

1
23.28
6.16
29.44

61
23.96
6.07
1.89

29.38
6.07
23.31

1
24.54
5.73
30.27

30.27
6.23
24.04

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: PEW 44 RI
Project No.: 112C00007
Location: S.T. 44
Personnel: W.D. Olson
Weather Conditions: HOT
Measuring Device: WLI
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
3221-01	8-14-96	0936		14.74	8.97			
3221-02		0933		14.52	8.85			
3221-03		0938		15.00	9.26			
3221-04		0946		15.10	8.79			
3221-05		0942		14.92	9.20			
3221-06		0940		14.70	9.62			
3221-07		0948		14.78	9.19			
3221-08		0947		14.78	9.80			
3221-09		0949		14.67	9.37			
3221-10		0956		14.93	9.85			
44-09		1000		13.75	9.02			
44-10		1007		13.95	9.66			
44-11		1009		13.91	9.61			
44-12		1017		13.72	9.53			
44-13		1035		13.72	8.91			
44-14		1012		13.75	9.32			
44-15		1024		12.94	9.04			
44-16		1004		13.50	9.74			
44-17		1015		13.80	9.92			
44-18		1027		74.00	13.06			
44-19		0958		73.95	13.39			
44-20		1030		13.85	8.58			
44-21		1032		13.38	8.55			
44-22		1020		13.77	8.66			
44-23		1047		15.00	7.82			

*All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: PEW 44 RI
Project No.: 112C00007
Location: Site 44
Personnel: W.A. Olson
Weather Conditions: Hot
Measuring Device: WLI
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
44-24	8-14	1042		14.43	8.33			
44-25	↓	1044		13.80	7.88			
44-26	↓	1045		13.60	8.62			

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: PEN 421 RI
Project No.: 112G00007
Location: Sitella
Personnel: W.D. Olson
Weather Conditions:
Measuring Device: 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
3221NE -9	5-12/06	1532	23.79	14.91	7.75			
3221N1 -01		1534	23.68	14.38	8.46			
3221NE 12D		1535	26.63	34.69	10.20			
3221NE mw8		1536	24.17	14.38	6.28			
44-18		1540			11.68			
44-15		1541			7.91			
44-12		1542			8.36			
44-14		1543			8.13			
44-11		1545			8.36			
44-13		1547			8.68			
44-10		1549			8.36			
44-09		1550			7.64			
3221 -09		1552			8.03			
3221 -10		1554			8.54			
44-19		1555			11.98			
3221 -07		1556			7.79			
3221 -08		1557			8.43			
3221 -05		1559			7.76			
3221 09		1602			7.33			
3221 06		1609			8.23			
3221 03		1611			7.81			
3221 -01		1613			7.51			
3221 -02		1614			7.36			

* All measurements to the nearest 0.01 foot

Page ____ of ____

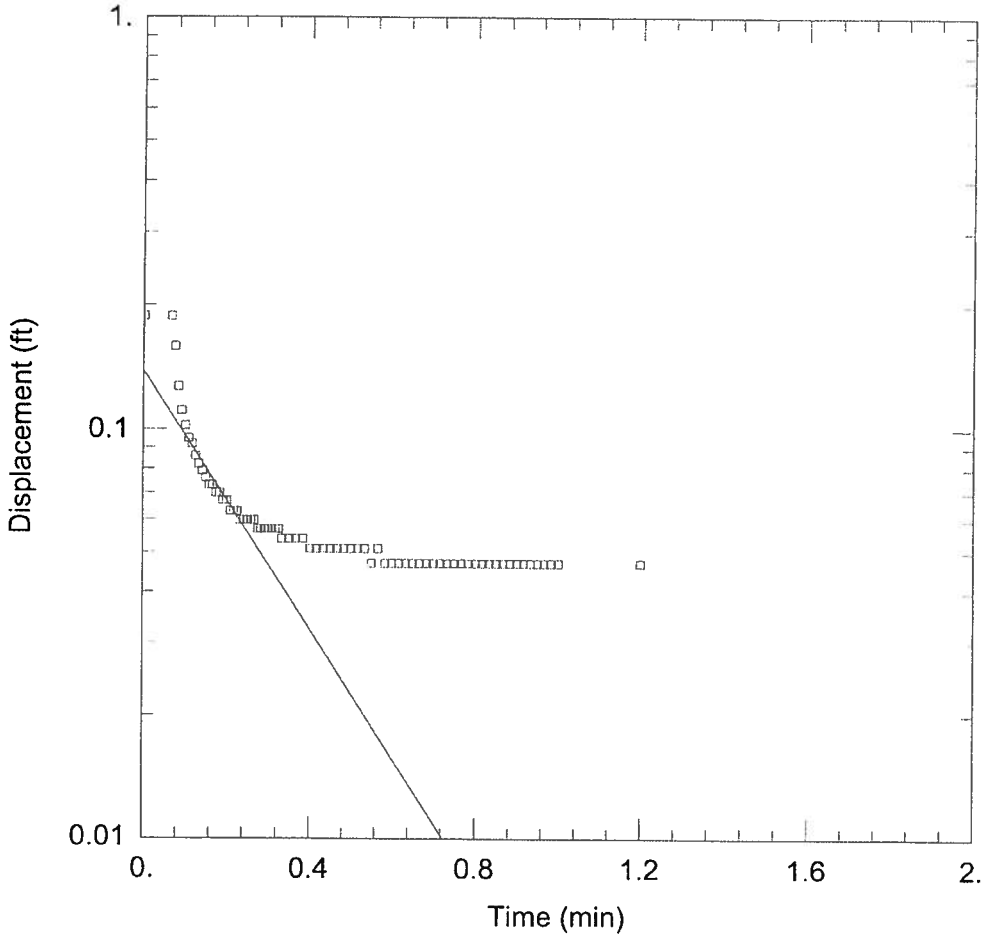
Site Information	
Site Name	NASP - Site 44
Project	Round I
Project Number	N00007
Date	12/4/05
Personnel	B Caldwell

Well Information	
Name	~~MW-5~~ PEN-44-07
Inside Diameter	2"
Borehole Diameter	8" (7)
Total Depth	14.75
Depth to Water	6.00
Water Column	8.75
Screen length	10
TOC Elevation	

Data Logger	
Model	Hermit 2000
Serial Number	2k 593
Test Rate	NA
Mode (TOC/SUR)	SUR
Level/Func.	Level

XD	
Model	PXD-260
Serial Number	205837
Scale	10.0509
Offset	0.00103
Linearity	0.0441
PSI	20

Test Data			
Test Number	6 (Step 0)	6 (Step 1)	
Well ID	MW-7	MW-7	
Slug In/Out	In	Out	
XD depth	8.38 BWT	8.38	
XD install time	1456	NA	
XD reading	0.8	0.019	
slug depth	12.00 BTOC	12.00	
slug install time	1500	NA	
slug length	6'	6'	
slug diameter	1.5 in	1.5	
slug volume			
slug displacement	.188	4.888	
reference setting	0.0		
reference reading	0.0		
start time	1500	1516	
initial displacement			
end time	1516	1520	
final XD reading			



PEN-44-07 SLUG IN

Data Set: E:\PENHYD~1\SITE44~1\44-07-BI.AQT
Date: 01/16/06 Time: 10:49:23

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367 - N00007
Test Location: NAS Pensacola Site 44
Test Well: Pen-44-07
Test Date: 12/04/05

AQUIFER DATA

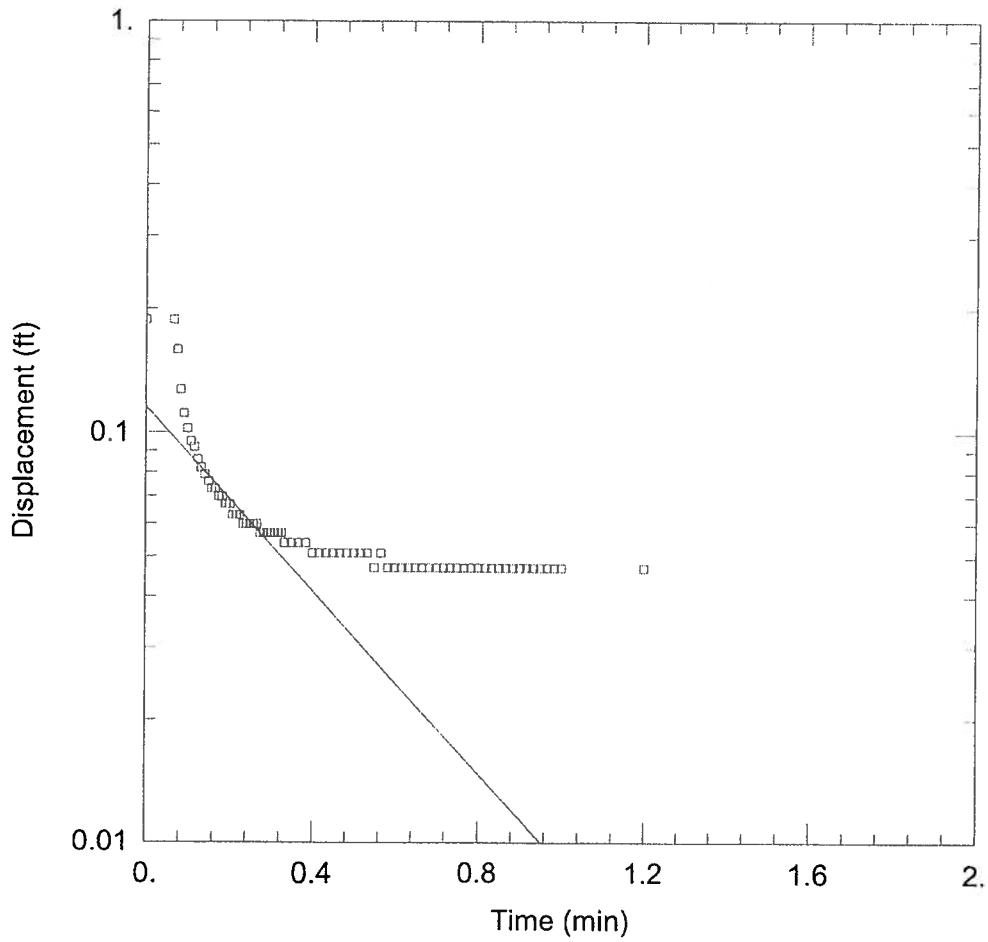
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 0.188 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.75 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01418 ft/min
y0 = 0.1382 ft



PEN-44-07 SLUG IN

Data Set: E:\PENHYD~1\SITE44~1\44-07-HI.AQT
Date: 01/16/06 Time: 10:52:30

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367 - N00007
Test Location: NAS Pensacola Site 44
Test Well: Pen-44-07
Test Date: 12/04/05

AQUIFER DATA

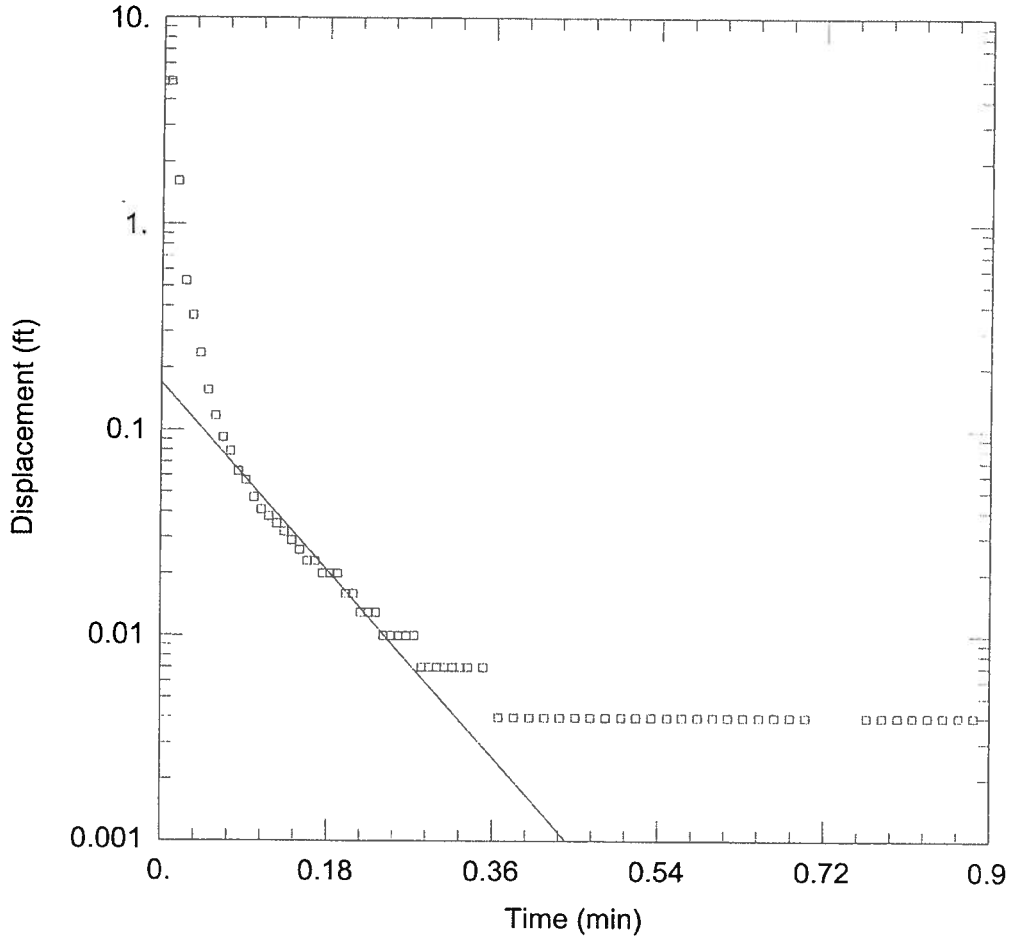
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 0.188 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.75 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.01669 ft/min
y0 = 0.1154 ft



PEN-44-07 SLUG OUT

Data Set: C:\PENHYD~1\SITE44~1\44-07-BO.AQT
Date: 01/11/06 Time: 10:14:16

PROJECT INFORMATION

Company: TtNus, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Siter 44
Test Well: Pen-44-07
Test Date: 12/4/05

AQUIFER DATA

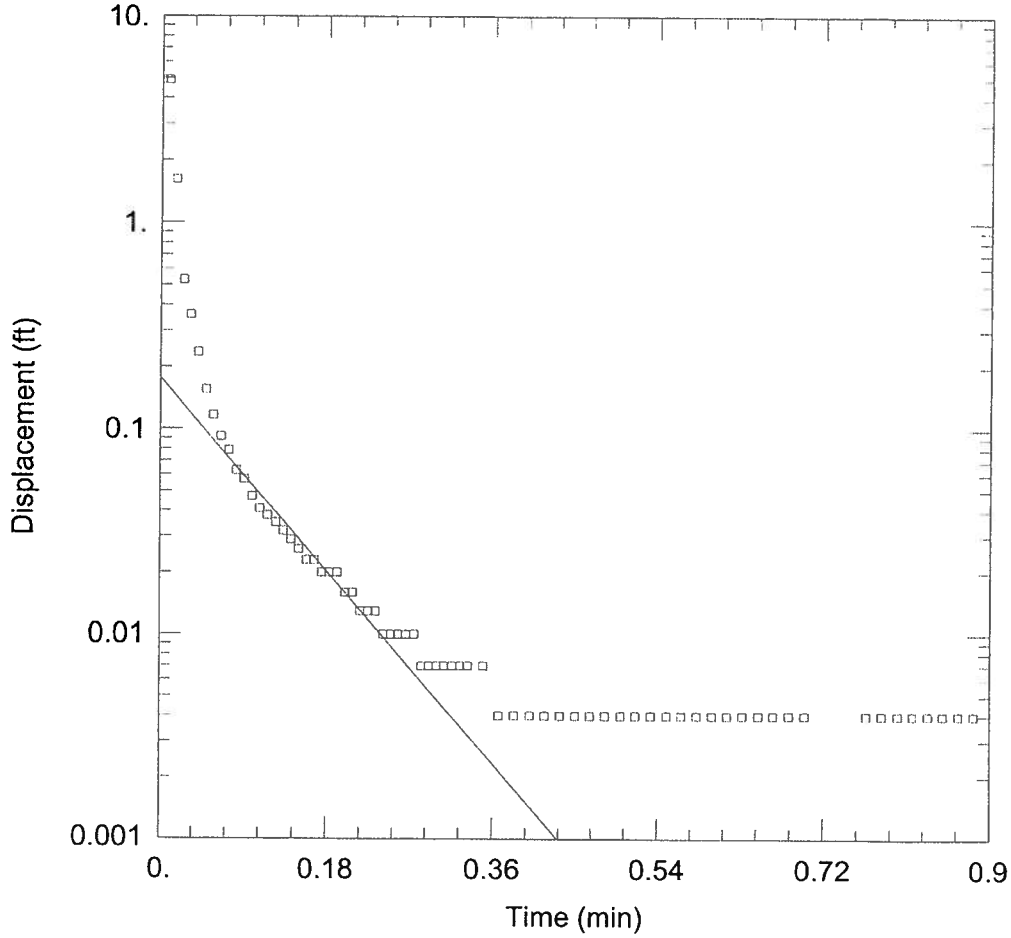
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.888 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.75 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04564 ft/min
y0 = 0.1688 ft



PEN-44-07 SLUG OUT

Data Set: C:\PENHYD~1\SITE44~1\44-07-HO.AQT
Date: 01/11/06 Time: 10:15:07

PROJECT INFORMATION

Company: TtNus, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Siter 44
Test Well: Pen-44-07
Test Date: 12/4/05

AQUIFER DATA

Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.888 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.75 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.07808 ft/min
y0 = 0.177 ft

Site Information	
Site Name	44
Project	PEWRI
Project Number	N00007
Date	11-28/05
Personnel	WDO/CO

Well Information	
Name	PEW-44-09
Inside Diameter	2"
Borehole Diameter	8"
Total Depth	13.85
Depth to Water	5.81
Water Column	8.04
Screen length	10'
TOC Elevation	

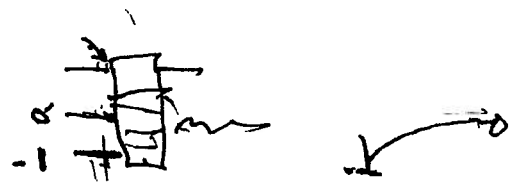
Data Logger	
Model	Hermit 2000
Serial Number	2K 593
Test Rate	L09
Mode (TOC/SUR)	TOC
Level/Func.	LEVEL

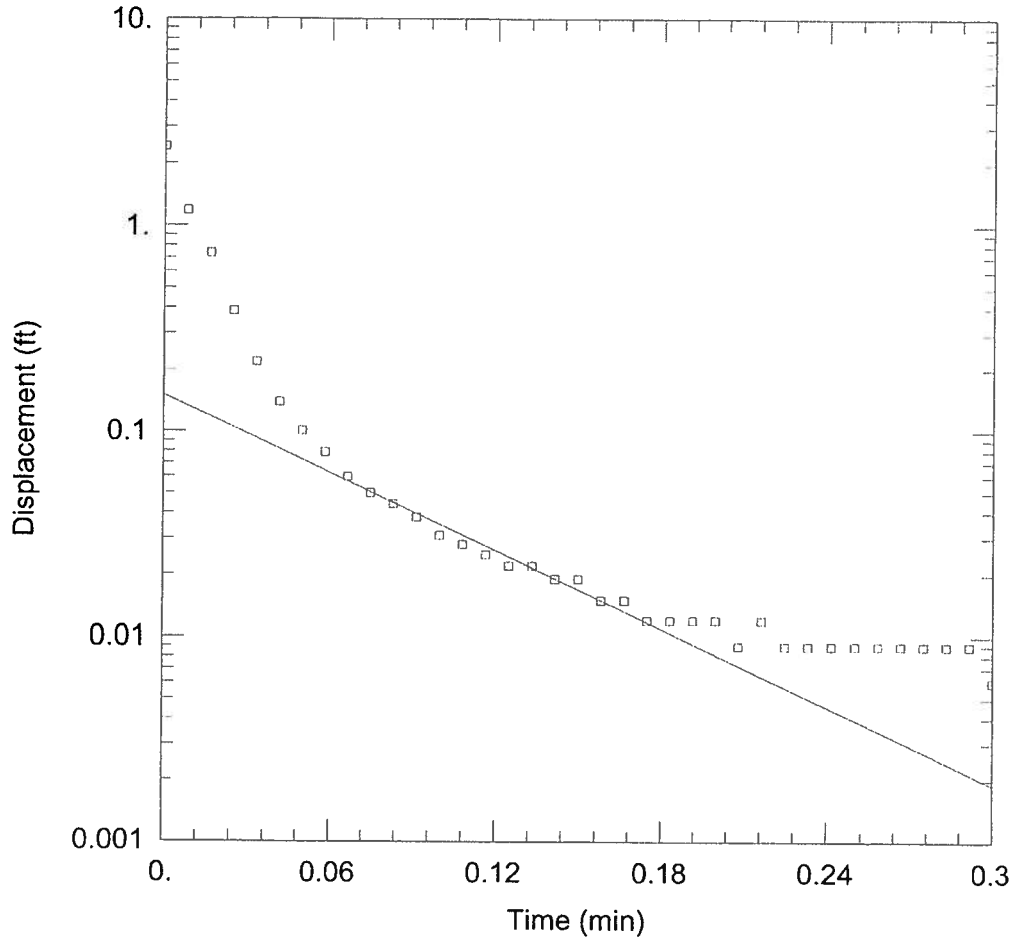
XD	
Model	PXD-260
Serial Number	203837
Scale	10.0509
Offset	0.0103
Linearity	0.0441
PSI	10

Test Data			
Test Number	0	1	2
Well ID	PEW 4409	PEW 4409	PEW 4409
Slug In/Out	OUT	OUT	OUT
XD depth	13.5	13.5	13.5
XD install time	1255	1255	1255
XD reading	7.206	7.206	7.206
slug depth	11.81	11.81	11.81
slug install time	1328	1338	1351
slug length	6'	6'	6'
slug diameter	1 1/2"	1 1/2"	1 1/2"
slug volume	—	—	—
slug displacement	— 2.413	— 2.003	— 1.946
reference setting	Ø	Ø	Ø
reference reading	7.212 35	7.215	7.219
start time	~~1325~~ 1334	1342	1354
initial displacement	2.413	2.003	1.946
end time	1337	1345	1357
final XD reading			7.219

5.81
7.21
13.02

11.81





PEN-44-09 SLUG OUT #1

Data Set: C:\PENHYD~1\SITE44~1\44-09-B1.AQT
Date: 01/11/06 Time: 11:31:30

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

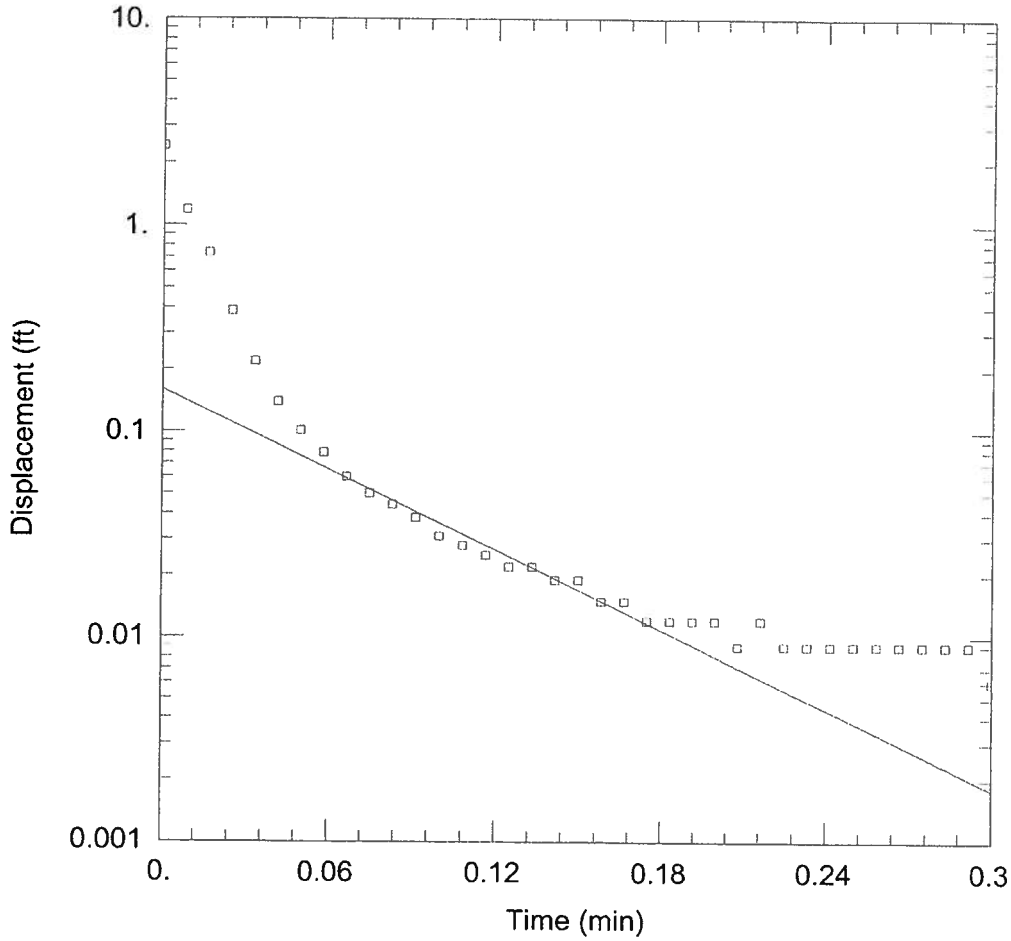
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.413 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.05601 ft/min
y0 = 0.1505 ft



PEN-44-09 SLUG OUT #1

Data Set: C:\PENHYD~1\SITE44~1\44-09-H1.AQT
Date: 01/11/06 Time: 11:32:13

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

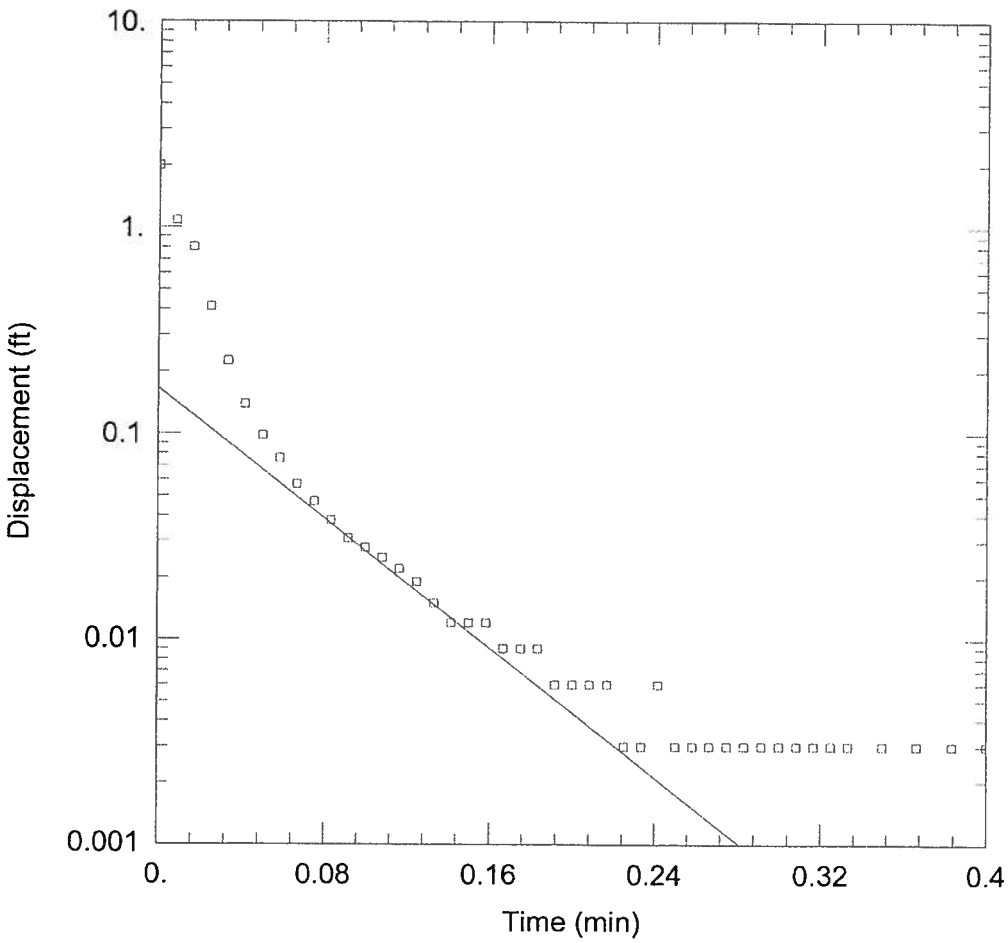
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.413 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.09698 ft/min
y0 = 0.16 ft



PEN-44-09 SLUG OUT #2

Data Set: C:\PENHYD~1\SITE44~1\44-09-B2.AQT
Date: 01/11/06 Time: 11:36:29

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

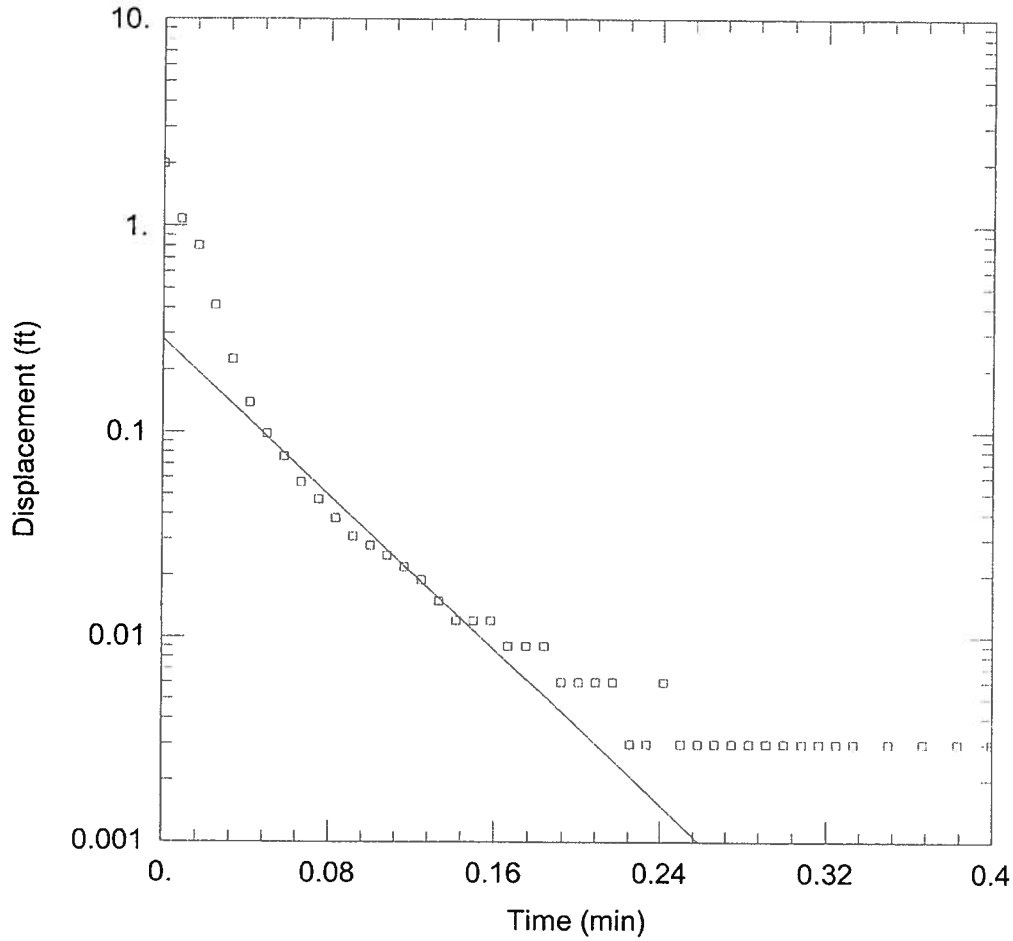
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.003 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.118 ft/min
y0 = 0.1662 ft



PEN-44-09 SLUG OUT #2

Data Set: C:\PENHYD~1\SITE44~1\44-09-B2.AQT
Date: 01/11/06 Time: 11:37:47

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

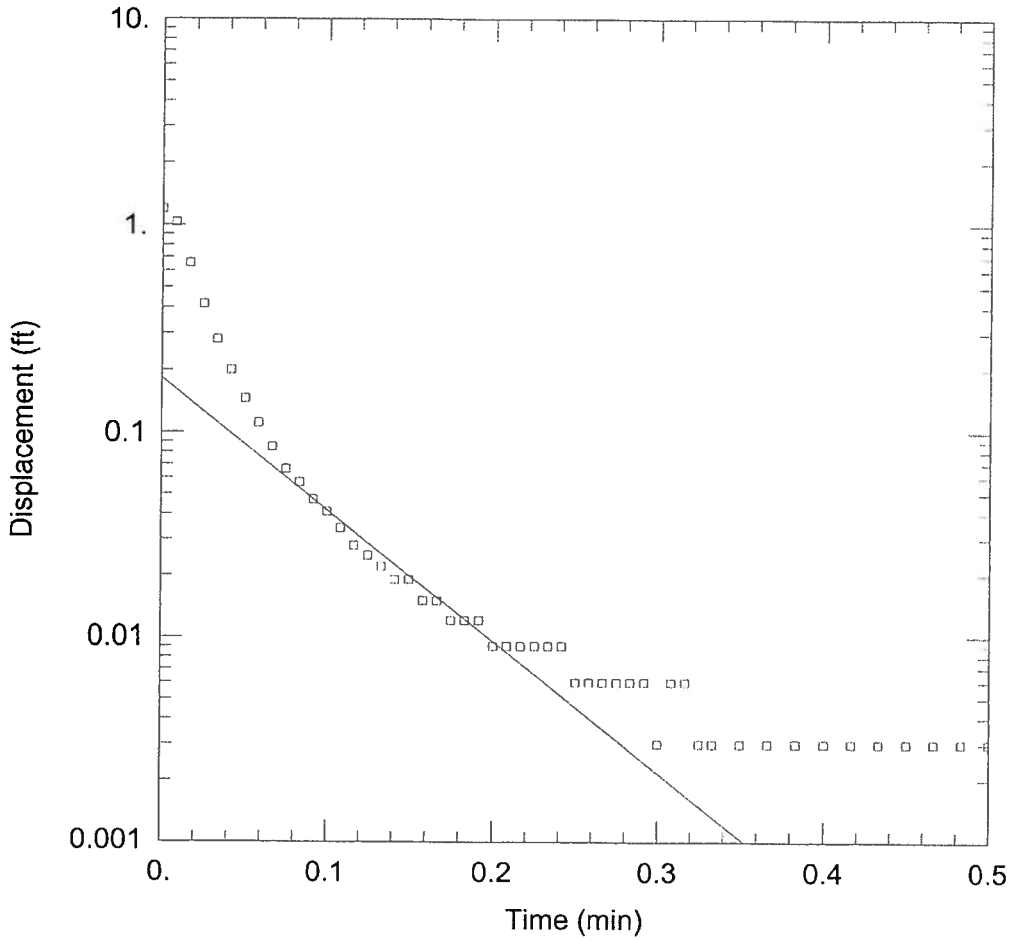
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 2.003 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.08384 ft/min
y0 = 0.2827 ft



PEN-44-09 SLUG OUT #3

Data Set: C:\PENHYD~1\SITE44~1\44-09-B3.AQT
Date: 01/11/06 Time: 11:41:01

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

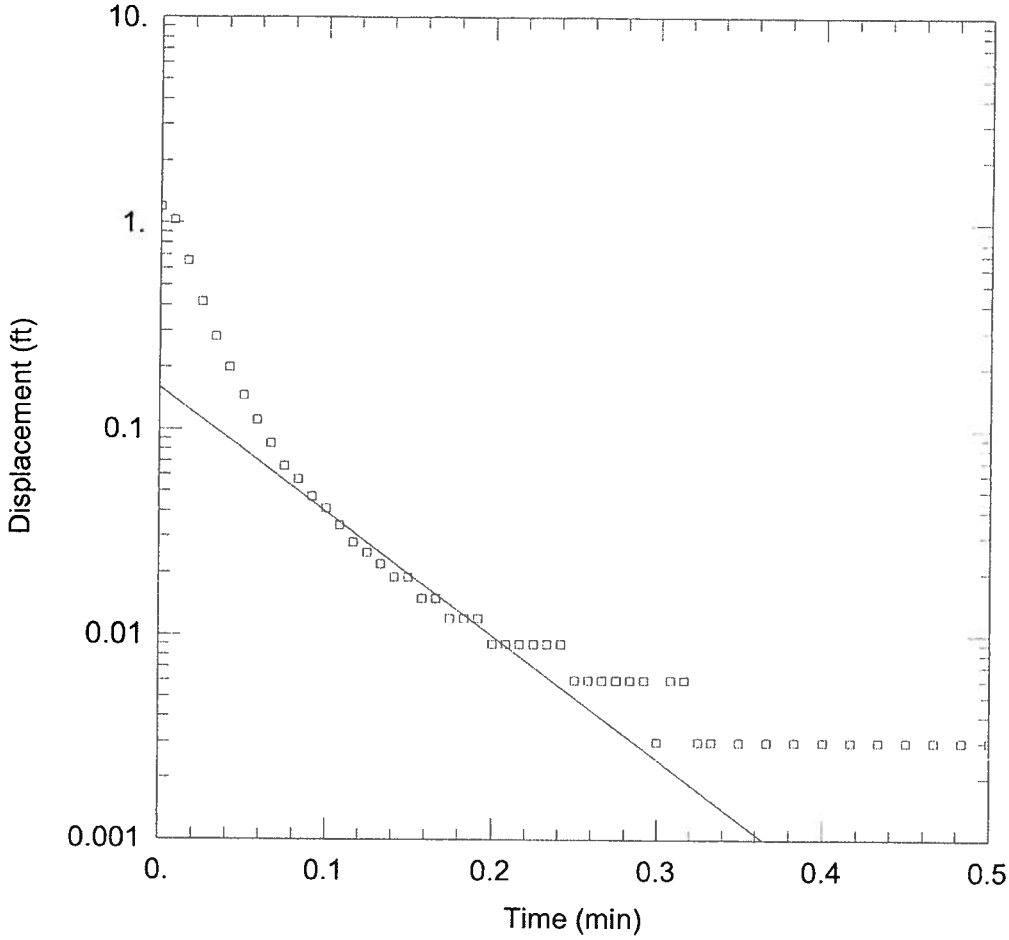
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.196 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.05677 ft/min
y0 = 0.1824 ft



PEN-44-09 SLUG OUT #3

Data Set: C:\PENHYD~1\SITE44~1\44-09-H3.AQT
Date: 01/11/06 Time: 11:41:51

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-109
Test Date: 11/28/05

AQUIFER DATA

Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.196 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 8.04 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.0903 ft/min
y0 = 0.1593 ft

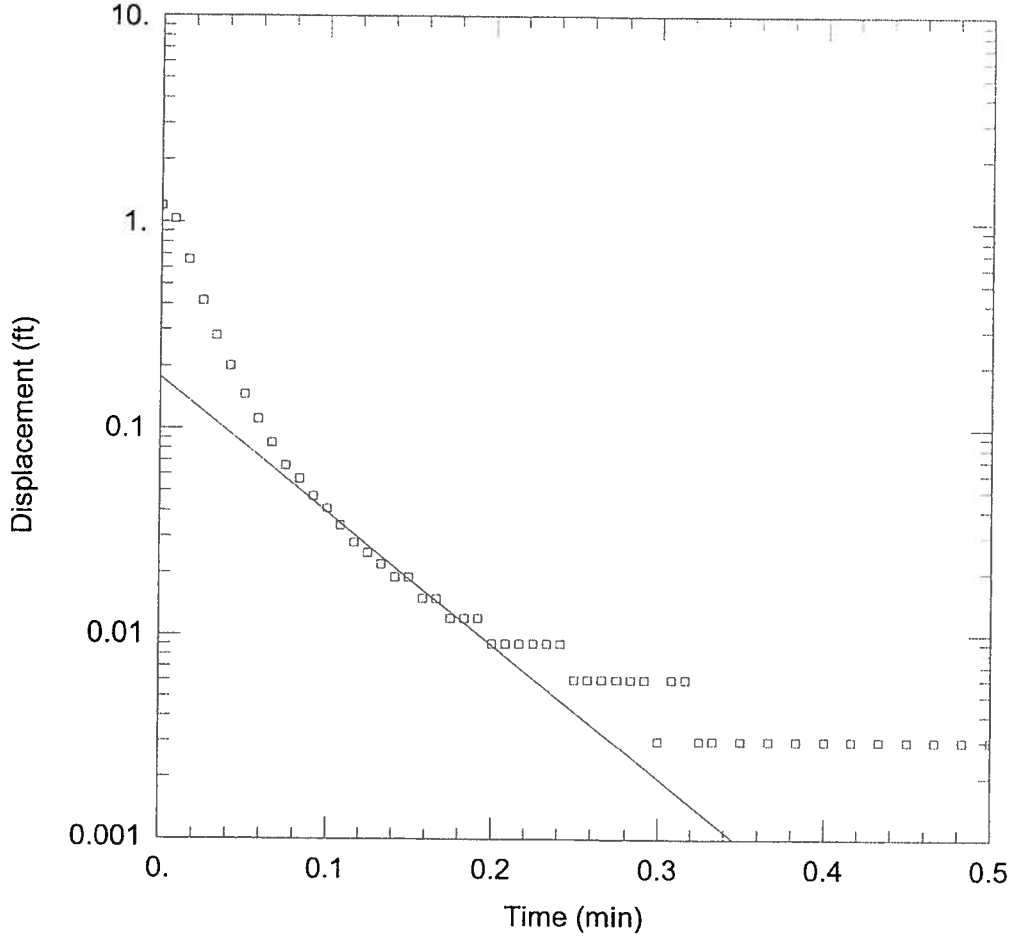
Site Information	
Site Name	44 RI
Project	PEW
Project Number	N00007
Date	10/28/05
Personnel	WOO/CEO

Well Information	
Name	PEW 44 11
Inside Diameter	2"
Borehole Diameter	8"
Total Depth	24.00
Depth to Water	6.89
Water Column	7.11
Screen length	10'
TOC Elevation	

Data Logger	
Model	SE 2000
Serial Number	2K 593
Test Rate	005 (5 min)
Mode (TOC/SUR)	TOC
Level/Func.	Level

XD	
Model	PXD 260
Serial Number	203837
Scale	10.0509
Offset	0.0103
Linearity	0.0441
PSI	10

Test Data			
Test Number	3	4	5
Well ID	PEW-44-11	PEW 44 11	PEW 44 11
Slug In/Out	OUT	OUT	OUT
XD depth	13.5	13.5	13.5
XD install time	1410	1410	1410
XD reading	6.179	6.179	6.179
slug depth	12.5	12.5	12.5
slug install time	1414	1431	1444
slug length	6'	6'	6'
slug diameter	1½"	1½"	1½"
slug volume	–	–	–
slug displacement	-1.196	-1.146	-1.292
reference setting	Ø	Ø	Ø
reference reading	6.126	6.~~180~~ 193	6.196
start time	1422	1440	1448
initial displacement	1.196	1.146	1.292
end time	1425	1443	1451
final XD reading	6.142	6.198	6.199



PEN-44-11-SLUG OUT #1

Data Set: C:\PENHYD~1\SITE44~1\44-11-B1.AQT
Date: 01/11/06 Time: 10:36:00

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367 - N00007
Test Location: Site 44, NAS Pensacola
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

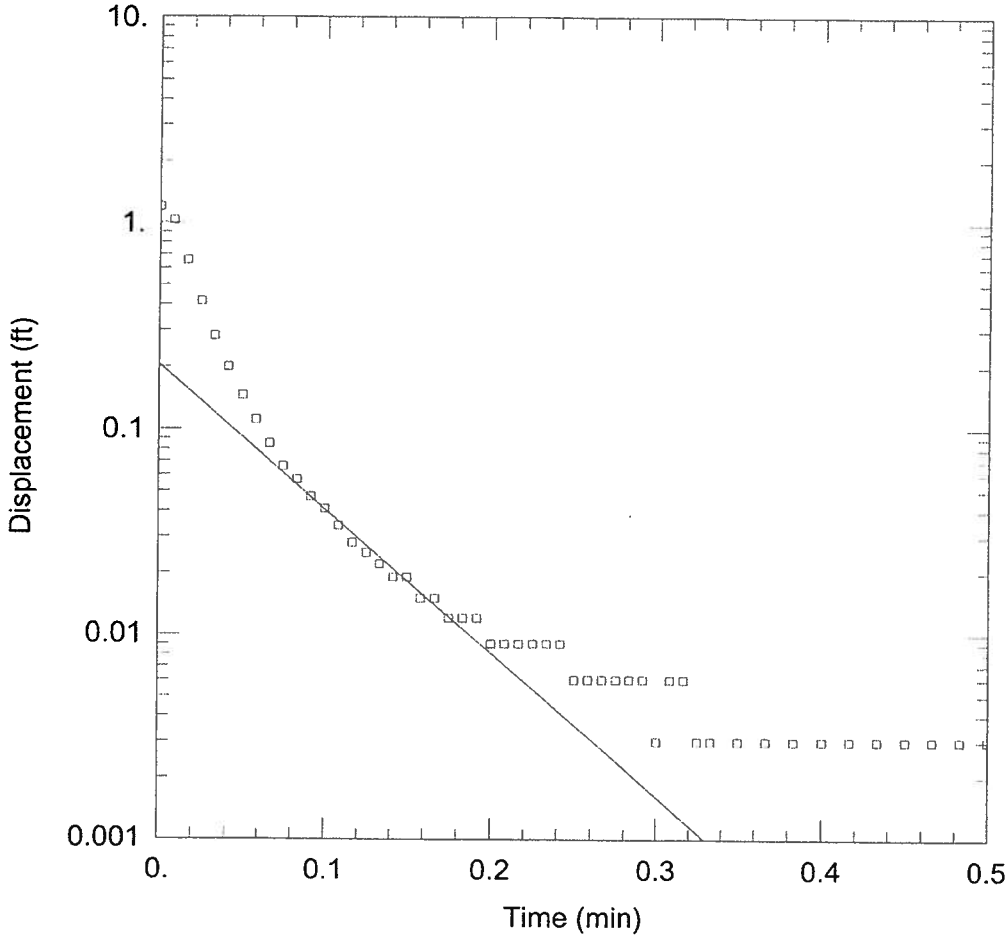
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.196 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.056 ft/min
y0 = 0.1767 ft



PEN-44-11-SLUG OUT #1

Data Set: C:\PENHYD~1\SITE44~1\44-11-H1.AQT
Date: 01/11/06 Time: 10:37:35

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367 - N00007
Test Location: Site 44, NAS Pensacola
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

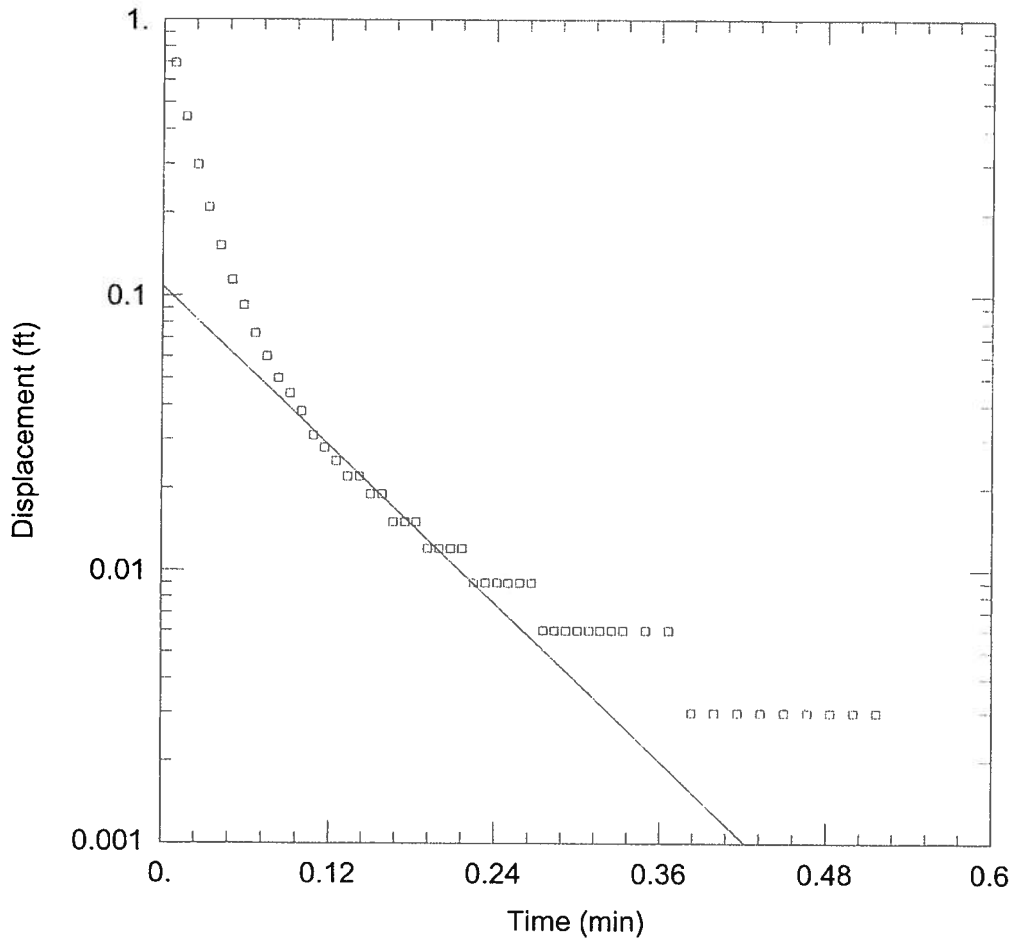
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.196 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.1048 ft/min
y0 = 0.2051 ft



PEN-44-11 SLUG OUT #2

Data Set: C:\PENHYD~1\SITE44~1\44-11-H2.AQT
Date: 01/11/06 Time: 10:33:23

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

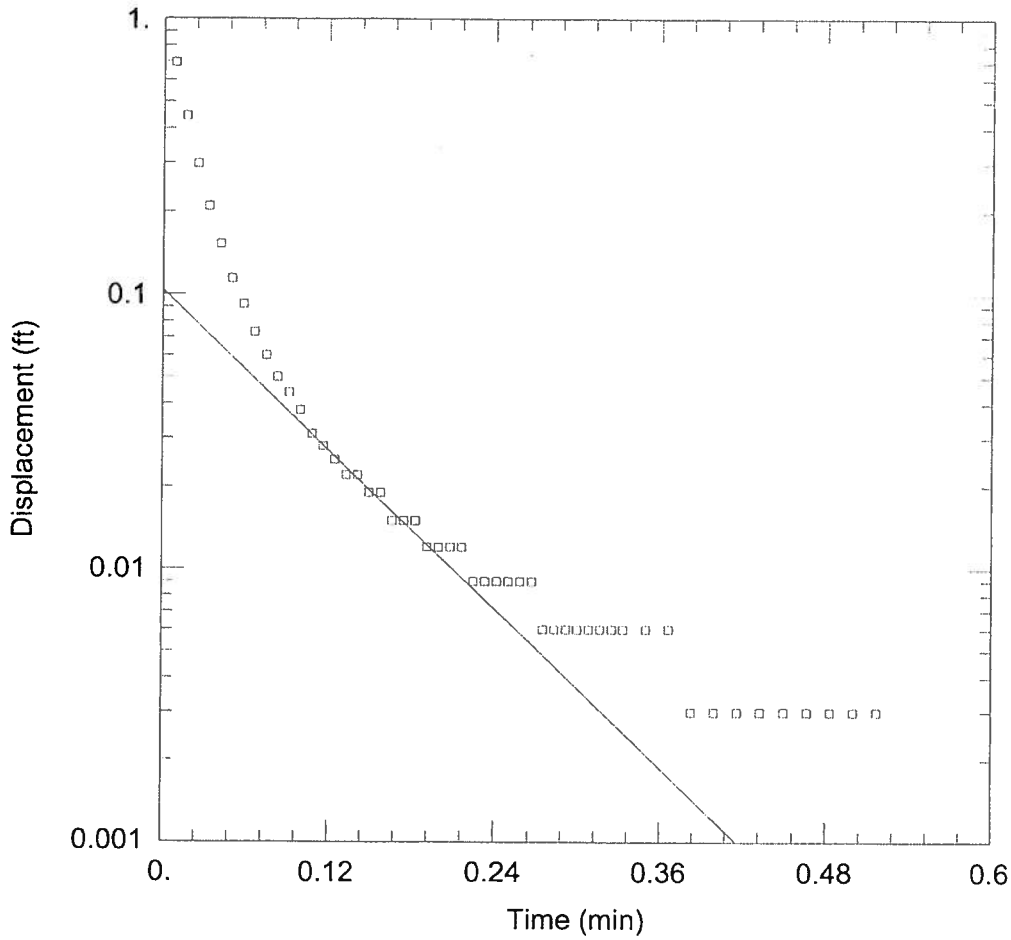
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.146 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.07204 ft/min
y0 = 0.1082 ft



PEN-44-11 SLUG OUT #2

Data Set: C:\PENHYD~1\SITE44~1\44-11-B2.AQT
Date: 01/11/06 Time: 10:32:29

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

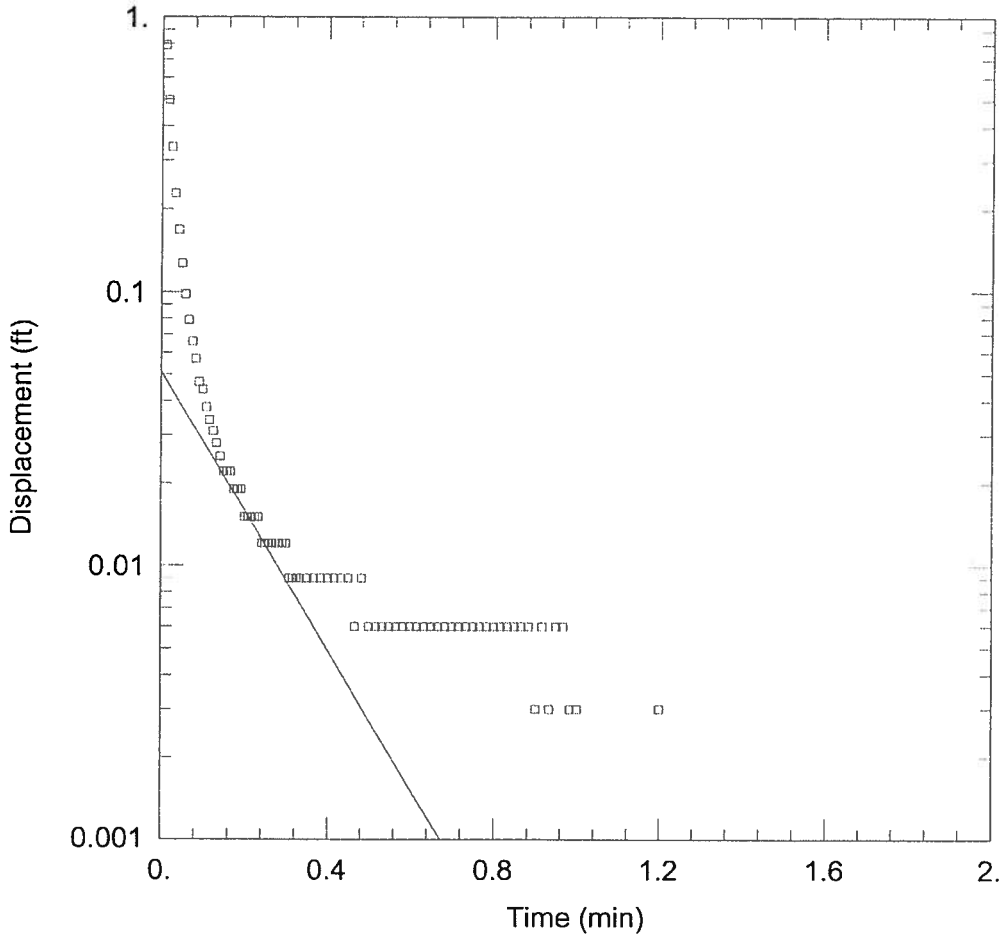
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.146 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04167 ft/min
y0 = 0.1036 ft



PEN-44-11 SLUG OUT #3

Data Set: C:\PENHYD~1\SITE44~1\44-11-B3.AQT
Date: 01/11/06 Time: 10:49:47

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

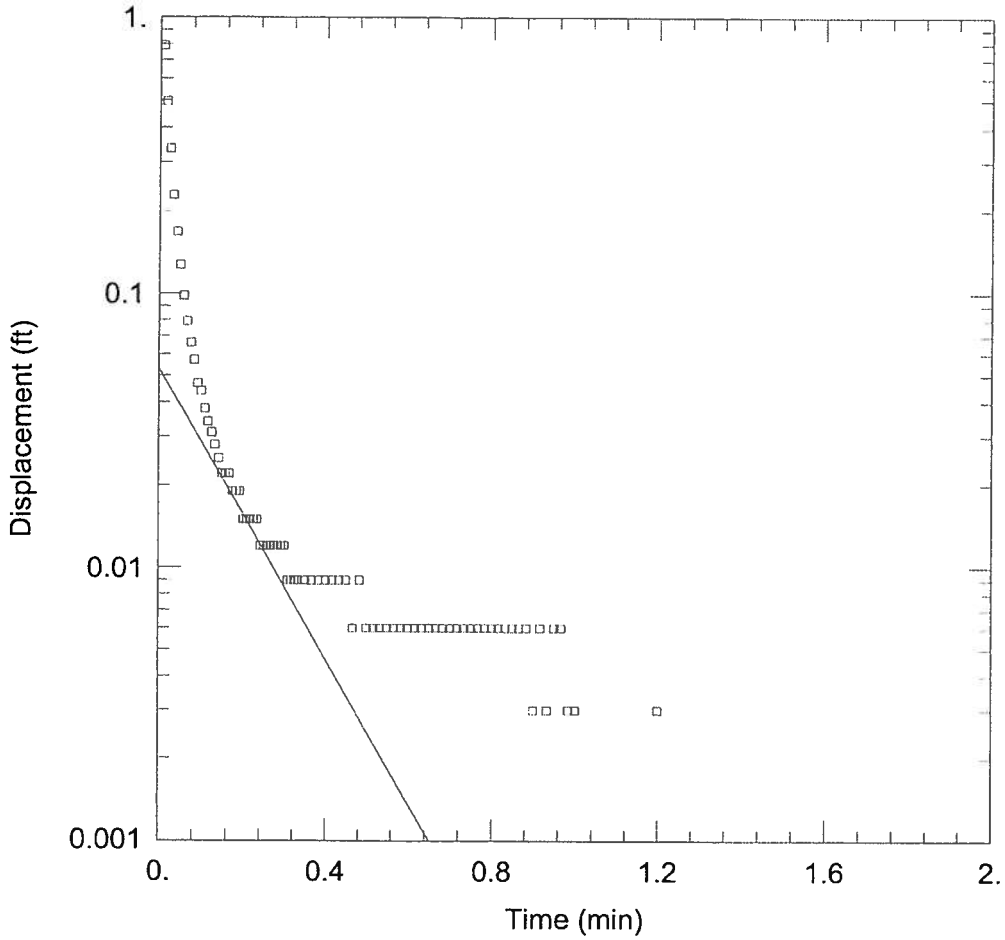
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.292 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02188 ft/min
y0 = 0.0512 ft



PEN-44-11 SLUG OUT #3

Data Set: C:\PENHYD~1\SITE44~1\44-11-H3.AQT
Date: 01/11/06 Time: 10:49:33

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-11
Test Date: 11/28/05

AQUIFER DATA

Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 1.292 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 7.11 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.0396 ft/min
y0 = 0.05293 ft

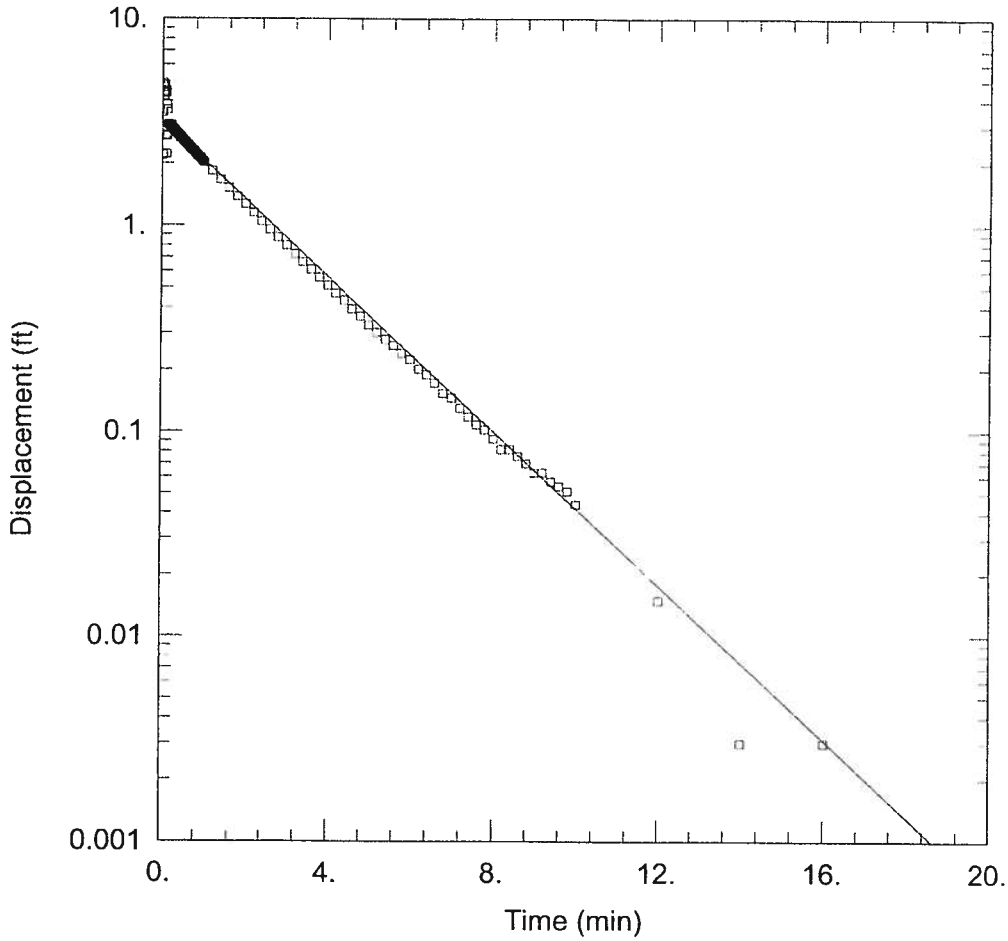
Site Information	
Site Name	NASP SITE 44
Project	PEN FI
Project Number	N00007
Date	12/6/05
Personnel	BEC

Well Information	
Name	PEN-44-15
Inside Diameter	2"
Borehole Diameter	~~4"~~ 3" 8"
Total Depth	74.2
Depth to Water	9.65
Water Column	64.55
Screen length	10
TOC Elevation	

Data Logger	
Model	Hermit 2000
Serial Number	24593
Test Rate	60
Mode (TOC/SUR)	SUR
Level/Func.	LSVSL

XD	
Model	PXD 260
Serial Number	203837
Scale	10.0509
Offset	0.0103
Linearity	0.0441
PSI	20

Test Data			
Test Number	10 (STEP 0)	10 (STEP 1)	
Well ID	MW-18	MW-18	
Slug In/Out	IN	OUT	
XD depth	16.512 BWT	16.512	
XD install time	1025	1025	
XD reading	0	0	
slug depth	15.70 BTOC	15.70	
slug install time	1030	NA	
slug length	6'	6'	
slug diameter	1.5"	1.5"	
slug volume			
slug displacement	3.512	6.859	
reference setting	0		
reference reading	0		
start time	1030	1050	
initial displacement			
end time	1050		
final XD reading			



PEN-44-18 SLUG IN

Data Set: C:\PENHYD~1\SITE44~1\44-18-BI.AQT
Date: 01/11/06 Time: 14:33:03

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-18
Test Date: 12/6/05

AQUIFER DATA

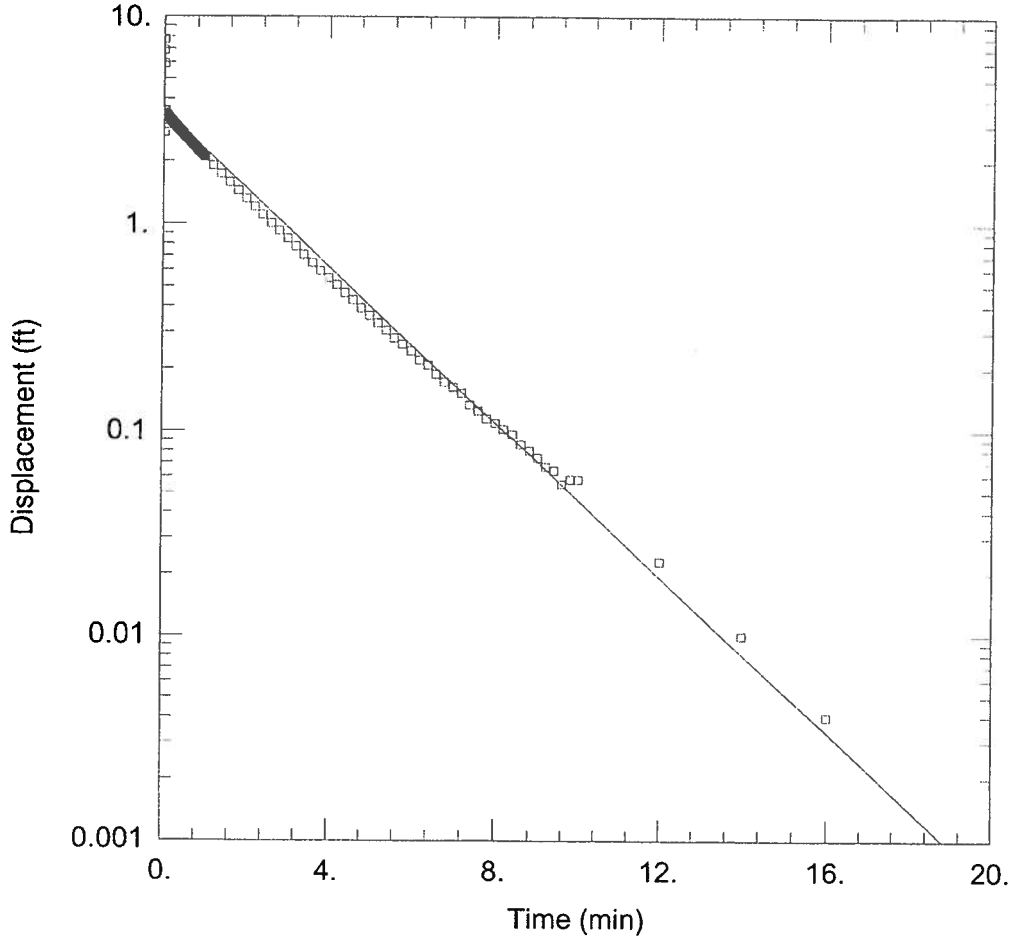
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 3.512 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.55 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002524 ft/min
y0 = 3.194 ft



PEN-44-18 SLUG OUT

Data Set: C:\PENHYD~1\SITE44~1\44-18-BO.AQT
Date: 01/11/06 Time: 14:36:18

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-18
Test Date: 12/6/05

AQUIFER DATA

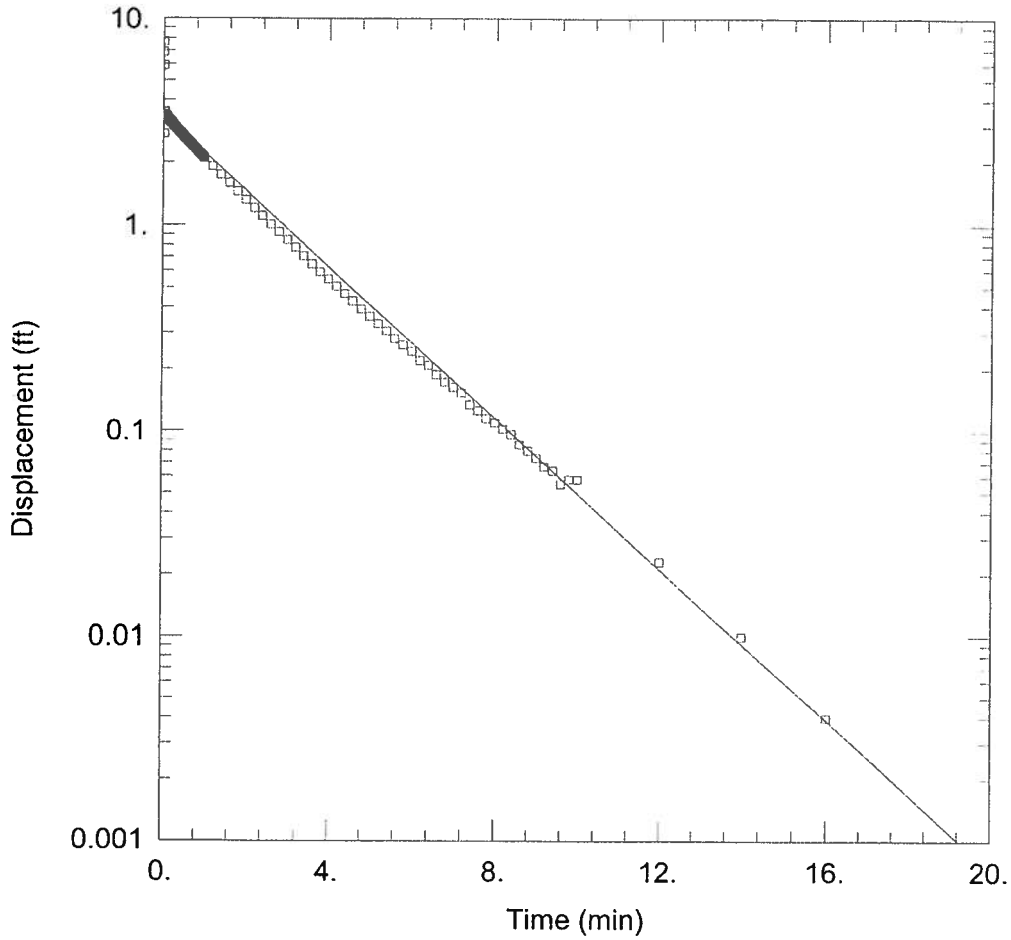
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 6.859 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.55 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002529 ft/min
y0 = 3.522 ft



PEN-44-18 SLUG OUT

Data Set: C:\PENHYD~1\SITE44~1\44-18-HO.AQT
Date: 01/11/06 Time: 14:36:58

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-18
Test Date: 12/6/05

AQUIFER DATA

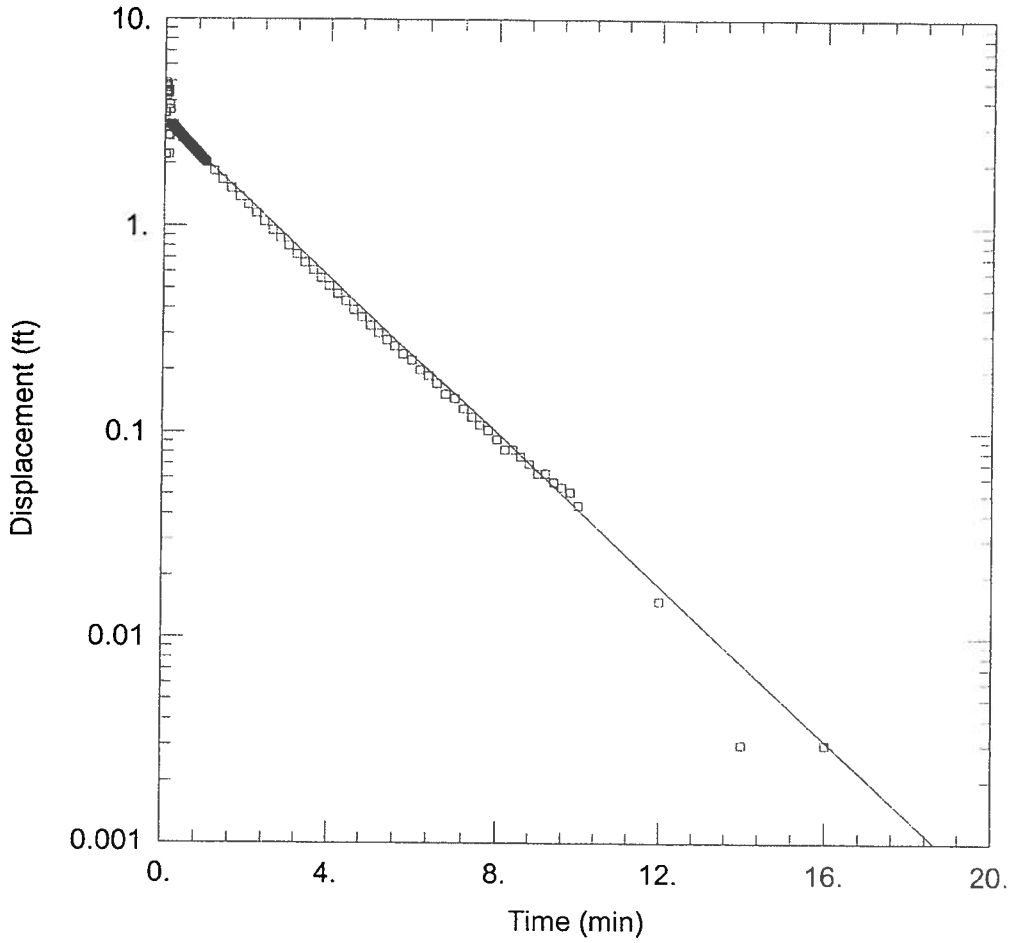
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 6.859 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.55 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.002742 ft/min
y0 = 3.392 ft



PEN-44-18 SLUG IN

Data Set: C:\PENHYD~1\SITE44~1\44-18-HI.AQT
Date: 01/11/06 Time: 14:32:21

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-18
Test Date: 12/6/05

AQUIFER DATA

Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 3.512 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.55 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.002809 ft/min
y0 = 3.19 ft

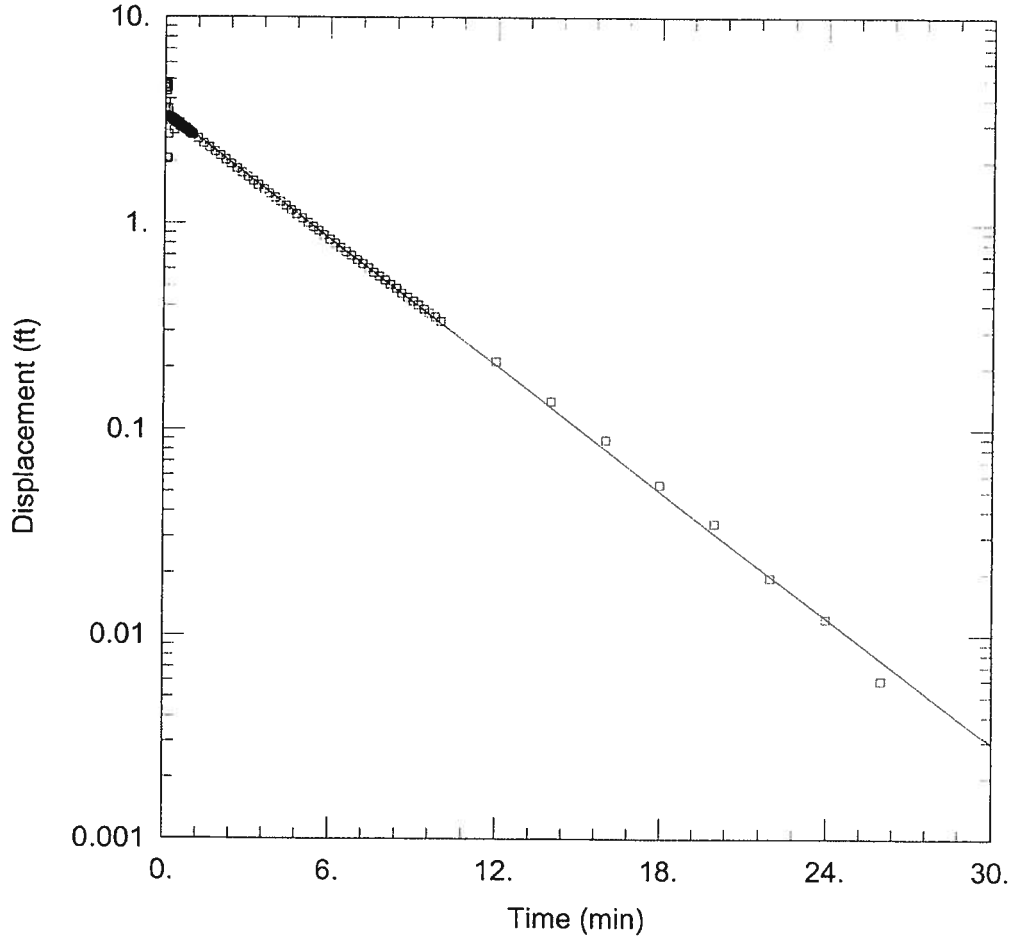
Site Information	
Site Name	NASP - Site 44
Project	PEN RI
Project Number	N00007
Date	12/6/05
Personnel	BEC

Well Information	
Name	PEN-44-19
Inside Diameter	2"
Borehole Diameter	~~4"~~ 5"
Total Depth	74.1
Depth to Water	9.98
Water Column	64.12
Screen length	10
TOC Elevation	

Data Logger	
Model	Hermit 2000
Serial Number	24593
Test Rate	LOG
Mode (TOC/SUR)	SUR
Level/Func.	LEVEL

XD	
Model	PXD 260
Serial Number	203837
Scale	10.0569
Offset	0.0103
Linearity	0.0441
PSI	20

Test Data			
Test Number	9 (Step 0)	9 (Step 1)	
Well ID	MW-19	MW-19	
Slug In/Out	IN	OUT	
XD depth	18.693 BWT	18.693	
XD install time	0850	NA	
XD reading	0		
slug depth	16.0 BTOC	16.0	
slug install time	0900	NA	
slug length	6'	6'	
slug diameter	1.5"	1.5"	
slug volume			
slug displacement	4.704	3.688	
reference setting	0		
reference reading	0		
start time	0900	0930	
initial displacement			
end time	0930		
final XD reading			



PEN-44-19 SLUG IN

Data Set: C:\PENHYD~1\SITE44~1\44-19-BI.AQT
Date: 01/11/06 Time: 15:33:40

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-19
Test Date: 12/6/05

AQUIFER DATA

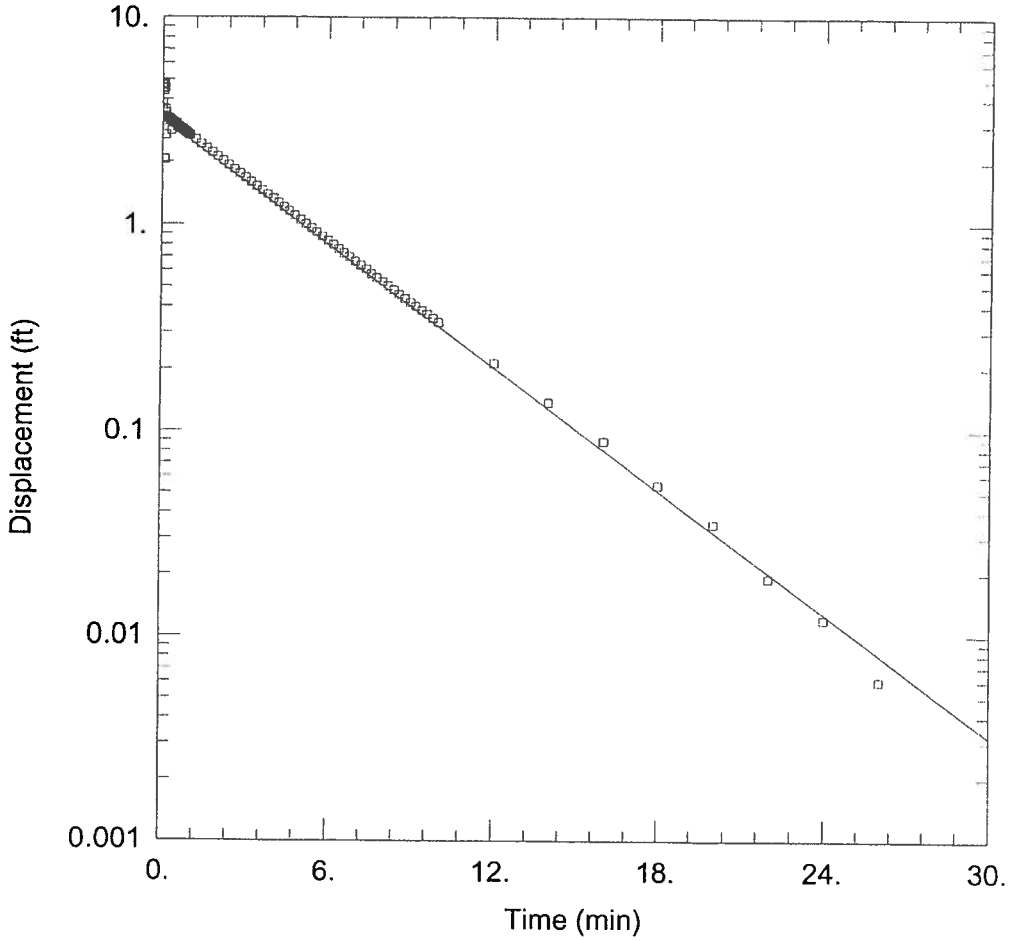
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.704 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.12 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001366 ft/min
y0 = 3.46 ft



PEN-44-19 SLUG IN

Data Set: C:\PENHYD~1\SITE44~1\44-19-HI.AQT
Date: 01/11/06 Time: 15:33:57

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-19
Test Date: 12/6/05

AQUIFER DATA

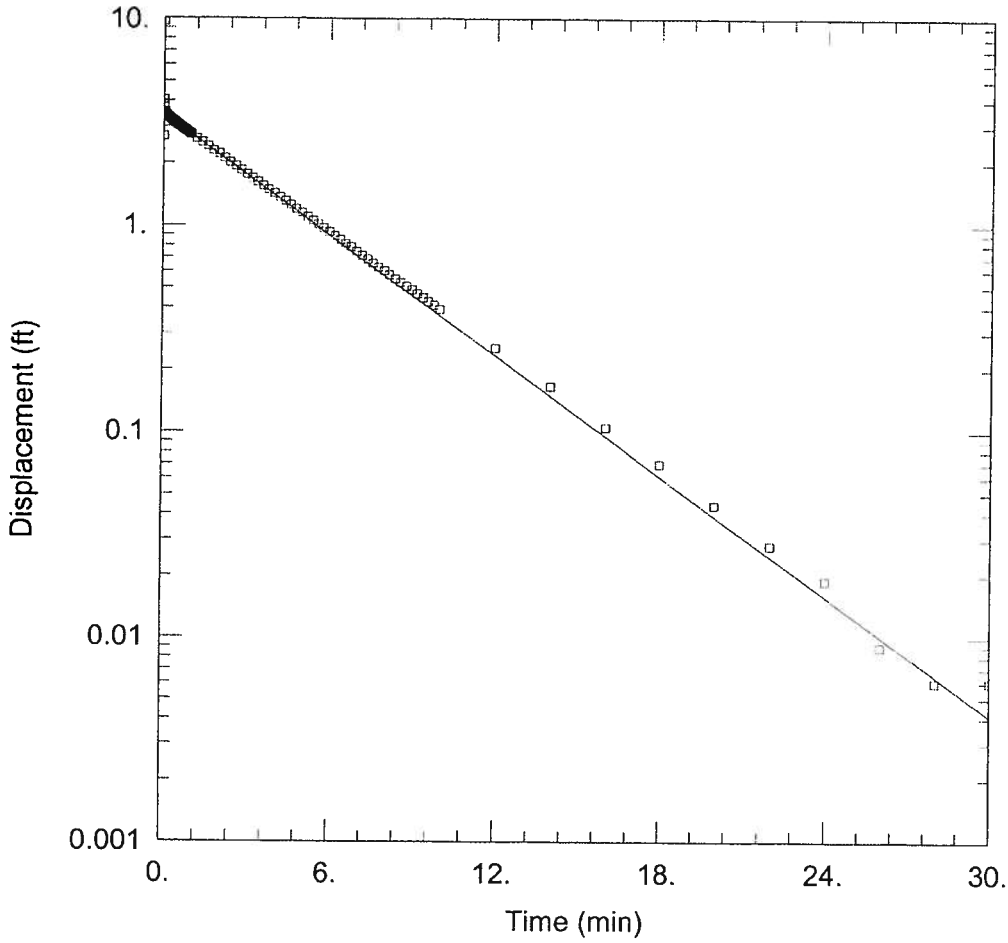
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.704 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.12 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.001493 ft/min
y0 = 3.194 ft



PEN-44-19 SLUG OUT

Data Set: E:\PENHYD~1\SITE44~1\44-19-BO.AQT
Date: 01/12/06 Time: 08:54:29

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-19
Test Date: 12/6/05

AQUIFER DATA

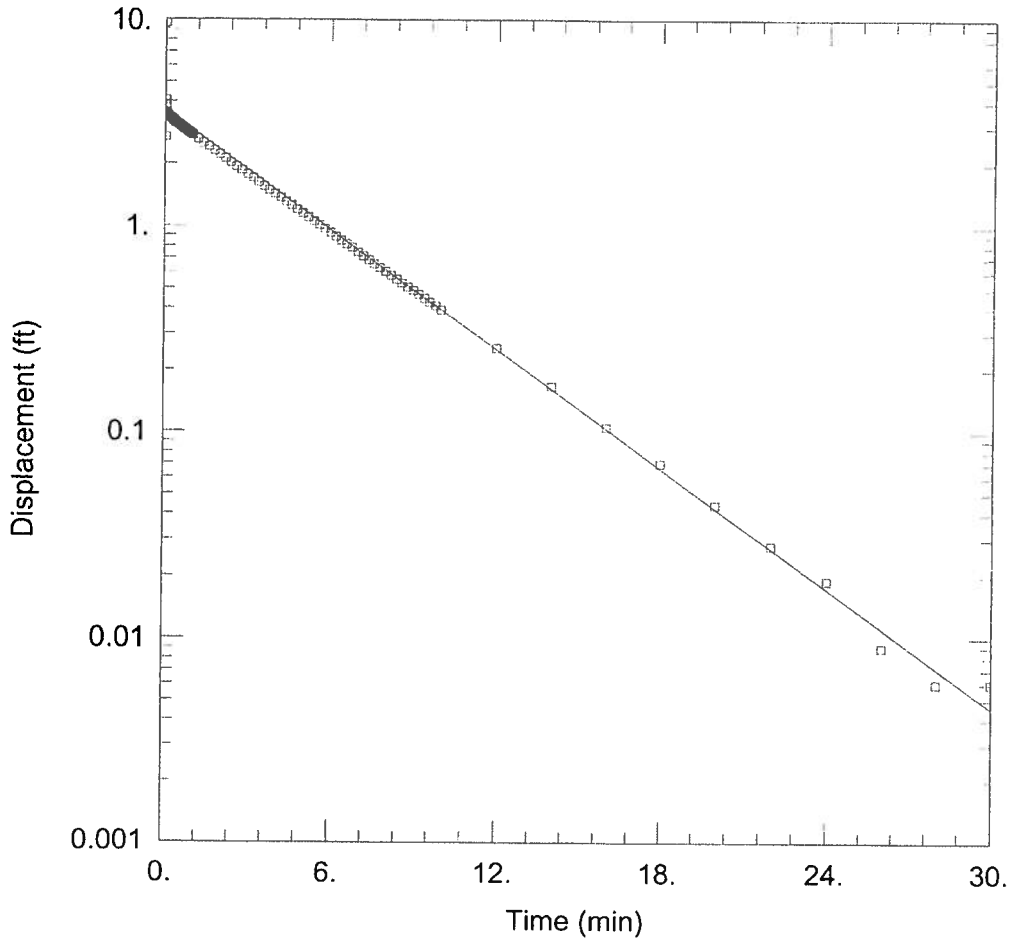
Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.051 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.12 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001302 ft/min
y0 = 3.442 ft



PEN-44-19 SLUG OUT

Data Set: E:\PENHYD~1\SITE44~1\44-19-HO.AQT
Date: 01/12/06 Time: 08:55:14

PROJECT INFORMATION

Company: TtNUS, Inc.
Client: EFD South, USN
Project: CTO 0367-N00007
Test Location: NAS Pensacola, Site 44
Test Well: Pen-44-19
Test Date: 12/6/05

AQUIFER DATA

Saturated Thickness: 70. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Initial Displacement: 4.051 ft
Casing Radius: 0.0833 ft
Screen Length: 10. ft
Water Column Height: 64.12 ft
Wellbore Radius: 0.333 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.001446 ft/min
y0 = 3.655 ft

APPENDIX B

SUPPORTING DOCUMENTS

Use of Geochemical Analysis in Identification of Inorganic Contamination in Soil – Naval Air Station Pensacola (NASP), Pensacola FL

Introduction:
This technical brief has been prepared to present a geochemical methodology that can be simply applied to site-specific data to identify "outliers" for a given inorganic (those samples that fall outside of expected natural concentrations) at NASP. Inherent to this is the use of the methodology to define the naturally occurring range of the inorganic. In this document, using the available data from base-wide investigations, the geochemical method of identifying the range of naturally-occurring inorganics has been used for arsenic in soil at NASP, and the consequent model can be applied to determine if site samples contain arsenic outside of the naturally occurring range. The geochemical method is relatively new (US Navy, 199; US Navy, 2002; Gannett Fleming 2005; Caldwell,et. al, 2005a & 2005b), but is based on robust statistical methods and has been used successfully to define inorganic outliers (Caldwell, et al 2005a, Gannett Fleming 2005). A significant programmatic approach utilizing this method has been performed at Avon Park Air Force Range (APAFR; Gannett Fleming 2005), and similar statistical procedures have been followed for NASP. Because the work performed at Avon Park has been extensively reviewed and accepted by both Florida Department of Environmental Protection (FDEP) and the EPA, relevant language is either paraphrased or excerpted in this technical brief.

Data Source:
In 1992 a small set of soil samples (n=approx. 20) were collected from known un-impacted areas to represent "background" for NASP. Since then, numerous site investigations have been performed, yielding a soil dataset on the order of n =2000. In a recent guidance document (USEPA, 2002) "background" is defined according to whether substances of interest are:

- *Naturally occurring*: substances present in the environment in forms that have not been influenced by human activity, or

- *Anthropogenic*: natural and man-made substances that are present in the environment as a result of human activity but are not specifically site-related

A background population, ideally, is a collection of samples that represents ambient conditions, i.e., not influenced by site-related human activities, at a location of interest. Included in the EPA definition of background are anthropogenic contributions that are not related to activities at a particular site. Three possible means of identifying a population of background samples are:

1. *From site investigations.* At many Federal facilities and elsewhere, large numbers of samples have been collected as part of routine site investigations, giving rise to the possibility that the "background" geochemical signal may be extracted from facility-wide data sets. Ideally, a background data set obtained in this manner would be desirable because the samples of which it is comprised would be truly representative

of the same soil types as the site soils. By using facility-wide data as the basis for identifying the background geochemical signature, the distribution of background samples is spatially constrained and so differences between "background" and "site" data attributable to large-scale, non-point-source effects (e.g., aerial deposition, regional differences in geologic environment, etc.) are minimized. However, this approach necessarily means that some subset of the facility-wide data consists of soil with chemical compositions reflecting naturally occurring and/or anthropogenic background conditions, and some other subset contains samples bearing site-related contamination.

2. *From basewide sampling.* Many facilities have conducted investigations specifically for the purpose of establishing facility-wide background concentration ranges. Typically, such studies sample locations that are agreed upon as "clean" but are from geologically, hydrologically, and geochemically similar environments as the site samples. In principle, this approach is well motivated, but in practice, the background samples may not be representative of site soils. Another limitation often encountered in examining data collected specifically to establish basewide background is the size of the sample population. In many cases, it is not clear that a sample set of the order of n = 20 is representative of the full range of background conditions.

3. *From other, independently derived data sets.* Other data sets have been assembled by state agencies, the US Geological Survey, and other entities, for independent purposes. Examples are the background concentrations established for Florida soils from a statewide investigation (Table 3; Chen et al., 1998, 1999), or the nationwide data set assembled by the US Geological Survey (Table 4; Boerngen and Shacklette, 1981). The data from both sets are similar in concentration ranges for all of the elements of interest.

At NASP, there are only two sites that are known to be directly associated with arsenic as an integral part of site activities (Sites 15 and 24, both associated with arsenate-containing pesticides). Because of the limited number of samples collected at these sites relative to the cumulative number collected from site investigations, the entire dataset from site investigations was used as the basis for determining the natural occurrence of arsenic in soil at NASP.

Choice of Background Modeling Methods:

Two generally accepted methods for determining the natural occurrence of inorganics using pre-existing data are population modeling and geochemical modeling (US Navy 2002; EPA 2000). The successful use of population modeling depends on the distribution of the data (normal or log-normal) and a reasonable ratio of detects to non-detects (NDs). If the data are neither normal or log-normally distributed (meaning they are naturally skewed on either the low or high end), the ability to predict their natural distribution and identify outliers is compromised. Similarly, the incorporation of non-detects into the modeling requires that the NDs comprise no more than 15% of the data; when they are greater than 15% reasonable conclusions regarding the data distribution cannot be made (US Navy, 2002; EPA 2000).

The soil dataset at NASP (included electronically as Attachment A) contains 2,106 samples for arsenic. Of these, only 828 (39.3%) had detectable concentrations (ranging from 0-66.3 mg/kg), and 1,278 (60.7%) were non-detect. As a result, population modeling was not performed to determine the naturally occurring range of arsenic. Instead, modeling using the geochemical method (US Navy, 2002; Caldwell, et. al, 2005a; Gannett Flemimg 2005) was performed.

Geochemical Modeling:

The concept of a 'geochemical evaluation' uses knowledge of naturally occurring geochemical processes to discriminate between concentrations of inorganic elements (specifically trace metals) that are characteristic of ambient soil/groundwater conditions, and levels that are likely to have resulted from site activities. In soils, trace element abundances are often controlled by processes that take place during soil formation. The elements of interest are liberated from their sources – for example, in minerals present in bedrock – by a number of mechanical, chemical, and microbial processes that occur during and after erosion, transport, and re-precipitation. Trace metals are often present in soils in constant proportions to a reference element (e.g., iron, aluminum, manganese, etc.) due to the integrated effects of any of a number of geochemical processes. These include adsorption onto oxides, hydroxides, and oxyhydroxides of iron, aluminum, and manganese; uptake by other surface complexation mechanisms; coprecipitation through substitution for elements with similar electrical charge and ionic radius; sorption onto clay mineral surfaces; and complexation by soil organic material. These processes are often geographically widespread and result in distributions of trace metals in fixed proportion to one another and to microelements such as iron, aluminum, or manganese. The geochemical evaluation focuses primarily on graphical presentation of the data so that relationships between a "reference element" (e.g., Fe, Al, or Mn) and other, trace metals, can be visually compared. When the log-transformed concentration of a trace metal of interest (for example, arsenic) is plotted against a reference element (for example, iron), the data often fall along a trend that is described by a straight line. A linear correlation indicates that these pairs of elements are present in a constant proportion as defined by the regression equation, which represents the *integrated* effects of naturally occurring geochemical processes: often, these ratios are approximately constant regardless of soil type, soil horizon, geological environment, or geographic location. Superimposing the regression line and the 95% upper and lower prediction limits *derived from the background data* on a site data set permits rapid visual assessment of any outliers. Conversely, data from many sites frequently lie within the 95% prediction interval and so may be considered to be consistent with the background population. Alternative methods for evaluating the linear correlation is to sequentially remove data points based on their iterative decrease in magnitude of their variance from a trend line until a desired correlation is met or until data removal does not result in an increase in correlation; the removed data are then considered outliers and the remaining are considered representative of natural conditions (Caldwell, 2005A, 2005b). This method also provides a range of ratios between the dependent and independent variable that can be used to bound the natural conditions. Thus, even though individual samples may report elevated concentrations of constituents of potential concern (e.g., arsenic) when

compared to a singular screening criteria (e.g., soil screening level) based on arsenic *alone*, these levels may be naturally occurring nevertheless and do not necessarily reflect site impact. Conversely, significant deviations from a linear correlation – for example, due to enrichment of an element above a generally linear trend – may indicate contamination.

Modeling technique:

The technique to model the geochemical relationship is the use of linear regression. Linear regression is a bivariate statistical solution that quantifies the relationship between two variables, one dependent and the other independent (unknown variable and a predictor variable). Use of this technique in the environmental arena assumes that, between two geochemically similar inorganics, they will co-exist at a relatively constant relationship under natural conditions, including variations in soil types and environmental conditions. Variations from this relationship signify a deviation from natural conditions, and therefore can be used as an indicator of potential contamination. Geochemically similar inorganics are chosen to be paired for the linear regression, as it is likely that intrinsic environmental conditions act on both of them equally (for example iron and arsenic or aluminum and lead).

The mechanical process of using linear regression in environmental data involves plotting of the paired values (from the same sample) of both the dependent and independent inorganics on both normally-scaled and log-scaled axes (or log-transformed data on linear –scaled axes) . The resulting statistic that quantifies the degree to which the two inorganics are correlated is the correlation coefficient R (also referred to as Pearson's product moment coefficient); this statistic ranges from 1.0 to -1.0, with the sign designating either a positive or negative correlation, and the numerical value designating the magnitude of correlation (1.0 or -1.0 representing a perfect 1-to-1 relationship). The process consists of plotting the paired data and calculating the R value; the best correlation between the two variables is then represented graphically by the linear equation $y = mx+b$ where m = the rate of change in the variables relative to each other and b is the intercept on the y-axis. On the graph, the line used to calculate the regression equation is fit through all of the data using a least-squares fit, whereby the variance from the line for each point (in total) is minimized. Once the data is plotted, the square of the correlation coefficient (the coefficient of determination - R^2) is used to quantify the proportion of variance in each variable that is explained by its co-occurrence with the other. For positive correlations that are normally encountered with environmental inorganics (more of one constituent results in more of the other), an R^2 value of 0.6 (60 % explained variance, correlation coefficient of 0.77) is considered significantly correlated, 0.8 (80 % explained variance, correlation coefficient of 0.89) is considered strongly correlated and 0.9 (90% explained variance, correlation coefficient of 0.95) is considered very strongly correlated. Linear regressions can be performed for both non-transformed and log-transformed data. In the case where variances are relatively small, non-transformed data plots tend to illuminate deviations from the least-squares trend line better than log-transformed data, which minimizes the magnitude of variances from the trend line and between points.

For NASP, the entire dataset from site investigations was used to perform linear regressions to define natural conditions. As a result, it was recognized that some samples representing potentially contaminated conditions would be included in the dataset. To identify those samples, and to arrive at a dataset that is representative of natural conditions, a process of sequential elimination was employed (Caldwell et. al, 2005a, 2005b). In this process, the raw data for paired inorganics are plotted and a consequent least-squares trend line is calculated and plotted. Data are then sequentially removed from the dataset based on the magnitude of their variance from the trend line (larger magnitudes are removed before those with less). Once a data point is removed, the R^2 value is re-calculated. This is continued on an iterative basis (virtual remediation) until the R^2 value is 0.6 or greater, indicating that significant correlation exists between the remaining data (Caldwell, et. al 2005a). It is critical that the process of data removal is objective, namely that using the magnitude of variance from the least-squares trend line is the criteria for data removal.

Arsenic Geochemical Model Results:
The geochemical modeling data is presented in logical steps, including:

a) All raw non-transformed data plotted with a least-squares trend line;
b) Non-transformed data plotted with a least-squares trend line and outliers removed;
c) All transformed data plotted with a least-squares trend line;
d) Transformed data plotted with a least-squares trend line and non-transformed identified outliers removed;
e) Transformed data with a least-squares trend line and outliers removed.

The following graphs and tables present the above – cited data.

Figure 1. Arsenic and Iron – Raw Data

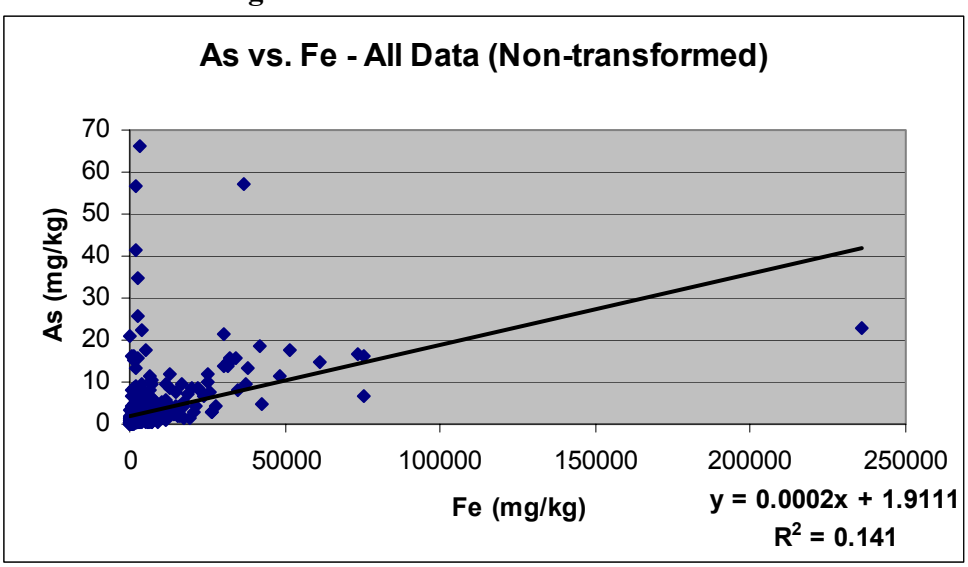
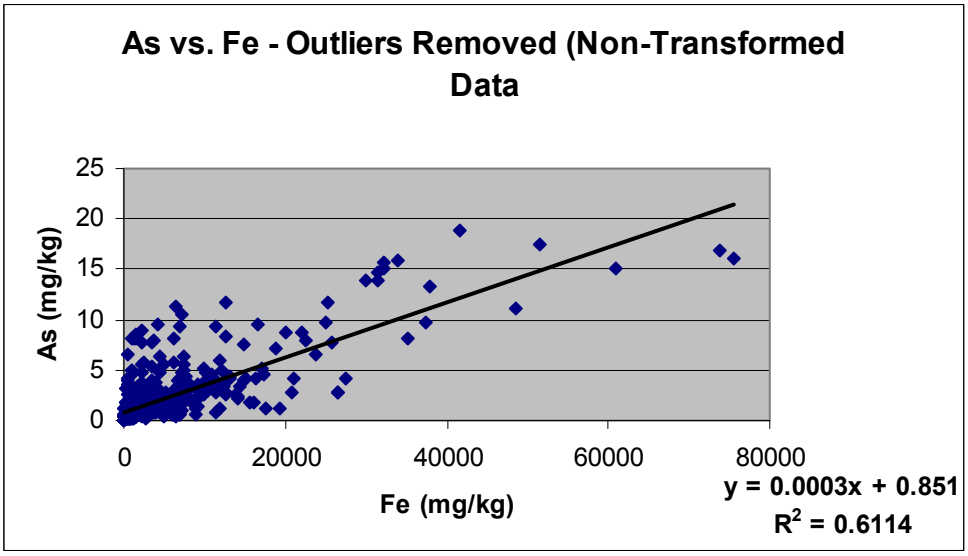


Figure 2. Arsenic and Iron – Outliers Removed; Non-transformed data

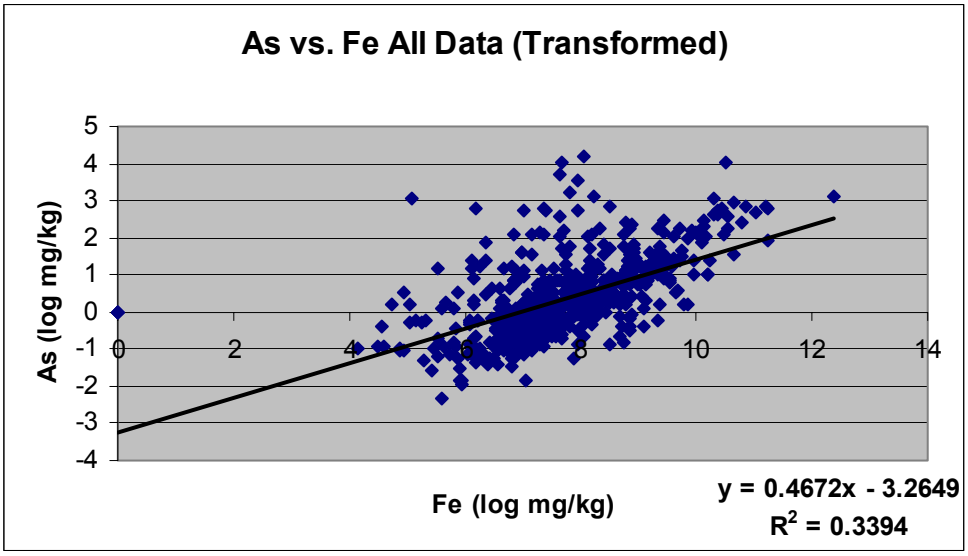


This graph presents the plot of non-transformed data with outliers removed. The outliers data were sequentially removed until an R^2 value of 0.6 or better with the remaining data was arrived at. Table 1 presents the outliers in the order in which they were identified and removed.

Table 1. Outliers Removed – Non-transformed data

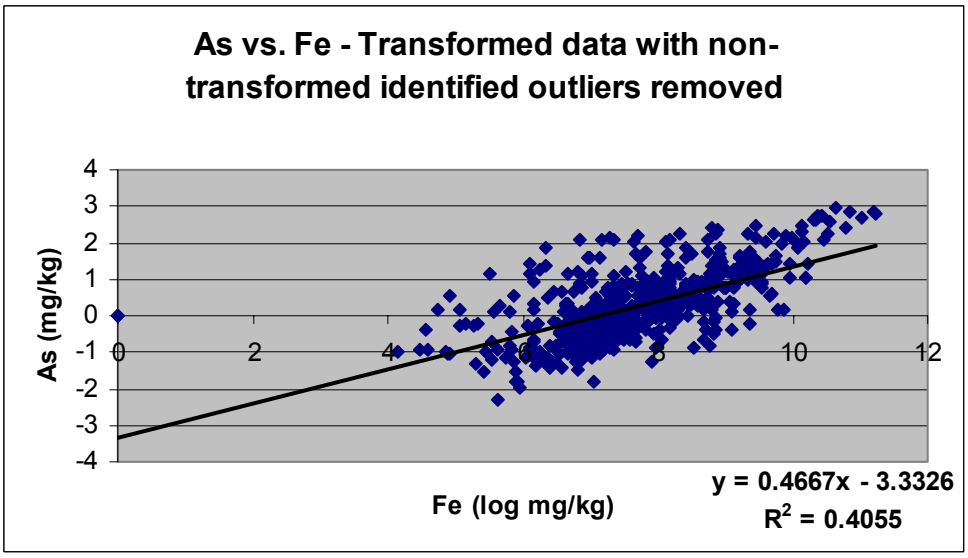
Site	Sample	Parameter	Value (mg/kg)	Parameter	Value (mg/kg)	Enriched Inorganic
15	15S007	IRON	2180	ARSENIC	56.5	As
15	15S014	IRON	3100	ARSENIC	66.3	As
43	PEN-43SV03	IRON	36700	ARSENIC	57.3	Fe
15	15S004	IRON	2100	ARSENIC	41.6	As
15	15S015	IRON	2830	ARSENIC	34.6	As
15	15S012	IRON	2460	ARSENIC	25.5	As
43	PEN-43SV07	IRON	236000	ARSENIC	22.9	Fe
15	15S027	IRON	3760	ARSENIC	22.4	As
38	38S035	IRON	160	ARSENIC	21.1	As
15	15S013	IRON	488	ARSENIC	16.2	As
11	11LF01	IRON	2870	ARSENIC	15.8	As
14	14S03	IRON	4920	ARSENIC	17.5	As
43	43DR01501	IRON	75500	ARSENIC	6.7	Fe
15	15S013	IRON	1120	ARSENIC	15.1	As
15	15S020	IRON	1580	ARSENIC	16	As
38	38S012	IRON	1610	ARSENIC	15.6	As
09	09S028	IRON	30200	ARSENIC	21.4	As
15	15S021	IRON	2060	ARSENIC	13.1	As
12	12S016	IRON	42600	ARSENIC	4.7	Fe

Figure 3. Arsenic and Iron; All data - Transformed



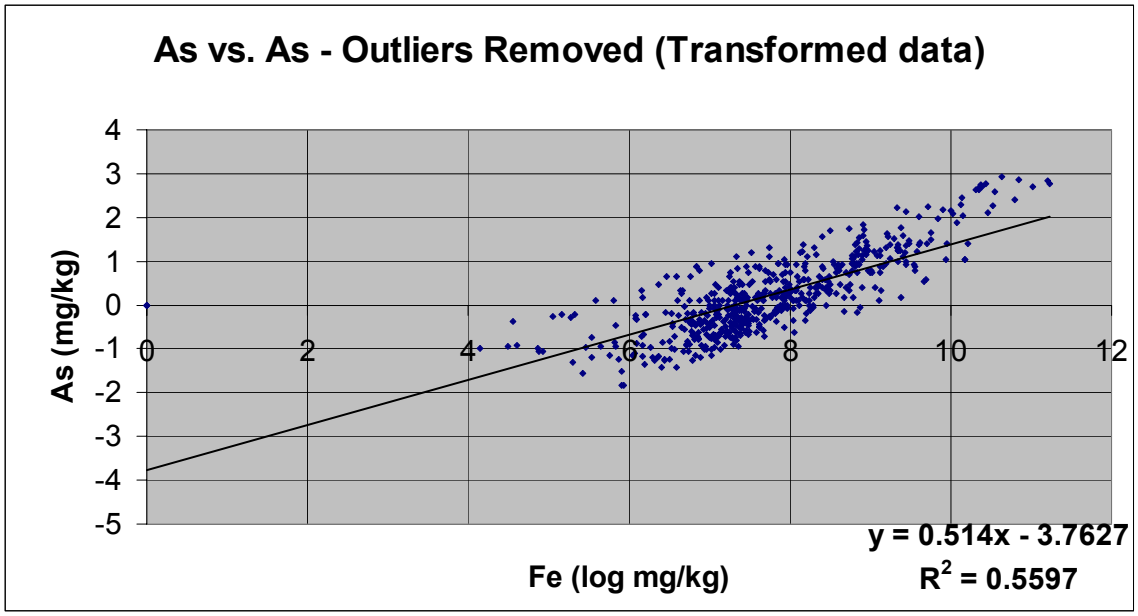
This graph presents the entire dataset plotted after log-transformation.

Figure 4. Arsenic and Iron- All data; Non-transformed identified outliers removed



This graph represents the beginning point for the transformed data analysis; all sequential removal of outliers proceeded using this dataset as the starting base. Identical to the non-transformed data, outliers were iteratively identified and removed based on their variance from the least-squares regression trend line. In the case of the transformed data, outliers (identified by their magnitude of variance from the least-squares trend line) were removed until which time additional point removal caused the R^2 value to decrease (0.5814), a threshold point at which the maximum natural correlation was reached.

Figure 5. Arsenic and Iron – Non-Transformed and Transformed data outliers removed



In sequential removal of outliers in the transformed data, the graph above represents the limit of sample points that could be removed objectively (using magnitude of variance from the least –squares trend line as the criteria) with a consequent increase in the R^2 value. Removal of additional outliers above the R^2 value of 0.5597 began to result in lower R^2 values. While it is possible the R^2 value could be further increased, it could be considered subjective as the variance between points was increasingly similar and it would not be based on sequentially removing points with the highest variance from the trend line. As a result, the regression above (55.97% explained variance) effectively represents the upper limit of correlation between As and Fe that naturally occurs at NASP. Because of the dulling effect of log transformation (which decreases the difference in magnitude of variance between points and results in smaller changes in R^2 value when one is removed), more outliers were identified in the transformed regression. These outliers are listed in order of their removal from the dataset in Table 2.

Site	Sample	Iron Result	Log Iron Result	Arsenic Result	Log Arsenic Result	Enriched Inorganic
15	15S015	571	6.34738921	6.5	1.871802177	As
38	38S036	936	6.841615476	8.2	2.104134154	As
15	15S005	1300	7.170119543	8.2	2.104134154	As
15	15S023	1450	7.279318835	8.5	2.140066163	As
33	033SS010	250	5.521460918	3.2	1.16315081	Fe
15	15S010	1170	7.064759028	0.16	-1.832581464	Fe
46	46SB29	275	5.616771098	0.1	-2.302585093	Fe
15	15S002	1560	7.3524411	8.1	2.091864062	As
15	15S004	447	6.102558595	4.1	1.410986974	As
15	15S016	2190	7.691656823	8.9	2.186051277	As
17	17S004	6370	8.759354749	0.43	-0.84397007	Fe

Site	Sample	Iron Result	Log Iron Result	Arsenic Result	Log Arsenic Result	Enriched Inorganic
33	033SS370	575	6.354370041	4	1.386294361	As
18	18-4	2110	7.654443226	7.8	2.054123734	As
18	18-4	138	4.927253685	1.7	0.530628251	As
45	45SB20	6540	8.785692444	11.4	2.433613355	As
45	45SB25	4090	8.316300249	9.5	2.251291799	As
15	15S015	1090	6.993932975	5	1.609437912	As
15	15S010	1060	6.966024187	5	1.609437912	As
38	38S035	513	6.240275845	3.5	1.252762968	As
38	38S013	453	6.115892125	3.2	1.16315081	As
33	033SS030	3370	8.122668023	7.7	2.041220329	As
15	15S029	2690	7.897296473	0.29	-1.237874356	As
17	017S0007	5010	8.519191194	0.42	-0.867500568	Fe
36	036S073W	1280	7.154615357	4.8	1.568615918	As
11	11S011	3600	8.188689124	7.9	2.066862759	As
45	45SB25	7230	8.885994315	10.6	2.360854001	As
45	45SB04	2180	7.687080156	5.6	1.722766598	As
27	27S027	115	4.744932128	1.2	0.182321557	As
15	15S010	384	5.950642553	0.14	-1.966112856	Fe
15	15S012	469	6.150602768	2.5	0.916290732	As
15	15S009	786	6.666956792	3.2	1.16315081	As
38	038S0T15	2500	7.824046011	5.7	1.740466175	As
15	15S001	913	6.816735881	3.4	1.223775432	As
27	27S018	7040	8.859363449	9.4	2.240709689	As
17	017S0008	5870	8.677609913	0.53	-0.634878272	Fe
17	17S003	8920	9.096051226	0.69	-0.371063681	Fe
36	36S022	11500	9.350102314	0.81	-0.210721031	Fe
17	17S005	6860	8.833462721	0.61	-0.494296322	Fe
27	27S025	12600	9.441452093	11.8	2.468099531	As
30	30GS12	6300	8.748304912	8.1	2.091864062	As
30	030S0147	2280	7.731930722	4.8	1.568615918	As
27	027S0012	158	5.062595033	1.2	0.182321557	As
15	15S020	956	6.862757913	3	1.098612289	As
45	45SB25	4500	8.411832676	6.3	1.840549633	As
27	27S019	353	5.866468057	1.7	0.530628251	As
15	15S007	1110	7.012115294	3.1	1.131402111	As
28	28S03	7040	8.859363449	0.67	-0.400477567	Fe
33	033SS570	19300	9.867860375	1.2	0.182321557	Fe
36	36S003	3500	8.160518247	5.4	1.686398954	As
15	15S030	2870	7.962067309	0.41	-0.891598119	Fe
34	034S1201	902	6.80461452	0.23	-1.46967597	Fe
27	27S049	291	5.673323267	1.3	0.262364264	As
27	28S02	6120	8.719317376	0.68	-0.385662481	Fe
43	43DR00901	17700	9.781319919	1.2	0.182321557	Fe

Conclusions

Based on the method of geochemical regression modeling (US Navy 2002; Gannett Fleming 2005), the soil data from all NASP investigations were evaluated for arsenic. The dataset consisted of a total of 2669 soil samples. Of these, 2016 were analyzed for

arsenic and 754 had detectable concentrations. Because of the high percentage of non-detects (62.6%), geochemical modeling was performed over population modeling to define the natural occurrence of arsenic.

Geochemical modeling of arsenic was performed through linear regression against iron, a geochemically similar constituent. There were a total of 653 samples that had detected concentrations of both iron and arsenic that were used in the evaluation. The R^2 value of the raw untransformed data was 0.141; sequential removal of 19 outliers based on their variance from a least squares trend line yielded an R^2 value of 0.6114 (for this evaluation an R^2 value of 0.6 was considered a significant correlation). The R^2 value of the raw transformed data was 0.3394; when the 19 outliers identified during the non-transformed analysis were removed the R^2 value increased to 0.4055. Sequential removal of an additional 54 outliers from the transformed data based on their decreasing variance from the least squares trend line yielded a R^2 value of 0.5597. At this point removal of additional points with the greater variance from the least squares trend line did not result in a consequent sequential increase in the R^2 value, thus the resulting dataset represents the maximum objective correlation between arsenic and iron, which in this case in interpreted to be inferrably natural. The final dataset had the following characteristics:

Fe range: 0 – 75,600 mg/kg
As range: 0 – 17.5 mg/kg
As/Fe ratio range: 0.000101695 to 00071204
Correlation prediction equation (log transformed): y (Fe) = 0.514x (As) – 3.7267

The samples identified as outliers represent statistically significant deviations from the natural distributions for both Fe and As. The geochemical analysis a) identified a total of 73 samples as being statistically different from background conditions (55 enriched with respect to As, and 18 enriched with respect to Fe); and b) provided a a prediction equation and a bounding range of ratios of As/Fe that can be used for future sampling to identify samples that are not consistent with background. An additional method that can be used is to bound this geochemical model with the 95% prediction limits; outliers falling outside of this 95% envelope should then be considered outliers (Gannett Fleming, 2005)..

References

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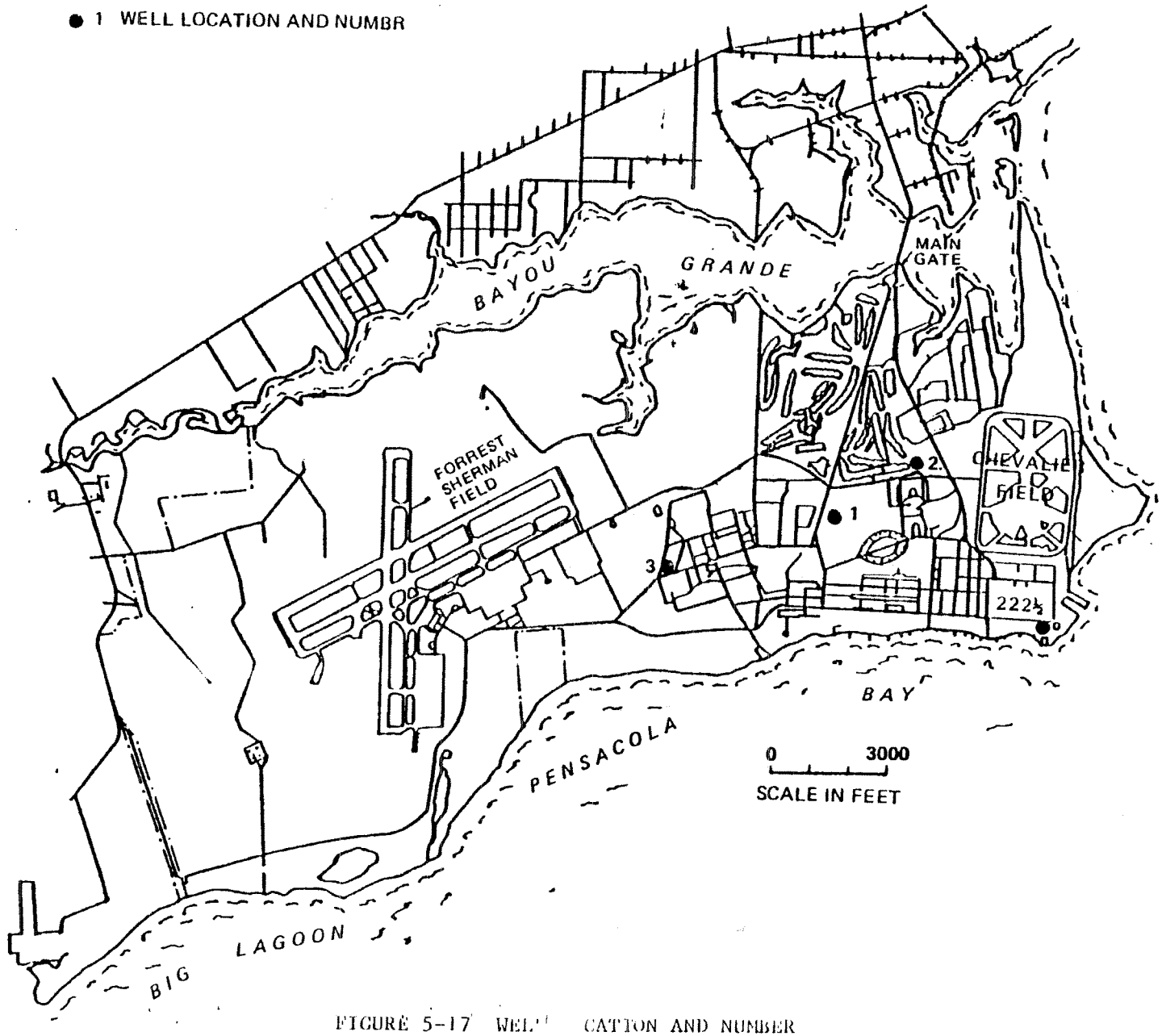

FIGURE 5-17 WELL LOCATION AND NUMBER

00000081

STATE AND FEDERAL THREATENED, ENDANGERED, AND OTHER SPECIES OF CONCERN
LIKELY TO OCCUR IN ESCAMBIA COUNTY FLORIDA
Compiled by U.S. Fish and Wildlife Service January 2006

Common Name	Scientific Name	Status State	Status FWS	Natural Communities
FISH:				
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	SSC	T CH	ESTUARINE: various MARINE: various habitats RIVERINE: alluvial and blackwater streams
Crystal darter	*Ammocrypta asprella*	T	ce	RIVERINE: alluvial stream
Harlequin darter	*Etheostoma histrio*	SSC		RIVERINE: alluvial stream
Saltmarsh topminnow	*Fundulus jenkinsi*	SSC		ESTUARINE: estuarine tidal marsh
Bluenose shiner	*Pteronotropis welaka*	SSC		RIVERINE: blackwater, alluvial, and spring-run streams
AMPHIBIANS & REPTILES:				
Flatwoods salamander	*Ambystoma cingulatum*	SSC	T	PALUSTRINE: wet flatwoods, dome swamp, basin swamp, ruderal TERRESTRIAL: mesic flatwoods (reproduces in ephemeral wetlands within this community)
Loggerhead turtle	*Caretta caretta*	T	T	TERRESTRIAL: sandy beaches; nesting
Green turtle	*Chelonia mydas mydas*	E	E	TERRESTRIAL: sandy beaches; nesting
Leatherback turtle	*Dermochelys coriacea*	E	E	TERRESTRIAL: sandy beaches; nesting
Eastern indigo snake	*Drymarchon corais couperi*	T	T	ESTUARINE: tidal swamp PALUSTRINE: hydric hammock, wet flatwoods TERRESTRIAL: mesic flatwoods, upland pine forest, sandhills, scrub, scrubby flatwoods, rockland hammock, ruderal
Hawksbill turtle	*Eretmochelys imbricata imbricata*	E	E	MARINE: open water; no nesting
Gopher tortoise	*Gopherus polyphemus*	SSC	ce	TERRESTRIAL: sandhills, scrub, scrubby flatwoods, xeric hammocks, coastal strand, ruderal
Pine barrens treefrog	*Hyla andersonii*	SSC		PALUSTRINE: seepage slope, baygall RIVERINE: seepage stream
Kemp's Ridley turtle	*Lepidochelys kempi*	E	E	TERRESTRIAL: sandy beaches; nesting
Alligator snapping turtle	*Macroclemys temminckii*	SSC	ce	ESTUARINE: tidal marsh LACUSTRINE: river floodplain lake, swamp lake RIVERINE: alluvial stream, blackwater stream
Gulf salt marsh snake	*Nerodia clarkii clarkii*		ce	ESTUARINE: tidal marsh, tidal swamp MARINE: tidal marsh, tidal swamp
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	ce	LACUSTRINE: ruderal, sandhill upland lake TERRESTRIAL: sandhill, scrubby flatwoods, xeric hammock, ruderal
BIRDS:				
Bachman's sparrow	*Aimophila aestivalis*		ce	TERRESTRIAL: various, ruderal

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STATE AND FEDERAL THREATENED, ENDANGERED, AND OTHER SPECIES OF CONCERN
LIKELY TO OCCUR IN ESCAMBIA COUNTY FLORIDA
Compiled by U.S. Fish and Wildlife Service January 2006

Common Name	Scientific Name	Status State	Status FWS	Natural Communities
Southeastern snowy plover	*Charadrius alexandrinus tenuirostris*	T	ce	ESTUARINE: exposed unconsolidated substrate MARINE: exposed unconsolidated substrate TERRESTRIAL: dunes, sandy beaches, and inlet areas
Piping plover	*Charadrius melodus*	T	T CH	ESTUARINE: exposed unconsolidated substrate MARINE: exposed unconsolidated substrate TERRESTRIAL: dunes, sandy beaches, and inlet areas. Mostly wintering and migrants.
Stoddard's yellow-throated warbler	*Dendroica dominica stoddardi*		ce	TERRESTRIAL: wooded habitats with spanish moss, various
Little blue heron	*Egretta caerulea*	SSC		ESTUARINE: marshes, shoreline PALUSTRINE: floodplains, swamps RIVERINE: shoreline
Snowy egret	*Egretta thula*	SSC		ESTUARINE: marshes, tidal swamps, shoreline LACUSTRINE: lake edges PALUSTRINE: swamp, floodplain, ruderal RIVERINE: shoreline
Tricolored heron	*Egretta tricolor*	SSC		ESTUARINE: marshes, tidal swamps, shoreline LACUSTRINE: lake edges PALUSTRINE: swamp, floodplain, ruderal RIVERINE: shoreline
Arctic peregrine falcon	*Falco peregrinus tundrius*	E	ce	ESTUARINE: winters along coasts LACUSTRINE: various PALUSTRINE: various TERRESTRIAL: various, ruderal
Southeastern kestrel	*Falco sparverius paulus*	T	ce	ESTUARINE: various habitats PALUSTRINE: various habitats TERRESTRIAL: open pine forests, clearings, ruderal, various
American oystercatcher	*Haematopus palliatus*	SSC		ESTUARINE: exposed unconsolidated substrate, exposed mollusk reef MARINE: exposed unconsolidated substrate, exposed mollusk reef TERRESTRIAL: beaches, ruderal areas
Bald eagle	*Haliaeetus leucocephalus*	T	T	ESTUARINE: marsh edges, tidal swamp, open water LACUSTRINE: swamp lakes, edges PALUSTRINE: swamp, floodplain RIVERINE: shoreline, open water TERRESTRIAL: pine and hardwood forests, clearings
Wood stork	*Mycteria americana*	E	E	ESTUARINE: marshes LACUSTRINE: floodplain lakes, marshes (feeding), various PALUSTRINE: marshes, swamps, various

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STATE AND FEDERAL THREATENED, ENDANGERED, AND OTHER SPECIES OF CONCERN
LIKELY TO OCCUR IN ESCAMBIA COUNTY FLORIDA
Compiled by U.S. Fish and Wildlife Service January 2006

Common Name	Scientific Name	Status State	Status FWS	Natural Communities
Brown pelican	*Pelecanus occidentalis*	SSC		ESTUARINE: islands for nesting, open water MARINE: open water
Red-cockaded woodpecker	*Picoides borealis*	SSC	E	TERRESTRIAL: mature pine forests
Black Skimmer	*Rynchops niger*	SSC		ESTUARINE: various LACUSTRINE: various RIVERINE: various TERRESTRIAL: ocean beaches, beach dune, ruderal. Nests common on rooftops.
Least tern	*Sterna antillarum*	T		ESTUARINE: various LACUSTRINE: various RIVERINE: various TERRESTRIAL: beach dune, ruderal. Nests common on rooftops.
MAMMALS:				
Santa Rosa beach mouse	*Peromyscus polionotus leucocephalus*		ce	TERRESTRIAL: beach dune, coastal scrub
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	E	E CH	TERRESTRIAL: beach dune, coastal scrub. Sites: Perdido Key State Rec. Area (CH), Gulf Islands National Seashore (CH).
Southeastern big-eared bat	*Plecotus rafinesquii*		ce	PALUSTRINE: various, floodplains TERRESTRIAL: pine and hardwood forests, ruderal, various
Eastern chipmunk	*Tamias striatus*	SSC		TERRESTRIAL: slope forest, upland hardwood forest, upland pine forest
West Indian manatee	*Trichechus manatus latirostris*	E	E	ESTUARINE: submerged vegetation, open water MARINE: open water, submerged vegetation RIVERINE: alluvial stream, blackwater stream, spring-run stream
Florida black bear	*Ursus americanus floridanus*	T	ce	PALUSTRINE: titi swamps, floodplains TERRESTRIAL: pine and hardwood forests
INVERTEBRATES:				
Narrow pigtoe	*Fusconaia escambia*		C (E)	Riverine: small to medium-sized creeks and rivers with slow to moderate current over gravel, and gravel mixed with sand or some silt. Endemic to the Escambia and Yellow River drainages of Alabama and Florida
Round ebonyshell	*Fusconaia rotulata*		C (E)	Riverine: Endemic and restricted to the main channel of the Conecuh River AL, and Escambia River, FL
Fuzzy pigtoe	*Pleurobema strodeanum*		C (E)	Riverine: small to medium-sized creeks and rivers with slow to moderate currents in sand and sand with some silt. Endemic to the Escambia, Yellow, and Choctawhatchee River drainages of Alabama and Florida.

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STATE AND FEDERAL THREATENED, ENDANGERED, AND OTHER SPECIES OF CONCERN
LIKELY TO OCCUR IN ESCAMBIA COUNTY FLORIDA
Compiled by U.S. Fish and Wildlife Service January 2006

Common Name	Scientific Name	Status State	Status FWS	Natural Communities
Choctaw bean	*Villosa choctawensis*		C (E)	Riverine: Small to large creeks and rivers with moderate current over sand to silty-sand substrates. Endemic to the Escambia, Yellow, and Choctawhatchee River drainages of Alabama and Florida.
Downy rainbow (mussel)	*Villosa villosa*		ce	RIVERINE: small streams to large rivers in sand or muddy sand substrates (Panhandle watersheds: Apalachicola, Chipola, Escambia, Choctawhatchee, Ochlockonee, Suwannee)
PLANTS:				
Aster	*Aster hemisphericus*	E	ce	TERRESTRIAL: upland mixed forest, on sandstone outcrop
Buckthorn	*Bumelia thornei*	E	ce	PALUSTRINE: hydric hammock, floodplain swamp
Curtiss' sandgrass	*Calamovilfa curtissii*	T	ce	PALUSTRINE: mesic and wet flatwoods, wet prairie, depression marsh TERRESTRIAL: mesic flatwoods
Sweet shrub	*Calycanthus floridus*	E		TERRESTRIAL: upland hardwood forest, slope forest, bluffs PALUSTRINE: bottomland forest, stream banks, floodplains
Baltzell's sedge	*Carex baltzellii*	T	ce	TERRESTRIAL: slope forest, moist sandy loam; moist sandy loam
Cruise's golden-aster	*Chrysopsis gossypina cruiseana*	E	ce	TERRESTRIAL: coastal dunes, coastal strand, coastal grassland; openings and blowouts
Spoon-leaved sundew	*Drosera intermedia*	T		LACUSTRINE: sinkhole lake edges PALUSTRINE: seepage slope, wet flatwoods, depression marsh RIVERINE: seepage stream banks, drainage ditches
Trailing arbutus	*Epigaea repens*	E		TERRESTRIAL: bluff, slope forest, mixed hardwood forest
Heartleaf	*Hexastylis arifolia*	T		RIVERINE: seepage stream bank TERRESTRIAL: slope forest
Florida anise	*Illicium floridanum*	T		PALUSTRINE: floodplain forest, baygall RIVERINE: seepage stream bank TERRESTRIAL: slope forest, seepage slope
Mountain laurel	*Kalmia latifolia*	T		RIVERINE: seepage stream bank TERRESTRIAL: slope forest, seepage stream banks
Southern red lily	*Lilium catesbaei*	T		PALUSTRINE: wet prairie, wet flatwoods, seepage slope TERRESTRIAL: mesic flatwoods, seepage slope; usually with grasses

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STATE AND FEDERAL THREATENED, ENDANGERED, AND OTHER SPECIES OF CONCERN
LIKELY TO OCCUR IN ESCAMBIA COUNTY FLORIDA
Compiled by U.S. Fish and Wildlife Service January 2006

Common Name	Scientific Name	Status State	Status FWS	Natural Communities
Panhandle lily	*Lilium iridollae*	E	ce	PALUSTRINE: baygall, dome swamp edges, mucky soil, seepage slope, edges of titi bogs, RIVERINE: blackwater stream banks
Gulf coast lupine	*Lupinus westianus*	T	ce	TERRESTRIAL: beach dune, scrub, disturbed areas, roadsides, blowouts in dunes
Hummingbird flower	*Macranthera flammea*	E		PALUSTRINE: seepage slope, dome swamp edges, floodplain swamps RIVERINE: seepage stream banks TERRESTRIAL: seepage slopes
Chapman's butterwort	*Pinguicula planifolia*	T	ce	PALUSTRINE: wet flatwoods, seepage slopes, bog, dome swamp, ditches; in water
Primrose-flower butterwort	*Pinguicula primulifolia*	E		PALUSTRINE: bogs, pond margins, margins of spring runs
Yellow fringed orchid	*Platanthera ciliaris*	T		PALUSTRINE: bogs, wet flatwoods TERRESTRIAL: Bluff
Yellow fringeless orchid	*Platanthera integra*	E	ce	PALUSTRINE: wet prairie, seepage slope TERRESTRIAL: mesic flatwoods
Large-leaved jointweed	*Polygonella macrophylla*	T	ce	TERRESTRIAL: scrub, sand pine/oak scrub ridges
Florida pondweed	*Potamogeton floridanus*		ce	RIVERINE: blackwater stream
Orange azalea	*Rhododendron austrinum*	E		PALUSTRINE: bottomland forest RIVERINE: seepage stream bank TERRESTRIAL: slope forest, upland mixed forest
White-top pitcher plant	*Sarracenia leucophylla*	E	ce	PALUSTRINE: wet prairie, seepage slope, baygall edges, ditches
Parrot pitcher plant	*Sarracenia psittacina*	T		PALUSTRINE: wet flatwoods, wet prairie, seepage slope
Decumbant pitcher plant	*Sarracenia purpurea*	T		PALUSTRINE: Bogs
Red-flowered pitcher plant	*Sarracenia rubra*	T		PALUSTRINE: bog, wet prairie, seepage slope, wet flatwoods RIVERINE: seepage stream banks
Silky camellia	*Stewartia malacodendron*	E		PALUSTRINE: baygall PALUSTRINE: slope forest, upland mixed forest, TERRESTRIAL: slope forest, upland mixed forest; acid soils
Drummond's yellow-eyed grass	*Xyris drummondii*		ce	PALUSTRINE: wet flatwoods, bog, seepage slopes, ditches
Harper's yellow-eyed grass	*Xyris scabrifolia*	T	ce	PALUSTRINE: seepage slope, wet prairie, bogs

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APPENDIX C

MOBILE LABORATORY REPORTS AND FIXED-BASED LABORATORY DATA VALIDATION REPORTS

C.1 - MOBILE LABORATORY ANALYTICAL REPORTS

KB Labs, Inc.
6821 SW Archer Road
Gainesville, FL 32608
P: 352-367-0073

Preliminary Sample Results -
NAS Pensacola,FL

09/19/05

KB LABS	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
	Blank	44SB01 0-6"	44SB01 6"-2'	44SB01 2'-4'	44SB01 4'-6'	44SB02 0-6"	44SB02 6"-2'	44SB02 2'-4'	44SB02 4'-6'	44SB03 0-6"	44SB03 6"-2'	44SB03 2'-4'
Analysis Date	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
	44SB03 4'-6'	44SB04 0-6"	44SB04 6"-2'	44SB04 2'-4'	44SB04 4'-6'	44SB05 0-6"	44SB05 6"-2'	44SB05 2'-4'	44SB05 4'-6'	Blank	44SB06 0-6"	44SB06 6"-2'
Analysis Date	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/14/05	09/15/05	09/15/05	09/15/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

KB Labs, Inc.
6821 SW Archer Road
Gainesville, FL 32608
P: 352-367-0073

Preliminary Sample Results -
NAS Pensacola,FL

KB LABS	Sample ID 44SB06 2'-4'	Sample ID 44SB06 4'-6'	Sample ID 44SB07 0-6"	Sample ID 44SB07 6"-2'	Sample ID 44SB07 2'-4'	Sample ID 44SB07 4'-6'	Sample ID 44SB08 0-6"	Sample ID 44SB08 6"-2'	Sample ID 44SB08 2'-4'	Sample ID 44SB08 4'-6'	Sample ID 44SB09 0-6"	Sample ID 44SB09 6"-2'
Analysis Date	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID 44SB09 2'-4'	Sample ID 44SB09 4'-6'	Sample ID 44SB10 0-6"	Sample ID 44SB10 6"-2'	Sample ID 44SB10 2'-4'	Sample ID 44SB10 4'-6'	Sample ID Blank	Sample ID 44SB11 0-6"	Sample ID 44SB11 6"-2'	Sample ID 44SB11 2'-4'	Sample ID 44SB11 4'-6'	Sample ID 44SB12 0-6"
Analysis Date	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/15/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	**0.028**	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

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Preliminary Sample Results -
NAS Pensacola,FL

KB LABS	Sample ID 44SB12 6"-2'	Sample ID 44SB12 2'-4'	Sample ID 44SB12 4'-6'	Sample ID 44SB13 0-6"	Sample ID 44SB13 6"-2'	Sample ID 44SB13 2'-4'	Sample ID 44SB13 4'-6'	Sample ID 44SB14 0-6"	Sample ID 44SB14 6"-2'	Sample ID 44SB14 2'-4'	Sample ID 44SB14 4'-6'	Sample ID 44SB15 0-6"
Analysis Date	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05	09/16/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID 44SB15 6"-2'	Sample ID 44SB15 2'-4'	Sample ID 44SB15 4'-6'	Sample ID Blank	Sample ID 44SB16 0-6"	Sample ID 44SB16 6"-2'	Sample ID 44SB16 2'-4'	Sample ID 44SB16 4'-6'	Sample ID 44SB17 0-6"	Sample ID 44SB17 6"-2'	Sample ID 44SB17 2'-4'	Sample ID 44SB17 4'-6'
Analysis Date	09/16/05	09/16/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

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Preliminary Sample Results -
NAS Pensacola,FL

09/19/05

KB LABS	Sample ID 44SB18 0-6"	Sample ID 44SB18 6"-2'	Sample ID 44SB18 2'-4'	Sample ID 44SB18 4'-6'	Sample ID 44SB19 0-6"	Sample ID 44SB19 6"-2'	Sample ID 44SB19 4'-6'	Sample ID 44SB19 6'-8'	Sample ID 44SB20 0-6"	Sample ID 44SB20 6"-2'	Sample ID 44SB20 2'-4'	Sample ID 44SB20 4'-6'
Analysis Date	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05	09/17/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
Analysis Date												
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

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Preliminary Sample Results -
NAS Pensacola,FL

09/19/05

KB LABS	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
	Blank	44SB21 0-6"	44SB21 6"-2'	44SB21 2'-4'	44SB21 4'-6'	44SB22 0-6"	44SB22 6"-2'	44SB22 2'-4'	44SB22 4'-6'	44SB23 0-6"	44SB23 6"-2'	44SB23 2'-4'
Analysis Date	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
	44SB23 4'-6'	44SB24 0-6"	44SB24 6"-2'	44SB24 2'-4'	44SB24 4'-6'	44SB25 0-6"	44SB25 6"-2'	44SB25 2'-4'	44SB25 4'-6'	Blank	44SB26 0-6"	44SB26 6"-2'
Analysis Date	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/18/05	09/19/05	09/19/05	09/19/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

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Preliminary Sample Results -
NAS Pensacola,FL

KB LABS	Sample ID 44SB26 2'-4'	Sample ID 44SB26 4'-6'	Sample ID 44SB27 0-6"	Sample ID 44SB27 6"-2'	Sample ID 44SB27 2'-4'	Sample ID 44SB27 4'-6'	Sample ID 44SB28 0-6"	Sample ID 44SB28 6"-2'	Sample ID 44SB28 2'-4'	Sample ID 44SB28 4'-6'	Sample ID 44SB29 0-6"	Sample ID 44SB29 6"-2'
Analysis Date	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05	09/19/05
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Dilution												
1,1 Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,2-Dichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1 Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
c-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
t-1,2-Dichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Methylene Chloride	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Benzene	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Toluene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,1-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
1,1,2-Trichloroethane	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Trichloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tetrachloroethene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ethylbenzene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
m&p-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
o-Xylene	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Naphthalene	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

KB LABS	Sample ID 44SB29 2'-4'	Sample ID 44SB29 4'-6'	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID	Sample ID
Analysis Date	09/19/05	09/19/05										
Matrix	Soil	Soil										
Dilution												
1,1 Dichloroethane	0.010	0.010										
1,2-Dichloroethane	0.010	0.010										
1,1 Dichloroethene	0.010	0.010										
c-1,2-Dichloroethene	0.010	0.010										
t-1,2-Dichloroethene	0.010	0.010										
Methylene Chloride	0.010	0.010										
Benzene	0.007	0.007										
Toluene	0.010	0.010										
1,1,1-Trichloroethane	0.010	0.010										
1,1,2-Trichloroethane	0.010	0.010										
Trichloroethene	0.010	0.010										
Tetrachloroethene	0.010	0.010										
Ethylbenzene	0.010	0.010										
m&p-Xylene	0.010	0.010										
o-Xylene	0.010	0.010										
Naphthalene	0.050	0.050										

Chemist:Glenn Jackson
Cell Phone #: 352-538-6491

Units: ug/L for waters
mg/kg for soils

C.2 - FIXED-BASED LABORATORY VALIDATION REPORTS

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0101	nsample	3221GW0101	nsample	3221GW0101-RE
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6688-4	lab_id	WV6688-4	lab_id	WV6688-4
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
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	UR	C
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	I	J	PR
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0201	nsample	3221GW0201	nsample	3221GW0201-RE
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6688-1	lab_id	WV6688-1	lab_id	WV6688-1
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
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.7	I	J	PR
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0301-RE
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OV

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	1		J	R
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.5	I	J	PR
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44RB1214-RE
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0101
samp_date	12/14/2005
lab_id	WV6688-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	U	
1,2-DICHLOROBENZENE	3	U	U	
1,3-DICHLOROBENZENE	3	U	U	
1,4-DICHLOROBENZENE	3	U	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	U	
2,4,5-TRICHLOROPHENOL	7	U	U	
2,4,6-TRICHLOROPHENOL	7	U	U	
2,4-DICHLOROPHENOL	6	U	U	
2,4-DIMETHYLPHENOL	7	U	U	
2,4-DINITROPHENOL	5	U	U	
2,4-DINITROTOLUENE	4	U	U	
2,6-DINITROTOLUENE	3	U	U	
2-CHLORONAPHTHALENE	3	U	U	
2-CHLOROPHENOL	5	U	U	
2-METHYLPHENOL	5	U	U	
2-NITROANILINE	3	U	U	
2-NITROPHENOL	5	U	U	
3,3'-DICHLOROBENZIDINE	4	U	U	
3-NITROANILINE	3	U	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	U	
4-BROMOPHENYL PHENYL ETHER	4	U	U	
4-CHLORO-3-METHYLPHENOL	6	U	U	
4-CHLOROANILINE	4	U	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	U	
4-METHYLPHENOL	5	U	U	
4-NITROANILINE	5	U	U	
4-NITROPHENOL	5	U	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	U	
BIS(2-CHLOROETHYL)ETHER	3	U	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	U	
BUTYL BENZYL PHTHALATE	3	U	U	
CARBAZOLE	4	U	U	

nsample	3221GW0101
samp_date	12/14/2005
lab_id	WV6688-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
DIBENZOFURAN	3	U	U	
DIETHYL PHTHALATE	2	U	U	
DIMETHYL PHTHALATE	3	U	U	
DI-N-BUTYL PHTHALATE	2	U	U	
DI-N-OCTYL PHTHALATE	3	U	U	
HEXACHLOROBENZENE	4	U	U	
HEXACHLOROBUTADIENE	4	U	U	
HEXACHLOROCYCLOPENTADIENE	2	U	UJ	C
HEXACHLOROETHANE	2	U	U	
ISOPHORONE	2	U	U	
NITROBENZENE	2	U	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	U	
N-NITROSODIPHENYLAMINE	8	U	U	
PENTACHLOROPHENOL	9	U	U	
PHENOL	6	U	U	

nsample	3221GW0201
samp_date	12/14/2005
lab_id	WV6688-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	U	
1,2-DICHLOROBENZENE	3	U	U	
1,3-DICHLOROBENZENE	3	U	U	
1,4-DICHLOROBENZENE	3	U	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	U	
2,4,5-TRICHLOROPHENOL	7	U	U	
2,4,6-TRICHLOROPHENOL	7	U	U	
2,4-DICHLOROPHENOL	6	U	U	
2,4-DIMETHYLPHENOL	8	U	U	
2,4-DINITROPHENOL	5	U	U	
2,4-DINITROTOLUENE	4	U	U	
2,6-DINITROTOLUENE	3	U	U	
2-CHLORONAPHTHALENE	3	U	U	
2-CHLOROPHENOL	5	U	U	
2-METHYLPHENOL	5	U	U	
2-NITROANILINE	3	U	U	
2-NITROPHENOL	6	U	U	
3,3'-DICHLOROBENZIDINE	4	U	U	
3-NITROANILINE	3	U	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	U	
4-BROMOPHENYL PHENYL ETHER	4	U	U	
4-CHLORO-3-METHYLPHENOL	6	U	U	
4-CHLOROANILINE	4	U	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	U	
4-METHYLPHENOL	5	U	U	
4-NITROANILINE	5	U	U	
4-NITROPHENOL	5	U	U	
BIS(2-CHLOROETHOXY)METHANE	3	U	U	
BIS(2-CHLOROETHYL)ETHER	3	U	U	
BIS(2-ETHYLHEXYL)PHTHALATE	8	U	U	
BUTYL BENZYL PHTHALATE	3	U	U	
CARBAZOLE	4	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0201
samp_date	12/14/2005
lab_id	WV6688-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
DIBENZOFURAN	3	U	U	
DIETHYL PHTHALATE	2	U	U	
DIMETHYL PHTHALATE	3	U	U	
DI-N-BUTYL PHTHALATE	2	U	U	
DI-N-OCTYL PHTHALATE	3	U	U	
HEXACHLOROBENZENE	4	U	U	
HEXACHLOROBUTADIENE	4	U	U	
HEXACHLOROCYCLOPENTADIENE	2	U	UJ	C
HEXACHLOROETHANE	2	U	U	
ISOPHORONE	2	U	U	
NITROBENZENE	2	U	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	U	
N-NITROSODIPHENYLAMINE	8	U	U	
PENTACHLOROPHENOL	9	U	U	
PHENOL	6	U	U	

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	U	
1,2-DICHLOROBENZENE	3	U	U	
1,3-DICHLOROBENZENE	3	U	U	
1,4-DICHLOROBENZENE	3	U	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	U	
2,4,5-TRICHLOROPHENOL	7	U	U	
2,4,6-TRICHLOROPHENOL	7	U	U	
2,4-DICHLOROPHENOL	6	U	U	
2,4-DIMETHYLPHENOL	8	U	U	
2,4-DINITROPHENOL	5	U	U	
2,4-DINITROTOLUENE	4	U	U	
2,6-DINITROTOLUENE	3	U	U	
2-CHLORONAPHTHALENE	3	U	U	
2-CHLOROPHENOL	5	U	U	
2-METHYLPHENOL	5	U	U	
2-NITROANILINE	3	U	U	
2-NITROPHENOL	5	U	U	
3,3'-DICHLOROBENZIDINE	4	U	U	
3-NITROANILINE	3	U	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	U	
4-BROMOPHENYL PHENYL ETHER	4	U	U	
4-CHLORO-3-METHYLPHENOL	6	U	U	
4-CHLOROANILINE	4	U	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	U	
4-METHYLPHENOL	5	U	U	
4-NITROANILINE	5	U	U	
4-NITROPHENOL	5	U	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	U	
BIS(2-CHLOROETHYL)ETHER	3	U	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	U	
BUTYL BENZYL PHTHALATE	3	U	U	
CARBAZOLE	4	U	U	

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
DIBENZOFURAN	3	U	U	
DIETHYL PHTHALATE	2	U	U	
DIMETHYL PHTHALATE	3	U	U	
DI-N-BUTYL PHTHALATE	2	U	U	
DI-N-OCTYL PHTHALATE	3	U	U	
HEXACHLOROBENZENE	4	U	U	
HEXACHLOROBUTADIENE	4	U	U	
HEXACHLOROCYCLOPENTADIENE	2	U	UJ	C
HEXACHLOROETHANE	2	U	U	
ISOPHORONE	2	U	U	
NITROBENZENE	2	U	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	U	
N-NITROSODIPHENYLAMINE	8	U	U	
PENTACHLOROPHENOL	9	U	U	
PHENOL	6	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: OS

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	U	
1,2-DICHLOROBENZENE	3	U	U	
1,3-DICHLOROBENZENE	3	U	U	
1,4-DICHLOROBENZENE	3	U	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	U	
2,4,5-TRICHLOROPHENOL	7	U	U	
2,4,6-TRICHLOROPHENOL	7	U	U	
2,4-DICHLOROPHENOL	6	U	U	
2,4-DIMETHYLPHENOL	7	U	U	
2,4-DINITROPHENOL	5	U	U	
2,4-DINITROTOLUENE	4	U	U	
2,6-DINITROTOLUENE	3	U	U	
2-CHLORONAPHTHALENE	3	U	U	
2-CHLOROPHENOL	5	U	U	
2-METHYLPHENOL	5	U	U	
2-NITROANILINE	3	U	U	
2-NITROPHENOL	5	U	U	
3,3'-DICHLOROBENZIDINE	4	U	U	
3-NITROANILINE	3	U	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	U	
4-BROMOPHENYL PHENYL ETHER	4	U	U	
4-CHLORO-3-METHYLPHENOL	6	U	U	
4-CHLOROANILINE	4	U	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	U	
4-METHYLPHENOL	5	U	U	
4-NITROANILINE	5	U	U	
4-NITROPHENOL	5	U	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	U	
BIS(2-CHLOROETHYL)ETHER	3	U	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	U	
BUTYL BENZYL PHTHALATE	3	U	U	
CARBAZOLE	4	U	U	

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
DIBENZOFURAN	3	U	U	
DIETHYL PHTHALATE	2	U	U	
DIMETHYL PHTHALATE	3	U	U	
DI-N-BUTYL PHTHALATE	2	U	U	
DI-N-OCTYL PHTHALATE	3	U	U	
HEXACHLOROBENZENE	4	U	U	
HEXACHLOROBUTADIENE	4	U	U	
HEXACHLOROCYCLOPENTADIENE	2	U	UJ	C
HEXACHLOROETHANE	2	U	U	
ISOPHORONE	2	U	U	
NITROBENZENE	2	U	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	U	
N-NITROSODIPHENYLAMINE	8	U	U	
PENTACHLOROPHENOL	9	U	U	
PHENOL	6	U	U	

nsample	46GW0101
samp_date	12/18/2005
lab_id	WV6766-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	U	
1,2-DICHLOROBENZENE	3	U	U	
1,3-DICHLOROBENZENE	3	U	U	
1,4-DICHLOROBENZENE	3	U	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	U	
2,4,5-TRICHLOROPHENOL	7	U	U	
2,4,6-TRICHLOROPHENOL	7	U	U	
2,4-DICHLOROPHENOL	6	U	U	
2,4-DIMETHYLPHENOL	7	U	U	
2,4-DINITROPHENOL	5	U	U	
2,4-DINITROTOLUENE	4	U	U	
2,6-DINITROTOLUENE	3	U	U	
2-CHLORONAPHTHALENE	3	U	U	
2-CHLOROPHENOL	5	U	U	
2-METHYLPHENOL	5	U	U	
2-NITROANILINE	3	U	U	
2-NITROPHENOL	5	U	U	
3,3'-DICHLOROBENZIDINE	4	U	U	
3-NITROANILINE	3	U	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	U	
4-BROMOPHENYL PHENYL ETHER	4	U	U	
4-CHLORO-3-METHYLPHENOL	6	U	U	
4-CHLOROANILINE	4	U	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	U	
4-METHYLPHENOL	5	U	U	
4-NITROANILINE	5	U	U	
4-NITROPHENOL	5	U	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	U	
BIS(2-CHLOROETHYL)ETHER	3	U	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	U	
BUTYL BENZYL PHTHALATE	3	U	U	
CARBAZOLE	4	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PAH

nsample	3221GW0101	nsample	3221GW0201	nsample	3221GW0301
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6688-4	lab_id	WV6688-1	lab_id	WV6688-3
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
2-METHYLNAPHTHALENE	0.06	U	U	
ACENAPHTHENE	0.08	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	U	
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	U	
BENZO(G,H,I)PERYLENE	0.1	U	U	
BENZO(K)FLUORANTHENE	0.09	U	U	
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	U	
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	U	
NAPHTHALENE	0.05	U	U	
PHENANTHRENE	0.08	U	U	
PYRENE	0.08	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	U	
ACENAPHTHENE	0.09	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	UJ	C
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	U	
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	UJ	C
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	UJ	C
NAPHTHALENE	0.05	U	U	
PHENANTHRENE	0.08	U	U	
PYRENE	0.09	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	U	
ACENAPHTHENE	0.09	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	UJ	C
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	U	
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	UJ	C
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	UJ	C
NAPHTHALENE	0.05	U	U	
PHENANTHRENE	0.08	U	U	
PYRENE	0.09	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PAH

nsample	44RB1214	nsample	46GW0101	nsample	46GW0201
samp_date	12/14/2005	samp_date	12/18/2005	samp_date	12/18/2005
lab_id	WV6688-2	lab_id	WV6766-1	lab_id	WV6766-2
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
2-METHYLNAPHTHALENE	0.06	U	U	
ACENAPHTHENE	0.08	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	UJ	C
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	U	
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	UJ	C
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	UJ	C
NAPHTHALENE	0.1	I	J	P
PHENANTHRENE	0.08	U	U	
PYRENE	0.08	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	U	
ACENAPHTHENE	0.08	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	UJ	C
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	U	
BENZO(G,H,I)PERYLENE	0.1	U	U	
BENZO(K)FLUORANTHENE	0.09	U	UJ	C
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	U	
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	UJ	C
NAPHTHALENE	0.05	U	U	
PHENANTHRENE	0.08	U	U	
PYRENE	0.08	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.1	I	J	P
ACENAPHTHENE	0.08	U	U	
ACENAPHTHYLENE	0.04	U	U	
ANTHRACENE	0.07	U	U	
BENZO(A)ANTHRACENE	0.08	U	UJ	C
BENZO(A)PYRENE	0.08	U	U	
BENZO(B)FLUORANTHENE	0.08	U	U	
BENZO(G,H,I)PERYLENE	0.1	U	U	
BENZO(K)FLUORANTHENE	0.1	U	UJ	C
CHRYSENE	0.05	U	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	U	
FLUORANTHENE	0.07	U	U	
FLUORENE	0.06	U	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	UJ	C
NAPHTHALENE	0.05	U	U	
PHENANTHRENE	0.08	U	U	
PYRENE	0.08	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	3221GW0101
samp_date	12/14/2005
lab_id	WV6688-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.05	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

nsample	3221GW0201
samp_date	12/14/2005
lab_id	WV6688-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	UJ	R
4,4'-DDE	0.057	U	UJ	R
4,4'-DDT	0.042	U	UJ	R
ALDRIN	0.026	U	UJ	R
ALPHA-BHC	0.05	U	UJ	R
ALPHA-CHLORDANE	0.022	U	UJ	R
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.25	U	UJ	R
AROCLOR-1232	0.28	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.095	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	UJ	R
DELTA-BHC	0.026	U	UJ	R
DIELDRIN	0.012	U	UJ	R
ENDOSULFAN I	0.023	U	UJ	R
ENDOSULFAN II	0.014	U	UJ	R
ENDOSULFAN SULFATE	0.012	U	UJ	R
ENDRIN	0.01	U	UJ	R
ENDRIN ALDEHYDE	0.031	U	UJ	R
ENDRIN KETONE	0.017	U	UJ	R
GAMMA-BHC (LINDANE)	0.016	U	UJ	R
GAMMA-CHLORDANE	0.028	U	UJ	R
HEPTACHLOR	0.017	U	UJ	R
HEPTACHLOR EPOXIDE	0.014	U	UJ	R
METHOXYCHLOR	0.032	U	UJ	R
TOXAPHENE	0.28	U	UJ	R

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.016	U	U	
4,4'-DDE	0.059	U	U	
4,4'-DDT	0.043	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.05	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.13	U	UJ	R
AROCLOR-1221	0.25	U	UJ	R
AROCLOR-1232	0.28	U	UJ	R
AROCLOR-1242	0.22	U	UJ	R
AROCLOR-1248	0.098	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.059	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.013	U	U	
ENDOSULFAN I	0.024	U	U	
ENDOSULFAN II	0.015	U	U	
ENDOSULFAN SULFATE	0.013	U	U	
ENDRIN	0.011	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.018	U	U	
GAMMA-BHC (LINDANE)	0.017	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.018	U	U	
HEPTACHLOR EPOXIDE	0.015	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	0.28	U	U	

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.05	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.24	U	U	
AROCLOR-1232	0.27	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.094	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

nsample	46GW0101
samp_date	12/18/2005
lab_id	WV6766-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.016	U	U	
4,4'-DDE	0.061	U	U	
4,4'-DDT	0.045	U	U	
ALDRIN	0.028	U	U	
ALPHA-BHC	0.019	U	U	
ALPHA-CHLORDANE	0.023	U	U	
AROCLOR-1016	0.13	U	UJ	R
AROCLOR-1221	0.26	U	UJ	R
AROCLOR-1232	0.3	U	UJ	R
AROCLOR-1242	0.22	U	UJ	R
AROCLOR-1248	0.1	U	UJ	R
AROCLOR-1254	0.26	U	UJ	R
AROCLOR-1260	0.061	U	UJ	R
BETA-BHC	0.026	U	U	
DELTA-BHC	0.028	U	U	
DIELDRIN	0.013	U	U	
ENDOSULFAN I	0.024	U	U	
ENDOSULFAN II	0.015	U	U	
ENDOSULFAN SULFATE	0.013	U	U	
ENDRIN	0.011	U	U	
ENDRIN ALDEHYDE	0.034	U	UJ	C
ENDRIN KETONE	0.018	U	UJ	C
GAMMA-BHC (LINDANE)	0.017	U	U	
GAMMA-CHLORDANE	0.031	U	U	
HEPTACHLOR	0.018	U	U	
HEPTACHLOR EPOXIDE	0.015	U	U	
METHOXYCHLOR	0.035	U	U	
TOXAPHENE	0.3	U	U	

nsample	46GW0201
samp_date	12/18/2005
lab_id	WV6766-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	UJ	R
4,4'-DDE	0.057	U	UJ	R
4,4'-DDT	0.042	U	UJ	R
ALDRIN	0.025	U	UJ	R
ALPHA-BHC	0.05	U	UJ	R
ALPHA-CHLORDANE	0.022	U	UJ	R
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	UJ	R
DELTA-BHC	0.025	U	UJ	R
DIELDRIN	0.012	U	UJ	R
ENDOSULFAN I	0.023	U	UJ	R
ENDOSULFAN II	0.014	U	UJ	R
ENDOSULFAN SULFATE	0.012	U	UJ	R
ENDRIN	0.01	U	UJ	R
ENDRIN ALDEHYDE	0.031	U	UJ	CR
ENDRIN KETONE	0.017	U	UJ	CR
GAMMA-BHC (LINDANE)	0.016	U	UJ	R
GAMMA-CHLORDANE	0.028	U	UJ	R
HEPTACHLOR	0.017	U	UJ	R
HEPTACHLOR EPOXIDE	0.014	U	UJ	R
METHOXYCHLOR	0.032	U	UJ	R
TOXAPHENE	0.27	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PET

nsample	3221GW0101
samp_date	12/14/2005
lab_id	WV6688-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	3221GW0201
samp_date	12/14/2005
lab_id	WV6688-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	3221GW0301
samp_date	12/14/2005
lab_id	WV6688-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PET

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	46GW0101
samp_date	12/18/2005
lab_id	WV6766-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	46GW0201
samp_date	12/18/2005
lab_id	WV6766-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PET

nsample	3221GW0101	nsample	3221GW0201	nsample	3221GW0301
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6688-4	lab_id	WV6688-1	lab_id	WV6688-3
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
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	UJ	R

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: PET

nsample	44RB1214	nsample	46GW0101	nsample	46GW0201
samp_date	12/14/2005	samp_date	12/18/2005	samp_date	12/18/2005
lab_id	WV6688-2	lab_id	WV6766-1	lab_id	WV6766-2
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
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	UJ	R

PROJ_NO: 00007

SDG: 0605112 MEDIA: SOIL DATA FRACTION: M

nsample	44SB3601
samp_date	5/9/2006
lab_id	0605112-01
qc_type	NM
units	MG/KG
Pct_Solids	95.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.73	U	U	

nsample	44SB3602
samp_date	5/9/2006
lab_id	0605112-02
qc_type	NM
units	MG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.71	U	U	

nsample	44SB3701
samp_date	5/9/2006
lab_id	0605112-03
qc_type	NM
units	MG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.73	U	U	

PROJ_NO: 00007

SDG: 0605112 MEDIA: SOIL DATA FRACTION: M

nsample	44SB3702
samp_date	5/9/2006
lab_id	0605112-04
qc_type	NM
units	MG/KG
Pct_Solids	98.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.71	U	U	

nsample	44SB3801
samp_date	5/9/2006
lab_id	0605112-05
qc_type	NM
units	MG/KG
Pct_Solids	95.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.70	U	U	

nsample	44SB3801D
samp_date	5/9/2006
lab_id	0605112-06
qc_type	NM
units	MG/KG
Pct_Solids	96.0
DUP_OF:	44SB3801

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.74	U	U	

PROJ_NO: 00007

SDG: 0605112 MEDIA: SOIL DATA FRACTION: M

nsample	44SB3802
samp_date	5/9/2006
lab_id	0605112-07
qc_type	NM
units	MG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.68	U	U	

nsample	44SB3901
samp_date	5/9/2006
lab_id	0605112-08
qc_type	NM
units	MG/KG
Pct_Solids	94.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.76	U	U	

nsample	44SB3902
samp_date	5/9/2006
lab_id	0605112-09
qc_type	NM
units	MG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.70	U	U	

PROJ_NO: 00007

SDG: 0605112 MEDIA: SOIL DATA FRACTION: M

nsample	44SB4001	nsample	44SB4002
samp_date	5/9/2006	samp_date	5/9/2006
lab_id	0605112-10	lab_id	0605112-11
qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG
Pct_Solids	96.0	Pct_Solids	96.0
DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.68	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ARSENIC	0.70	U	U	

PROJ_NO: 00007

SDG: 0605114 MEDIA: SPLP DATA FRACTION: SPLPP

nsample	44SB3001
samp_date	5/9/2006
lab_id	0605114-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.01	U	U	
4,4'-DDE	0.01	U	U	
4,4'-DDT	0.01	U	U	
ALDRIN	0.01	U	UJ	C
ALPHA-BHC	0.01	U	U	
ALPHA-CHLORDANE	0.01	U	U	
BETA-BHC	0.01	U	U	
DELTA-BHC	0.01	U	U	
DIELDRIN	0.01	U	U	
ENDOSULFAN I	0.01	U	U	
ENDOSULFAN II	0.01	U	U	
ENDOSULFAN SULFATE	0.01	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.01	U	UJ	C
ENDRIN KETONE	0.01	U	U	
GAMMA-BHC (LINDANE)	0.01	U	U	
GAMMA-CHLORDANE	0.01	U	U	
HEPTACHLOR	0.01	U	U	
HEPTACHLOR EPOXIDE	0.01	U	U	
METHOXYCHLOR	0.01	U	U	
TOXAPHENE	1	U	U	

PROJ_NO: 00007

SDG: 0605114 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB3101	nsample	44SB3102	nsample	44SB3102D
samp_date	5/9/2006	samp_date	5/9/2006	samp_date	5/9/2006
lab_id	0605114-02RE	lab_id	0605114-03RE	lab_id	0605114-04RE
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	91.0	Pct_Solids	92.0	Pct_Solids	92.0
DUP_OF:		DUP_OF:		DUP_OF:	44SB3102

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	13			
2-METHYLNAPHTHALENE	24			
ACENAPHTHENE	5.2			
ACENAPHTHYLENE	140			
ANTHRACENE	200			
BENZO(A)ANTHRACENE	420			
BENZO(A)PYRENE	1200			
BENZO(B)FLUORANTHENE	930			
BENZO(G,H,I)PERYLENE	3000			
BENZO(K)FLUORANTHENE	940			
CHRYSENE	510			
DIBENZO(A,H)ANTHRACENE	400			
FLUORANTHENE	240			
FLUORENE	6.3			
INDENO(1,2,3-CD)PYRENE	1800			
NAPHTHALENE	20	V		
PHENANTHRENE	36			
PYRENE	390			

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.4	U	U	
2-METHYLNAPHTHALENE	2.7	I	J	P
ACENAPHTHENE	3.4	U	U	
ACENAPHTHYLENE	5			
ANTHRACENE	8.1			
BENZO(A)ANTHRACENE	11			
BENZO(A)PYRENE	3.4	U	UJ	G
BENZO(B)FLUORANTHENE	27		J	G
BENZO(G,H,I)PERYLENE	78			
BENZO(K)FLUORANTHENE	18		J	G
CHRYSENE	14		J	G
DIBENZO(A,H)ANTHRACENE	3.4	U	UJ	G
FLUORANTHENE	7.1		J	G
FLUORENE	3.4	U	U	
INDENO(1,2,3-CD)PYRENE	40			
NAPHTHALENE	4.4	V	U	A
PHENANTHRENE	1	I	J	P
PYRENE	12		J	G

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	1.4	I	J	P
2-METHYLNAPHTHALENE	2.3	I	J	P
ACENAPHTHENE	3.5	U	U	
ACENAPHTHYLENE	5.6			
ANTHRACENE	10			
BENZO(A)ANTHRACENE	54		J	G
BENZO(A)PYRENE	85		J	G
BENZO(B)FLUORANTHENE	81		J	G
BENZO(G,H,I)PERYLENE	95			
BENZO(K)FLUORANTHENE	100		J	G
CHRYSENE	62		J	G
DIBENZO(A,H)ANTHRACENE	25		J	G
FLUORANTHENE	55		J	G
FLUORENE	3.5	U	U	
INDENO(1,2,3-CD)PYRENE	63			
NAPHTHALENE	5.5	V	U	A
PHENANTHRENE	5.4			
PYRENE	59		J	G

PROJ_NO: 00007

SDG: 0605114 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB3201
samp_date	5/9/2006
lab_id	0605114-05RE
qc_type	NM
units	UG/KG
Pct_Solids	92.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.5	U	U	
2-METHYLNAPHTHALENE	3.5	U	U	
ACENAPHTHENE	3.5	U	U	
ACENAPHTHYLENE	4.1			
ANTHRACENE	5.7			
BENZO(A)ANTHRACENE	24			
BENZO(A)PYRENE	63			
BENZO(B)FLUORANTHENE	72			
BENZO(G,H,I)PERYLENE	53			
BENZO(K)FLUORANTHENE	57			
CHRYSENE	37			
DIBENZO(A,H)ANTHRACENE	21			
FLUORANTHENE	20			
FLUORENE	3.5	U	U	
INDENO(1,2,3-CD)PYRENE	55			
NAPHTHALENE	4.9	V	U	A
PHENANTHRENE	2.9	I	J	P
PYRENE	24			

nsample	44SB3202
samp_date	5/9/2006
lab_id	0605114-06RE
qc_type	NM
units	UG/KG
Pct_Solids	95.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.4	U	U	
2-METHYLNAPHTHALENE	3.4	U	U	
ACENAPHTHENE	3.4	U	U	
ACENAPHTHYLENE	3.4	U	U	
ANTHRACENE	3.4	U	U	
BENZO(A)ANTHRACENE	3.4	U	U	
BENZO(A)PYRENE	3.4	U	U	
BENZO(B)FLUORANTHENE	3.4	U	U	
BENZO(G,H,I)PERYLENE	3.4	U	U	
BENZO(K)FLUORANTHENE	3.4	U	U	
CHRYSENE	3.4	U	U	
DIBENZO(A,H)ANTHRACENE	3.4	U	U	
FLUORANTHENE	3.4	U	U	
FLUORENE	3.4	U	U	
INDENO(1,2,3-CD)PYRENE	3.4	U	U	
NAPHTHALENE	2.9	IV	U	A
PHENANTHRENE	3.4	U	U	
PYRENE	3.4	U	U	

nsample	44SB3301
samp_date	5/9/2006
lab_id	0605114-07RE
qc_type	NM
units	UG/KG
Pct_Solids	94.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.4	U	U	
2-METHYLNAPHTHALENE	3.4	U	U	
ACENAPHTHENE	3.4	U	U	
ACENAPHTHYLENE	1.2	I	J	P
ANTHRACENE	2	I	J	P
BENZO(A)ANTHRACENE	12			
BENZO(A)PYRENE	31			
BENZO(B)FLUORANTHENE	26			
BENZO(G,H,I)PERYLENE	36			
BENZO(K)FLUORANTHENE	25			
CHRYSENE	17			
DIBENZO(A,H)ANTHRACENE	10			
FLUORANTHENE	5.7			
FLUORENE	3.4	U	U	
INDENO(1,2,3-CD)PYRENE	31			
NAPHTHALENE	3	IV	U	A
PHENANTHRENE	1.6	I	J	P
PYRENE	7.4			

PROJ_NO: 00007

SDG: 0605114 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB3302
samp_date	5/9/2006
lab_id	0605114-08RE
qc_type	NM
units	UG/KG
Pct_Solids	91.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.5	U	U	
2-METHYLNAPHTHALENE	3.5	U	U	
ACENAPHTHENE	3.5	U	U	
ACENAPHTHYLENE	3.5	U	U	
ANTHRACENE	3.5	U	U	
BENZO(A)ANTHRACENE	3.5	U	U	
BENZO(A)PYRENE	3.5	U	U	
BENZO(B)FLUORANTHENE	3.5	U	U	
BENZO(G,H,I)PERYLENE	3.5	U	U	
BENZO(K)FLUORANTHENE	3.5	U	U	
CHRYSENE	3.5	U	U	
DIBENZO(A,H)ANTHRACENE	3.5	U	U	
FLUORANTHENE	3.5	U	U	
FLUORENE	3.5	U	U	
INDENO(1,2,3-CD)PYRENE	3.5	U	U	
NAPHTHALENE	2.1	IV	U	A
PHENANTHRENE	3.5	U	U	
PYRENE	3.5	U	U	

nsample	44SB3401
samp_date	5/9/2006
lab_id	0605114-09RE
qc_type	NM
units	UG/KG
Pct_Solids	92.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.6	U	U	
2-METHYLNAPHTHALENE	3.6	U	U	
ACENAPHTHENE	3.6	U	U	
ACENAPHTHYLENE	5.5			
ANTHRACENE	7			
BENZO(A)ANTHRACENE	33			
BENZO(A)PYRENE	94			
BENZO(B)FLUORANTHENE	80			
BENZO(G,H,I)PERYLENE	110			
BENZO(K)FLUORANTHENE	92			
CHRYSENE	49			
DIBENZO(A,H)ANTHRACENE	36			
FLUORANTHENE	22			
FLUORENE	3.6	U	U	
INDENO(1,2,3-CD)PYRENE	94			
NAPHTHALENE	3.2	IV	U	A
PHENANTHRENE	4.3			
PYRENE	29			

nsample	44SB3402
samp_date	5/9/2006
lab_id	0605114-10RE
qc_type	NM
units	UG/KG
Pct_Solids	93.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.4	U	U	
2-METHYLNAPHTHALENE	3.4	U	U	
ACENAPHTHENE	3.4	U	U	
ACENAPHTHYLENE	3.4	U	U	
ANTHRACENE	3.4	U	U	
BENZO(A)ANTHRACENE	3.4	U	U	
BENZO(A)PYRENE	3.4	U	U	
BENZO(B)FLUORANTHENE	3.4	U	U	
BENZO(G,H,I)PERYLENE	3.4	U	U	
BENZO(K)FLUORANTHENE	3.4	U	U	
CHRYSENE	3.4	U	U	
DIBENZO(A,H)ANTHRACENE	3.4	U	U	
FLUORANTHENE	3.4	U	U	
FLUORENE	3.4	U	U	
INDENO(1,2,3-CD)PYRENE	3.4	U	U	
NAPHTHALENE	2.2	IV	U	A
PHENANTHRENE	3.4	U	U	
PYRENE	3.4	U	U	

PROJ_NO: 00007

SDG: 0605114 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB3501
samp_date	5/9/2006
lab_id	0605114-11RE
qc_type	NM
units	UG/KG
Pct_Solids	94.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.5	U	U	
2-METHYLNAPHTHALENE	3.5	U	U	
ACENAPHTHENE	3.5	U	U	
ACENAPHTHYLENE	4.1			
ANTHRACENE	4.5			
BENZO(A)ANTHRACENE	20			
BENZO(A)PYRENE	55			
BENZO(B)FLUORANTHENE	46			
BENZO(G,H,I)PERYLENE	56			
BENZO(K)FLUORANTHENE	47			
CHRYSENE	26			
DIBENZO(A,H)ANTHRACENE	22			
FLUORANTHENE	12			
FLUORENE	3.5	U	U	
INDENO(1,2,3-CD)PYRENE	51			
NAPHTHALENE	2.9	IV	U	A
PHENANTHRENE	2.1	I	J	P
PYRENE	13			

nsample	44SB3502
samp_date	5/9/2006
lab_id	0605114-12RE
qc_type	NM
units	UG/KG
Pct_Solids	93.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	3.5	U	U	
2-METHYLNAPHTHALENE	3.5	U	U	
ACENAPHTHENE	3.5	U	U	
ACENAPHTHYLENE	3.5	U	U	
ANTHRACENE	3.5	U	U	
BENZO(A)ANTHRACENE	3.5	U	U	
BENZO(A)PYRENE	3.5	U	U	
BENZO(B)FLUORANTHENE	3.5	U	U	
BENZO(G,H,I)PERYLENE	3.5	U	U	
BENZO(K)FLUORANTHENE	3.5	U	U	
CHRYSENE	3.5	U	U	
DIBENZO(A,H)ANTHRACENE	3.5	U	U	
FLUORANTHENE	3.5	U	U	
FLUORENE	3.5	U	U	
INDENO(1,2,3-CD)PYRENE	3.5	U	U	
NAPHTHALENE	2.2	IV	U	A
PHENANTHRENE	3.5	U	U	
PYRENE	3.5	U	U	

PROJ_NO: 00007

SDG: 0605115 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1502
samp_date	5/9/2006
lab_id	0605115-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
BIS(2-ETHYLHEXYL)PHTHALATE	5.1	U	U	

PROJ_NO: 00007

SDG: 0605115 MEDIA: WATER DATA FRACTION: M

nsample	3321GW0302
samp_date	5/9/2006
lab_id	0605115-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
MANGANESE	5.2	I		

nsample	44GW1802
samp_date	5/9/2006
lab_id	0605115-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
IRON	1460			
MANGANESE	25.4			

PROJ_NO: 00007

SDG: 0605184 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1601
samp_date	5/12/2006
lab_id	0605184-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	1.6			
CHLOROMETHANE	2	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	2	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	1	U	U	
TRICHLOROFLUOROMETHANE	2	U	U	

nsample	44GW1601
samp_date	5/12/2006
lab_id	0605184-01
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

nsample	44GW1701
samp_date	5/12/2006
lab_id	0605184-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	0.26	I	J	P
CHLOROMETHANE	2	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	2	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	1	U	U	
TRICHLOROFLUOROMETHANE	2	U	U	

PROJ_NO: 00007

SDG: 0605184 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1701
samp_date	5/12/2006
lab_id	0605184-05
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

nsample	44GW2001
samp_date	5/12/2006
lab_id	0605184-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	2	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	2	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	1	U	U	
TRICHLOROFLUOROMETHANE	2	U	U	

nsample	44GW2001
samp_date	5/12/2006
lab_id	0605184-02
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

PROJ_NO: 00007

SDG: 0605184 MEDIA: WATER DATA FRACTION: OV

nsample	44GW2101
samp_date	5/12/2006
lab_id	0605184-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	0.68	I	J	P
CHLOROMETHANE	2	U	U	
CIS-1,2-DICHLOROETHENE	2.9			
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	2	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	34			
TRICHLOROFLUOROMETHANE	2	U	U	

nsample	44GW2101
samp_date	5/12/2006
lab_id	0605184-03
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

nsample	44GW2201
samp_date	5/12/2006
lab_id	0605184-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	0.34	I	J	P
CHLOROMETHANE	2	U	U	
CIS-1,2-DICHLOROETHENE	1	U	U	
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	2	U	U	
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	3.4		U	B
TRICHLOROFLUOROMETHANE	2	U	U	

PROJ_NO: 00007

SDG: 0605184 MEDIA: WATER DATA FRACTION: OV

nsample	44GW2201
samp_date	5/12/2006
lab_id	0605184-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

nsample	44TB0512
samp_date	5/12/2006
lab_id	0605184-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	U	
1,1,2,2-TETRACHLOROETHANE	1	U	U	
1,1,2-TRICHLOROETHANE	1	U	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	U	U	
1,1-DICHLOROETHANE	1	U	U	
1,1-DICHLOROETHENE	1	U	U	
1,2,4-TRICHLOROBENZENE	1	U	U	
1,2-DIBROMO-3-CHLOROPROPANE	2	U	U	
1,2-DIBROMOETHANE	1	U	U	
1,2-DICHLOROBENZENE	1	U	U	
1,2-DICHLOROETHANE	1	U	U	
1,2-DICHLOROPROPANE	1	U	U	
1,3-DICHLOROBENZENE	1	U	U	
1,4-DICHLOROBENZENE	1	U	U	
BROMODICHLOROMETHANE	1	U	U	
BROMOFORM	1	U	U	
BROMOMETHANE	2	U	U	
CARBON TETRACHLORIDE	1	U	U	
CHLOROBENZENE	1	U	U	
CHLORODIBROMOMETHANE	1	U	U	
CHLOROETHANE	2	U	U	
CHLOROFORM	1	U	U	
CHLOROMETHANE	0.43	I	J	P
CIS-1,2-DICHLOROETHENE	1	U	U	
CIS-1,3-DICHLOROPROPENE	1	U	U	
DICHLORODIFLUOROMETHANE	2	U	U	
METHYLENE CHLORIDE	1.4	I	J	P
TETRACHLOROETHENE	1	U	U	
TRANS-1,2-DICHLOROETHENE	1	U	U	
TRANS-1,3-DICHLOROPROPENE	1	U	U	
TRICHLOROETHENE	1.3			
TRICHLOROFLUOROMETHANE	2	U	U	

nsample	44TB0512
samp_date	5/12/2006
lab_id	0605184-06
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
VINYL CHLORIDE	1	U	U	

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4201
samp_date	8/7/2006
lab_id	0608073-01
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

nsample	44SB4202
samp_date	8/7/2006
lab_id	0608073-02
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	49	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

nsample	44SB4301
samp_date	8/7/2006
lab_id	0608073-03
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4302
samp_date	8/7/2006
lab_id	0608073-04
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

nsample	44SB4401
samp_date	8/7/2006
lab_id	0608073-05
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	55	U	
2-METHYLNAPHTHALENE	22	U	
ACENAPHTHENE	22	U	
ACENAPHTHYLENE	22	U	
ANTHRACENE	22	U	
BENZO(A)ANTHRACENE	22	U	
BENZO(A)PYRENE	22	U	
BENZO(B)FLUORANTHENE	22	U	
BENZO(G,H,I)PERYLENE	22	U	
BENZO(K)FLUORANTHENE	22	U	
CHRYSENE	22	U	
DIBENZO(A,H)ANTHRACENE	22	U	
FLUORANTHENE	22	U	
FLUORENE	22	U	
INDENO(1,2,3-CD)PYRENE	22	U	
NAPHTHALENE	22	U	
PHENANTHRENE	22	U	
PYRENE	22	U	

nsample	44SB4402
samp_date	8/7/2006
lab_id	0608073-06
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	49	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4501
samp_date	8/7/2006
lab_id	0608073-07
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	54	U	
2-METHYLNAPHTHALENE	22	U	
ACENAPHTHENE	22	U	
ACENAPHTHYLENE	22	U	
ANTHRACENE	22	U	
BENZO(A)ANTHRACENE	22	U	
BENZO(A)PYRENE	22	U	
BENZO(B)FLUORANTHENE	22	U	
BENZO(G,H,I)PERYLENE	22	U	
BENZO(K)FLUORANTHENE	22	U	
CHRYSENE	22	U	
DIBENZO(A,H)ANTHRACENE	22	U	
FLUORANTHENE	22	U	
FLUORENE	22	U	
INDENO(1,2,3-CD)PYRENE	22	U	
NAPHTHALENE	22	U	
PHENANTHRENE	22	U	
PYRENE	22	U	

nsample	44SB4502
samp_date	8/7/2006
lab_id	0608073-08
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

nsample	44SB4601
samp_date	8/7/2006
lab_id	0608073-09
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	22	J	P
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4602	nsample	44SB4701	nsample	44SB4702
samp_date	8/7/2006	samp_date	8/7/2006	samp_date	8/7/2006
lab_id	0608073-10	lab_id	0608073-11	lab_id	0608073-12
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	73	J	P
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	36	J	P
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	35	J	P

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	110		
BENZO(A)PYRENE	260		
BENZO(B)FLUORANTHENE	260		
BENZO(G,H,I)PERYLENE	180		
BENZO(K)FLUORANTHENE	210		
CHRYSENE	160		
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	100		
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	210		
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	120		

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4801
samp_date	8/7/2006
lab_id	0608073-13
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

nsample	44SB4802
samp_date	8/7/2006
lab_id	0608073-14
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	52	U	
2-METHYLNAPHTHALENE	21	U	
ACENAPHTHENE	21	U	
ACENAPHTHYLENE	21	U	
ANTHRACENE	21	U	
BENZO(A)ANTHRACENE	21	U	
BENZO(A)PYRENE	21	U	
BENZO(B)FLUORANTHENE	21	U	
BENZO(G,H,I)PERYLENE	21	U	
BENZO(K)FLUORANTHENE	21	U	
CHRYSENE	21	U	
DIBENZO(A,H)ANTHRACENE	21	U	
FLUORANTHENE	21	U	
FLUORENE	21	U	
INDENO(1,2,3-CD)PYRENE	21	U	
NAPHTHALENE	21	U	
PHENANTHRENE	21	U	
PYRENE	21	U	

nsample	44SB4901
samp_date	8/7/2006
lab_id	0608073-15
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	54	J	P
BENZO(B)FLUORANTHENE	53	J	P
BENZO(G,H,I)PERYLENE	37	J	P
BENZO(K)FLUORANTHENE	47	J	P
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	45	J	P
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608073 MEDIA: SOIL DATA FRACTION: OS

nsample	44SB4902
samp_date	8/7/2006
lab_id	0608073-16
qc_type	NM
units	UG/KG
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608143 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB4703	nsample	45SB4301	nsample	45SB4401
samp_date	8/11/2006	samp_date	8/11/2006	samp_date	8/11/2006
lab_id	0608143-03	lab_id	0608143-01	lab_id	0608143-02
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids		Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	49	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	60	J	P
BENZO(A)PYRENE	170		
BENZO(B)FLUORANTHENE	180		
BENZO(G,H,I)PERYLENE	160		
BENZO(K)FLUORANTHENE	130		
CHRYSENE	82	J	P
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	25	J	P
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	180		
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	28	J	P

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	22	J	P
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	21	J	P
PYRENE	20	J	P

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608149 MEDIA: SOIL DATA FRACTION: PAH

nsample	44SB5201	nsample	44SB5202
samp_date	8/13/2006	samp_date	8/13/2006
lab_id	0608149-01	lab_id	0608149-02
qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG
Pct_Solids		Pct_Solids	
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	50	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	51	U	
2-METHYLNAPHTHALENE	20	U	
ACENAPHTHENE	20	U	
ACENAPHTHYLENE	20	U	
ANTHRACENE	20	U	
BENZO(A)ANTHRACENE	20	U	
BENZO(A)PYRENE	20	U	
BENZO(B)FLUORANTHENE	20	U	
BENZO(G,H,I)PERYLENE	20	U	
BENZO(K)FLUORANTHENE	20	U	
CHRYSENE	20	U	
DIBENZO(A,H)ANTHRACENE	20	U	
FLUORANTHENE	20	U	
FLUORENE	20	U	
INDENO(1,2,3-CD)PYRENE	20	U	
NAPHTHALENE	20	U	
PHENANTHRENE	20	U	
PYRENE	20	U	

PROJ_NO: 00007

SDG: 0608149 MEDIA: WATER DATA FRACTION: OV

nsample	44GW2301
samp_date	8/14/2006
lab_id	0608149-07
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.12	U	
1,1,2,2-TETRACHLOROETHANE	0.13	U	
1,1,2-TRICHLOROETHANE	0.1	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	UJ	C
1,1-DICHLOROETHANE	0.11	U	
1,1-DICHLOROETHENE	0.13	U	
1,2,4-TRICHLOROBENZENE	0.57	U	
1,2-DIBROMO-3-CHLOROPROPANE	0.09	U	
1,2-DIBROMOETHANE	0.14	U	
1,2-DICHLOROBENZENE	0.11	U	
1,2-DICHLOROETHANE	0.13	U	
1,2-DICHLOROPROPANE	0.11	U	
1,3-DICHLOROBENZENE	0.38	U	
1,4-DICHLOROBENZENE	0.1	U	
BROMODICHLOROMETHANE	0.12	U	
BROMOFORM	0.13	U	
BROMOMETHANE	0.13	U	
CARBON TETRACHLORIDE	0.11	U	
CHLOROBENZENE	0.1	U	
CHLORODIBROMOMETHANE	0.14	U	
CHLOROETHANE	0.14	U	
CHLOROFORM	0.32	J	P
CHLOROMETHANE	0.28	U	
CIS-1,2-DICHLOROETHENE	0.14	U	
CIS-1,3-DICHLOROPROPENE	0.08	U	
DICHLORODIFLUOROMETHANE	0.25	U	
METHYLENE CHLORIDE	0.23	U	
TETRACHLOROETHENE	0.1	U	
TRANS-1,2-DICHLOROETHENE	0.15	U	
TRANS-1,3-DICHLOROPROPENE	0.12	U	
TRICHLOROETHENE	0.23	U	
TRICHLOROFLUOROMETHANE	0.12	U	

nsample	44GW2301
samp_date	8/14/2006
lab_id	0608149-07
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
VINYL CHLORIDE	0.2	U	

nsample	44GW2401
samp_date	8/14/2006
lab_id	0608149-08
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.12	U	
1,1,2,2-TETRACHLOROETHANE	0.13	U	
1,1,2-TRICHLOROETHANE	0.1	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	UJ	C
1,1-DICHLOROETHANE	0.11	U	
1,1-DICHLOROETHENE	0.13	U	
1,2,4-TRICHLOROBENZENE	0.57	U	
1,2-DIBROMO-3-CHLOROPROPANE	0.09	U	
1,2-DIBROMOETHANE	0.14	U	
1,2-DICHLOROBENZENE	0.11	U	
1,2-DICHLOROETHANE	0.13	U	
1,2-DICHLOROPROPANE	0.11	U	
1,3-DICHLOROBENZENE	0.38	U	
1,4-DICHLOROBENZENE	0.1	U	
BROMODICHLOROMETHANE	0.12	U	
BROMOFORM	0.13	U	
BROMOMETHANE	0.13	U	
CARBON TETRACHLORIDE	0.11	U	
CHLOROBENZENE	0.1	U	
CHLORODIBROMOMETHANE	0.14	U	
CHLOROETHANE	0.14	U	
CHLOROFORM	0.22	J	P
CHLOROMETHANE	0.28	U	
CIS-1,2-DICHLOROETHENE	0.14	U	
CIS-1,3-DICHLOROPROPENE	0.08	U	
DICHLORODIFLUOROMETHANE	0.25	U	
METHYLENE CHLORIDE	0.23	U	
TETRACHLOROETHENE	0.1	U	
TRANS-1,2-DICHLOROETHENE	0.15	U	
TRANS-1,3-DICHLOROPROPENE	0.12	U	
TRICHLOROETHENE	5		
TRICHLOROFLUOROMETHANE	0.12	U	

PROJ_NO: 00007

SDG: 0608149 MEDIA: WATER DATA FRACTION: OV

nsample	44GW2401
samp_date	8/14/2006
lab_id	0608149-08
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
VINYL CHLORIDE	0.2	U	

nsample	44GW2501
samp_date	8/14/2006
lab_id	0608149-09
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.12	U	
1,1,2,2-TETRACHLOROETHANE	0.13	U	
1,1,2-TRICHLOROETHANE	0.1	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	UJ	C
1,1-DICHLOROETHANE	0.11	U	
1,1-DICHLOROETHENE	0.13	U	
1,2,4-TRICHLOROBENZENE	0.57	U	
1,2-DIBROMO-3-CHLOROPROPANE	0.09	U	
1,2-DIBROMOETHANE	0.14	U	
1,2-DICHLOROBENZENE	0.11	U	
1,2-DICHLOROETHANE	0.13	U	
1,2-DICHLOROPROPANE	0.11	U	
1,3-DICHLOROBENZENE	0.38	U	
1,4-DICHLOROBENZENE	0.1	U	
BROMODICHLOROMETHANE	0.12	U	
BROMOFORM	0.13	U	
BROMOMETHANE	0.13	U	
CARBON TETRACHLORIDE	0.11	U	
CHLOROBENZENE	0.1	U	
CHLORODIBROMOMETHANE	0.14	U	
CHLOROETHANE	0.14	U	
CHLOROFORM	0.13	U	
CHLOROMETHANE	0.28	U	
CIS-1,2-DICHLOROETHENE	0.14	U	
CIS-1,3-DICHLOROPROPENE	0.08	U	
DICHLORODIFLUOROMETHANE	0.25	U	
METHYLENE CHLORIDE	0.23	U	
TETRACHLOROETHENE	0.1	U	
TRANS-1,2-DICHLOROETHENE	0.15	U	
TRANS-1,3-DICHLOROPROPENE	0.12	U	
TRICHLOROETHENE	0.49	J	P
TRICHLOROFLUOROMETHANE	0.12	U	

nsample	44GW2501
samp_date	8/14/2006
lab_id	0608149-09
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
VINYL CHLORIDE	0.2	U	

PROJ_NO: 00007

SDG: 0608149 MEDIA: WATER DATA FRACTION: OV

nsample	44GW2601
samp_date	8/14/2006
lab_id	0608149-10
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.12	U	
1,1,2,2-TETRACHLOROETHANE	0.13	U	
1,1,2-TRICHLOROETHANE	0.1	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	UJ	C
1,1-DICHLOROETHANE	0.11	U	
1,1-DICHLOROETHENE	0.13	U	
1,2,4-TRICHLOROBENZENE	0.57	U	
1,2-DIBROMO-3-CHLOROPROPANE	0.09	U	
1,2-DIBROMOETHANE	0.14	U	
1,2-DICHLOROBENZENE	0.11	U	
1,2-DICHLOROETHANE	0.13	U	
1,2-DICHLOROPROPANE	0.11	U	
1,3-DICHLOROBENZENE	0.38	U	
1,4-DICHLOROBENZENE	0.1	U	
BROMODICHLOROMETHANE	0.12	U	
BROMOFORM	0.13	U	
BROMOMETHANE	0.13	U	
CARBON TETRACHLORIDE	0.11	U	
CHLOROBENZENE	0.1	U	
CHLORODIBROMOMETHANE	0.14	U	
CHLOROETHANE	0.14	U	
CHLOROFORM	0.13	U	
CHLOROMETHANE	0.28	U	
CIS-1,2-DICHLOROETHENE	0.14	U	
CIS-1,3-DICHLOROPROPENE	0.08	U	
DICHLORODIFLUOROMETHANE	0.25	U	
METHYLENE CHLORIDE	0.23	U	
TETRACHLOROETHENE	0.1	U	
TRANS-1,2-DICHLOROETHENE	0.15	U	
TRANS-1,3-DICHLOROPROPENE	0.12	U	
TRICHLOROETHENE	0.23	U	
TRICHLOROFLUOROMETHANE	0.12	U	

nsample	44GW2601
samp_date	8/14/2006
lab_id	0608149-10
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
VINYL CHLORIDE	0.2	U	

nsample	44TB0814
samp_date	8/14/2006
lab_id	0608149-04
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.12	U	
1,1,2,2-TETRACHLOROETHANE	0.13	U	
1,1,2-TRICHLOROETHANE	0.1	U	
1,1,2-TRICHLOROTRIFLUOROETHANE	1	UJ	C
1,1-DICHLOROETHANE	0.11	U	
1,1-DICHLOROETHENE	0.13	U	
1,2,4-TRICHLOROBENZENE	0.57	U	
1,2-DIBROMO-3-CHLOROPROPANE	0.09	U	
1,2-DIBROMOETHANE	0.14	U	
1,2-DICHLOROBENZENE	0.11	U	
1,2-DICHLOROETHANE	0.13	U	
1,2-DICHLOROPROPANE	0.11	U	
1,3-DICHLOROBENZENE	0.38	U	
1,4-DICHLOROBENZENE	0.1	U	
BROMODICHLOROMETHANE	0.12	U	
BROMOFORM	0.13	U	
BROMOMETHANE	0.13	U	
CARBON TETRACHLORIDE	0.11	U	
CHLOROBENZENE	0.1	U	
CHLORODIBROMOMETHANE	0.14	U	
CHLOROETHANE	0.14	U	
CHLOROFORM	0.13	U	
CHLOROMETHANE	0.28	U	
CIS-1,2-DICHLOROETHENE	0.14	U	
CIS-1,3-DICHLOROPROPENE	0.08	U	
DICHLORODIFLUOROMETHANE	0.25	U	
METHYLENE CHLORIDE	0.23	U	
TETRACHLOROETHENE	0.1	U	
TRANS-1,2-DICHLOROETHENE	0.15	U	
TRANS-1,3-DICHLOROPROPENE	0.12	U	
TRICHLOROETHENE	0.23	U	
TRICHLOROFLUOROMETHANE	0.12	U	

PROJ_NO: 00007

SDG: 0608149 MEDIA: WATER DATA FRACTION: OV

nsample	44TB0814	nsample	46GW0102
samp_date	8/14/2006	samp_date	8/14/2006
lab_id	0608149-04	lab_id	0608149-05
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
VINYL CHLORIDE	0.2	U	

Parameter	Result	Val Qual	Qual Code
BROMODICHLOROMETHANE	1.6		

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0401-RE
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0501-RE
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0601-RE
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0701-RE
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0801-RE
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.7	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	1			
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	1	I	J	P

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	52			
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW0901-RE
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	3221GW1001D-RE
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

nsample	3221GW1001-RE
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DIBROMOETHANE	0.4	U	UJ	C
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.8	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44GW0901-RE
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	CD

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1001-RE
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	2			
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	2	I	J	P

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	23			
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1101-RE
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	1			
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1201-RE
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.7	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1301-RE
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.6	I	J	PR
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	2		J	R
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	2	I	J	PR

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	32		J	R
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1401-RE
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-9
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.5	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-9
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	4			
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1501D
samp_date	12/14/2005
lab_id	WV6687-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	44GW1501

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.6	I	J	P
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1501D	nsample	44GW1501D-RE	nsample	44GW1501-RE
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-12	lab_id	WV6687-12	lab_id	WV6687-9
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:	44GW1501	DUP_OF:	44GW1501	DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	3			
VINYL CHLORIDE	0.3	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	CR

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0052	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	2			
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.9	I	J	P
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	0.9	I	J	P

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1801-RE
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44GW1901
samp_date	12/14/2005
lab_id	WV6687-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	1			
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	
TOTAL 1,2-DICHLOROETHENE	1	I	J	P

nsample	44GW1901
samp_date	12/14/2005
lab_id	WV6687-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44GW1901-RE
samp_date	12/14/2005
lab_id	WV6687-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	UJ	C

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44TB1213
samp_date	12/13/2005
lab_id	WV6662-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DIBROMOETHANE	0.4	U	UJ	C
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	UJ	C
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	

nsample	44TB1213
samp_date	12/13/2005
lab_id	WV6662-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

nsample	44TB1214
samp_date	12/14/2005
lab_id	WV6687-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	U	
1,1,2-TRICHLOROETHANE	0.3	U	U	
1,1-DICHLOROETHANE	0.4	U	U	
1,1-DICHLOROETHENE	0.4	U	U	
1,2-DIBROMOETHANE	0.4	U	UJ	C
1,2-DICHLOROETHANE	0.3	U	U	
1,2-DICHLOROPROPANE	0.3	U	U	
2-BUTANONE	3	U	UR	C
2-HEXANONE	2	U	U	
4-METHYL-2-PENTANONE	3	U	U	
ACETONE	2	U	UR	C
BENZENE	0.3	U	U	
BROMODICHLOROMETHANE	0.2	U	U	
BROMOFORM	0.5	U	U	
BROMOMETHANE	0.6	U	U	
CARBON DISULFIDE	0.3	U	U	
CARBON TETRACHLORIDE	0.3	U	U	
CHLOROBENZENE	0.2	U	U	
CHLORODIBROMOMETHANE	0.4	U	U	
CHLOROETHANE	0.3	U	U	
CHLOROFORM	0.4	U	U	
CHLOROMETHANE	0.3	U	U	
CIS-1,2-DICHLOROETHENE	0.3	U	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	U	
ETHYLBENZENE	0.2	U	U	
M+P-XYLENES	0.5	U	U	
METHYLENE CHLORIDE	2	U	U	
O-XYLENE	0.3	U	U	
STYRENE	0.6	U	U	
TETRACHLOROETHENE	0.4	U	U	
TOLUENE	0.2	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OV

nsample	44TB1214
samp_date	12/14/2005
lab_id	WV6687-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL 1,2-DICHLOROETHENE	0.6	U	U	
TOTAL XYLENES	0.8	U	U	
TRANS-1,2-DICHLOROETHENE	0.3	U	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	U	
TRICHLOROETHENE	0.3	U	U	
VINYL CHLORIDE	0.3	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	8	U	
2,4,6-TRICHLOROPHENOL	8	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	6	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	5	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	6	U	
BIS(2-CHLOROETHOXY)METHANE	3	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	8	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	4	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	3	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	9	U	
PENTACHLOROPHENOL	10	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-9
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	10		
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-9
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1501D
samp_date	12/14/2005
lab_id	WV6687-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	44GW1501

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1501D
samp_date	12/14/2005
lab_id	WV6687-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	44GW1501

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: OS

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

nsample	44GW1901
samp_date	12/14/2005
lab_id	WV6687-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	U	
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	8	U	
2,4-DINITROPHENOL	5	U	
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	U	
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	U	
4-CHLOROANILINE	4	UJ	C
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	U	
4-NITROANILINE	5	U	
4-NITROPHENOL	5	U	
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	U	
BIS(2-ETHYLHEXYL)PHTHALATE	11		
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	44GW1901
samp_date	12/14/2005
lab_id	WV6687-5
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	2	U	
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	3221GW0401	nsample	3221GW0501	nsample	3221GW0601
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/14/2005
lab_id	WV6662-1	lab_id	WV6662-2	lab_id	WV6687-11
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
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.3		
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.07	J	P
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.4		
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	J	P
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.2	J	P
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	3221GW0701	nsample	3221GW0801	nsample	3221GW0901
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/13/2005
lab_Id	WV6662-4	lab_id	WV6662-3	lab_id	WV6662-6
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
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.4		
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.09	J	P
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.09	J	P
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	3221GW1001	nsample	3221GW1001D	nsample	44GW0901
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/14/2005
lab_id	WV6662-7	lab_id	WV6662-8	lab_id	WV6687-4
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:	3221GW1001	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.1	J	P
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	44GW1001	nsample	44GW1101	nsample	44GW1201
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-3	lab_id	WV6687-2	lab_id	WV6687-10
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
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	UJ	C
BENZO(G,H,I)PERYLENE	0.1	U	
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	U	
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.2	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	44GW1301	nsample	44GW1401	nsample	44GW1501
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-8	lab_id	WV6687-1	lab_id	WV6687-9
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
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PAH

nsample	44GW1501D	nsample	44GW1801	nsample	44GW1901
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-12	lab_id	WV6687-7	lab_id	WV6687-5
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:	44GW1501	DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.09	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.09	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	U	
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.1	U	
CHRYSENE	0.05	U	
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	UJ	C
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	3221GW0401	nsample	3221GW0501	nsample	3221GW0601
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/14/2005
lab_id	WV6662-1	lab_id	WV6662-2	lab_id	WV6687-11
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
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.095	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.058	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.096	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.058	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.24	U	U	
AROCLOR-1232	0.27	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.094	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	3221GW0701	nsample	3221GW0801	nsample	3221GW0901
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/13/2005
lab_id	WV6662-4	lab_id	WV6662-3	lab_id	WV6662-6
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
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.24	U	U	
AROCLOR-1232	0.27	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.094	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	1	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.058	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.096	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.058	U	U	
BETA-BHC	0.05	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	1	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.058	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.25	U	UJ	R
AROCLOR-1232	0.28	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.096	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.058	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	0.28	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	3221GW1001	nsample	3221GW1001D	nsample	44GW0901
samp_date	12/13/2005	samp_date	12/13/2005	samp_date	12/14/2005
lab_id	WV6662-7	lab_id	WV6662-8	lab_id	WV6687-4
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:	3221GW1001	DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.058	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.096	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.058	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.25	U	UJ	R
AROCLOR-1232	0.28	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.095	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	1	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	44GW1001	nsample	44GW1101	nsample	44GW1201
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-3	lab_id	WV6687-2	lab_id	WV6687-10
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
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.058	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.096	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.058	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.032	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.029	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.033	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.24	U	U	
AROCLOR-1232	0.27	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.094	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	44GW1301	nsample	44GW1401	nsample	44GW1501
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-8	lab_id	WV6687-1	lab_id	WV6687-9
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
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.24	U	U	
AROCLOR-1232	0.27	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.094	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	44GW1501D	nsample	44GW1801	nsample	44GW1901
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6687-12	lab_id	WV6687-7	lab_id	WV6687-5
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:	44GW1501	DUP_OF:		DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.025	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	UJ	R
AROCLOR-1221	0.24	U	UJ	R
AROCLOR-1232	0.27	U	UJ	R
AROCLOR-1242	0.21	U	UJ	R
AROCLOR-1248	0.094	U	UJ	R
AROCLOR-1254	0.24	U	UJ	R
AROCLOR-1260	0.057	U	UJ	R
BETA-BHC	0.024	U	U	
DELTA-BHC	0.025	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	U	
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.27	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.095	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	0.28	U	U	

Parameter	Result	Lab Qual	Val Qual	Qual Code
4,4'-DDD	0.015	U	U	
4,4'-DDE	0.057	U	U	
4,4'-DDT	0.042	U	U	
ALDRIN	0.026	U	U	
ALPHA-BHC	0.018	U	U	
ALPHA-CHLORDANE	0.022	U	U	
AROCLOR-1016	0.12	U	U	
AROCLOR-1221	0.25	U	U	
AROCLOR-1232	0.28	U	U	
AROCLOR-1242	0.21	U	U	
AROCLOR-1248	0.095	U	U	
AROCLOR-1254	0.24	U	U	
AROCLOR-1260	0.057	U	U	
BETA-BHC	0.024	U	U	
DELTA-BHC	0.026	U	U	
DIELDRIN	0.012	U	U	
ENDOSULFAN I	0.023	U	U	
ENDOSULFAN II	0.014	U	U	
ENDOSULFAN SULFATE	0.012	U	UJ	C
ENDRIN	0.01	U	U	
ENDRIN ALDEHYDE	0.031	U	U	
ENDRIN KETONE	0.017	U	U	
GAMMA-BHC (LINDANE)	0.016	U	U	
GAMMA-CHLORDANE	0.028	U	U	
HEPTACHLOR	0.017	U	U	
HEPTACHLOR EPOXIDE	0.014	U	U	
METHOXYCHLOR	0.032	U	U	
TOXAPHENE	1	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	240	I	U	A

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-11
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	270	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	280	I	U	A

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	480	I	U	A

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	230	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-3
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	230	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-1
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-9
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: PET

nsample	44GW1501D
samp_date	12/14/2005
lab_id	WV6687-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	44GW1501

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	U	

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-7
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	220	U	U	

nsample	44GW1901RE
samp_date	12/14/2005
lab_id	WV6687-5RE
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS	210	U	UJ	H

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	3221GW0401
samp_date	12/13/2005
lab_id	WV6662-001
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	999			
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	8.3		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	24700			
CHROMIUM	1.5	I		
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	577			
LEAD	1.65	U	U	
MAGNESIUM	1600			
MANGANESE	1.5	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1270	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	19000			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	4.1	I	U	A

nsample	3221GW0501
samp_date	12/13/2005
lab_id	WV6662-002
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	782		U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	9.8		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	22500			
CHROMIUM	17.4			
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	678			
LEAD	1.65	U	U	
MAGNESIUM	1740			
MANGANESE	9.1			
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1030	I	U	A
SELENIUM	3.59	U	U	
SILVER	5.6	I	U	A
SODIUM	15000			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	8.3	I	U	A

nsample	3221GW0601
samp_date	12/14/2005
lab_id	WV6687-011
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	111	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	4.6	I	U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	32400			
CHROMIUM	2.4	I		
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	123			
LEAD	1.65	U	U	
MAGNESIUM	2070			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1140	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	7050			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.8	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	3221GW0701
samp_date	12/13/2005
lab_id	WV6662-004
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	195	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	4.8	I	U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	34800			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	132			
LEAD	1.65	U	U	
MAGNESIUM	2050			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1190	I	U	A
SELENIUM	3.59	U	U	
SILVER	8.4	I	U	A
SODIUM	9270			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	10.5	I	U	A

nsample	3221GW0801
samp_date	12/13/2005
lab_id	WV6662-003
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	74.2	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	8.2		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	31400			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	217			
LEAD	1.65	U	U	
MAGNESIUM	2040			
MANGANESE	4.1	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1600	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	12800			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	2.4	I	U	A

nsample	3221GW0901
samp_date	12/13/2005
lab_id	WV6662-006
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	1130			
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	4.8	I	U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	20700			
CHROMIUM	1.5	I		
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	567			
LEAD	1.65	U	U	
MAGNESIUM	2780			
MANGANESE	1.6	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1800	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	23700			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	8.6	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	3221GW1001
samp_date	12/13/2005
lab_id	WV6662-007
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	150	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	5.0		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	39400			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	74.7	I	U	A
LEAD	1.65	U	U	
MAGNESIUM	2620			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2440		U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	12900			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	6.2	I	U	A

nsample	3221GW1001D
samp_date	12/13/2005
lab_id	WV6662-008
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	3221GW1001

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	149	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	5.1		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	38500			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	59.9	I	U	A
LEAD	1.65	U	U	
MAGNESIUM	2540			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2680		U	A
SELENIUM	3.59	U	U	
SILVER	5.5	I	U	A
SODIUM	12300			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	2.8	I	U	A

nsample	44GW0901
samp_date	12/14/2005
lab_id	WV6687-004
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	2800		J	D
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	5.1		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	12600			
CHROMIUM	1.4	I		
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	1290		J	D
LEAD	1.65	U	U	
MAGNESIUM	3390			
MANGANESE	1.4	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	898	I	U	A
SELENIUM	3.7	I	U	A
SILVER	4.9	I	U	A
SODIUM	23900			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	18.6	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	44GW1001
samp_date	12/14/2005
lab_id	WV6687-003
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	232	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	5.0	I	U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	29200			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	69.0	I	U	A
LEAD	1.65	U	U	
MAGNESIUM	3250			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2400		U	A
SELENIUM	3.59	U	U	
SILVER	4.9	I	U	A
SODIUM	27200			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	2.0	I	U	A

nsample	44GW1101
samp_date	12/14/2005
lab_id	WV6687-002
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	245	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	3.1	I	U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	38200			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	51.7	I	U	A
LEAD	1.65	U	U	
MAGNESIUM	2720			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2160		U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	19900			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.8	I	U	A

nsample	44GW1201
samp_date	12/14/2005
lab_id	WV6687-010
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	627		U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	8.8		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	44300			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	284			
LEAD	1.65	U	U	
MAGNESIUM	2140			
MANGANESE	1.6	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	5360			
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	27900			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.9	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	44GW1301
samp_date	12/14/2005
lab_id	WV6687-008
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	1360			
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	9.6		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	28000			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	515			
LEAD	1.65	U	U	
MAGNESIUM	3800			
MANGANESE	1.3	I		
MERCURY	0.03	I	U	A
NICKEL	11.7	U	U	
POTASSIUM	1410	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	33700			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	6.5	I	U	A

nsample	44GW1401
samp_date	12/14/2005
lab_id	WV6687-001
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	372		U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	5.2		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	35600			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	92.4	I	U	A
LEAD	1.65	U	U	
MAGNESIUM	2540			
MANGANESE	1.2	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2070		U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	14000			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	2.2	I	U	A

nsample	44GW1501
samp_date	12/14/2005
lab_id	WV6687-009
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	960			
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	6.7		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	28800			
CHROMIUM	6.6	I		
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	258			
LEAD	1.6	I		
MAGNESIUM	1790			
MANGANESE	1.3	I		
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1980	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	17200			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.6	I	U	A

PROJ_NO: 00007

SDG: CTO367-3 MEDIA: WATER DATA FRACTION: M

nsample	44GW1501D
samp_date	12/14/2005
lab_id	WV6687-012
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	44GW1501

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	810		U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	6.8		U	A
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	28200			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	152			
LEAD	1.65	U	U	
MAGNESIUM	1780			
MANGANESE	0.70	U	U	
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	2200		U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	17500			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.7	I	U	A

nsample	44GW1801
samp_date	12/14/2005
lab_id	WV6687-007
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	152	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	19.4			
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	45500			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	1820			
LEAD	1.65	U	U	
MAGNESIUM	4160			
MANGANESE	55.3			
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1930	I	U	A
SELENIUM	3.59	U	U	
SILVER	4.4	U	U	
SODIUM	8830			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	6.6	I	U	A

nsample	44GW1901
samp_date	12/14/2005
lab_id	WV6687-005
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
ALUMINUM	69.7	I	U	A
ANTIMONY	4.11	U	U	
ARSENIC	3.45	U	U	
BARIUM	13.2			
BERYLLIUM	0.29	U	U	
CADMIUM	4.36	U	U	
CALCIUM	46900			
CHROMIUM	1.01	U	U	
COBALT	3.05	U	U	
COPPER	2.86	U	U	
IRON	1800			
LEAD	1.65	U	U	
MAGNESIUM	4740			
MANGANESE	71.0			
MERCURY	0.02	U	U	
NICKEL	11.7	U	U	
POTASSIUM	1780	I	U	A
SELENIUM	3.59	U	U	
SILVER	5.0	I	U	A
SODIUM	7800			
THALLIUM	6.13	U	U	
VANADIUM	4.88	U	U	
ZINC	3.4	I	U	A

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: M

nsample	3221GW0101	nsample	3221GW0201	nsample	3221GW0301
samp_date	12/14/2005	samp_date	12/14/2005	samp_date	12/14/2005
lab_id	WV6688-004	lab_id	WV6688-001	lab_id	WV6688-003
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
ALUMINUM	466	U	A
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	7.5	U	A
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	25200		
CHROMIUM	1.6		
COBALT	3.05	U	
COPPER	2.86	U	
IRON	384		
LEAD	1.65	U	
MAGNESIUM	2020		
MANGANESE	2.2	U	A
MERCURY	0.02	U	
NICKEL	11.7	U	
POTASSIUM	420	U	
SELENIUM	3.59	U	
SILVER	4.4	U	
SODIUM	11900		
THALLIUM	6.13	U	
VANADIUM	5.4	U	A
ZINC	4.6	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	711	U	A
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	5.5	U	A
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	22800		
CHROMIUM	24.1		
COBALT	3.05	U	
COPPER	2.86	U	
IRON	710		
LEAD	1.65	U	
MAGNESIUM	1830		
MANGANESE	3.9	U	A
MERCURY	0.02	U	
NICKEL	18.2		
POTASSIUM	420	U	
SELENIUM	3.6		
SILVER	4.4	U	
SODIUM	11100		
THALLIUM	6.13	U	
VANADIUM	5.4	U	A
ZINC	2.7	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2720	J	I
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	9.5		
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	24700		
CHROMIUM	8.3		
COBALT	3.05	U	
COPPER	12.1	U	A
IRON	1670		
LEAD	3.8		
MAGNESIUM	1670		
MANGANESE	74.2		
MERCURY	0.02	U	
NICKEL	11.7	U	
POTASSIUM	845	U	A
SELENIUM	3.59	U	
SILVER	4.4	U	
SODIUM	12100		
THALLIUM	6.13	U	
VANADIUM	4.88	U	
ZINC	17.7	U	A

PROJ_NO: 00007

SDG: CTO367-4 MEDIA: WATER DATA FRACTION: M

nsample	44RB1214
samp_date	12/14/2005
lab_id	WV6688-002
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	13.5	J	I
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	1.17	U	
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	155		
CHROMIUM	1.01	U	
COBALT	3.05	U	
COPPER	2.86	U	
IRON	3.79	U	
LEAD	2.2		
MAGNESIUM	76.2		
MANGANESE	0.7	U	
MERCURY	0.02	U	
NICKEL	11.7	U	
POTASSIUM	434		
SELENIUM	3.59	U	
SILVER	4.4	U	
SODIUM	5260		
THALLIUM	6.13	U	
VANADIUM	4.88	U	
ZINC	1.74	U	

nsample	46GW0101
samp_date	12/18/2005
lab_id	WV6766-001
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	432	U	A
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	16.7		
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	8280		
CHROMIUM	1.01	U	
COBALT	3.05	U	
COPPER	2.86	U	
IRON	128	U	A
LEAD	5.7		
MAGNESIUM	3160		
MANGANESE	1.9	U	A
MERCURY	0.08	U	A
NICKEL	11.7	U	
POTASSIUM	1960	U	A
SELENIUM	3.59	U	
SILVER	4.4	U	
SODIUM	27800		
THALLIUM	6.13	U	
VANADIUM	16.7	U	A
ZINC	13.7	U	A

nsample	46GW0201
samp_date	12/18/2005
lab_id	WV6766-002
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2430	J	I
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	8.9	U	A
BERYLLIUM	0.29	U	
CADMIUM	4.36	U	
CALCIUM	4250		
CHROMIUM	15.5		
COBALT	3.05	U	
COPPER	14.1	U	A
IRON	2500		
LEAD	1.9		
MAGNESIUM	5230		
MANGANESE	15.3		
MERCURY	0.08	U	A
NICKEL	11.7	U	
POTASSIUM	11700		
SELENIUM	3.59	U	
SILVER	4.5		
SODIUM	208000		
THALLIUM	6.13	U	
VANADIUM	11.5	U	A
ZINC	13.9	U	A

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: OV

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	4	J	CP
2-HEXANONE	3	J	CP
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	30	J	CP
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	4		
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.2	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	0.8	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	
TRICHLOROETHENE	0.3	U	

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
VINYL CHLORIDE	0.3	U	

nsample	PEN44RB0919RE
samp_date	9/19/2005
lab_id	WV4866-22RE
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2-DIBROMOETHANE	0.0051	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: OV

nsample	PEN44TB0919
samp_date	9/19/2005
lab_id	WV4866-21
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	4	J	CP
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.2	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	0.8	U	
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44TB0919
samp_date	9/19/2005
lab_id	WV4866-21
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	9	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	2	U	A
METHYLENE CHLORIDE	3	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	11	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-2
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	64	J	C
ACETONE	9	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	80	R	A
METHYLENE CHLORIDE	2	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.3	J	P
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	500	R	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-4
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	9	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	3	U	A
METHYLENE CHLORIDE	2	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.3	J	P
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	16	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-6
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	8	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	3	U	A
METHYLENE CHLORIDE	3	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	16	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-8
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	13	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	3	U	A
METHYLENE CHLORIDE	2	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.4	J	P
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	16	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-10
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	3	J	CP
4-METHYL-2-PENTANONE	61	J	C
ACETONE	16	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	99	R	A
METHYLENE CHLORIDE	2	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.3	J	P
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	620	R	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-12
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-14
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	14	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	1	U	A
METHYLENE CHLORIDE	2	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	8	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-14
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-16
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	10	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	2	U	A
METHYLENE CHLORIDE	3	U	A
STYRENE	0.6	U	
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	10	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-16
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-18
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	2	R	A
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	2	R	A
1,1-DICHLOROETHANE	3	R	A
1,1-DICHLOROETHENE	1	R	A
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	2	R	A
1,2-DICHLOROPROPANE	3	R	A
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	5	U	A
BENZENE	3	R	A
BROMODICHLOROMETHANE	2	R	A
BROMOFORM	0.5	U	
BROMOMETHANE	2	R	A
CARBON DISULFIDE	1	R	A
CARBON TETRACHLORIDE	3	R	A
CHLOROBENZENE	2	R	A
CHLORODIBROMOMETHANE	3	R	A
CHLOROETHANE	2	R	A
CHLOROFORM	3	R	A
CHLOROMETHANE	2	R	A
CIS-1,3-DICHLOROPROPENE	2	R	A
ETHYLBENZENE	4	U	A
METHYLENE CHLORIDE	5	U	A
STYRENE	2	R	A
TETRACHLOROETHENE	1	R	A
TOLUENE	2	R	A
TOTAL 1,2-DICHLOROETHENE	5	R	A
TOTAL XYLENES	22	U	A
TRANS-1,3-DICHLOROPROPENE	1	R	A

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-18
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	2	R	A
VINYL CHLORIDE	0.9	R	A

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPV

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-20
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.2	U	
1,1,2,2-TETRACHLOROETHANE	0.5	U	
1,1,2-TRICHLOROETHANE	0.3	U	
1,1-DICHLOROETHANE	0.4	U	
1,1-DICHLOROETHENE	0.4	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.3	U	
1,2-DICHLOROPROPANE	0.3	U	
2-BUTANONE	3	UJ	C
2-HEXANONE	2	UJ	C
4-METHYL-2-PENTANONE	3	UJ	C
ACETONE	5	U	A
BENZENE	0.3	U	
BROMODICHLOROMETHANE	0.2	U	
BROMOFORM	0.5	U	
BROMOMETHANE	0.6	U	
CARBON DISULFIDE	0.3	U	
CARBON TETRACHLORIDE	0.3	U	
CHLOROBENZENE	0.2	U	
CHLORODIBROMOMETHANE	0.4	U	
CHLOROETHANE	0.3	U	
CHLOROFORM	0.4	U	
CHLOROMETHANE	0.3	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	3	U	A
METHYLENE CHLORIDE	3	U	A
STYRENE	0.8	J	P
TETRACHLOROETHENE	0.4	U	
TOLUENE	0.2	U	
TOTAL 1,2-DICHLOROETHENE	0.6	U	
TOTAL XYLENES	18	U	A
TRANS-1,3-DICHLOROPROPENE	0.4	U	

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-20
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.3	U	
VINYL CHLORIDE	0.3	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-1
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	U	
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	120	J	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.6	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	1	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	1	UJ	C
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-1
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB0201DRA
samp_date	9/19/2005
lab_id	WV4866-3RA
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	UR	C
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	24	U	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.7	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	2	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	1	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	3	U	A
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB0201DRA
samp_date	9/19/2005
lab_id	WV4866-3RA
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB0202RA
samp_date	9/19/2005
lab_id	WV4866-5RA
qc_type	NM
units	UG/KG
Pct_Solids	96.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.8	U	
2-BUTANONE	3	UR	C
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	34	U	A
BENZENE	0.9	U	
BROMODICHLOROMETHANE	0.6	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.7	U	
CHLORODIBROMOMETHANE	0.6	U	
CHLOROETHANE	2	U	
CHLOROFORM	0.9	U	
CHLOROMETHANE	1	U	
CIS-1,3-DICHLOROPROPENE	0.4	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	4	U	A
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

nsample	PEN44SB0202RA
samp_date	9/19/2005
lab_id	WV4866-5RA
qc_type	NM
units	UG/KG
Pct_Solids	96.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-7
qc_type	NM
units	UG/KG
Pct_Solids	96.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	2	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.9	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.7	U	
1,2-DICHLOROPROPANE	0.8	U	
2-BUTANONE	4	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	U	
BENZENE	1	U	
BROMODICHLOROMETHANE	0.6	U	
BROMOFORM	0.7	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.8	U	
CHLORODIBROMOMETHANE	0.6	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	1	UJ	C
CIS-1,3-DICHLOROPROPENE	0.4	U	
ETHYLBENZENE	0.9	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.4	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-7
qc_type	NM
units	UG/KG
Pct_Solids	96.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.9	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-9
qc_type	NM
units	UG/KG
Pct_Solids	87.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	U	
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	16	U	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.7	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	1	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	1	UJ	C
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-9
qc_type	NM
units	UG/KG
Pct_Solids	87.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-11
qc_type	NM
units	UG/KG
Pct_Solids	91.3
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.8	U	
2-BUTANONE	3	U	
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	22	U	A
BENZENE	0.9	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.7	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	2	U	
CHLOROFORM	0.9	U	
CHLOROMETHANE	1	UJ	C
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-11
qc_type	NM
units	UG/KG
Pct_Solids	91.3
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	UG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.5	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.8	U	
2-BUTANONE	3	U	
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	31	U	A
BENZENE	0.9	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	2	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.7	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	2	U	
CHLOROFORM	0.9	U	
CHLOROMETHANE	1	UJ	C
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	UG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB2501RA2
samp_date	9/19/2005
lab_id	WV4866-15RA2
qc_type	NM
units	UG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.8	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	UR	C
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	8	U	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.6	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	1	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	1	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.8	U	
METHYLENE CHLORIDE	2	U	
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.9	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.6	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB2501RA2
samp_date	9/19/2005
lab_id	WV4866-15RA2
qc_type	NM
units	UG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.8	U	
VINYL CHLORIDE	2	U	

nsample	PEN44SB2502RA2
samp_date	9/19/2005
lab_id	WV4866-17RA2
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.7	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	0.9	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	UR	C
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	72	U	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.6	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	1	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	0.9	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.7	U	
METHYLENE CHLORIDE	3	U	A
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.8	U	
TOTAL 1,2-DICHLOROETHENE	1	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.5	U	

nsample	PEN44SB2502RA2
samp_date	9/19/2005
lab_id	WV4866-17RA2
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.7	U	
VINYL CHLORIDE	2	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OV

nsample	PEN44SB2503RA2
samp_date	9/19/2005
lab_id	WV4866-19RA2
qc_type	NM
units	UG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	0.7	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DIBROMOETHANE	0.4	U	
1,2-DICHLOROETHANE	0.6	U	
1,2-DICHLOROPROPANE	0.7	U	
2-BUTANONE	3	UR	C
2-HEXANONE	4	U	
4-METHYL-2-PENTANONE	4	U	
ACETONE	11	U	A
BENZENE	0.8	U	
BROMODICHLOROMETHANE	0.5	U	
BROMOFORM	0.6	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	3	U	
CHLOROBENZENE	0.6	U	
CHLORODIBROMOMETHANE	0.5	U	
CHLOROETHANE	1	U	
CHLOROFORM	0.8	U	
CHLOROMETHANE	0.9	U	
CIS-1,3-DICHLOROPROPENE	0.3	U	
ETHYLBENZENE	0.7	U	
METHYLENE CHLORIDE	4	U	A
STYRENE	0.3	U	
TETRACHLOROETHENE	1	U	
TOLUENE	0.8	U	
TOTAL 1,2-DICHLOROETHENE	2	U	
TOTAL XYLENES	2	U	
TRANS-1,3-DICHLOROPROPENE	0.5	U	

nsample	PEN44SB2503RA2
samp_date	9/19/2005
lab_id	WV4866-19RA2
qc_type	NM
units	UG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TRICHLOROETHENE	0.7	U	
VINYL CHLORIDE	2	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: OS

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	3	U	
1,2-DICHLOROBENZENE	3	U	
1,3-DICHLOROBENZENE	3	U	
1,4-DICHLOROBENZENE	3	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	2	UJ	C
2,4,5-TRICHLOROPHENOL	7	U	
2,4,6-TRICHLOROPHENOL	7	U	
2,4-DICHLOROPHENOL	6	U	
2,4-DIMETHYLPHENOL	7	UJ	C
2,4-DINITROPHENOL	5	UJ	C
2,4-DINITROTOLUENE	4	U	
2,6-DINITROTOLUENE	3	U	
2-CHLORONAPHTHALENE	3	U	
2-CHLOROPHENOL	5	U	
2-METHYLPHENOL	5	U	
2-NITROANILINE	3	UJ	C
2-NITROPHENOL	5	U	
3,3'-DICHLOROBENZIDINE	4	U	
3-NITROANILINE	3	U	
4,6-DINITRO-2-METHYLPHENOL	10	U	
4-BROMOPHENYL PHENYL ETHER	4	U	
4-CHLORO-3-METHYLPHENOL	6	UJ	C
4-CHLOROANILINE	4	U	
4-CHLOROPHENYL PHENYL ETHER	3	U	
4-METHYLPHENOL	5	UJ	C
4-NITROANILINE	5	U	
4-NITROPHENOL	5	UJ	C
BIS(2-CHLOROETHOXY)METHANE	2	U	
BIS(2-CHLOROETHYL)ETHER	3	UJ	C
BIS(2-ETHYLHEXYL)PHTHALATE	7	U	
BUTYL BENZYL PHTHALATE	3	U	
CARBAZOLE	4	U	

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	3	U	
DIETHYL PHTHALATE	3	J	P
DIMETHYL PHTHALATE	3	U	
DI-N-BUTYL PHTHALATE	2	U	
DI-N-OCTYL PHTHALATE	3	U	
HEXACHLOROBENZENE	4	U	
HEXACHLOROBUTADIENE	4	U	
HEXACHLOROCYCLOPENTADIENE	2	UJ	C
HEXACHLOROETHANE	2	U	
ISOPHORONE	2	U	
NITROBENZENE	2	U	
N-NITROSO-DI-N-PROPYLAMINE	2	U	
N-NITROSODIPHENYLAMINE	8	U	
PENTACHLOROPHENOL	9	U	
PHENOL	6	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-3
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	44	U	
1,2-DICHLOROBENZENE	43	U	
1,3-DICHLOROBENZENE	54	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	31	UJ	C
2,4,5-TRICHLOROPHENOL	180	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	63	U	
2,4-DINITROTOLUENE	99	U	
2,6-DINITROTOLUENE	78	U	
2-CHLORONAPHTHALENE	49	U	
2-CHLOROPHENOL	92	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	76	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	73	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	56	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	54	U	
4-CHLOROPHENYL PHENYL ETHER	51	U	
4-METHYLPHENOL	150	U	
4-NITROANILINE	70	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	53	U	
BIS(2-CHLOROETHYL)ETHER	33	U	
BIS(2-ETHYLHEXYL)PHTHALATE	110	J	P
BUTYL BENZYL PHTHALATE	90	J	P
CARBAZOLE	61	U	

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-3
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	63	U	
DIETHYL PHTHALATE	100	U	
DIMETHYL PHTHALATE	63	U	
DI-N-BUTYL PHTHALATE	86	U	
DI-N-OCTYL PHTHALATE	75	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	44	U	
HEXACHLOROCYCLOPENTADIENE	76	UJ	C
HEXACHLOROETHANE	62	U	
ISOPHORONE	53	U	
NITROBENZENE	75	U	
N-NITROSO-DI-N-PROPYLAMINE	57	U	
N-NITROSODIPHENYLAMINE	73	U	
PENTACHLOROPHENOL	140	U	
PHENOL	93	U	

nsample	PEN44SB0201RA
samp_date	9/19/2005
lab_id	WV4866-1RA
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	44	U	
1,2-DICHLOROBENZENE	43	U	
1,3-DICHLOROBENZENE	53	U	
1,4-DICHLOROBENZENE	25	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	31	UJ	C
2,4,5-TRICHLOROPHENOL	180	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	62	U	
2,4-DINITROTOLUENE	99	U	
2,6-DINITROTOLUENE	78	U	
2-CHLORONAPHTHALENE	49	U	
2-CHLOROPHENOL	91	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	76	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	130	U	
3-NITROANILINE	72	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	56	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	54	U	
4-CHLOROPHENYL PHENYL ETHER	51	U	
4-METHYLPHENOL	150	U	
4-NITROANILINE	70	U	
4-NITROPHENOL	160	UJ	C
BIS(2-CHLOROETHOXY)METHANE	53	U	
BIS(2-CHLOROETHYL)ETHER	33	U	
BIS(2-ETHYLHEXYL)PHTHALATE	99	J	P
BUTYL BENZYL PHTHALATE	100	J	P
CARBAZOLE	61	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB0201RA
samp_date	9/19/2005
lab_id	WV4866-1RA
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	63	U	
DIETHYL PHTHALATE	100	U	
DIMETHYL PHTHALATE	63	U	
DI-N-BUTYL PHTHALATE	85	U	
DI-N-OCTYL PHTHALATE	74	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	44	U	
HEXACHLOROCYCLOPENTADIENE	76	UJ	C
HEXACHLOROETHANE	61	U	
ISOPHORONE	52	U	
NITROBENZENE	75	U	
N-NITROSO-DI-N-PROPYLAMINE	57	U	
N-NITROSODIPHENYLAMINE	73	U	
PENTACHLOROPHENOL	140	U	
PHENOL	92	U	

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-5
qc_type	NM
units	UG/KG
Pct_Solids	96.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	45	U	
1,2-DICHLOROBENZENE	44	U	
1,3-DICHLOROBENZENE	55	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	32	UJ	C
2,4,5-TRICHLOROPHENOL	190	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	64	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	80	U	
2-CHLORONAPHTHALENE	50	U	
2-CHLOROPHENOL	94	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	78	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	74	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	58	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	56	U	
4-CHLOROPHENYL PHENYL ETHER	52	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	72	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	55	U	
BIS(2-CHLOROETHYL)ETHER	34	U	
BIS(2-ETHYLHEXYL)PHTHALATE	240	J	P
BUTYL BENZYL PHTHALATE	71	U	
CARBAZOLE	62	U	

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-5
qc_type	NM
units	UG/KG
Pct_Solids	96.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	64	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	65	U	
DI-N-BUTYL PHTHALATE	88	U	
DI-N-OCTYL PHTHALATE	77	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	46	U	
HEXACHLOROCYCLOPENTADIENE	78	UJ	C
HEXACHLOROETHANE	63	U	
ISOPHORONE	54	U	
NITROBENZENE	77	U	
N-NITROSO-DI-N-PROPYLAMINE	58	U	
N-NITROSODIPHENYLAMINE	75	U	
PENTACHLOROPHENOL	150	U	
PHENOL	95	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-7
qc_type	NM
units	UG/KG
Pct_Solids	96.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	45	U	
1,2-DICHLOROBENZENE	44	U	
1,3-DICHLOROBENZENE	55	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	32	UJ	C
2,4,5-TRICHLOROPHENOL	190	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	64	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	80	U	
2-CHLORONAPHTHALENE	50	U	
2-CHLOROPHENOL	93	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	78	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	74	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	58	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	55	U	
4-CHLOROPHENYL PHENYL ETHER	52	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	72	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	54	U	
BIS(2-CHLOROETHYL)ETHER	34	U	
BIS(2-ETHYLHEXYL)PHTHALATE	77	U	
BUTYL BENZYL PHTHALATE	70	U	
CARBAZOLE	62	U	

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-7
qc_type	NM
units	UG/KG
Pct_Solids	96.4
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	64	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	65	U	
DI-N-BUTYL PHTHALATE	87	U	
DI-N-OCTYL PHTHALATE	76	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	45	U	
HEXACHLOROCYCLOPENTADIENE	78	UJ	C
HEXACHLOROETHANE	63	U	
ISOPHORONE	54	U	
NITROBENZENE	77	U	
N-NITROSO-DI-N-PROPYLAMINE	58	U	
N-NITROSODIPHENYLAMINE	74	U	
PENTACHLOROPHENOL	140	U	
PHENOL	95	U	

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-9
qc_type	NM
units	UG/KG
Pct_Solids	87.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	50	UJ	R
1,2-DICHLOROBENZENE	49	UJ	R
1,3-DICHLOROBENZENE	60	UJ	R
1,4-DICHLOROBENZENE	29	UJ	R
2,2'-OXYBIS(1-CHLOROPROPANE)	35	UJ	CR
2,4,5-TRICHLOROPHENOL	200	U	
2,4,6-TRICHLOROPHENOL	130	U	
2,4-DICHLOROPHENOL	150	U	
2,4-DIMETHYLPHENOL	130	U	
2,4-DINITROPHENOL	71	U	
2,4-DINITROTOLUENE	110	UJ	R
2,6-DINITROTOLUENE	88	UJ	R
2-CHLORONAPHTHALENE	55	UJ	R
2-CHLOROPHENOL	100	U	
2-METHYLPHENOL	160	U	
2-NITROANILINE	86	UJ	R
2-NITROPHENOL	120	U	
3,3'-DICHLOROBENZIDINE	150	UJ	R
3-NITROANILINE	82	UJ	R
4,6-DINITRO-2-METHYLPHENOL	140	U	
4-BROMOPHENYL PHENYL ETHER	63	UJ	R
4-CHLORO-3-METHYLPHENOL	140	U	
4-CHLOROANILINE	61	UJ	R
4-CHLOROPHENYL PHENYL ETHER	57	UJ	R
4-METHYLPHENOL	170	U	
4-NITROANILINE	79	UJ	R
4-NITROPHENOL	180	U	
BIS(2-CHLOROETHOXY)METHANE	60	UJ	R
BIS(2-CHLOROETHYL)ETHER	38	UJ	R
BIS(2-ETHYLHEXYL)PHTHALATE	85	UJ	R
BUTYL BENZYL PHTHALATE	78	UJ	R
CARBAZOLE	69	UJ	R

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-9
qc_type	NM
units	UG/KG
Pct_Solids	87.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	71	UJ	R
DIETHYL PHTHALATE	120	UJ	R
DIMETHYL PHTHALATE	71	UJ	R
DI-N-BUTYL PHTHALATE	96	UJ	R
DI-N-OCTYL PHTHALATE	84	UJ	R
HEXACHLOROBENZENE	270	UJ	R
HEXACHLOROBUTADIENE	50	UJ	R
HEXACHLOROCYCLOPENTADIENE	86	UJ	CR
HEXACHLOROETHANE	69	UJ	R
ISOPHORONE	59	UJ	R
NITROBENZENE	85	UJ	R
N-NITROSO-DI-N-PROPYLAMINE	64	UJ	R
N-NITROSODIPHENYLAMINE	82	UJ	R
PENTACHLOROPHENOL	160	U	
PHENOL	100	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-11
qc_type	NM
units	UG/KG
Pct_Solids	91.3
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	48	U	
1,2-DICHLOROBENZENE	47	U	
1,3-DICHLOROBENZENE	58	U	
1,4-DICHLOROBENZENE	28	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	33	UJ	C
2,4,5-TRICHLOROPHENOL	200	U	
2,4,6-TRICHLOROPHENOL	130	U	
2,4-DICHLOROPHENOL	150	U	
2,4-DIMETHYLPHENOL	130	U	
2,4-DINITROPHENOL	68	U	
2,4-DINITROTOLUENE	110	U	
2,6-DINITROTOLUENE	84	U	
2-CHLORONAPHTHALENE	53	U	
2-CHLOROPHENOL	98	U	
2-METHYLPHENOL	150	U	
2-NITROANILINE	82	U	
2-NITROPHENOL	120	U	
3,3'-DICHLOROBENZIDINE	150	U	
3-NITROANILINE	78	U	
4,6-DINITRO-2-METHYLPHENOL	130	U	
4-BROMOPHENYL PHENYL ETHER	61	U	
4-CHLORO-3-METHYLPHENOL	130	U	
4-CHLOROANILINE	58	U	
4-CHLOROPHENYL PHENYL ETHER	55	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	76	U	
4-NITROPHENOL	170	U	
BIS(2-CHLOROETHOXY)METHANE	57	U	
BIS(2-CHLOROETHYL)ETHER	36	U	
BIS(2-ETHYLHEXYL)PHTHALATE	82	U	
BUTYL BENZYL PHTHALATE	74	U	
CARBAZOLE	66	U	

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-11
qc_type	NM
units	UG/KG
Pct_Solids	91.3
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	68	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	68	U	
DI-N-BUTYL PHTHALATE	92	U	
DI-N-OCTYL PHTHALATE	81	UJ	N
HEXACHLOROBENZENE	260	U	
HEXACHLOROBUTADIENE	48	U	
HEXACHLOROCYCLOPENTADIENE	82	UJ	C
HEXACHLOROETHANE	66	U	
ISOPHORONE	57	U	
NITROBENZENE	81	U	
N-NITROSO-DI-N-PROPYLAMINE	62	U	
N-NITROSODIPHENYLAMINE	79	U	
PENTACHLOROPHENOL	150	U	
PHENOL	100	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	UG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	45	U	
1,2-DICHLOROBENZENE	44	U	
1,3-DICHLOROBENZENE	55	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	32	UJ	C
2,4,5-TRICHLOROPHENOL	190	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	64	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	80	U	
2-CHLORONAPHTHALENE	50	U	
2-CHLOROPHENOL	93	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	78	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	74	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	58	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	55	U	
4-CHLOROPHENYL PHENYL ETHER	52	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	72	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	54	U	
BIS(2-CHLOROETHYL)ETHER	34	U	
BIS(2-ETHYLHEXYL)PHTHALATE	77	U	
BUTYL BENZYL PHTHALATE	70	U	
CARBAZOLE	62	U	

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	UG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	64	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	64	U	
DI-N-BUTYL PHTHALATE	87	U	
DI-N-OCTYL PHTHALATE	76	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	45	U	
HEXACHLOROCYCLOPENTADIENE	78	UJ	C
HEXACHLOROETHANE	63	U	
ISOPHORONE	54	U	
NITROBENZENE	77	U	
N-NITROSO-DI-N-PROPYLAMINE	58	U	
N-NITROSODIPHENYLAMINE	74	U	
PENTACHLOROPHENOL	140	U	
PHENOL	95	U	

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-15
qc_type	NM
units	UG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	45	U	
1,2-DICHLOROBENZENE	44	U	
1,3-DICHLOROBENZENE	54	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	31	UJ	C
2,4,5-TRICHLOROPHENOL	180	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	64	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	80	U	
2-CHLORONAPHTHALENE	50	U	
2-CHLOROPHENOL	93	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	77	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	74	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	57	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	55	U	
4-CHLOROPHENYL PHENYL ETHER	52	U	
4-METHYLPHENOL	150	U	
4-NITROANILINE	71	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	54	U	
BIS(2-CHLOROETHYL)ETHER	34	U	
BIS(2-ETHYLHEXYL)PHTHALATE	330	J	P
BUTYL BENZYL PHTHALATE	130	J	P
CARBAZOLE	62	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-15
qc_type	NM
units	UG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	64	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	64	U	
DI-N-BUTYL PHTHALATE	87	U	
DI-N-OCTYL PHTHALATE	76	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	45	U	
HEXACHLOROCYCLOPENTADIENE	77	UJ	C
HEXACHLOROETHANE	62	U	
ISOPHORONE	53	U	
NITROBENZENE	76	U	
N-NITROSO-DI-N-PROPYLAMINE	58	U	
N-NITROSODIPHENYLAMINE	74	U	
PENTACHLOROPHENOL	140	U	
PHENOL	94	U	

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-17
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	46	U	
1,2-DICHLOROBENZENE	44	U	
1,3-DICHLOROBENZENE	55	U	
1,4-DICHLOROBENZENE	26	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	32	UJ	C
2,4,5-TRICHLOROPHENOL	190	U	
2,4,6-TRICHLOROPHENOL	120	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	120	U	
2,4-DINITROPHENOL	64	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	80	U	
2-CHLORONAPHTHALENE	50	U	
2-CHLOROPHENOL	94	U	
2-METHYLPHENOL	140	U	
2-NITROANILINE	78	U	
2-NITROPHENOL	110	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	74	U	
4,6-DINITRO-2-METHYLPHENOL	120	U	
4-BROMOPHENYL PHENYL ETHER	58	U	
4-CHLORO-3-METHYLPHENOL	120	U	
4-CHLOROANILINE	56	U	
4-CHLOROPHENYL PHENYL ETHER	52	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	72	U	
4-NITROPHENOL	160	U	
BIS(2-CHLOROETHOXY)METHANE	55	U	
BIS(2-CHLOROETHYL)ETHER	34	U	
BIS(2-ETHYLHEXYL)PHTHALATE	78	U	
BUTYL BENZYL PHTHALATE	71	U	
CARBAZOLE	62	U	

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-17
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	65	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	65	U	
DI-N-BUTYL PHTHALATE	88	U	
DI-N-OCTYL PHTHALATE	77	U	
HEXACHLOROBENZENE	240	U	
HEXACHLOROBUTADIENE	46	U	
HEXACHLOROCYCLOPENTADIENE	78	UJ	C
HEXACHLOROETHANE	63	U	
ISOPHORONE	54	U	
NITROBENZENE	77	U	
N-NITROSO-DI-N-PROPYLAMINE	59	U	
N-NITROSODIPHENYLAMINE	75	U	
PENTACHLOROPHENOL	150	U	
PHENOL	95	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: OS

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-19
qc_type	NM
units	UG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1,2,4-TRICHLOROBENZENE	47	U	
1,2-DICHLOROBENZENE	46	U	
1,3-DICHLOROBENZENE	57	U	
1,4-DICHLOROBENZENE	27	U	
2,2'-OXYBIS(1-CHLOROPROPANE)	33	UJ	C
2,4,5-TRICHLOROPHENOL	190	U	
2,4,6-TRICHLOROPHENOL	130	U	
2,4-DICHLOROPHENOL	140	U	
2,4-DIMETHYLPHENOL	130	U	
2,4-DINITROPHENOL	67	U	
2,4-DINITROTOLUENE	100	U	
2,6-DINITROTOLUENE	83	U	
2-CHLORONAPHTHALENE	52	U	
2-CHLOROPHENOL	97	U	
2-METHYLPHENOL	150	U	
2-NITROANILINE	81	U	
2-NITROPHENOL	120	U	
3,3'-DICHLOROBENZIDINE	140	U	
3-NITROANILINE	77	U	
4,6-DINITRO-2-METHYLPHENOL	130	U	
4-BROMOPHENYL PHENYL ETHER	60	U	
4-CHLORO-3-METHYLPHENOL	130	U	
4-CHLOROANILINE	58	U	
4-CHLOROPHENYL PHENYL ETHER	54	U	
4-METHYLPHENOL	160	U	
4-NITROANILINE	75	U	
4-NITROPHENOL	170	U	
BIS(2-CHLOROETHOXY)METHANE	57	U	
BIS(2-CHLOROETHYL)ETHER	36	U	
BIS(2-ETHYLHEXYL)PHTHALATE	80	U	
BUTYL BENZYL PHTHALATE	73	U	
CARBAZOLE	65	U	

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-19
qc_type	NM
units	UG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
DIBENZOFURAN	67	U	
DIETHYL PHTHALATE	110	U	
DIMETHYL PHTHALATE	67	U	
DI-N-BUTYL PHTHALATE	91	U	
DI-N-OCTYL PHTHALATE	80	U	
HEXACHLOROBENZENE	250	U	
HEXACHLOROBUTADIENE	47	U	
HEXACHLOROCYCLOPENTADIENE	81	UJ	C
HEXACHLOROETHANE	66	U	
ISOPHORONE	56	U	
NITROBENZENE	80	U	
N-NITROSO-DI-N-PROPYLAMINE	61	U	
N-NITROSODIPHENYLAMINE	78	U	
PENTACHLOROPHENOL	150	U	
PHENOL	99	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: PAH

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.06	U	
ACENAPHTHENE	0.08	U	
ACENAPHTHYLENE	0.04	U	
ANTHRACENE	0.07	U	
BENZO(A)ANTHRACENE	0.08	UJ	C
BENZO(A)PYRENE	0.08	U	
BENZO(B)FLUORANTHENE	0.08	U	
BENZO(G,H,I)PERYLENE	0.1	UJ	C
BENZO(K)FLUORANTHENE	0.09	UJ	C
CHRYSENE	0.05	UJ	C
DIBENZO(A,H)ANTHRACENE	0.1	UJ	C
FLUORANTHENE	0.07	U	
FLUORENE	0.06	U	
INDENO(1,2,3-CD)PYRENE	0.07	U	
NAPHTHALENE	0.05	U	
PHENANTHRENE	0.08	U	
PYRENE	0.08	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PAH

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-1
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.8	J	P
ACENAPHTHYLENE	1	J	P
ANTHRACENE	2	J	P
BENZO(A)ANTHRACENE	31	J	G
BENZO(A)PYRENE	40	J	G
BENZO(B)FLUORANTHENE	70	J	G
BENZO(G,H,I)PERYLENE	30	J	CG
BENZO(K)FLUORANTHENE	25	J	G
CHRYSENE	23	J	G
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	22	J	G
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	44	J	CG
NAPHTHALENE	1	J	P
PHENANTHRENE	8	J	P
PYRENE	30	J	G

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-3
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.9	J	P
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	1	J	P
ANTHRACENE	4	J	P
BENZO(A)PYRENE	150	J	G
BENZO(G,H,I)PERYLENE	61	J	GC
BENZO(K)FLUORANTHENE	84	J	G
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	79	J	CG
NAPHTHALENE	0.9	U	
PHENANTHRENE	31		

nsample	PEN44SB0201DDL
samp_date	9/19/2005
lab_id	WV4866-3DL
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
BENZO(A)ANTHRACENE	200	J	G
BENZO(B)FLUORANTHENE	260	J	G
CHRYSENE	170	J	G
FLUORANTHENE	210	J	G
PYRENE	200	J	G

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PAH

nsample	PEN44SB0202	nsample	PEN44SB0203	nsample	PEN44SB1101
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-5	lab_id	WV4866-7	lab_id	WV4866-9
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	96.1	Pct_Solids	96.4	Pct_Solids	87.6
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	J	P
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	0.6	U	
ANTHRACENE	0.9	J	P
BENZO(A)ANTHRACENE	10	J	P
BENZO(A)PYRENE	7	J	P
BENZO(B)FLUORANTHENE	12	J	P
BENZO(G,H,I)PERYLENE	8	J	CP
BENZO(K)FLUORANTHENE	5	J	P
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	4	J	P
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	6	J	CP
NAPHTHALENE	0.9	U	
PHENANTHRENE	2	J	P
PYRENE	4	J	P

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	0.5	U	
ANTHRACENE	0.8	U	
BENZO(A)ANTHRACENE	1	U	
BENZO(A)PYRENE	0.8	U	
BENZO(B)FLUORANTHENE	4	J	P
BENZO(G,H,I)PERYLENE	2	UJ	C
BENZO(K)FLUORANTHENE	1	U	
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	2	U	
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	2	UJ	C
NAPHTHALENE	0.9	U	
PHENANTHRENE	2	U	
PYRENE	2	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.8	U	
ACENAPHTHYLENE	0.6	U	
ANTHRACENE	0.9	U	
BENZO(A)ANTHRACENE	9	J	P
BENZO(A)PYRENE	0.8	U	
BENZO(B)FLUORANTHENE	2	U	
BENZO(G,H,I)PERYLENE	2	UJ	C
BENZO(K)FLUORANTHENE	2	U	
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	2	U	
FLUORENE	0.7	U	
INDENO(1,2,3-CD)PYRENE	2	UJ	C
NAPHTHALENE	1	U	
PHENANTHRENE	2	U	
PYRENE	2	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PAH

nsample	PEN44SB1102	nsample	PEN44SB1103	nsample	PEN44SB2501
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-11	lab_id	WV4866-13	lab_id	WV4866-15
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	91.3	Pct_Solids	96.5	Pct_Solids	97.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.8	U	
ACENAPHTHYLENE	0.6	U	
ANTHRACENE	0.9	U	
BENZO(A)ANTHRACENE	1	U	
BENZO(A)PYRENE	0.8	UJ	N
BENZO(B)FLUORANTHENE	2	UJ	N
BENZO(G,H,I)PERYLENE	2	UJ	CN
BENZO(K)FLUORANTHENE	1	UJ	N
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	CN
FLUORANTHENE	2	U	
FLUORENE	0.7	U	
INDENO(1,2,3-CD)PYRENE	2	UJ	CN
NAPHTHALENE	1	U	
PHENANTHRENE	2	U	
PYRENE	2	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	0.5	U	
ANTHRACENE	0.8	U	
BENZO(A)ANTHRACENE	1	U	
BENZO(A)PYRENE	0.8	U	
BENZO(B)FLUORANTHENE	2	U	
BENZO(G,H,I)PERYLENE	2	UJ	C
BENZO(K)FLUORANTHENE	1	U	
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	2	U	
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	2	UJ	C
NAPHTHALENE	0.9	U	
PHENANTHRENE	2	U	
PYRENE	2	U	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	0.5	U	
ANTHRACENE	1	J	P
BENZO(A)ANTHRACENE	20	J	P
BENZO(A)PYRENE	29		
BENZO(B)FLUORANTHENE	52		
BENZO(G,H,I)PERYLENE	23	J	C
BENZO(K)FLUORANTHENE	15	J	P
CHRYSENE	11	J	P
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	13	J	P
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	31	J	C
NAPHTHALENE	0.9	U	
PHENANTHRENE	3	J	P
PYRENE	15	J	P

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PAH

nsample	PEN44SB2502	nsample	PEN44SB2503
samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-17	lab_id	WV4866-19
qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG
Pct_Solids	96.0	Pct_Solids	92.6
DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.7	U	
ACENAPHTHYLENE	0.6	U	
ANTHRACENE	0.8	U	
BENZO(A)ANTHRACENE	9	J	P
BENZO(A)PYRENE	3	J	P
BENZO(B)FLUORANTHENE	2	U	
BENZO(G,H,I)PERYLENE	2	UJ	C
BENZO(K)FLUORANTHENE	1	U	
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	3	J	P
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	2	UJ	C
NAPHTHALENE	0.9	U	
PHENANTHRENE	2	U	
PYRENE	2	J	P

Parameter	Result	Val Qual	Qual Code
2-METHYLNAPHTHALENE	0.6	U	
ACENAPHTHENE	0.8	U	
ACENAPHTHYLENE	0.6	U	
ANTHRACENE	0.9	U	
BENZO(A)ANTHRACENE	13	J	P
BENZO(A)PYRENE	12	J	P
BENZO(B)FLUORANTHENE	21	J	P
BENZO(G,H,I)PERYLENE	12	J	CP
BENZO(K)FLUORANTHENE	8	J	P
CHRYSENE	1	U	
DIBENZO(A,H)ANTHRACENE	2	UJ	C
FLUORANTHENE	7	J	P
FLUORENE	0.6	U	
INDENO(1,2,3-CD)PYRENE	11	J	CP
NAPHTHALENE	1	U	
PHENANTHRENE	2	J	P
PYRENE	7	J	P

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: PEST/PCB

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.015	UJ	R
4,4'-DDE	0.057	UJ	R
4,4'-DDT	0.042	UJ	R
ALDRIN	0.025	UJ	R
ALPHA-BHC	0.018	UJ	R
ALPHA-CHLORDANE	0.022	UJ	R
AROCLOR-1016	0.12	UJ	CR
AROCLOR-1221	0.24	UJ	R
AROCLOR-1232	0.27	UJ	R
AROCLOR-1242	0.21	UJ	R
AROCLOR-1248	0.094	UJ	R
AROCLOR-1254	0.24	UJ	R
AROCLOR-1260	0.057	UJ	CR
BETA-BHC	0.024	UJ	R
DELTA-BHC	0.025	UJ	CR
DIELDRIN	0.1	UJ	R
ENDOSULFAN I	0.023	UJ	R
ENDOSULFAN II	0.014	UJ	R
ENDOSULFAN SULFATE	0.012	UJ	CR
ENDRIN	0.01	UJ	R
ENDRIN ALDEHYDE	0.031	UJ	R
ENDRIN KETONE	0.017	UJ	CR
GAMMA-BHC (LINDANE)	0.016	UJ	R
GAMMA-CHLORDANE	0.05	UJ	R
HEPTACHLOR	0.017	UJ	R
HEPTACHLOR EPOXIDE	0.014	UJ	R
METHOXYCHLOR	0.032	UJ	R
TOXAPHENE	0.27	UJ	R

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-1
qc_type	NM
units	UG/KG
Pct_Solids	98.8
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.44	U	
4,4'-DDE	0.5	U	
4,4'-DDT	0.67	U	
ALDRIN	0.54	U	
ALPHA-BHC	1	U	
ALPHA-CHLORDANE	0.89	J	PU
AROCLOR-1016	7.6	UJ	C
AROCLOR-1221	9.1	U	
AROCLOR-1232	5.3	U	
AROCLOR-1242	6.8	U	
AROCLOR-1248	5.8	U	
AROCLOR-1254	13	U	
AROCLOR-1260	4.2	UJ	C
BETA-BHC	0.61	U	
DELTA-BHC	0.98	UJ	C
DIELDRIN	1.2	J	PU
ENDOSULFAN I	0.84	U	
ENDOSULFAN II	0.98	U	
ENDOSULFAN SULFATE	2.1	J	CPU
ENDRIN	0.91	U	
ENDRIN ALDEHYDE	1.2	U	
ENDRIN KETONE	1.6	J	CPU
GAMMA-BHC (LINDANE)	0.78	J	P
GAMMA-CHLORDANE	0.47	U	
HEPTACHLOR	0.67	U	
HEPTACHLOR EPOXIDE	0.64	U	
METHOXYCHLOR	1.2	U	
TOXAPHENE	18	U	

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-3
qc_type	NM
units	UG/KG
Pct_Solids	98.3
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	1.4	J	P
4,4'-DDE	0.51	U	
4,4'-DDT	0.68	U	
ALDRIN	0.94	J	P
ALPHA-BHC	1.1	J	P
ALPHA-CHLORDANE	1.2	J	P
AROCLOR-1016	7.6	UJ	C
AROCLOR-1221	9.1	U	
AROCLOR-1232	5.4	U	
AROCLOR-1242	6.8	U	
AROCLOR-1248	5.8	U	
AROCLOR-1254	13	U	
AROCLOR-1260	4.2	UJ	C
BETA-BHC	1.6	J	P
DELTA-BHC	0.98	UJ	C
DIELDRIN	1.5	J	PU
ENDOSULFAN I	0.85	U	
ENDOSULFAN II	0.98	U	
ENDOSULFAN SULFATE	3	J	CPU
ENDRIN	0.92	U	
ENDRIN ALDEHYDE	1.2	U	
ENDRIN KETONE	2	J	CP
GAMMA-BHC (LINDANE)	1.1	J	P
GAMMA-CHLORDANE	3.1	J	U
HEPTACHLOR	1.6	J	PU
HEPTACHLOR EPOXIDE	0.64	U	
METHOXYCHLOR	1.2	U	
TOXAPHENE	18	U	

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-5
qc_type	NM
units	UG/KG
Pct_Solids	96.1
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.45	U	
4,4'-DDE	0.52	U	
4,4'-DDT	0.69	U	
ALDRIN	0.55	U	
ALPHA-BHC	1	U	
ALPHA-CHLORDANE	0.48	U	
AROCLOR-1016	7.8	UJ	C
AROCLOR-1221	9.4	U	
AROCLOR-1232	5.5	U	
AROCLOR-1242	7	U	
AROCLOR-1248	6	U	
AROCLOR-1254	13	U	
AROCLOR-1260	4.3	UJ	C
BETA-BHC	0.62	U	
DELTA-BHC	1	UJ	C
DIELDRIN	0.38	U	
ENDOSULFAN I	0.87	U	
ENDOSULFAN II	1	U	
ENDOSULFAN SULFATE	0.66	UJ	C
ENDRIN	0.94	U	
ENDRIN ALDEHYDE	1.2	U	
ENDRIN KETONE	0.69	UJ	C
GAMMA-BHC (LINDANE)	0.45	U	
GAMMA-CHLORDANE	0.48	U	
HEPTACHLOR	0.69	U	
HEPTACHLOR EPOXIDE	0.66	U	
METHOXYCHLOR	1.2	U	
TOXAPHENE	18	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	PEN44SB0203	nsample	PEN44SB1101	nsample	PEN44SB1102
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-7	lab_id	WV4866-9	lab_id	WV4866-11
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	96.4	Pct_Solids	87.6	Pct_Solids	91.3
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.45	U	
4,4'-DDE	0.52	U	
4,4'-DDT	0.69	U	
ALDRIN	0.55	U	
ALPHA-BHC	1	U	
ALPHA-CHLORDANE	0.48	U	
AROCLOR-1016	7.8	UJ	C
AROCLOR-1221	9.3	U	
AROCLOR-1232	5.5	U	
AROCLOR-1242	7	U	
AROCLOR-1248	5.9	U	
AROCLOR-1254	13	U	
AROCLOR-1260	4.3	UJ	C
BETA-BHC	0.62	U	
DELTA-BHC	1	UJ	C
DIELDRIN	0.38	U	
ENDOSULFAN I	0.86	U	
ENDOSULFAN II	1	U	
ENDOSULFAN SULFATE	0.66	UJ	C
ENDRIN	0.93	U	
ENDRIN ALDEHYDE	1.2	U	
ENDRIN KETONE	0.69	UJ	C
GAMMA-BHC (LINDANE)	0.45	U	
GAMMA-CHLORDANE	0.48	U	
HEPTACHLOR	0.69	U	
HEPTACHLOR EPOXIDE	0.66	U	
METHOXYCHLOR	1.2	U	
TOXAPHENE	18	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.49	U	
4,4'-DDE	0.57	U	
4,4'-DDT	0.76	U	
ALDRIN	0.61	U	
ALPHA-BHC	1.1	U	
ALPHA-CHLORDANE	0.53	U	
AROCLOR-1016	8.6	UJ	C
AROCLOR-1221	10	U	
AROCLOR-1232	6	U	
AROCLOR-1242	7.7	U	
AROCLOR-1248	6.5	U	
AROCLOR-1254	15	U	
AROCLOR-1260	4.8	UJ	C
BETA-BHC	0.68	U	
DELTA-BHC	1.1	UJ	C
DIELDRIN	0.42	U	
ENDOSULFAN I	0.95	U	
ENDOSULFAN II	1.1	U	
ENDOSULFAN SULFATE	0.72	UJ	C
ENDRIN	1	U	
ENDRIN ALDEHYDE	1.3	U	
ENDRIN KETONE	0.76	UJ	C
GAMMA-BHC (LINDANE)	0.49	U	
GAMMA-CHLORDANE	0.53	U	
HEPTACHLOR	0.76	U	
HEPTACHLOR EPOXIDE	0.72	U	
METHOXYCHLOR	1.4	U	
TOXAPHENE	20	U	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.47	U	
4,4'-DDE	0.55	U	
4,4'-DDT	0.73	U	
ALDRIN	0.58	U	
ALPHA-BHC	1.1	U	
ALPHA-CHLORDANE	0.51	U	
AROCLOR-1016	8.2	UJ	C
AROCLOR-1221	9.8	U	
AROCLOR-1232	5.8	U	
AROCLOR-1242	7.4	U	
AROCLOR-1248	6.3	U	
AROCLOR-1254	14	U	
AROCLOR-1260	4.6	UJ	C
BETA-BHC	0.66	U	
DELTA-BHC	1	UJ	C
DIELDRIN	0.4	U	
ENDOSULFAN I	0.91	U	
ENDOSULFAN II	1	U	
ENDOSULFAN SULFATE	0.69	UJ	C
ENDRIN	0.99	U	
ENDRIN ALDEHYDE	1.3	U	
ENDRIN KETONE	0.73	UJ	C
GAMMA-BHC (LINDANE)	0.47	U	
GAMMA-CHLORDANE	0.51	U	
HEPTACHLOR	0.73	U	
HEPTACHLOR EPOXIDE	0.69	U	
METHOXYCHLOR	1.3	U	
TOXAPHENE	19	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	UG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.45	U	
4,4'-DDE	0.52	U	
4,4'-DDT	0.69	U	
ALDRIN	0.55	U	
ALPHA-BHC	1	U	
ALPHA-CHLORDANE	0.48	U	
AROCLOR-1016	7.8	UJ	C
AROCLOR-1221	9.3	U	
AROCLOR-1232	5.5	U	
AROCLOR-1242	7	U	
AROCLOR-1248	5.9	U	
AROCLOR-1254	13	U	
AROCLOR-1260	4.3	UJ	C
BETA-BHC	0.62	U	
DELTA-BHC	1	UJ	C
DIELDRIN	0.38	U	
ENDOSULFAN I	0.86	U	
ENDOSULFAN II	1	U	
ENDOSULFAN SULFATE	0.66	UJ	C
ENDRIN	0.93	U	
ENDRIN ALDEHYDE	1.2	U	
ENDRIN KETONE	0.69	UJ	C
GAMMA-BHC (LINDANE)	0.45	U	
GAMMA-CHLORDANE	0.48	U	
HEPTACHLOR	0.69	U	
HEPTACHLOR EPOXIDE	0.66	U	
METHOXYCHLOR	1.2	U	
TOXAPHENE	18	U	

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-15RE
qc_type	NM
units	UG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.45	UJ	H
4,4'-DDE	0.52	UJ	H
4,4'-DDT	0.69	UJ	CH
ALDRIN	0.55	UJ	H
ALPHA-BHC	1	UJ	H
ALPHA-CHLORDANE	0.48	UJ	H
AROCLOR-1016	7.8	UJ	H
AROCLOR-1221	9.3	UJ	H
AROCLOR-1232	5.4	UJ	H
AROCLOR-1242	6.9	UJ	H
AROCLOR-1248	5.9	UJ	H
AROCLOR-1254	13	UJ	H
AROCLOR-1260	4.3	UJ	H
BETA-BHC	0.62	UJ	H
DELTA-BHC	1	UJ	H
DIELDRIN	0.38	UJ	H
ENDOSULFAN I	0.86	UJ	H
ENDOSULFAN II	1	UJ	H
ENDOSULFAN SULFATE	0.65	UJ	H
ENDRIN	0.93	UJ	H
ENDRIN ALDEHYDE	1.2	UJ	H
ENDRIN KETONE	0.69	UJ	CH
GAMMA-BHC (LINDANE)	0.45	UJ	H
GAMMA-CHLORDANE	0.48	UJ	H
HEPTACHLOR	0.69	UJ	H
HEPTACHLOR EPOXIDE	0.65	UJ	H
METHOXYCHLOR	1.2	UJ	CH
TOXAPHENE	18	UJ	H

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-17RE
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
AROCLOR-1016	7.8	UJ	H
AROCLOR-1221	9.4	UJ	H
AROCLOR-1232	5.5	UJ	H
AROCLOR-1242	7	UJ	H
AROCLOR-1248	6	UJ	H
AROCLOR-1254	13	UJ	H
AROCLOR-1260	4.3	UJ	H

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PEST/PCB

nsample	PEN44SB2502RERA
samp_date	9/19/2005
lab_id	WV4866-17RERA
qc_type	NM
units	UG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	3.4	UJ	H
4,4'-DDE	0.52	UJ	H
4,4'-DDT	0.69	UJ	CH
ALDRIN	0.56	UJ	H
ALPHA-BHC	1	UJ	H
ALPHA-CHLORDANE	0.49	UJ	H
BETA-BHC	0.62	UJ	H
DELTA-BHC	1	UJ	CH
DIELDRIN	3.4	UJ	H
ENDOSULFAN I	0.87	UJ	H
ENDOSULFAN II	1	UJ	H
ENDOSULFAN SULFATE	0.66	UJ	CH
ENDRIN	0.94	UJ	H
ENDRIN ALDEHYDE	1.2	UJ	H
ENDRIN KETONE	0.69	UJ	H
GAMMA-BHC (LINDANE)	0.45	UJ	H
GAMMA-CHLORDANE	0.49	UJ	H
HEPTACHLOR	0.69	UJ	H
HEPTACHLOR EPOXIDE	0.66	UJ	H
METHOXYCHLOR	1.2	UJ	CH
TOXAPHENE	34	UJ	H

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-19
qc_type	NM
units	UG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
4,4'-DDD	0.47	U	
4,4'-DDE	0.54	U	
4,4'-DDT	0.72	U	
ALDRIN	0.58	U	
ALPHA-BHC	1.1	U	
ALPHA-CHLORDANE	0.5	U	
AROCLOR-1016	8.1	UJ	C
AROCLOR-1221	9.7	U	
AROCLOR-1232	5.7	U	
AROCLOR-1242	7.3	U	
AROCLOR-1248	6.2	U	
AROCLOR-1254	14	U	
AROCLOR-1260	4.5	UJ	C
BETA-BHC	0.65	U	
DELTA-BHC	1	UJ	C
DIELDRIN	0.4	U	
ENDOSULFAN I	0.9	U	
ENDOSULFAN II	1	U	
ENDOSULFAN SULFATE	0.68	UJ	C
ENDRIN	0.97	U	
ENDRIN ALDEHYDE	1.3	U	
ENDRIN KETONE	0.72	UJ	C
GAMMA-BHC (LINDANE)	0.47	U	
GAMMA-CHLORDANE	0.5	U	
HEPTACHLOR	0.72	U	
HEPTACHLOR EPOXIDE	0.68	U	
METHOXYCHLOR	1.3	U	
TOXAPHENE	19	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: PET

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-22
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	210	U	

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PET

nsample	PEN44SB0201	nsample	PEN44SB0201D	nsample	PEN44SB0202
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-1	lab_id	WV4866-3	lab_id	WV4866-5
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	98.8	Pct_Solids	98.3	Pct_Solids	96.1
DUP_OF:		DUP_OF:	PEN44SB0201	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	40		

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	34		

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	31		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PET

nsample	PEN44SB0203	nsample	PEN44SB1101	nsample	PEN44SB1102
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-7	lab_id	WV4866-9	lab_id	WV4866-11
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	96.4	Pct_Solids	87.6	Pct_Solids	91.3
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	2.5	J	P

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	1.9	U	A

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	1.3	U	A

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PET

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-13
qc_type	NM
units	MG/KG
Pct_Solids	96.5
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	0.81	U	A

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-15
qc_type	NM
units	MG/KG
Pct_Solids	97.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	47		

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-17
qc_type	NM
units	MG/KG
Pct_Solids	96.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	5.1	J	P

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: PET

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-19
qc_type	NM
units	MG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
TOTAL PETROLEUM HYDROCARBONS(C8 -	5	J	P

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: M

nsample	PEN44SB0201	nsample	PEN44SB0201D	nsample	PEN44SB0202
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-001R	lab_id	WV4866-003R	lab_id	WV4866-005R
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	98.8	Pct_Solids	98.3	Pct_Solids	96.1
DUP_OF:		DUP_OF:	PEN44SB0201	DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	3240		
ANTIMONY	0.24	UJ	D
ARSENIC	0.90		
BARIUM	11.2		
BERYLLIUM	0.02	U	
CADMIUM	2.1		
CALCIUM	1050	J	G
CHROMIUM	10.5		
COBALT	0.32		
COPPER	7.9	J	I
IRON	2680		
LEAD	26.8		
MAGNESIUM	144		
MANGANESE	20.5		
MERCURY	0.02		
NICKEL	2.3		
POTASSIUM	90.7		
SELENIUM	0.21	U	
SILVER	0.06	U	
SODIUM	2.61	U	
THALLIUM	0.36	U	
VANADIUM	6.3		
ZINC	39.4		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	2920		
ANTIMONY	0.35	UJ	D
ARSENIC	0.89		
BARIUM	8.2		
BERYLLIUM	0.03	U	
CADMIUM	2.0		
CALCIUM	4290	J	G
CHROMIUM	10.1		
COBALT	0.55		
COPPER	8.5	J	I
IRON	2580		
LEAD	27.6		
MAGNESIUM	118		
MANGANESE	16.5		
MERCURY	0.01		
NICKEL	2.3		
POTASSIUM	29.66	U	
SELENIUM	0.30	U	
SILVER	0.09	U	
SODIUM	29.7		
THALLIUM	0.52	U	
VANADIUM	6.0		
ZINC	38.3		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	3780		
ANTIMONY	0.36	UJ	D
ARSENIC	0.30	U	
BARIUM	7.0		
BERYLLIUM	0.03	U	
CADMIUM	1.3		
CALCIUM	1120	J	G
CHROMIUM	7.0		
COBALT	0.31		
COPPER	3.8	J	I
IRON	1700		
LEAD	26.3		
MAGNESIUM	208		
MANGANESE	8.4		
MERCURY	0.01	U	
NICKEL	2.2		
POTASSIUM	54.5		
SELENIUM	0.31	U	
SILVER	0.09	U	
SODIUM	3.1		
THALLIUM	0.53	U	
VANADIUM	5.4		
ZINC	16.7		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: M

nsample	PEN44SB0203	nsample	PEN44SB1101	nsample	PEN44SB1102
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-007R	lab_id	WV4866-009R	lab_id	WV4866-011R
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	96.4	Pct_Solids	87.6	Pct_Solids	91.3
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	997		
ANTIMONY	0.33	UJ	D
ARSENIC	0.28	U	
BARIUM	1.9		
BERYLLIUM	0.03	U	
CADMIUM	0.14	U	A
CALCIUM	188	J	G
CHROMIUM	2.7		
COBALT	0.11		
COPPER	0.77	J	I
IRON	408		
LEAD	2.7		
MAGNESIUM	56.3		
MANGANESE	1.8		
MERCURY	0.01	U	
NICKEL	1.0		
POTASSIUM	50.8		
SELENIUM	0.29	U	
SILVER	0.08	U	
SODIUM	2.62	U	
THALLIUM	0.49	U	
VANADIUM	1.5		
ZINC	2.8	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	1360		
ANTIMONY	0.30	UJ	DK
ARSENIC	0.49		
BARIUM	2.4		
BERYLLIUM	0.03	UJ	K
CADMIUM	0.03	UJ	K
CALCIUM	36900	J	G
CHROMIUM	2.1		
COBALT	0.58		
COPPER	1.1	J	IK
IRON	712		
LEAD	0.82	U	A
MAGNESIUM	574		
MANGANESE	30.2		
MERCURY	0.01	U	
NICKEL	0.93	J	K
POTASSIUM	71.2	J	K
SELENIUM	0.26	UJ	K
SILVER	0.08	U	
SODIUM	292	J	K
THALLIUM	0.44	UJ	K
VANADIUM	1.9	J	K
ZINC	1.8	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	1520		
ANTIMONY	0.27	UJ	D
ARSENIC	0.24		
BARIUM	2.2		
BERYLLIUM	0.02	U	
CADMIUM	0.03	U	
CALCIUM	8180	J	G
CHROMIUM	2.5		
COBALT	0.29		
COPPER	0.83	J	I
IRON	723		
LEAD	0.97		
MAGNESIUM	132		
MANGANESE	6.6		
MERCURY	0.01	U	
NICKEL	1.2		
POTASSIUM	57.2		
SELENIUM	0.24	U	
SILVER	0.07	U	
SODIUM	58.8		
THALLIUM	0.40	U	
VANADIUM	2.2		
ZINC	1.8	U	A

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: M

nsample	PEN44SB1103	nsample	PEN44SB2501	nsample	PEN44SB2502
samp_date	9/19/2005	samp_date	9/19/2005	samp_date	9/19/2005
lab_id	WV4866-013R	lab_id	WV4866-015R	lab_id	WV4866-017R
qc_type	NM	qc_type	NM	qc_type	NM
units	MG/KG	units	MG/KG	units	MG/KG
Pct_Solids	96.5	Pct_Solids	97.0	Pct_Solids	96.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	203		
ANTIMONY	0.31	UJ	D
ARSENIC	0.26	U	
BARIUM	0.19		
BERYLLIUM	0.03	U	
CADMIUM	0.03	U	
CALCIUM	290	J	G
CHROMIUM	0.93	U	A
COBALT	0.09		
COPPER	0.13	U	
IRON	107		
LEAD	0.35	U	A
MAGNESIUM	17.3	U	A
MANGANESE	0.71	U	A
MERCURY	0.01	U	
NICKEL	0.53	U	A
POTASSIUM	26.38	U	
SELENIUM	0.27	U	
SILVER	0.08	U	
SODIUM	2.12	U	
THALLIUM	0.46	U	
VANADIUM	0.36	U	
ZINC	0.53	U	A

Parameter	Result	Val Qual	Qual Code
ALUMINUM	7070		
ANTIMONY	0.34	UJ	D
ARSENIC	1.6		
BARIUM	8.2		
BERYLLIUM	0.03	U	
CADMIUM	1.8		
CALCIUM	4030	J	G
CHROMIUM	15.3		
COBALT	0.47		
COPPER	4.8	J	I
IRON	5550		
LEAD	22.6		
MAGNESIUM	227		
MANGANESE	33.5		
MERCURY	0.02		
NICKEL	3.1		
POTASSIUM	247		
SELENIUM	0.30	U	
SILVER	0.09	U	
SODIUM	53.6		
THALLIUM	0.51	U	
VANADIUM	11.6		
ZINC	36.3		

Parameter	Result	Val Qual	Qual Code
ALUMINUM	11700		
ANTIMONY	0.35	UJ	D
ARSENIC	2.5		
BARIUM	6.5		
BERYLLIUM	0.03	U	
CADMIUM	0.13	U	A
CALCIUM	2950	J	G
CHROMIUM	11.4		
COBALT	0.41		
COPPER	4.2	J	I
IRON	6680		
LEAD	4.7		
MAGNESIUM	117		
MANGANESE	16.9		
MERCURY	0.02		
NICKEL	2.7		
POTASSIUM	129		
SELENIUM	0.30	U	
SILVER	0.09	U	
SODIUM	2.69	U	
THALLIUM	0.52	U	
VANADIUM	16.9		
ZINC	7.8		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SOIL DATA FRACTION: M

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-019R
qc_type	NM
units	MG/KG
Pct_Solids	92.6
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	10400		
ANTIMONY	0.32	UJ	D
ARSENIC	2.5		
BARIUM	5.9		
BERYLLIUM	0.03	U	
CADMIUM	0.19		
CALCIUM	321	J	G
CHROMIUM	13.0		
COBALT	0.35		
COPPER	3.6	J	I
IRON	6720		
LEAD	7.2		
MAGNESIUM	93.2		
MANGANESE	16.2		
MERCURY	0.02		
NICKEL	2.6		
POTASSIUM	78.0		
SELENIUM	0.28	U	
SILVER	0.08	U	
SODIUM	3.07	U	
THALLIUM	0.48	U	
VANADIUM	18.2		
ZINC	11.7		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPM

nsample	PEN44SB0201
samp_date	9/19/2005
lab_id	WV4866-002
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	3.54	U	
ARSENIC	6.3		
BARIUM	125		
BERYLLIUM	0.22	U	
CADMIUM	3.8		
CHROMIUM	31.2		
COBALT	1.19	U	
COPPER	20.4	U	A
LEAD	57.0	U	A
MERCURY	0.11	U	A
NICKEL	8.8		
SELENIUM	4.08	U	
SILVER	1.6	U	A
THALLIUM	4.26	U	
VANADIUM	36.0		
ZINC	113		

nsample	PEN44SB0201D
samp_date	9/19/2005
lab_id	WV4866-004
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	PEN44SB0201

Parameter	Result	Val Qual	Qual Code
ANTIMONY	3.54	U	
ARSENIC	4.0		
BARIUM	108		
BERYLLIUM	0.22	U	
CADMIUM	5.4		
CHROMIUM	33.3		
COBALT	1.19	U	
COPPER	24.2		
LEAD	71.9	U	A
MERCURY	0.10	U	A
NICKEL	8.2	U	A
SELENIUM	4.08	U	
SILVER	1.3	U	A
THALLIUM	4.26	U	
VANADIUM	35.6		
ZINC	125		

nsample	PEN44SB0202
samp_date	9/19/2005
lab_id	WV4866-006
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	3.54	U	
ARSENIC	2.81	U	
BARIUM	77.0		
BERYLLIUM	0.22	U	
CADMIUM	2.4	U	A
CHROMIUM	29.4		
COBALT	1.19	U	
COPPER	11.5	U	A
LEAD	48.9	U	A
MERCURY	0.07	U	A
NICKEL	10.5		
SELENIUM	4.08	U	
SILVER	0.74	U	
THALLIUM	4.26	U	
VANADIUM	36.5		
ZINC	72.6		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPM

nsample	PEN44SB0203
samp_date	9/19/2005
lab_id	WV4866-008
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	3.54	U	
ARSENIC	2.81	U	
BARIUM	30.2		
BERYLLIUM	0.22	U	
CADMIUM	1.4	U	A
CHROMIUM	7.1	U	A
COBALT	1.19	U	
COPPER	6.4	U	A
LEAD	7.2	U	A
MERCURY	0.03	U	A
NICKEL	4.9	U	A
SELENIUM	4.08	U	
SILVER	0.74	U	
THALLIUM	4.26	U	
VANADIUM	8.4		
ZINC	26.6		

nsample	PEN44SB1101
samp_date	9/19/2005
lab_id	WV4866-010
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	3.54	U	
ARSENIC	2.81	U	
BARIUM	40.1		
BERYLLIUM	0.22	U	
CADMIUM	0.41	U	
CHROMIUM	2.5	U	A
COBALT	1.19	U	
COPPER	1.16	U	
LEAD	2.5	U	A
MERCURY	0.02	U	
NICKEL	1.26	U	
SELENIUM	4.08	U	
SILVER	0.74	U	
THALLIUM	4.26	U	
VANADIUM	5.07	U	
ZINC	39.0		

nsample	PEN44SB1102
samp_date	9/19/2005
lab_id	WV4866-012
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	2.1	U	A
BERYLLIUM	0.41	U	A
CADMIUM	0.40	U	
CHROMIUM	11.1		
COBALT	1.12	U	
COPPER	2.6	U	A
LEAD	2.3	U	A
MERCURY	0.05	U	A
NICKEL	4.4	U	A
SELENIUM	3.59	U	
SILVER	1.04	U	
THALLIUM	6.13	U	
VANADIUM	1.5		
ZINC	7.1	U	A

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPM

nsample	PEN44SB1103
samp_date	9/19/2005
lab_id	WV4866-014
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	2.0	U	A
BERYLLIUM	0.35	U	
CADMIUM	0.40	U	
CHROMIUM	3.4	U	A
COBALT	1.12	U	
COPPER	2.2	U	A
LEAD	3.9	U	A
MERCURY	0.06	U	A
NICKEL	28.7		
SELENIUM	3.59	U	
SILVER	1.04	U	
THALLIUM	6.13	U	
VANADIUM	3.0		
ZINC	34.7		

nsample	PEN44SB2501
samp_date	9/19/2005
lab_id	WV4866-016
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	172		
BERYLLIUM	0.45	U	A
CADMIUM	71.6		
CHROMIUM	15.5		
COBALT	5.8		
COPPER	7.6	U	A
LEAD	43.8		
MERCURY	0.04	U	A
NICKEL	14.8		
SELENIUM	3.59	U	
SILVER	1.04	U	
THALLIUM	6.13	U	
VANADIUM	4.88	U	
ZINC	851		

nsample	PEN44SB2502
samp_date	9/19/2005
lab_id	WV4866-018
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	59.7		
BERYLLIUM	0.68	U	A
CADMIUM	4.9		
CHROMIUM	10.0		
COBALT	4.6	U	A
COPPER	20.9	U	A
LEAD	47.3		
MERCURY	0.05	U	A
NICKEL	5.4	U	A
SELENIUM	3.59	U	
SILVER	1.04	U	
THALLIUM	6.13	U	
VANADIUM	67.6		
ZINC	106		

PROJ_NO: 00007

SDG: WV4866 MEDIA: SPLP DATA FRACTION: SPLPM

nsample	PEN44SB2503
samp_date	9/19/2005
lab_id	WV4866-020
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ANTIMONY	4.11	U	
ARSENIC	3.45	U	
BARIUM	57.8		
BERYLLIUM	0.57	U	A
CADMIUM	7.0		
CHROMIUM	9.6		
COBALT	5.1	U	A
COPPER	19.2	U	A
LEAD	93.1		
MERCURY	0.04	U	A
NICKEL	7.2	U	A
SELENIUM	3.59	U	
SILVER	1.04	U	
THALLIUM	6.13	U	
VANADIUM	25.8		
ZINC	158		

PROJ_NO: 00007

SDG: WV4866 MEDIA: WATER DATA FRACTION: M

nsample	PEN44RB0919
samp_date	9/19/2005
lab_id	WV4866-022
qc_type	NM
units	UG/L
Pct_Solids	0.0
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
ALUMINUM	22.0	U	
ANTIMONY	3.54	U	
ARSENIC	2.81	U	
BARIUM	1.1		
BERYLLIUM	0.22	U	
CADMIUM	0.41	U	
CALCIUM	250		
CHROMIUM	1.01	U	
COBALT	1.19	U	
COPPER	1.16	U	
IRON	22.6		
LEAD	2.07	U	
MAGNESIUM	34.9		
MANGANESE	0.91	U	
MERCURY	0.04		
NICKEL	1.26	U	
POTASSIUM	621	U	
SELENIUM	4.08	U	
SILVER	0.74	U	
SODIUM	33.7		
THALLIUM	4.26	U	
VANADIUM	5.07	U	
ZINC	9.4		

APPENDIX D

SUPPORTING INFORMATION FOR HUMAN HEALTH RISK ASSESSMENT

APPENDIX D.1

USEPA HUMAN HEALTH RISK CHARACTERIZATION CALCULATIONS AND RESULTS

TABLE D-1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - RESIDENTIAL EXPOSURES TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	0.1	2E-05	Cancer	NA	NA
Arsenic	1.6	2.1	8E-07	Cardiovascular, Skin	26	0.06
Iron	5550	NA	NA	Gastrointestinal	53000	0.1
Vanadium	11.6	NA	NA	Hair Loss	67	NA
		Total ILCR	2E-05		Total HI	0.2

1 - Table II Soil Cleanup Target Levels (FDEP, April 2005). Some noncarcinogenic SCTLs not presented in Table II were calculated as per the methodology presented in Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Final Report, February, 2005.

NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TYPICAL INDUSTRIAL EXPOSURES TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	0.7	3E-06	Cancer	56	NA
Arsenic	1.6	12	1E-07	Cardiovascular, Skin	657	0.002
Iron	5550	NA	NA	Gastrointestinal	1000000	0.006
Vanadium	11.6	NA	NA	Hair Loss	10000	NA
		Total ILCR	3E-06		Total HI	0.008

1 - Table II Soil Cleanup Target Levels (FDEP, April 2005). Some noncarcinogenic SCTLs not presented in Table II were calculated as per the methodology presented in Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Final Report, February, 2005.

NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	2.1	9E-07	Cancer	105	NA
Arsenic	1.6	11.0	1E-07	Cardiovascular, Skin	83.0	0.02
Iron	5550	NA	NA	Gastrointestinal	90600	0.06
Vanadium	11.6	NA	NA	Hair Loss	302	NA
		Total ILCR	1E-06		Total HI	0.08

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-4

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	2.4	8E-07	Cancer	920	0.002
Arsenic	1.6	23	7E-08	Cardiovascular, Skin	3660	0.0004
Iron	5550	NA	NA	Gastrointestinal	5110000	0.001
Vanadium	11.6	NA	NA	Hair Loss	17000	NA
		Total ILCR	9E-07		Total HI	0.004

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT RECREATIONAL USERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	1.5	1E-06	Cancer	1700	0.001
Arsenic	1.6	13.0	1E-07	Cardiovascular, Skin	845	0.002
Iron	5550	NA	NA	Gastrointestinal	1090000	NA
Vanadium	11.6	NA	NA	Hair Loss	3650	NA
		Total ILCR	1E-06		Total HI	0.003

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	1.8	1E-06	Cancer	930	0.002
Arsenic	1.6	12	1E-07	Cardiovascular, Skin	1520	0.001
Iron	5550	NA	NA	Gastrointestinal	1700000	0.003
Vanadium	11.6	NA	NA	Hair Loss	5680	NA
		Total ILCR	1E-06		Total HI	0.006

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-7

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - LIFELONG RECREATIONAL USERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	1.93	0.8	2.4E-06			
Arsenic	1.6	6.2	NA			
Iron	5550	NA	NA			
Vanadium	11.6	NA	NA			
		Total ILCR	2E-06		Total HI	

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-8

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - RESIDENTIAL EXPOSURES TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	0.33	0.1	3E-06	Cancer	NA	NA
Aluminum	1420	11700	NA	Body Weight	80000	0.02
Arsenic	2.4	2.5	1E-06	Cardiovascular, Skin	26	0.09
Iron	1930	6720	NA	Gastrointestinal	53000	0.04
Vanadium	18.2	NA	NA	Hair Loss	67	0.3
		Total ILCR	4E-06		Total HI	0.4

1 - Table II Soil Cleanup Target Levels (FDEP, April 2005). Some noncarcinogenic SCTLs not presented in Table II were calculated as per the methodology presented in Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Final Report, February, 2005.

NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - TYPICAL INDUSTRIAL EXPOSURES TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	0.33	0.7	5E-07	Cancer	56	NA
Aluminum	1420	NA	NA	Body Weight	1000000	0.001
Arsenic	2.4	12	2E-07	Cardiovascular, Skin	657	0.004
Iron	1930	NA	NA	Gastrointestinal	1000000	0.002
Vanadium	18.2	NA	NA	Hair Loss	10000	0.002
		Total ILCR	7E-07		Total HI	0.007

1 - Table II Soil Cleanup Target Levels (FDEP, April 2005). Some noncarcinogenic SCTLs not presented in Table II were calculated as per the methodology presented in Technical Report: Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., Final Report, February, 2005.

NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS EXPOSED TO SURFACE SOIL
SITE 44
NAVAL AIR STATION, PENSACOLA
PENSACOLA, FLORIDA

Chemical	Incremental Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Point Concentration (mg/kg)	SCTL[1] (mg/kg)	Estimated ILCR	Primary Target Organs	SCTL[1] (mg/kg)	Estimated HQ
Carcinogenic PAHs	0.33	2.1	2E-07	Cancer	105	NA
Aluminum	1420	NA	NA	Body Weight	11900	0.1
Arsenic	2.4	11.0	2E-07	Cardiovascular, Skin	83.0	0.03
Iron	1930	NA	NA	Gastrointestinal	90600	0.02
Vanadium	18.2	NA	NA	Hair Loss	302	0.06
		Total ILCR	4E-07		Total HI	0.2

1 - SCTLs were calculated as per the methodology presented in Appendix D.
NA - Not applicable. There are no cancer slope factors (CSF) available for this chemical.

TABLE D-11

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
RESIDENTIAL EXPOSURE TO ONSITE GROUNDWATER
SITE 44
NAVAL AIR STATION PENSACOLA, PENSACOLA, FLORIDA

Chemical	Estimated Lifetime Carcinogenic Risk (ILCR)			Estimated Non-Carcinogenic Hazard Quotient (HQ)		
	Exposure Concentration µg/L	PRG[1] µg/L	Estimated ILCR	Primary Target Organs	PRG[1] µg/L	Estimated HQ
Chloroform	1.6	0.17	9E-06	Liver	80	0.02
Trichloroethene	52	0.028	2E-03	Liver	6.5	8
Bis(2-Ethylhexyl)phthalate	11	4.8	2E-06	Liver	730	0.02
Iron	1820	NA	NA	Gastrointestinal	11000	0.2
Manganese	74.2	NA	NA	Neurological	880	0.08
		Total Carcinogenic Risk	**2E-03**		**Total HI**	**8**

Total Liver HI =	8
Total Gastrointestinal HI =	0.08
Total Neurological HI =	0.08

1 - Tap Water Preliminary Remediation Goal (PRG) (USEPA Region 9, October 2004, Updated December 28, 2004).

2 - NA - Not applicable. The USEPA has not established a cancer slope factor (CSF) or noncarcinogenic reference dose (RfD) for this chemical.

APPENDIX D.2

FDEP CALCULATOR RESULTS

FDEP UCL Calculator Version 1.0 12/15/06

Note: Too few observations available to compute UCLs - Use Maximum.

Summary Statistics for 2-METHYLNAPHTHALENE	
Number of Samples	19
Number of Censored Data	17
Minimum	22
Maximum	24
Mean	13.47895
Median	20
Standard Deviation	9.835174
Variance	
Coefficient of Variation	0.729669
Skewness	-0.55766

95% UCL (Assuming Normal Data)	
Student's-t	NA

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	NA
Modified-t	NA

95% Non-parametric UCL	
CLT	NA
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	NA

Summary Statistics for	
Minimum	NA
Maximum	NA
Mean	NA
Standard Deviation	NA
Variance	NA

Goodness-of-Fit Results	
Distribution Recommended	NA
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA

UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:
24

FDEP UCL Calculator Version 1.0 12/15/06

Note: Too few observations available to compute UCLs - Use Maximum.

Summary Statistics for ACENAPHTHENE	
Number of Samples	19
Number of Censored Data	17
Minimum	22
Maximum	22
Mean	12.47237
Median	20
Standard Deviation	9.682146
Variance	
Coefficient of Variation	0.776288
Skewness	-0.36229

95% UCL (Assuming Normal Data)	
Student's-t	NA

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	NA
Modified-t	NA

95% Non-parametric UCL	
CLT	NA
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	NA

Summary Statistics for	
Minimum	NA
Maximum	NA
Mean	NA
Standard Deviation	NA
Variance	NA

Goodness-of-Fit Results	
Distribution Recommended	NA
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA

UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:
22

FDEP UCL Calculator Version 1.0 12/15/06

Note: Bounding estimates are worst case 95% UCLs based on the Chebyshev (mean, std) method.

Summary Statistics for ACENAPHTHYLENE	
Number of Samples	19
Number of Censored Data	13
Minimum	20
Maximum	140
Mean	20.10526
Median	20
Standard Deviation	30.36419
Variance	
Coefficient of Variation	1.510261
Skewness	3.733809

95% UCL (Assuming Normal Data)	
Student's-t	NA

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	NA
Modified-t	NA

95% Non-parametric UCL	
CLT	NA
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	NA

95% Bounding Method UCL	
Bounding (Max)	50.46946
Bounding (1/2 DL)	44.89762

Summary Statistics for	
Minimum	NA
Maximum	NA
Mean	NA
Standard Deviation	NA
Variance	NA

Goodness-of-Fit Results	
Distribution Recommended	NA
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA

UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:
50.46946

FDEP UCL Calculator Version 1.0 **12/15/06**

Summary Statistics for ANTHRACENE	
Number of Samples	19
Number of Censored Data	12
Minimum	0.45
Maximum	200
Mean	17.69211
Median	10
Standard Deviation	44.2976
Variance	1962.277
Coefficient of Variation	2.503806
Skewness	4.309158

95% UCL (Assuming Normal Data)	
Student's-t	35.31464

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	45.14607
Modified-t	36.98907

95% Non-parametric UCL	
CLT	34.40953
Jackknife	NA
Standard Bootstrap	30.25771
Bootstrap-t	165.0173
Chebyshev (Mean, Std)	61.99073

Summary Statistics for ln(ANTHRACENE)	
Minimum	-0.79851
Maximum	5.298317
Mean	1.949993
Standard Deviation	1.217287
Variance	1.481788

Goodness-of-Fit Results	
Distribution Recommended	Neither
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	14.74475
MLE Standard Deviation	27.19121
MLE Median	7.028639
MLE Coefficient of Variation	1.844128
MVUE Estimate of Mean	12.7015
MVUE Estimate of Std. Dev.	15.87223
MVUE Estimate of SE	5.818432
MVUE Coefficient of Variation	1.249635

UCL Assuming Lognormal Distribution	
95% H-UCL	35.05736
95% Chebyshev (MVUE) UCL	38.06346
99% Chebyshev (MVUE) UCL	70.59431

FDEP Recommended UCL to Use:
61.99073

FDEP UCL Calculator Version 1.0 **12/15/06**

Summary Statistics for BENZO(G,H,I)PERYLENE	
Number of Samples	19
Number of Censored Data	10
Minimum	1
Maximum	3000
Mean	182.9474
Median	11
Standard Deviation	682.6754
Variance	466045.6
Coefficient of Variation	3.73154
Skewness	4.348425

95% UCL (Assuming Normal Data)	
Student's-t	454.5303

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	607.5514
Modified-t	480.5703

95% Non-parametric UCL	
CLT	440.5815
Jackknife	NA
Standard Bootstrap	413.6269
Bootstrap-t	7285.73
Chebyshev (Mean, Std)	865.6385

Summary Statistics for ln(BENZO(G,H,I)PERYLENE)	
Minimum	0
Maximum	8.006368
Mean	3.100203
Standard Deviation	1.567562
Variance	2.45725

Goodness-of-Fit Results	
Distribution Recommended	Neither
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	75.85533
MLE Standard Deviation	247.8122
MLE Median	22.20245
MLE Coefficient of Variation	3.266906
MVUE Estimate of Mean	60.06174
MVUE Estimate of Std. Dev.	105.8107
MVUE Estimate of SE	32.31432
MVUE Coefficient of Variation	1.761699

UCL Assuming Lognormal Distribution	
95% H-UCL	287.1213
95% Chebyshev (MVUE) UCL	200.9166
99% Chebyshev (MVUE) UCL	381.586

FDEP Recommended UCL to Use:
865.6385

FDEP UCL Calculator Version 1.0 **12/15/06**

Summary Statistics for FLUORANTHENE	
Number of Samples	19
Number of Censored Data	12
Minimum	1
Maximum	240
Mean	28.53684
Median	10
Standard Deviation	56.74801
Variance	3220.337
Coefficient of Variation	1.988588
Skewness	3.402904

95% UCL (Assuming Normal Data)	
Student's-t	51.11242

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	60.81448
Modified-t	52.80635

95% Non-parametric UCL	
CLT	49.95291
Jackknife	NA
Standard Bootstrap	49.62949
Bootstrap-t	294.85
Chebyshev (Mean, Std)	85.28617

Summary Statistics for ln(FLUORANTHENE)	
Minimum	0
Maximum	5.480639
Mean	2.562062
Standard Deviation	1.09724
Variance	1.203935

Goodness-of-Fit Results	
Distribution Recommended	Neither
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	23.66576
MLE Standard Deviation	36.14908
MLE Median	12.96252
MLE Coefficient of Variation	1.527484
MVUE Estimate of Mean	21.08748
MVUE Estimate of Std. Dev.	23.67072
MVUE Estimate of SE	8.753271
MVUE Coefficient of Variation	1.122501

UCL Assuming Lognormal Distribution	
95% H-UCL	49.22005
95% Chebyshev (MVUE) UCL	59.24212
99% Chebyshev (MVUE) UCL	108.1817

FDEP Recommended UCL to Use:
85.28617

FDEP UCL Calculator Version 1.0 12/15/06

Note: Too few observations available to compute UCLs - Use Maximum.

Summary Statistics for FLUORENE	
Number of Samples	19
Number of Censored Data	18
Minimum	22
Maximum	22
Mean	12.48
Median	20
Standard Deviation	9.702477
Variance	
Coefficient of Variation	0.777442
Skewness	-0.37807

95% UCL (Assuming Normal Data)	
Student's-t	NA

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	NA
Modified-t	NA

95% Non-parametric UCL	
CLT	NA
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	NA

Summary Statistics for	
Minimum	NA
Maximum	NA
Mean	NA
Standard Deviation	NA
Variance	NA

Goodness-of-Fit Results	
Distribution Recommended	NA
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA

UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:
22

FDEP UCL Calculator Version 1.0 12/15/06

Note: Too few observations available to compute UCLs - Use Maximum.

Summary Statistics for NAPHTHALENE	
Number of Samples	19
Number of Censored Data	17
Minimum	22
Maximum	22
Mean	13.76974
Median	20
Standard Deviation	9.007676
Variance	
Coefficient of Variation	0.654165
Skewness	-0.60967

95% UCL (Assuming Normal Data)	
Student's-t	NA

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	NA
Modified-t	NA

95% Non-parametric UCL	
CLT	NA
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	NA

Summary Statistics for	
Minimum	NA
Maximum	NA
Mean	NA
Standard Deviation	NA
Variance	NA

Goodness-of-Fit Results	
Distribution Recommended	NA
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA

UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:
22

FDEP UCL Calculator Version 1.0 **12/15/06**

Summary Statistics for PHENANTHRENE	
Number of Samples	19
Number of Censored Data	12
Minimum	1
Maximum	36
Mean	9.626316
Median	10
Standard Deviation	7.858883
Variance	61.76205
Coefficient of Variation	0.816396
Skewness	2.172385

95% UCL (Assuming Normal Data)	
Student's-t	12.75275

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	13.55243
Modified-t	12.90251

95% Non-parametric UCL	
CLT	12.59217
Jackknife	NA
Standard Bootstrap	12.51248
Bootstrap-t	13.9555
Chebyshev (Mean, Std)	17.48538

Summary Statistics for ln(PHENANTHRENE)	
Minimum	0
Maximum	3.583519
Mean	1.945035
Standard Deviation	0.896548
Variance	0.803799

Goodness-of-Fit Results	
Distribution Recommended	Neither
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	10.45347
MLE Standard Deviation	11.61235
MLE Median	6.993875
MLE Coefficient of Variation	1.110861
MVUE Estimate of Mean	9.736793
MVUE Estimate of Std. Dev.	8.877872
MVUE Estimate of SE	3.318719
MVUE Coefficient of Variation	0.911786

UCL Assuming Lognormal Distribution	
95% H-UCL	17.877
95% Chebyshev (MVUE) UCL	24.20276
99% Chebyshev (MVUE) UCL	42.75772

FDEP Recommended UCL to Use:
17.48538

FDEP UCL Calculator Version 1.0 **12/15/06**

Summary Statistics for PYRENE	
Number of Samples	19
Number of Censored Data	12
Minimum	1
Maximum	390
Mean	37.20526
Median	10
Standard Deviation	88.83305
Variance	7891.312
Coefficient of Variation	2.387648
Skewness	3.902861

95% UCL (Assuming Normal Data)	
Student's-t	72.54496

95% UCL (Adjusted for Skewness)	
Adjusted-CLT	90.23055
Modified-t	75.58621

95% Non-parametric UCL	
CLT	70.72987
Jackknife	NA
Standard Bootstrap	67.22374
Bootstrap-t	687.5441
Chebyshev (Mean, Std)	126.0404

Summary Statistics for ln(PYRENE)	
Minimum	0
Maximum	5.966147
Mean	2.636777
Standard Deviation	1.174052
Variance	1.378397

Goodness-of-Fit Results	
Distribution Recommended	Neither
Distribution Used	Neither

Estimates Assuming Lognormal Distribution	
MLE Mean	27.82612
MLE Standard Deviation	47.94285
MLE Median	13.96811
MLE Coefficient of Variation	1.722944
MVUE Estimate of Mean	24.28035
MVUE Estimate of Std. Dev.	29.22773
MVUE Estimate of SE	10.75016
MVUE Coefficient of Variation	1.20376

UCL Assuming Lognormal Distribution	
95% H-UCL	62.95367
95% Chebyshev (MVUE) UCL	71.13923
99% Chebyshev (MVUE) UCL	131.2434

FDEP Recommended UCL to Use:
126.0404

APPENDIX D.3

EXAMPLE CALCULATIONS OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS)

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS CONSTRUCTION WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for consturction workers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{TR \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = CSFo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = CSFd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = CSFi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Benzo(a)pyrene (cPAHs)	
SCTL	=		Soil Cleanup Target Level (mg/kg)
TR	=	1.0E-06	Target Cancer Risk (unitless)
BW	=	70	Body weight (kg)
AT	=	25550	Averaging time (days)
EF	=	250	Exposure frequency (days/year)
ED	=	1	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	330	Ingestion rate, oral (mg/day)
SA	=	3300	Surface area of skin exposed (cm^2/day)
AF	=	0.3	Adherence factor (mg/cm^2)
DA	=	0.13	Dermal absorption (unitless)
IRi	=	20	Inhalation rate (m^3/day)
VF	=	2.72E+07	Volatilization factor (m^3/kg)
PEF	=	2.43E+06	Particulate emission factor (m^3/kg)
CSFo	=	7.30E+00	Oral cancer slope factor $(mg/kg/day)^{-1}$
CSFd	=	7.30E+00	Dermal cancer slope factor $(mg/kg/day)^{-1}$
CSFi	=	3.10E+00	Inhalation cancer slope factor $(mg/kg/day)^{-1}$

CLIENT: NAVAL AIR STATION, PENSACOLA		JOB NUMBER: 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS CONSTRUCTION WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 7.30E+00 (mg/kg-day)-1 x 330 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 2.41E-03 kg-kg/mg

$Intake_{Der}$ = 7.30E+00 (mg/kg-day)-1 x 3300 cm2/day x 0.3 mg/cm2 x 0.13 x 1E-06 kg/mg

$Intake_{Der}$ = 9.40E-04 kg-kg/mg

$Intake_{Inh}$ = 3.10E+00 (mg/kg-day)-1 x 20 m3/day x (1/2.72E+07 m3/kg + 1/2.43E+06 m3/kg)

$Intake_{Inh}$ = 2.78E-05 kg-kg/mg

$$SCTL = \frac{1.E\text{-}06 \times 70\ kg \times 25550\ days}{250\ days/yr \times 1\ yrs \times 1 \times [2.41E\text{-}03\ kg\text{-}kg/mg + 9.40E\text{-}04\ kg\text{-}kg/mg + 2.78E\text{-}05\ kg\text{-}kg/mg]}$$

SCTL = 2.12E+00 mg/kg

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - CONSTRUCTION WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for consturction workers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{THI \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = 1/RfDo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = 1/RfDd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = 1/RfDi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Arsenic	
SCTL	=		Soil Cleanup Target Level (mg/kg)
THI	=	1	Target Hazard Index (unitless)
BW	=	70	Body weight (kg)
AT	=	365	Averaging time (days)
EF	=	250	Exposure frequency (days/year)
ED	=	1	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	330	Ingestion rate, oral (mg/day)
SA	=	3300	Surface area of skin exposed (cm^2/day)
AF	=	0.3	Adherence factor (mg/cm^2)
DA	=	0.03	Dermal absorption (unitless)
IRi	=	20	Inhalation rate (m^3/day)
VF	=	1.00E+99	Volatilization factor (m^3/kg)
PEF	=	2.43E+06	Particulate emission factor (m^3/kg)
RfDo	=	3.0E-04	Oral reference dose (mg/kg/day)
RfDd	=	3.0E-04	Dermal reference dose (mg/kg/day)
RfDi	=	3.0E-04	Inhalation reference dose (mg/kg/day)

CLIENT: NAVAL AIR STATION, PENSACOLA		JOB NUMBER: 4821
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - CONSTRUCTION WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 1/3.0E-04 mg/kg-day x 330 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 1.10E+00 kg-kg/mg

$Intake_{Der}$ = 1/3.0E-04 mg/kg-day x 3300 cm2/day x 0.3 mg/cm2 x 0.03 x 1E-06 kg/mg

$Intake_{Der}$ = 9.90E-02 kg-kg/mg

$Intake_{Inh}$ = 1/3.0E-04 mg/kg-day x 20 m3/day x (1/1.00E+99 m3/kg + 1/2.43E+06 m3/kg)

$Intake_{Inh}$ = 2.74E-02 kg-kg/mg

$$SCTL = \frac{1 \times 70 \text{ kg} \times 365 \text{ days}}{250 \text{ days/yr} \times 1 \text{ yrs} \times 1 \times [1.10E+00 \text{ kg-kg/mg} + 9.90E-02 \text{ kg-kg/mg} + 2.74E-02 \text{ kg-kg/mg}]}$$

SCTL = 8.33E+01 mg/kg

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS MAINTENANCE WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for maintenance workers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{TR \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = CSFo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = CSFd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = CSFi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Benzo(a)pyrene (cPAHs)	
SCTL	=		Soil Cleanup Target Level (mg/kg)
TR	=	1.0E-06	Target Cancer Risk (unitless)
BW	=	70	Body weight (kg)
AT	=	25550	Averaging time (days)
EF	=	30	Exposure frequency (days/year)
ED	=	25	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	50	Ingestion rate, oral (mg/day)
SA	=	3300	Surface area of skin exposed (cm^2/day)
AF	=	0.2	Adherence factor (mg/cm^2)
DA	=	0.13	Dermal absorption (unitless)
IRi	=	20	Inhalation rate (m^3/day)
VF	=	2.72E+07	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
CSFo	=	7.30E+00	Oral cancer slope factor $(mg/kg/day)^{-1}$
CSFd	=	7.30E+00	Dermal cancer slope factor $(mg/kg/day)^{-1}$
CSFi	=	3.10E+00	Inhalation cancer slope factor $(mg/kg/day)^{-1}$

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS MAINTENANCE WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 7.30E+00 (mg/kg-day)-1 x 50 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 3.65E-04 kg-kg/mg

$Intake_{Der}$ = 7.30E+00 (mg/kg-day)-1 x 3300 cm2/day x 0.2 mg/cm2 x 0.13 x 1E-06 kg/mg

$Intake_{Der}$ = 6.26E-04 kg-kg/mg

$Intake_{Inh}$ = 3.10E+00 (mg/kg-day)-1 x 20 m3/day x (1/2.72E+07 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 2.33E-06 kg-kg/mg

$$SCTL = \frac{1.E\text{-}06 \times 70\ kg \times 25550\ days}{30\ days/yr \times 25\ yrs \times 1 \times [3.65E\text{-}04\ kg\text{-}kg/mg + 6.26E\text{-}04\ kg\text{-}kg/mg + 2.33E\text{-}06\ kg\text{-}kg/mg]}$$

SCTL = 2.40E+00 mg/kg

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - MAINTENANCE WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for maintenance workers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{THI \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = 1/RfDo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = 1/RfDd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = 1/RfDi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Arsenic	
SCTL	=		Soil Cleanup Target Level (mg/kg)
THI	=	1	Target Hazard Index (unitless)
BW	=	70	Body weight (kg)
AT	=	9125	Averaging time (days)
EF	=	30	Exposure frequency (days/year)
ED	=	25	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	50	Ingestion rate, oral (mg/day)
SA	=	3300	Surface area of skin exposed (cm^2/day)
AF	=	0.2	Adherence factor (mg/cm^2)
DA	=	0.03	Dermal absorption (unitless)
IRi	=	20	Inhalation rate (m^3/day)
VF	=	1.00E+99	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
RfDo	=	3.0E-04	Oral reference dose (mg/kg/day)
RfDd	=	3.0E-04	Dermal reference dose (mg/kg/day)
RfDi	=	3.0E-04	Inhalation reference dose (mg/kg/day)

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - MAINTENANCE WORKERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 1/3.0E-04 mg/kg-day x 50 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 1.67E-01 kg-kg/mg

$Intake_{Der}$ = 1/3.0E-04 mg/kg-day x 3300 cm2/day x 0.2 mg/cm2 x 0.03 x 1E-06 kg/mg

$Intake_{Der}$ = 6.60E-02 kg-kg/mg

$Intake_{Inh}$ = 1/3.0E-04 mg/kg-day x 20 m3/day x (1/1.00E+99 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 5.38E-05 kg-kg/mg

$$SCTL = \frac{1 \times 70 \text{ kg} \times 9125 \text{ days}}{30 \text{ days/yr} \times 25 \text{ yrs} \times 1 \times [1.67E\text{-}01 \text{ kg-kg/mg} + 6.60E\text{-}02 \text{ kg-kg/mg} + 5.38E\text{-}05 \text{ kg-kg/mg}]}$$

SCTL = 3.66E+03 mg/kg

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS ADOLESCENT TRESPASSERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for adolescent trespassers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{TR \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = CSFo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = CSFd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = CSFi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Benzo(a)pyrene (cPAHs)	
SCTL	=		Soil Cleanup Target Level (mg/kg)
TR	=	1.0E-06	Target Cancer Risk (unitless)
BW	=	45	Body weight (kg)
AT	=	25550	Averaging time (days)
EF	=	45	Exposure frequency (days/year)
ED	=	10	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	100	Ingestion rate, oral (mg/day)
SA	=	3280	Surface area of skin exposed (cm^2/day)
AF	=	0.3	Adherence factor (mg/cm^2)
DA	=	0.13	Dermal absorption (unitless)
IRi	=	4.8	Inhalation rate (m^3/day)
VF	=	2.98E+07	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
CSFo	=	7.30E+00	Oral cancer slope factor $(mg/kg/day)^{-1}$
CSFd	=	7.30E+00	Dermal cancer slope factor $(mg/kg/day)^{-1}$
CSFi	=	3.10E+00	Inhalation cancer slope factor $(mg/kg/day)^{-1}$

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS ADOLESCENT TRESPASSERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 7.30E+00 (mg/kg-day)-1 x 100 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 7.30E-04 kg-kg/mg

$Intake_{Der}$ = 7.30E+00 (mg/kg-day)-1 x 3280 cm2/day x 0.3 mg/cm2 x 0.13 x 1E-06 kg/mg

$Intake_{Der}$ = 9.34E-04 kg-kg/mg

$Intake_{Inh}$ = 3.10E+00 (mg/kg-day)-1 x 4.8 m3/day x (1/2.98E+07 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 5.11E-07 kg-kg/mg

$$SCTL = \frac{1.E\text{-}06 \times 45\ kg \times 25550\ days}{45\ days/yr \times 10\ yrs \times 1 \times [7.30E\text{-}04\ kg\text{-}kg/mg + 9.34E\text{-}04\ kg\text{-}kg/mg + 5.11E\text{-}07\ kg\text{-}kg/mg]}$$

SCTL = 1.54E+00 mg/kg

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - ADOLESCENT TRESPASERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for adolescent trespassers exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{THI \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = 1/RfDo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = 1/RfDd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = 1/RfDi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Arsenic	
SCTL	=		Soil Cleanup Target Level (mg/kg)
THI	=	1	Target Hazard Index (unitless)
BW	=	45	Body weight (kg)
AT	=	3650	Averaging time (days)
EF	=	45	Exposure frequency (days/year)
ED	=	10	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	100	Ingestion rate, oral (mg/day)
SA	=	3280	Surface area of skin exposed (cm^2/day)
AF	=	0.3	Adherence factor (mg/cm^2)
DA	=	0.03	Dermal absorption (unitless)
IRi	=	4.8	Inhalation rate (m^3/day)
VF	=	1.00E+99	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
RfDo	=	3.0E-04	Oral reference dose (mg/kg/day)
RfDd	=	3.0E-04	Dermal reference dose (mg/kg/day)
RfDi	=	3.0E-04	Inhalation reference dose (mg/kg/day)

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - ADOLESCENT TRESPASERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 1/3.0E-04 mg/kg-day x 100 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 3.33E-01 kg-kg/mg

$Intake_{Der}$ = 1/3.0E-04 mg/kg-day x 3280 cm2/day x 0.3 mg/cm2 x 0.03 x 1E-06 kg/mg

$Intake_{Der}$ = 9.84E-02 kg-kg/mg

$Intake_{Inh}$ = 1/3.0E-04 mg/kg-day x 4.8 m3/day x (1/1.00E+99 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 1.29E-05 kg-kg/mg

$$SCTL = \frac{1 \times 45 \text{ kg} \times 3650 \text{ days}}{45 \text{ days/yr} \times 10 \text{ yrs} \times 1 \times [3.33\text{E-01 kg-kg/mg} + 9.84\text{E-02 kg-kg/mg} + 1.29\text{E-05 kg-kg/mg}]}$$

SCTL = 8.45E+02 mg/kg

CLIENT: NAVAL AIR STATION, PENSACOLA		JOB NUMBER: 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS ADULT RECREATIONAL USERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for adult recreational users exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{TR \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = CSFo \times IRo \times 10^{-6} \text{ kg/mg}$$

$$Intake_{Der} = CSFd \times SA \times AF \times DA \times 10^{-6} \text{ kg/mg}$$

$$Intake_{Inh} = CSFi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Benzo(a)pyrene (cPAHs)	
SCTL	=		Soil Cleanup Target Level (mg/kg)
TR	=	1.0E-06	Target Cancer Risk (unitless)
BW	=	70	Body weight (kg)
AT	=	25550	Averaging time (days)
EF	=	45	Exposure frequency (days/year)
ED	=	20	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	100	Ingestion rate, oral (mg/day)
SA	=	5700	Surface area of skin exposed (cm^2/day)
AF	=	0.07	Adherence factor (mg/cm^2)
DA	=	0.13	Dermal absorption (unitless)
IRi	=	6.4	Inhalation rate (m^3/day)
VF	=	2.98E+07	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
CSFo	=	7.30E+00	Oral cancer slope factor $(mg/kg/day)^{-1}$
CSFd	=	7.30E+00	Dermal cancer slope factor $(mg/kg/day)^{-1}$
CSFi	=	3.10E+00	Inhalation cancer slope factor $(mg/kg/day)^{-1}$

CLIENT: NAVAL AIR STATION, PENSACOLA		JOB NUMBER: 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR CARCINOGENS ADULT RECREATIONAL USERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 7.30E+00 (mg/kg-day)-1 x 100 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 7.30E-04 kg-kg/mg

$Intake_{Der}$ = 7.30E+00 (mg/kg-day)-1 x 5700 cm2/day x 0.07 mg/cm2 x 0.13 x 1E-06 kg/mg

$Intake_{Der}$ = 3.79E-04 kg-kg/mg

$Intake_{Inh}$ = 3.10E+00 (mg/kg-day)-1 x 6.4 m3/day x (1/2.98E+07 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 6.81E-07 kg-kg/mg

$$SCTL = \frac{1.E\text{-}06 \times 70\ kg \times 25550\ days}{45\ days/yr \times 20\ yrs \times 1 \times [7.30E\text{-}04\ kg\text{-}kg/mg + 3.79E\text{-}04\ kg\text{-}kg/mg + 6.81E\text{-}07\ kg\text{-}kg/mg]}$$

SCTL = 1.79E+00 mg/kg

CALCULATION WORKSHEET

CLIENT: NAVAL AIR STATION, PENSACOLA		**JOB NUMBER:** 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - ADULT RECREATIONAL USERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	**CHECKED BY:**	**DATE:** 11/27/2006

PURPOSE: To calculate an alternative soil cleanup level for adult recreational users exposed to soil.

RELEVANT EQUATIONS:

$$SCTL = \frac{THI \times BW \times AT}{EF \times ED \times FC \times [Intake_{Ing} + Intake_{Der} + Intake_{Inh}]}$$

$$Intake_{Ing} = 1/RfDo \times IRo \times 10^{-6}\ kg/mg$$

$$Intake_{Der} = 1/RfDd \times SA \times AF \times DA \times 10^{-6}\ kg/mg$$

$$Intake_{Inh} = 1/RfDi \times IRi \times (1/VF + 1/PEF)$$

Where:

Chemical	=	Arsenic	
SCTL	=		Soil Cleanup Target Level (mg/kg)
THI	=	1	Target Hazard Index (unitless)
BW	=	70	Body weight (kg)
AT	=	7300	Averaging time (days)
EF	=	45	Exposure frequency (days/year)
ED	=	20	Exposure duration (years)
FC	=	1	Fraction from contaminated source (unitless)
IRo	=	100	Ingestion rate, oral (mg/day)
SA	=	5700	Surface area of skin exposed (cm^2/day)
AF	=	0.07	Adherence factor (mg/cm^2)
DA	=	0.03	Dermal absorption (unitless)
IRi	=	6.4	Inhalation rate (m^3/day)
VF	=	1.00E+99	Volatilization factor (m^3/kg)
PEF	=	1.24E+09	Particulate emission factor (m^3/kg)
RfDo	=	3.0E-04	Oral reference dose (mg/kg/day)
RfDd	=	3.0E-04	Dermal reference dose (mg/kg/day)
RfDi	=	3.0E-04	Inhalation reference dose (mg/kg/day)

CLIENT: NAVAL AIR STATION, PENSACOLA		JOB NUMBER: 0007
SUBJECT: CALCULATION OF ALTERNATE SOIL CLEANUP TARGET LEVELS (SCTLS) FOR NONCARCINOGENS - ADULT RECREATIONAL USERS		
BASED ON: TECHNICAL REPORT: DEVELOPMENT OF SOIL CLEANUP TARGET LEVELS FOR CHAPTER 62-777, F.A.C., FDEP, FEBRUARY 2005		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/27/2006

EXAMPLE CALCULATION

$Intake_{Ing}$ = 1/3.0E-04 mg/kg-day x 100 mg/day x 1E-06 kg/mg

$Intake_{Ing}$ = 3.33E-01 kg-kg/mg

$Intake_{Der}$ = 1/3.0E-04 mg/kg-day x 5700 cm2/day x 0.07 mg/cm2 x 0.03 x 1E-06 kg/mg

$Intake_{Der}$ = 3.99E-02 kg-kg/mg

$Intake_{Inh}$ = 1/3.0E-04 mg/kg-day x 6.4 m3/day x (1/1.00E+99 m3/kg + 1/1.24E+09 m3/kg)

$Intake_{Inh}$ = 1.72E-05 kg-kg/mg

$$SCTL = \frac{1 \times 70 \text{ kg} \times 7300 \text{ days}}{45 \text{ days/yr} \times 20 \text{ yrs} \times 1 \times [3.33E\text{-}01 \text{ kg-kg/mg} + 3.99E\text{-}02 \text{ kg-kg/mg} + 1.72E\text{-}05 \text{ kg-kg/mg}]}$$

SCTL = 1.52E+03 mg/kg

APPENDIX E

RESPONSE TO COMMENTS

NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA
REMEDIAL INVESTIGATION REPORT FOR SITE 44
(FORMER UST SITE 3221 SW)

RESPONSE TO EPA COMMENTS DATED NOVEMBER 27, 2007

COMMENTS

"In the report in two different sections (4.2 and 8.2), it is stated that the arsenic is within the background range determined by statistical analysis of arsenic and iron distribution at Pensacola NAS. Please explain the basis for this "statistical analysis".

Response:
A detailed discussion of the basis and methods for the "statistical analysis" is attached to the Remedial Investigation Report as Appendix B and is referenced in Section 4.2.2.6. Later discussions of the statistical analysis, including those in Sections 4.2 and 8.2, do not call out the location of the detailed statistical analysis in Appendix B. The report text will be modified to refer the reader to the full statistical basis and method discussion presented in Appendix B at all occurrences in the document text.

As indicated in Appendix B, the basis for the statistical analysis is to "present a geochemical methodology that can be simply applied to site-specific data to identify "outliers" for a given inorganic (those samples that fall outside of expected natural concentrations) at NASP. Inherent to this is the use of the methodology to define the naturally occurring range of the inorganic. In this document, using the available data from base-wide investigations, the geochemical method of identifying the range of naturally-occurring inorganics has been used for arsenic in soil at NASP, and the consequent model can be applied to determine if site samples contain arsenic outside of the naturally occurring range. The geochemical method is relatively new (US Navy, 1999; US Navy, 2002; Gannett Fleming 2005; Caldwell, et. al, 2005a&2005b), but is based on robust statistical methods and has been used successfully to define inorganic outliers (Caldwell, et al 2005a, Gannett Fleming 2005). A significant programmatic approach utilizing this method has been performed at Avon Park Air Force Range (APAFR; Gannett Fleming 2005), and similar statistical procedures have been followed for NASP. Because the work performed at Avon Park has been extensively reviewed and accepted by both Florida Department of Environmental Protection (FDEP) and the EPA, relevant language is either paraphrased or excerpted in this technical brief."

NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA
REMEDIAL INVESTIGATION REPORT FOR SITE 44
(FORMER UST SITE 3221 SW)

RESPONSE TO FDEP COMMENTS DATED OCTOBER 8, 2007

GENERAL COMMENTS

Comment 1
Page ES-2, 4th paragraph General Issue: In this paragraph, Tetra Tech state [sic], "Carcinogenic risks exceed 1 x 10^{-4}, for exposure to groundwater by hypothetical future residents." The Department has always required 1 x 10^{-6} for this scenario. Please review this and address this in the final Remedial Investigation Report.

Response:
The Navy is not disputing that FDEP's target risk level is 1 x 10-6. The language will be revised to reflect the distinction between the agencies' respective target risk levels and will state that the carcinogenic risk to groundwater exceeds both of these targets.

Comment 2
Chapters 6 and 7: Please review the attached comments from the University of Florida for the Departments [sic] comments on these chapters.

Response:
See the attached response to "specific comments" below.

Comment 3
Conclusions: The Department concurs with the recommendation to proceed with a Feasibility Study for this site.

Response:
Concur.

SPECIFIC COMMENTS

Comment 1
In section 4.0, both cadmium and lead SPLP results showed an exceedance in the leachability to groundwater criteria but were not discussed further as potential COPCs in Section 6.0.

Response:
Although cadmium and lead leachate concentrations in the SPLP procedure exceeded the groundwater criteria, the concentrations in the corresponding soil samples were all less than their respective leachability criteria. Moreover, cadmium was not detected in groundwater and lead concentrations in all groundwater samples were less than the GCTL or below detection limits.

Comment 2
For arsenic, the site concentrations in soil appear to be indicative of background. The highest on-site value is 2.5 mg/kg. Any values above 2.5 mg/kg would need further evaluation.

Response:
Concur.

Comment 3
On page 6-5, surface soil is defined as zero to one feet bls and subsurface soil is defined as soil collected from depths one to nine feet bls. Chapter 62-780, FAC defines surface soil as soil located from zero to two feet bls and subsurface soil as greater than two feet bls.

Response:
In actuality, surface soil in this report is defined as zero to 0.5 feet bls. Investigations were conducted at this site and other sites at NAS Pensacola prior to the promulgation of 62-780 and this definition of surface soil is consistent throughout other investigations. The language will be changed to reflect how surface soil was defined.

Comment 4
For the construction worker scenario, a groundwater exposure route should be added for completeness to account for inadvertent exposure to groundwater during construction activities.

Response:
Although possible, exposure to groundwater by a construction worker would be regarded as negligible relative to direct exposure to soil. The text will be modified to reflect that this exposure pathway is possible, but its contribution to overall risk would be insignificant.

Comment 5
A soil-to-air inhalation pathway was not included in the risk assessment evaluation due to partial covering of the site with asphalt and concrete. Although exposed soil may not be a significant portion of the site, inhaled fugitive dusts from exposed soil areas should be included for completeness.

Response:
In actuality, risks associated with inhalation of fugitive dust were included as part of the risk assessment for Site 44, despite levels being less than the soil screening levels for volatilization from soil to air. This pathway is identified in Table 6-4 and is discussed in detail in Section 6.3.3.3. Language regarding the asphalt cover providing a rationale for not evaluating this pathway will be removed from the text.

Comment 6
For the maintenance worker scenario, documentation on frequency of duties is necessary to determine whether 30 days/year is an upper limit exposure for EF. We also recommend a soil ingestion rate of 100 mg/d (US EPA, 2002) because the grounds maintenance worker will spend part of the day outdoors.

Response:
The Navy disagrees with increasing the soil ingestion rate from 50 to mg/kg to 100 mg/kg. The soil ingestion rate is consistent with FDEP's exposure assumption for an industrial worker, which forms the basis for the derivation of the industrial SCTLs. The EF of 30 days/year is recognized as professional judgment for evaluating risk at the site. It should be recognized that this provides a point of reference to the industrial worker who is assumed to have an EF of 250 days/year.

Comment 7
The exposure frequency for adult/adolescent recreational users and trespassers was assumed as 45 d/y based on professional judgment. In the past, FDEP has recommended and finalized an exposure frequency of 200 d/y for recreational users.

Response:

As stated, the exposure frequency for recreational users and trespassers is based on professional judgment. The 45 days per year is based on an estimate for swimming frequency in the southeast; this estimate is stated in EPA Region 4 guidance (Supplemental Guidance to RAGS: Human Health Risk Assessment Bulletins, EPA Region 4, www.epa.gov/region4/waste/ots/healtbul.htm). Although the recreational user or trespasser at this site is not equivalent to a swimmer, it helps to predict the frequency that one may trespass or recreate, which may be similar to going to a lake or pond to swim. The Navy believes that the swimming frequency of 45 days per year was sufficiently conservative with regards to evaluating a reasonably maximum exposed individual. We believe that it is unlikely that a recreational user or trespasser would be at the site for an average of 4 days per week, especially when the site is currently adjacent to an aircraft runway and airplane repair facility. Increasing the exposure frequency to 200 days per year renders these receptors essentially equivalent to an industrial worker. It is unlikely that the Navy would tolerate trespassers on the property with a frequency of 200 days per year.

Comment 8
We recommend changing the adult skin adherence factor for future adult recreational users/trespassers to 0.08 mg/cm^2 (US EPA, 2004) based on the same conditions as the adolescent (95th percentile value for soccer players in moist conditions).

Response:
Changing the skin adherence factor from 0.07 mg/cm^2 to 0.08 mg/cm^2 will pose a negligible change to the overall risk, and would have no significant impact on any risk management decisions. The adherence factor of 0.07 mg/cm^2 is taken from Exhibit 3-5 in EPA's Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (EPA, July 2004). It is consistent with residential exposure conditions. The value of 0.08 mg/cm^2 is the 95th percentile adherence factor for an adult soccer player in moist conditions. This value is also presented in the referenced guidance (EPA, July 2004). This exposure assumption is inconsistent with the nature of the site being adjacent to an aircraft runway and airplane repair facility.

The change in the adherence factor from 0.07 mg/cm^2 to 0.08 mg/cm^2 will result in decreases in the recreational Soil Cleanup Target Levels for benzo[a]pyrene from 1.79 mg/kg to 1.71 mg/kg and for arsenic from 11.8 mg/kg to 11.6 mg/kg. These changes will have negligible impacts to the total risks associated with exposure at these sites.

Comment 9
For the ecological risk assessment, the following values should be updated for screening values in Tables 7-1 and 7-2.

a. For total PAHs, a new value of 1.1 mg/kg was developed based on protection of mammals in June 2007 by US EPA.
b. For manganese, an ecological screening value of 220 mg/kg was developed based on protection of plants by US EPA in April 2007. The conclusion that manganese is not a COPEC at this site remains valid.
c. The Canadian Soil Quality Guideline (2006) recommends using a soil screening value of 0.1 mg/kg for benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene for the protection of the environment and human health. This value is the same as the US EPA Region 4 surface soil screening value for benzo(a)pyrene.

Response:
The recommended USEPA Ecological Soil Screening Levels (SSLs) for total PAHs and manganese, as well as the recommended Canadian Soil Screening Guidelines for benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene will be incorporated into the ecological risk assessment (Table 7-1). The text will be modified accordingly to reflect the use of these screening levels and to reflect any changes in estimated potential ecological risk.