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FINAL REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 11 (OU 11) SITE 45 STEAM GENERATING PLANT NAS CECIL FIELD FL

6/1/2001

TETRA TECH NUS INC

Rev. 1
6/01/01

Remedial Investigation Report
for
Operable Unit 11, Site 45 – Steam Generating Plant

Naval Air Station Cecil Field
Jacksonville, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888

Contract Task Order 0078

June 2001

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REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 11, SITE 45 – STEAM GENERATING PLANT

NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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This document that describes the Remedial Investigation for Site 45 – Steam Generating Plant, Naval Air Station Cecil Field, Jacksonville, Florida, has been prepared under the direction of a Florida-registered professional engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice.

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ACRONYMS

µg/kg	microgram per kilogram
µg/L	microgram per liter
ABB-ES	ABB Environmental Services, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
BaP	benzo(a)pyrene
BaPEq	benzo(a)pyrene equivalent
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Realignment and Closure
BWGWP	Base-Wide Generic Work Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	contaminant of concern
COPC	contaminant of potential concern
cPAH	carcinogenic PAH
CTO	Contract Task Order
DON	Department of the Navy
DQO	Data Quality Objective
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
GCTL	Groundwater Cleanup Target Level
HASP	Health and Safety Plan
HLA	Harding Lawson Associates
HQ	Hazard Quotient
HSA	hollow-stem auger
IAS	Initial Assessment Study
IBDS	inorganic background data set
ID	inside diameter
IR	Installation Restoration
JEDC	Jacksonville Economic Development Commission
KAG	Kerosene Analytical Group
K_d	distribution coefficient

K_h	horizontal hydraulic conductivity
K_{oc}	organic carbon partition coefficient
K_{ow}	octanol/water partition coefficient
MCL	Maximum Contaminant Level
mg/kg	milligram per kilogram
mg/L	milligram per liter
msl	mean sea level
NAS	Naval Air Station
NAVFACENGCOM	Naval Facilities Engineering Command
NCP	National Contingency Plan
NGVD	National Geodetic Vertical Datum
NSF	National Sanitation Foundation
NTU	nephelometric turbidity unit
OU	Operable Unit
PAH	polycyclic or polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PQL	practical quantitation limit
PRE	Preliminary Risk Evaluation
PRG	Preliminary Remediation Goal
PSC	Potential Source of Contamination
PVC	polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RIWP	Remedial Investigation Work Plan
RPD	relative percent difference
RQL	Required Quantitation Limit
SCS	Soil Conservation Service
SCTL	Soil Cleanup Target Level
SMCL	secondary maximum contaminant level
SMDP	Scientific/Management Decision Point
SOP	standard operating procedure
SOUTHDIV	Southern Division
SPECAP	specific capacity

SVOC	semivolitile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
UCL	upper confidence level
USCS	United Soil Classification System
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

EXECUTIVE SUMMARY

This Remedial Investigation (RI) Report for Operable Unit (OU) 11, Site 45, Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, has been prepared by Tetra Tech NUS, Inc., (TtNUS) for the Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFACENGCOM) under the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0078. This report describes the field investigation and subsequent findings of the RI at Site 45 – Steam Generating Plant.

This executive summary provides a brief summary of the geology at the site, describes the nature and extent of contamination at the site, summarizes the results of the human health and ecological risk assessments, and provides recommendations for additional actions.

E.1 GEOLOGY AND HYDROGEOLOGY

Site 45 is underlain by a surficial aquifer system consisting of sand (nonclayey to clayey) of Pleistocene and Recent deposits. This formation is about 85 feet to 95 feet thick beneath the site. Immediately below the sand unit are limestones of the upper part of the Hawthorn Group. Beneath the limestone are low permeability clay units of the Hawthorn formation that form a barrier to groundwater flow and act as a confining unit. The RI was limited to the surficial aquifer. This investigation was conducted by installing monitoring wells.

The upper portion of the surficial aquifer is about 40 feet thick and consists of brownish, silty very fine sand. This sand is typically underlain by green and/or gray silty, very fine sand of similar thickness. A white to dark gray limestone underlies the sand. Discontinuous thin lenses of clay and marl were observed throughout the subsurface at other sites on the base.

Site 45 is located near the groundwater divide. The direction of groundwater flow across the site is generally to the south. The vertical gradient is downward.

The hydraulic conductivity of the shallow surficial sand deposits was estimated to be 3.8 feet per day based on specific capacity tests. No specific capacity tests were performed on deeper zones of the surficial sand aquifer.

E.2 NATURE AND EXTENT OF CONTAMINATION

At Site 45, the investigation was focused primarily on the groundwater. Soil samples were collected from the unsaturated zone as part of a previous investigation. Soil contaminated with arsenic, vanadium, and benzo(a)pyrene was delineated to Florida Department of Environmental Protection (FDEP) industrial criteria and those soils above a threshold concentration were removed to be protective of human health (industrial scenario) and the environment as part of a time critical removal action per the NCP, 40 CFR 300.415. Approximately 325 cubic yards of soil were removed. No surface water and sediments are present at the site, and, therefore, did not need to be evaluated.

Vanadium was detected in a plume that was centered near Building 7. Vanadium was detected at concentrations greater than the FDEP Groundwater Cleanup Target Levels (GCTLs) Florida Administrative Code (FAC) 62-777 criteria. The plume, as defined by the GCTL, covers an area of about 260 feet by 110 feet. Vanadium was also detected in the soil above the contaminated wells. The source of the vanadium is probably related to fuels burned at the facility. Most of locations with the highest vanadium concentrations were coincidentally removed during the soil excavation. The contamination is limited to the shallow zone of the surficial aquifer. No organic compounds were detected in wells at concentrations greater than the FDEP criteria.

E.3 HUMAN HEALTH RISK ASSESSMENT

The Human Health Risk Assessment for groundwater was conducted as a Preliminary Risk Evaluation (PRE). The human health PRE is a screening level evaluation of potential risks from exposure to site constituents by human receptors. Some sample concentrations of vanadium exceed the FDEP GCTL and the U.S. Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goal (PRG). This suggests that exposure to vanadium in groundwater may cause one to experience noncarcinogenic effects.

The removal action for the soil eliminates any significant risks to human health for industrial use and the environment associated with direct exposure to the soil. Under an industrial exposure scenario, post-removal concentrations result in a cancer risk of approximately 1×10^{-6} and a cumulative hazard index significantly less than 1.0. Under a residential scenario, post-removal concentrations result in a cancer risk of approximately 9×10^{-6} and a cumulative hazard index less than 1.0. The cancer risk falls within USEPA's target range, but exceeds FDEP's target risk.

E.4 ECOLOGICAL RISK ASSESSMENT

The soil exposure pathway is negligible based on the lack of suitable habitat for wildlife and this exposure route was not investigated. A comparison of existing groundwater data to surface water guidelines was not conducted because of the long distance between the plume and surface water, and the relatively slow groundwater velocity.

E.5 CONCLUSIONS

The following conclusions are made based on the RI and the removal activities at the site.

- The concentrations of contaminants in the soil, specifically arsenic, vanadium and benzo(a)pyrene, do not pose a significant risk to human health (based on industrial use of the site) or the environment. Institutional controls will be required to prevent residential uses of the soil.

- Vanadium is present in the groundwater at concentrations greater than the FDEP GCTL. The plume, as defined by the GCTL of 49 µg/L, covers an area approximately 260 feet by 110 feet and is limited to the shallow zone (about 6 to 25 feet below ground surface) of the surficial aquifer.

- Because of a lack of suitable habitat, the risks to ecological receptors is negligible.

E.6 RECOMMENDATIONS

The following additional activities at Site 45 are recommended:

- Remediate the contaminated groundwater to conform to FDEP criteria, or
- Implement institutional controls to prevent the use of the groundwater as a potable water source.
- Implement institutional controls to prevent the use of the site for residential purposes.
- Continue to monitor the plume.

1.0 INTRODUCTION

This Remedial Investigation (RI) Report for Site 45, Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Southern Division (SOUTHDIV) Naval Facilities Engineering Command (NAVFACENGCOM) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0078. This report describes the groundwater field investigation and subsequent findings for the RI at Site 45 – Steam Generating Plant.

The RI was conducted to determine the nature and extent of contamination, to assess the human health and environmental risks posed by contamination, and to provide a basis for selecting alternatives for remediation of the site. Because the risks posed by the site are not expected to be significant and the site is located within an industrial area per current reuse plans, the Base Realignment and Closure (BRAC) Cleanup Team (BCT) agreed that a Preliminary Risk Evaluation (PRE) would be acceptable rather than a Baseline Risk Assessment. The RI focused on the groundwater and potential sources that had been identified in previous investigations.

Soil contamination was addressed during the Potential Source of Contamination (PSC) investigation in 1999-2000. Soil contaminated with arsenic, vanadium, and benzo(a)pyrene was delineated for excavation according to the Action Memorandum (TtNUS, 2000b). The soil was excavated from August 15 through August 18, 2000 (CH2M Hill, 2001). This RI recommends Land Use Controls for soil, based on the completed removal action.

The RI fieldwork was conducted from April 2000 through July 2000 in accordance with the Final RI Work Plan (RIWP) (TtNUS, 2000a).

1.1 PURPOSE OF REPORT

This report presents the results of the groundwater RI for Site 45. It includes a description of the field investigations, the presentation of the data, and presentation of the PRE.

The results and conclusions of this report will be used to develop a Feasibility Study (FS) for the site to develop, screen, and evaluate remedial alternatives based on risk assessments and remediation criteria.

1.2 SITE BACKGROUND

The following paragraphs describe the background of the site. Figure 1-1 provides a site location map. Figure 1-2 shows the vicinity of the site. Figure 1-3 provides the current arrangement of the site.

1.2.1 Site Description

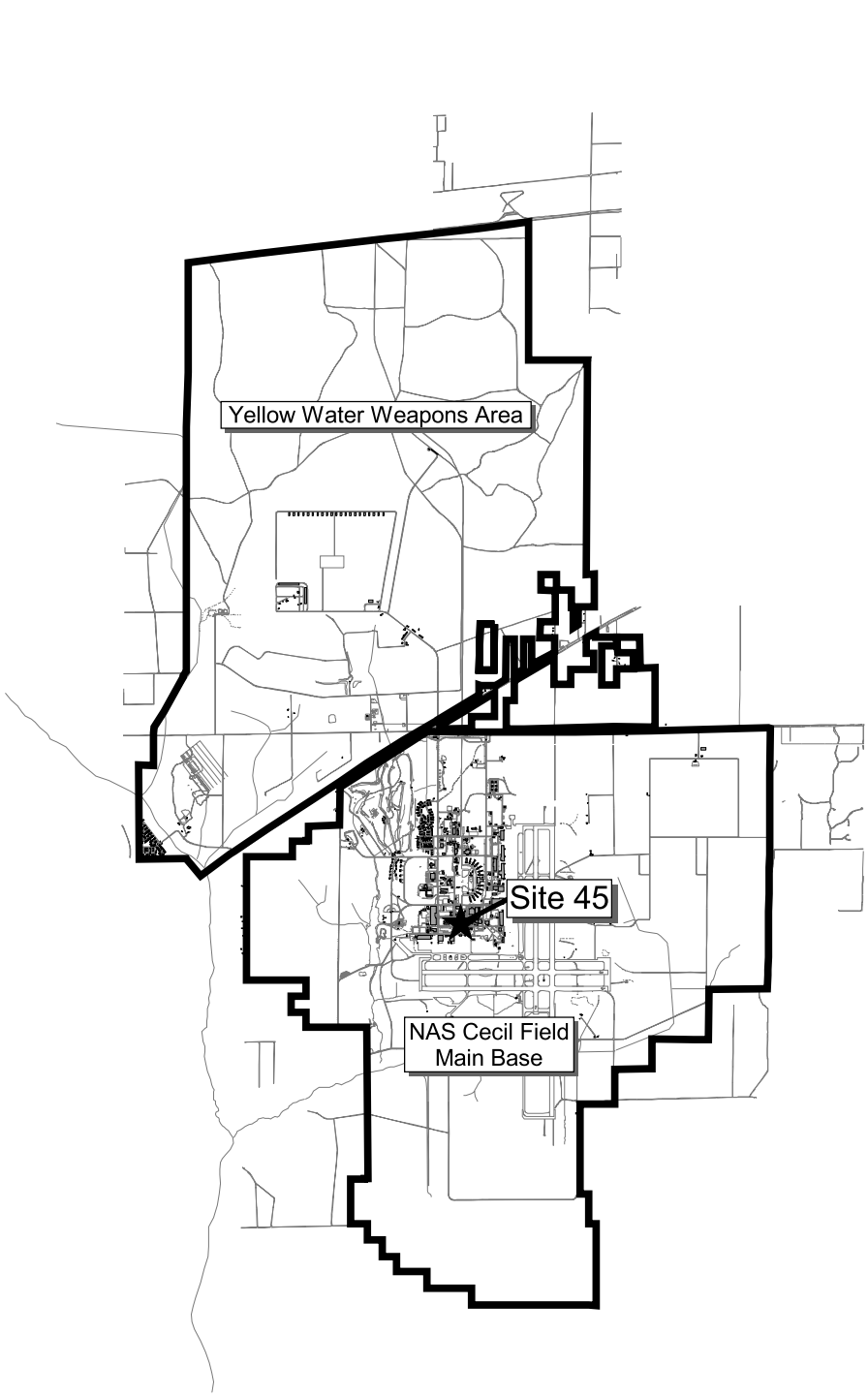
Site 45, the Steam Generating Plant, is located north of Crossover Street (formerly Second Street) and east of Authority Avenue (formerly "C" Avenue). The site includes Buildings 2, 7, 11, and 12 and the adjacent land area (HLA, 1999a). Investigations at the site were originally focused on Buildings 7 and 11. Three above ground storage tanks and a concrete containment area are located on the eastern side of Building 11. An underground storage tank was located to the south of Building 11 but was removed in 1986 (ABB, 1994).

The site is primarily unpaved and covers an area of about 2 acres. The south border is Crossover Street, the west border is Authority Avenue, the north border is Skillside Street (formerly Third Street), and the east border is a parking lot. There are also parking lots adjacent to the buildings along Crossover Street, Skillside Street, and Authority Avenue. The base railroad tracks passed through the eastern side of the site, next to the current parking lot. These tracks were removed in 1986.

Building 11 is the Steam Generating Plant and includes a large room for three boilers and several smaller rooms for office space, workshops, and rest rooms. The building was constructed in 1941. Building 2 is an administrative office and was constructed in 1985. Building 7 was a Flammable and Hazardous Materials Storage Building for operations in Building 11. The building is divided into four rooms, three for storage and one for electrical power. The building was constructed in 1989. Building 12 was the Operations Training Building and includes offices and classrooms for training. The building was built in 1941 as a utility building and hospital. In 1943, the building was converted to a headquarters administrative facility. In 1989, the building was converted to Operations Training (ABB, 1994).

Soil contaminated with polynuclear aromatic hydrocarbons (PAHs), total recoverable petroleum hydrocarbons (TRPH), arsenic, mercury, and vanadium was delineated during earlier investigations. The contaminated soil was excavated and disposed of offsite (CH2M Hill, 2001). Groundwater contaminated by lead and vanadium was also identified in earlier studies, and this contamination is the subject of this RI. These earlier investigations are further described elsewhere in this report.

The name of the site has been changed over the course of the investigations. In the Environmental Baseline Study investigation, the site was designated as Facility 11. When it was determined that soil contamination was over a large area, the area was redesignated Potential Source of Contamination (PSC)



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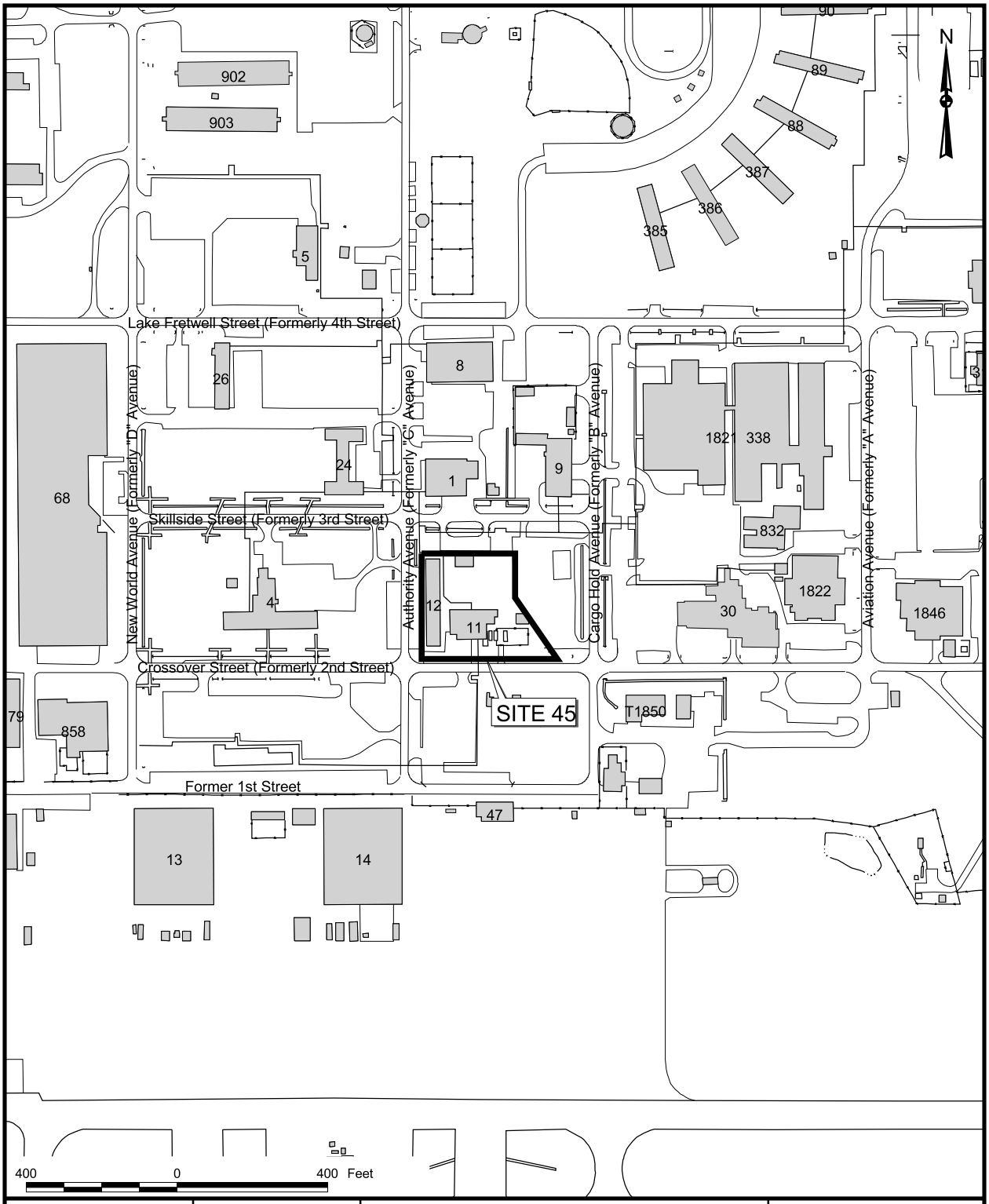
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-1 / REV 1

P:\GIS\NAS_CecilField\PSC45_RI_Rev1.apr 14May01 MJJ Site Location Map Layout



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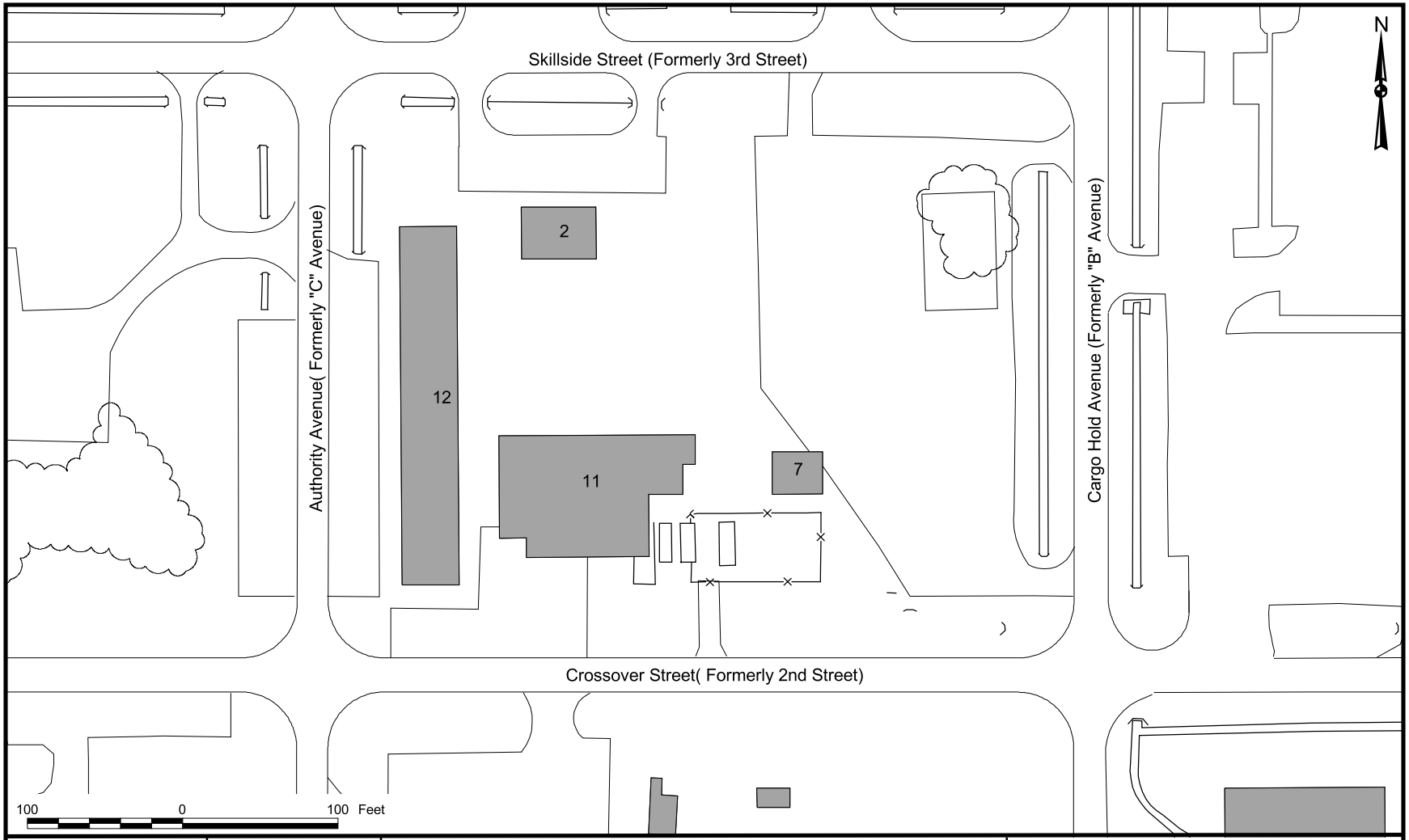

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45 in January 1999. When the presence of groundwater contamination was confirmed, the area was designated as Installation Restoration (IR) Site 45 and Operable Unit (OU) 11 in February 2000. Vanadium concentrations of 54.2 micrograms per liter (µg/L), 220 µg/L, 290 µg/L, and 744 µg/L have been measured in each of four wells. Lead concentrations of 17.3 µg/L and 18.8 µg/L have been measured in each of two wells.

1.2.2 Site History

Since its construction, Building 11 has been used for steam generation for the entire base. Building 7 has always stored chemicals used in Building 11. The adjacent buildings, Buildings 2 and 12, have always been used for administrative functions. Three above ground storage tanks provided fuel to the boilers, and an underground storage tank provided fuel to Building 11 for an emergency generator (ABB, 1994).

1.2.3 Previous Investigations and Actions

1.2.3.1 Preliminary and Tank Investigations

Previous investigations, studies, and actions in and around Site 45 are summarized below:

- November 1995 through February 1996 – Phase II investigation (BRAC program) of Building 7 by ABB Environmental Services (ABB-ES). One monitoring well was installed and sampled and one soil sample was collected. Samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) inorganics (HLA, 1997).

- November 1995 through September 1998 – Phase II investigation (BRAC program) of Building 11 by Harding Lawson Associates (HLA). One monitoring well was installed and sampled and four soil samples were collected. Samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics. An additional seven surface soil samples and 2 subsurface soil samples were collected and analyzed for PAHs (HLA, 1999a).

- January 1997 through August 1997 – Confirmatory sampling investigation for underground storage tank (UST) 11A was performed by HLA. Five soil borings for headspace analysis were advanced. One monitoring well was installed and one groundwater sample was analyzed for Florida Kerosene Analytical Group (KAG) parameters (HLA, 1998a).

- February 1997 through October 1998 – Confirmatory sampling investigation and Site Assessment investigation for above ground storage tanks 11B, 11C, and 11D were performed by HLA. Six soil

borings for headspace analysis were advanced. One monitoring well was installed and one groundwater sample and one subsurface soil sample were analyzed for Florida KAG parameters (HLA 1998b, 1999b, and 1999c).

- April 1999 through March 2000 – PSC investigation of PSC 45 by TtNUS. Samples were collected to delineate soil and groundwater contamination. This investigation is described in detail below.

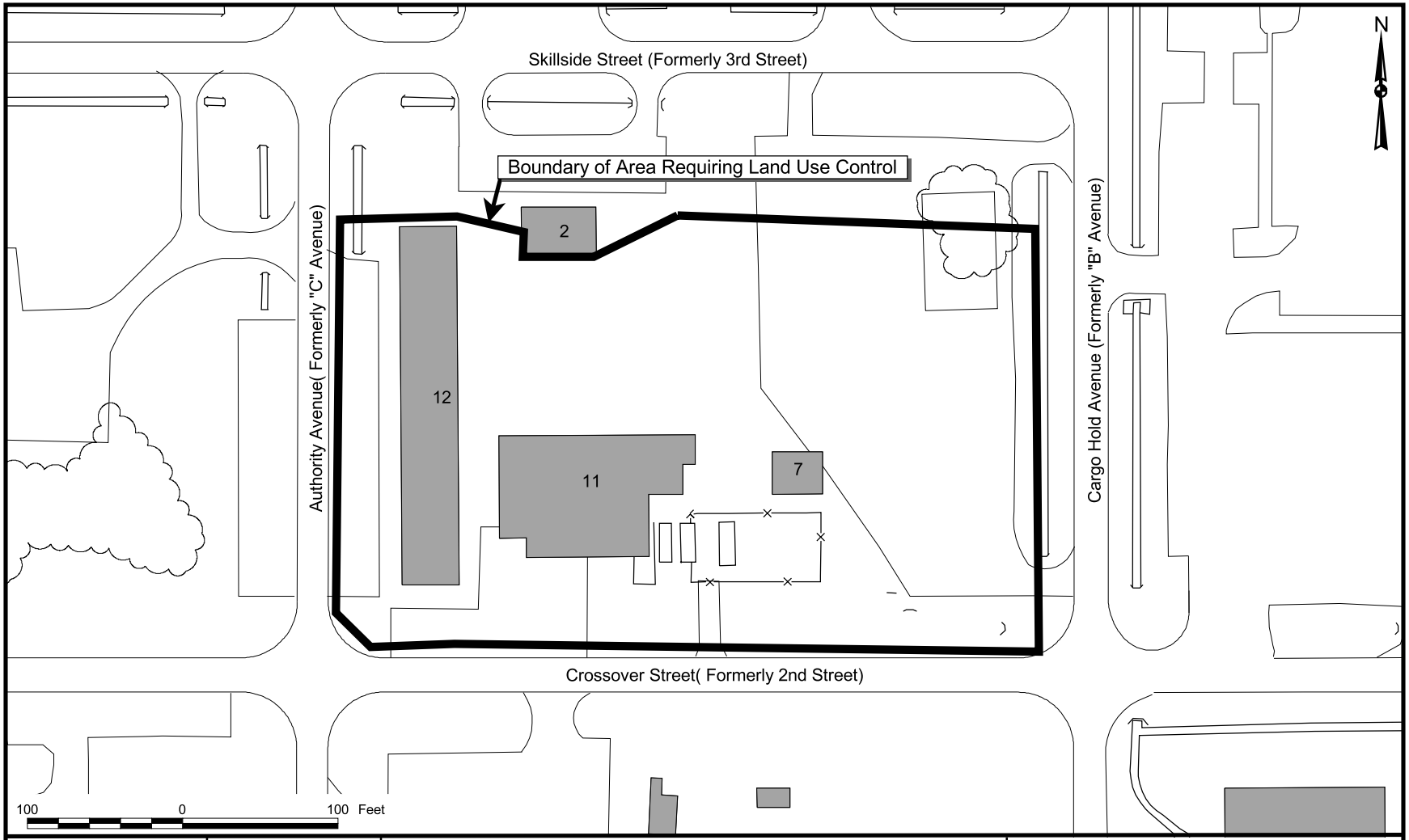
- Because the extent of site contamination was not completely delineated in the vicinity of Site 45 when the Main Base property was transferred to the City of Jacksonville in 2000, a parcel of land requiring land use controls was identified. Only part of the area within the parcel will be subject to land use controls when all remedial actions are complete. Therefore, the extent of the area(s) requiring land use controls may be further refined prior to transfer of the parcel. The boundaries of the parcel as they were created in 2000 are shown on Figure 1-4.

- No investigations were performed at Buildings 2 and 12 based on the activities in the buildings.

1.2.3.2 PSC Investigation

Six soil sampling and analysis events were conducted at PSC 45 between April 1999 and March 2000 to delineate the extent of PAH-, total recoverable petroleum hydrocarbon- (TRPH-), and inorganic contaminated surface soil that had been identified during the preliminary investigations. A total of 88 soil samples were collected.

- During Phase I, 23 surface soil samples were collected at a depth interval of 0- to 1-foot below ground surface (bgs) to determine the horizontal extent of contamination at Facility 11. Twelve surface soil samples (CEF-P45-SS-001 to CEF-P45-SS-012) were collected in a grid pattern in the large area north of Facility 11 to determine the horizontal extent of PAH, arsenic, and vanadium contamination. One of the samples, CEF-P45-SS-012, was also analyzed for TRPH and mercury to delineate the northern boundary of those contaminants. In addition, two surface soil samples (CEF-P45-SS-013 and CEF-P45-SS-015) collected in the small area of stressed vegetation near Facilities 7 and 11 were analyzed for PAHs, TRPH, mercury and vanadium. Also, seven surface soil samples (CEF-P45-SS-017 to CEF-P45-SS-023) collected along 2nd Street near the above ground storage tanks and in a small area of stressed vegetation near 2nd Street were analyzed for PAHs and TRPH. In addition, one surface soil sample, CEF-P45-SS-014, was collected west of Facility 11 and analyzed for PAHs. Finally, one surface soil sample, CEF-P45-SS-016, was collected east of the above ground storage tanks and analyzed for PAHs, TRPH, mercury, and vanadium.



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SCALE AS NOTED			DRAWING NO. FIGURE 1-4 / REV 1

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- During Phase II, 29 soil samples were collected to further delineate the extent of contamination in the following five areas within Facility 11: 14 soil samples were collected in the area north of Facility 11 and between Facilities 11 and 7 to delineate the horizontal and vertical extent of PAH, TRPH, arsenic, and vanadium contamination in that area. To the east of the above ground storage tanks four surface soil samples were collected and one sample was collected from the 1- to 2-foot depth interval to further delineate PAH contamination (horizontally and vertically). To the south of the above ground storage tanks in the swale, two surface soil samples were collected and one sample was collected from the 1- to 2-foot depth interval to further delineate TRPH contamination (horizontally and vertically). Along 2nd Street, three surface soil samples were collected and one sample was collected from the 1- to 2-foot depth interval to further delineate PAH contamination (horizontally and vertically). Approximately 340 feet east of sample location CEF-P45-SS-024, two surface soil samples were collected and one sample was collected from the 1- to 2-foot depth interval to further delineate PAH contamination (horizontally and vertically).

- During Phase III, 11 soil samples were collected to further delineate the extent of previously encountered PAH, TRPH, arsenic, mercury, and vanadium contamination in the following four areas within Facility 11: in the area north of Facility 11 and between Facilities 11 and 7, east of the above ground storage tanks, south of the above ground storage tanks in the swale, and along 2nd Street.

- During Phase IV, one surface soil and two subsurface soil samples were collected to further define horizontal and vertical limits of excavation for PAH-, TRPH-, and vanadium-contaminated soil. Two soil samples were collected near a well that had a high vanadium concentration to verify the presence of vanadium in the soil in an area where no previous vanadium data were collected.

- During Phase V, two surface soil samples and one subsurface soil sample were collected to further define the horizontal and vertical excavation limits for arsenic- and vanadium-contaminated soil. In addition, one subsurface soil sample was collected and analyzed for PAHs at the location of a sample that had been previously collected as part of the Oil/Water Separator investigation and exhibited a high PAH concentration.

- Finally, during Phase VI, 16 surface and subsurface soil samples were collected and analyzed for PAHs, TRPH, and vanadium to further define horizontal and vertical excavation limits.

Over the six phases of sampling, 11 duplicate soil samples were collected for quality assurance/ quality control (QA/QC) purposes.

Soil samples were collected as grab samples using plastic, disposable trowels. Sampling activities were performed in accordance with the procedures described in the U.S. Environmental Protection Agency (USEPA) Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM) (USEPA Region 4, 1996) and the NAS Cecil Field Base-Wide Generic Work Plan (TtNUS, 1998). As agreed by the BCT, no rinsate and trip blanks were collected. In addition, field blanks were not collected because the sampling equipment was disposable.

The soil samples were analyzed for PAHs by USEPA Method SW-846 8310 and for TRPH by the Florida Petroleum Residual Organics (FL-PRO) method.

Three groundwater sampling and analysis events were conducted at PSC 45 between July 1999 and October 1999 to identify the extent of groundwater contamination based on the observation of the level of soil contamination. Water level measurements were made to assess groundwater flow direction in the site area.

- In July 1999, three shallow monitoring wells, CEF-P45-1S, CEF-P45-2S, and CEF-P45-3S, were installed in the areas with the highest soil contamination. Each well was about 15 feet deep and had a screen that was 10 feet long. The three new wells and an existing well, CEF-7-1Sa, were sampled and analyzed for PAHs, TRPH, and vanadium.

- In the September 1999 event, two shallow monitoring wells, CEF-P45-4S and CEF-P45-5S, were installed upgradient and downgradient of the first wells to define the extent of the plume. Each well was about 15 feet deep and had a screen that was 10 feet long. The two new wells were sampled and analyzed for vanadium.

- In the October 1999 event, an existing well, CEF-11-1Sb, was sampled and analyzed for VOCs, PAHs, TRPH, lead, and vanadium to fulfill the requirements of a petroleum tank investigation at the site and to determine the extent of vanadium.

Over the three sampling events, three duplicate groundwater samples were collected for quality assurance/ quality control (QA/QC) purposes.

Groundwater samples were collected using low-flow purge methods. Sampling activities were performed in accordance with the procedures described in the USEPA Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM) (USEPA Region 4, 1996) and the NAS Cecil Field Base-Wide Generic Work Plan (TtNUS, 1998). As agreed by the BCT, no rinsate and trip blanks were collected.

The groundwater samples were analyzed for VOCs by USEPA Method SW-846 8260B, for PAHs by USEPA Method SW-846 8310, for metals by USEPA Method SW-846 6010B, and for TRPH by the FL-PRO method.

1.2.4 Removal Action

1.2.4.1 Determination of Soil to be Removed

The approach to determining the amount of soil to be removed is summarized here. The evaluation of the data and determination of the soil to be excavated were described in the Remedial Action Design Package that was included with the Action Memorandum (TtNUS, 2000). Additional details on the human health risk evaluation can be found in Sections 3.0 and 7.0 of this report.

Based on the Jacksonville Economic Development Commission's (JEDC) reuse plan for the area, the extent of contaminated soil was delineated based on industrial criteria. PAHs, TRPH, mercury, and vanadium were detected at concentrations in excess of the industrial Soil Cleanup Target Levels (SCTLs). A statistical evaluation was conducted to determine the areas requiring removal to achieve a site-wide upper confidence level (UCL) that was below the industrial SCTLs.

To determine how much excavation would be performed, a statistically-based approach was used. It was determined that not all samples with contaminant concentrations greater than the Florida industrial SCTLs would need to be removed. The exceedance of a criterion by an individual sample does not necessarily indicate a significant exceedance of a risk level. Exposure to the contaminants in the soil is a result of exposure to an area, not an individual sampling location. Therefore, the entire data set was used to determine a post-excavation exposure concentration that would be less than the industrial SCTL.

In addition to meeting the FDEP SCTL criteria, the excavation also had to meet the FDEP policy that requires the removal of all soil that has contaminant concentrations that are greater than 3 times the applicable criteria.

The exposure concentration is represented best by the 95% UCL of the mean. Using an iterative statistical process, the concentration above which soil must be removed to achieve a UCL less than or equal to the Florida industrial SCTL (pickup level) was determined. In theory, the sampling locations with the highest contaminant concentrations would be excavated and replaced with clean fill. The concentrations of excavated sample points were replaced with the contaminant concentrations of the backfill, or were set equal to one half of the detection limits for contaminants that were not detected in the backfill. The data set was evaluated in a stepwise manner by replacing the highest concentration with the

clean fill concentration, then recalculating the UCL. When the UCL was less than the Florida industrial SCTL, the calculations were stopped. If samples with concentrations greater than 3 times the industrial SCTL were still present, those samples were also removed. This iterative process indicated that soil with benzo(a)pyrene (BaP) concentrations greater than 1,500 µg/kg required removal to achieve a UCL less than 500 µg/kg. Arsenic and vanadium UCL concentrations were already less than their respective UCLs. Their concentrations were reduced due to the removal of BaP.

Horizontal excavation limits were determined by locating points halfway between the contaminated soil sample locations to be removed and the nearest sample locations not requiring excavation. Horizontal limits of excavation were not extended beneath buildings or paved areas.

The vertical limit of excavation was determined by collecting depth samples at the location that had the highest contaminant concentrations. Samples were collected at intervals of one foot until contaminant concentrations were found less than the industrial criteria. Therefore, in some locations, the depth of the excavation was 1 foot bgs and in others the depth was 2 feet bgs.

Note that because the human health risk is considered for industrial reuse on a site-wide basis, some individual sample locations remain where the contaminant concentrations are greater than industrial and residential SCTLs.

1.2.4.2 Summary of Removal Action

The Navy's Remedial Action Contractor (RAC), CH2M Hill Contractors, Inc., conducted the source removal activities from August 15 through August 18, 2000. The removal is described in the Source Removal Report (CH2M Hill, 2001) for PSC 45. The RAC characterized, transported, and disposed of 362.17 tons of excavated contaminated soil and restored the site to pre-excavation conditions. The excavated soil was transported and disposed off site from August 15 through August 17, 2000.

The soil was excavated using a track excavator and directly loaded into tarp-covered trucks, provided by Beaver Bulk Trucking, for transportation and disposal. Soils were excavated to the horizontal excavation limits and to the vertical excavation limits of 1 foot bgs or 2 feet bgs, as specified in the Remedial Action Design Package that was included with the Action Memorandum (TtNUS, 2000). The excavated soil was transported to the Broadhurst Landfill in Jessup, Georgia.

By defining the limits of excavation prior to the remediation activities, it was not necessary to collect confirmation samples after the remedial action was completed. Waste disposal classification samples, however, were collected by the RAC and the results were provided in the Source Removal Report (CH2M Hill, 2001).

The material used to backfill the excavation was clean fill obtained from the North Fuel Farm Clean Pile Nos. 5 and 6. The site was then graded and hydroseeded with a mixture of brown millet, rye, bahia grass, fertilizer, and mulch. The site has been returned to its pre-remedial-action condition.

Detailed information on the remedial activities, including photographs, copies of the soil manifests, certificates of disposal, and certificate of clean fill, is provided in the Source Removal Report (CH2M Hill, 2001).

1.2.5 Existing Data Summary

The extent of soil contamination has been presented and described in the Action Memorandum (TtNUS, 2000b). Table 1-1 provides a summary of the detected contaminants in the soil from all the previous investigations. A summary of that data, showing the range and average concentrations of contaminants in the soil samples, is provided on Table 1-2. Figure 1-5 shows the soil sample locations. This figure also shows the locations of the existing monitoring wells.

Figure 1-6 is a tag map that shows the concentration of contaminants greater than FDEP Soil Cleanup Target Levels (SCTLs) prior to excavation. As described in the Action Memorandum for PSC 45 (TtNUS, 2000b), the data were statistically evaluated and a site-specific risk-based cleanup concentration based on continued industrial use of the site was determined. The cleanup concentration was used to delineate the contaminated soil. The contaminated soil was excavated and replaced by clean fill. Figure 1-7 is a tag map that shows the soil samples with contaminant concentrations greater than industrial SCTLs that have not been excavated. Figure 1-8 is a tag map that shows the soil samples with contaminant concentrations greater than residential SCTLs that have not been excavated.

Because the focus of this investigation is on groundwater, the groundwater results are presented in this report. Table 1-3 presents a summary of the positive detections in groundwater samples collected prior to the RI. Table 1-4 presents a summary of that data, showing the range and average concentrations of contaminants in the groundwater samples. The groundwater sampling locations and analytical results are depicted on Figure 1-9. The groundwater analytical data are provided in Appendix D.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	45B00101	45B00201	45S00101	45S00201	45S00301	45S00401	45S00501	45S00601
Sample Number (CEF-P45-)(Note 1)	45B00101	45B00201	45S00101	45S00201	45S00301	45S00401	45S00501	45S00601
Sample Date	09/23/98	09/23/98	11/16/95	11/16/95	11/16/95	11/16/95	09/23/98	09/23/98
Depth, feet below ground surface	1 - 2	1 - 2	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)								
TRICHLOROETHENE			11 U	3 J	11 U	11 U		
Semivolatile Organics (ug/kg)								
1-METHYLNAPHTHALENE	17 U	170 U					170 U	17 U
2-METHYLNAPHTHALENE	17 U	170 U	370 U	360 U	20 J	350 U	170 U	17 U
ACENAPHTHENE	17 U	170 U	43 J	360 U	260 J	350 U	170 U	17 U
ACENAPHTHYLENE	3.3 U	33 U	20 J	18 J	350 U	350 U	33 U	3.3 U
ANTHRACENE	17 U	1200	98 J	20 J	410	20 J	410	17 U
BENZO(A)ANTHRACENE	12	2200	340 J	99 J	1300	220 J	1500	77
BENZO(A)PYRENE	2 U	1200	430	130 J	860	190 J	1200	80
BENZO(B)FLUORANTHENE	3 U	1400	550	240 J	1200	260 J	1400	120
BENZO(G,H,I)PERYLENE	3.3 U	1200	460	99 J	430	94 J	900	53
BENZO(K)FLUORANTHENE	2 U	800	150 J	100 J	380	130 J	630	47
BIS(2-ETHYLHEXYL)PHTHALATE			580	120 J	150 J	350 U		
BUTYLBENZYL PHTHALATE			260 J	27 J	350 U	350 U		
CARBAZOLE			99 J	360 U	490	350 U		
CHRYSENE	14	2300	470	150 J	1200	250 J	1800	93
DI-N-BUTYL PHTHALATE			36 J	78 J	350 U	350 U		
DIBENZO(A,H)ANTHRACENE	3.3 U	2000	65 J	25 J	180 J	38 J	900	3.3 U
DIBENZOFURAN			370 U	360 U	93 J	350 U		
FLUORANTHENE	9.6	6400	580	170 J	2100	380	3900	210
FLUORENE	3.3 U	710	39 J	360 U	210 J	350 U	220	41
INDENO(1,2,3-CD)PYRENE	1.7 U	870	160 J	67 J	440	100 J	800	60
NAPHTHALENE	17 U	170 U	370 U	360 U	38 J	350 U	170 U	17 U
PHENANTHRENE	5 J	4900	400	28 J	1600	150 J	1900	70
PYRENE	9.3	3500	890	130 J	1600	270 J	2300	130
Pesticides/PCBs (ug/kg)								
4,4'-DDD			3.7 U	3.6 U	3.6 U	8.3 J		
4,4'-DDE			0.21 J	24	1.9 J	160		
4,4'-DDT			3.7 U	22	3.6 U	44		
ALDRIN			1.8 U	1.8 U	0.4 J	8.8 U		
ALPHA-CHLORDANE			1.6 J	5.3	0.2 J	18		
AROCLOR-1254			73	280	36 U	180 U		
ENDOSULFAN I			0.54 J	4.1	1.8 U	0.42 J		
ENDRIN			3.7 U	3.6 U	3.6 U	0.39 J		
ENDRIN KETONE			3.7 U	0.83 J	3.6 U	18 U		
GAMMA-CHLORDANE			1.8 J	1.6 J	1.8 U	15		
HEPTACHLOR EPOXIDE			1.8 U	1.8 U	1.8 U	1.4 J		
Inorganics (mg/kg)								
ALUMINUM			2440	4430	2450	1460		
ARSENIC	0.9 J		0.67 U	1.7 J	5.5	1.3 J		1.6 J
BARIUM			19.3 J	54.4	6.2 J	3.4 J		
BERYLLIUM			0.22 U	0.33 J	0.21 U	0.21 U		
CADMIUM			0.22 U	0.54 J	0.21 U	0.34 J		
CHROMIUM			8	14.3	5.5	2.5		
COBALT			0.59 J	1.3 J	0.22 J	0.21 U		
COPPER			22.3	73.3	8.7	48.5		
CYANIDE			0.17 J	0.1 U	0.11 U	0.1 U		
IRON			2530	6000	1780	3250		
LEAD			26.2	112	19.4	10.5		
MANGANESE			39.5	118	12.6	11.2		
MERCURY			0.76	5.2	0.11 U	0.11 U		
NICKEL			6.2 J	24.8	11.6	4.6 J		
SILVER			0.22 U	0.26 J	0.29 J	0.21 U		
VANADIUM			21.5	55.7	27.6	4.5 J		
ZINC			66.6	144	22.9	22.6		
Petroleum Hydrocarbons (mg/kg)								
TRPH		220	770	560	230	23		

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	45S00701	45S00801	45S00901	45S01001	45S01101	SS-001	SS-002	SS-003	SS-004
Sample Number (CEF-P45-)(Note 1)	45S00701	45S00801	45S00901	45S01001	45S01101	SS-001	SS-002	SS-003	SS-004
Sample Date	09/23/98	09/23/98	09/23/98	09/23/98	09/23/98	04/27/99	04/27/99	04/27/99	04/27/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)									
TRICHLOROETHENE									
Semivolatile Organics (ug/kg)									
1-METHYLNAPHTHALENE	17 U	170 U	84 U	170 U	170 U	100 U	105 U	100 U	106 U
2-METHYLNAPHTHALENE	17 U	170 U	84 U	170 U	170 U	100 U	105 U	100 U	106 U
ACENAPHTHENE	17 U	170 U	84 U	170 U	170 U	100 U	105 U	100 U	106 U
ACENAPHTHYLENE	3.3 U	33 U	16 U	33 U	33 U	100 U	105 U	100 U	106 U
ANTHRACENE	32	440	83 U	170 U	170 U	16 U	16 U	15 U	16 U
BENZO(A)ANTHRACENE	83	1400	100	250	260	16 U	16 U	15 U	16 U
BENZO(A)PYRENE	25	1000	120	270	200	16 U	16 U	15 U	16 U
BENZO(B)FLUORANTHENE	110	1100	160	330	270	16 U	16 U	15 U	16 U
BENZO(G,H,I)PERYLENE	27	770	81	220	160	16 U	16 U	15 U	16 U
BENZO(K)FLUORANTHENE	27	530	71	200	150	16 U	16 U	15 U	16 U
BIS(2-ETHYLHEXYL)PHTHALATE									
BUTYLBENZYL PHTHALATE									
CARBAZOLE									
CHRYSENE	70	1600	200	340	320	16 U	16 U	15 U	16 U
DI-N-BUTYL PHTHALATE									
DIBENZO(A,H)ANTHRACENE	130	730	100	420	450	16 U	16 U	15 U	16 U
DIBENZOFURAN									
FLUORANTHENE	310	3400	460	580	820	16 U	16 U	15 U	16 U
FLUORENE	3.3 U	210	28	33 U	33 U	100 U	105 U	100 U	106 U
INDENO(1,2,3-CD)PYRENE	44	630	93	230	170	16 U	16 U	15 U	16 U
NAPHTHALENE	17 U	170 U	84 U	170 U	170 U	100 U	105 U	100 U	106 U
PHENANTHRENE	150	1800	290	180	250	100 U	105 U	100 U	106 U
PYRENE	340	2000	240	400	730	16 U	16 U	15 U	16 U
Pesticides/PCBs (ug/kg)									
4,4'-DDD									
4,4'-DDE									
4,4'-DDT									
ALDRIN									
ALPHA-CHLORDANE									
AROCLOR-1254									
ENDOSULFAN I									
ENDRIN									
ENDRIN KETONE									
GAMMA-CHLORDANE									
HEPTACHLOR EPOXIDE									
Inorganics (mg/kg)									
ALUMINUM									
ARSENIC	1.3 J	1.4 J				9.6	5	0.81 U	0.34 U
BARIUM									
BERYLLIUM									
CADMIUM									
CHROMIUM									
COBALT									
COPPER									
CYANIDE									
IRON									
LEAD									
MANGANESE									
MERCURY									
NICKEL									
SILVER									
VANADIUM						9.1	6	13.2	9.4
ZINC									
Petroleum Hydrocarbons (mg/kg)									
TRPH				150	120				

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-005	SS-006	SS-006	SS-007	SS-008	SS-009	SS-010	SS-011	SS-012	SS-012
Sample Number (CEF-P45-)(Note 1)	SS-005	SS-006	SS-DUP01	SS-007	SS-008	SS-009	SS-010	SS-011	SS-012	SS-DUP02
Sample Date	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	101 U	102 U	103 U	100 U	112 U	101 U	103 U	105 U	103 U	102 U
2-METHYLNAPHTHALENE	101 U	102 U	103 U	100 U	1111	101 U	4080	1230	103 U	102 U
ACENAPHTHENE	101 U	102 U	103 U	100 U	281	101 U	6540	1150	103 U	102 U
ACENAPHTHYLENE	101 U	102 U	103 U	100 U	112 U	101 U	238	105 U	103 U	102 U
ANTHRACENE	101 U	102 U	103 U	100 U	112 U	101 U	1660	286	103 U	102 U
BENZO(A)ANTHRACENE	111	15 U	15 U	15 U	3162	15 U	3850	810	15 U	15 U
BENZO(A)PYRENE	149	15 U	15 U	15 U	5923	15 U	3230	705	157	128
BENZO(B)FLUORANTHENE	182	15 U	15 U	15 U	12029	15 U	3420	861	138	144
BENZO(G,H,I)PERYLENE	15 U	15 U	15 U	15 U	9790	15 U	2520	361	170	170
BENZO(K)FLUORANTHENE	154	15 U	15 U	15 U	4323	15 U	1480	429	15 U	15 U
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	15 U	15 U	15 U	15 U	5782	15 U	4910	1270	15 U	15 U
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	15 U	15 U	15 U	15 U	1331	15 U	413	15 U	15 U	15 U
DIBENZOFURAN										
FLUORANTHENE	760	15 U	15 U	15 U	5952	15 U	8750	2020	15 U	103 J
FLUORENE	101 U	102 U	103 U	100 U	112 U	101 U	1870	418	103 UJ	103 U
INDENO(1,2,3-CD)PYRENE	15 U	15 U	15 U	15 U	7076	15 U	2490	380	194	15 U
NAPHTHALENE	101 U	102 U	103 U	100 U	112 U	101 U	103 U	105 U	103 U	103 U
PHENANTHRENE	101 U	102 U	103 U	100 U	112 U	101 U	6300	1610	103 U	103 U
PYRENE	456	15 U	15 U	15 U	7110	15 U	6720	1590	128	149
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC	2.6	0.38 U	0.28 U	2	6	7.2	1.7 U	0.99 U	0.47 U	0.98 U
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY									0.04 U	0.04 U
NICKEL										
SILVER										
VANADIUM	10.6	2.4 U	1.8	10.4	62.8	5.9	136	20.3	58.4	39.1
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH									109 J	388 J

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-013	SS-014	SS-015	SS-016	SS-017	SS-018	SS-019	SS-020	SS-021	SS-022
Sample Number (CEF-P45-)(Note 1)	SS-013	SS-014	SS-015	SS-016	SS-017	SS-018	SS-019	SS-020	SS-021	SS-022
Sample Date	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99	04/27/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	105 U	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
2-METHYLNAPHTHALENE	681	115 U	108 U	102 U	110 U	133	102 U	108 U	102 U	101 U
ACENAPHTHENE	307	115 U	108 U	102 U	110 U	155	102 U	108 U	102 U	101 U
ACENAPHTHYLENE	1240	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
ANTHRACENE	105 U	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
BENZO(A)ANTHRACENE	1010	17 U	16 U	156	16 U	316	15 U	16 U	155	15 U
BENZO(A)PYRENE	1900	17 U	16 U	425	16 U	658	15 U	16 U	337	147
BENZO(B)FLUORANTHENE	2430	17 U	16 U	593	16 U	800	15 U	16 U	444	186
BENZO(G,H,I)PERYLENE	1150	17 U	16 U	549	16 U	470	15 U	16 U	289	136
BENZO(K)FLUORANTHENE	912	17 U	16 U	266	16 U	385	15 U	16 U	228	15 U
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	1750	17 U	16 U	316	16 U	533	15 U	16 U	295	15 U
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	16 U	17 U	16 U	15 U	16 U	15 U	15 U	16 U	15 U	15 U
DIBENZOFURAN										
FLUORANTHENE	2060	17 U	16 U	334	16 U	393	15 U	16 U	230	15 UJ
FLUORENE	105 U	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
INDENO(1,2,3-CD)PYRENE	1270	17 U	16 U	604	16 U	526	15 U	16 U	398	137
NAPHTHALENE	178	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
PHENANTHRENE	272	115 U	108 U	102 U	110 U	100 U	102 U	108 U	102 U	101 U
PYRENE	2280	17 U	16 U	337	16 U	500	15 U	16 U	247	183
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY	0.07		0.05	0.04 U						
NICKEL										
SILVER										
VANADIUM	162		10.5							
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH	440		341	148		94.5	52.6		44.7	54.9

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-022	SS-023	SS-024	SS-101	SS-102	SS-103	SS-104	SS-105	SS-106	SS-107
Sample Number (CEF-P45-)(Note 1)	SS-DUP03	SS-023	SS-024	SS-101-01	SS-102-01	SS-103-01	SS-104-01	SS-105-01	SS-106-01	SS-107-01
Sample Date	04/27/99	04/27/99	04/27/99	06/29/99	06/29/99	06/29/99	06/29/99	06/29/99	06/29/99	06/29/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	101 U	103 U	109 U				38 U	36 U	36 U	36 U
2-METHYLNAPHTHALENE	101 U	103 U	109 U				180	230	89	1100
ACENAPHTHENE	101 U	103 U	109 U				330	460	150	2300
ACENAPHTHYLENE	101 U	103 U	109 U				78 U	74 U	74 U	73 U
ANTHRACENE	101 U	103 U	109 U				30	40	10	300
BENZO(A)ANTHRACENE	15 U	15 U	16 U				260	130	59	830
BENZO(A)PYRENE	117	15 U	182				550	230	84	730
BENZO(B)FLUORANTHENE	132	15 U	194				1100	400	120	890
BENZO(G,H,I)PERYLENE	128	15 U	176				570	350	140	540
BENZO(K)FLUORANTHENE	15 U	15 U	16 U				480	160	49	420
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	15 U	15 U	175				290	240	76	920
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	15 U	15 U	16 U				15	21	11	38
DIBENZOFURAN										
FLUORANTHENE	157 J	15 U	182				350	370	140	2000
FLUORENE	101 U	103 U	109 U				11	13	7.4 U	73
INDENO(1,2,3-CD)PYRENE	156	15 U	188				520	180	48	450
NAPHTHALENE	101 U	103 U	109 U				42	42	36 U	63
PHENANTHRENE	101 U	103 U	109 U				96	110	40	1100
PYRENE	139	15 U	185				570	280	110	1500
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC				6.3	0.72	2.2				
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM							20	12.9	26.7	30.3
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH	51.2	439					109	100	150	393

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-108	SS-109	SS-110	SS-111	SS-112	SS-113	SS-114	SS-115	SS-116	SS-117
Sample Number (CEF-P45-)(Note 1)	SS-108-01	SS-109-01	SS-110-01	SS-111-01	SS-112-01	SS-113-01	SS-114-01	SS-115-01	SS-116-01	SS-117-01
Sample Date	06/29/99	06/29/99	06/29/99	06/30/99	06/30/99	06/30/99	06/30/99	06/30/99	06/30/99	06/30/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	36 U	37 U		39 U	36 U	38 U	38 U			35 U
2-METHYLNAPHTHALENE	280	7400		230	190	4700	700			85
ACENAPHTHENE	440	14000		380	340	6600	1200			250
ACENAPHTHYLENE	74 U	370		79 U	73 U	370	76 U			71 U
ANTHRACENE	71	4700		39	52	210	57			21
BENZO(A)ANTHRACENE	250	6400		130	160	5800	2000			92
BENZO(A)PYRENE	160	3700		210	230	7300	2000			110
BENZO(B)FLUORANTHENE	250	5000		350	340	16000	4200			120
BENZO(G,H,I)PERYLENE	140	2400		280	310	7300	2300			72
BENZO(K)FLUORANTHENE	110	2600		140	150	7500	1900			55
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	220	6400		180	150	9500	1900			110
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	19	320		11	29	190	260			10
DIBENZOFURAN										
FLUORANTHENE	520	19000		370	360	12000	2400			240
FLUORENE	19	2400		13	16	83	49			7 U
INDENO(1,2,3-CD)PYRENE	45	1900		130	150	6200	1500			56
NAPHTHALENE	45	1900		43	38	230	99			35 U
PHENANTHRENE	270	17000		130	200	1100	210			100
PYRENE	420	13000		280	310	15000	3400			170
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC		2.9	1.5							
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM	92.6	276								
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH	489							95 U	92 U	

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-118	SS-119	SS-120	SS-121	SS-122	SS-122	SS-123	SS-123	SS-124	SS-016
Sample Number (CEF-P45-)(Note 1)	SS-118-01	SS-119-01	SS-120-01	SS-121-01	SS-122-02	SS-DU04	SS-123-02	SS-DU05	SS-124-02	SS-125-02
Sample Date	06/30/99	06/30/99	06/30/99	06/30/99	06/29/99	06/29/99	06/29/99	06/29/99	06/29/99	06/30/99
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	1 - 2	1 - 2	1 - 2	1 - 2	1 - 2	1 - 2
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	170	34 U	37 U	37 U	38 J	120 J	37 U	70 U	36 U	36 U
2-METHYLNAPHTHALENE	870	34 U	46	54	36 U	35 U	37 U	37 U	1700	170
ACENAPHTHENE	1700	34 U	56	56	36 U	35 U	37 U	37 U	2800	290
ACENAPHTHYLENE	72 U	70 U	76 U	76 U	73 U	72 U	75 U	74 U	100	74 U
ANTHRACENE	240	5.2 U	6.4	9.3	5.4 U	5.4 U	10	12	710	29
BENZO(A)ANTHRACENE	760	74	43	49	5.4 U	10	54	66	3400	110
BENZO(A)PYRENE	560	140	80	81	5.4 U	5.4 U	90	110	3900	210
BENZO(B)FLUORANTHENE	710	190	110	130	5.4 U	13	200	270	6600	340
BENZO(G,H,I)PERYLENE	470	190	91	94	7.3 U	7.2 U	110	160	2800	350
BENZO(K)FLUORANTHENE	350	82	46	55	5.4 U	5.8	86	110	2900	140
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	640	68	47	63	5.4 U	6.8	43	61	2900	98
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	10	8.6 U	9.3 U	9.4 U	9 U	8.9 U	14	9.2 U	36	9 U
DIBENZOFURAN										
FLUORANTHENE	2000	89	72	99	41	41	84	91	7100	220
FLUORENE	96	7 U	7.5 U	7.6	7.3 U	7.2 U	7.4 U	7.4 U	63	9.9
INDENO(1,2,3-CD)PYRENE	260	56	60	58	5.4 U	5.4 U	81	100	2300	170
NAPHTHALENE	110	34 U	50	37 U	36 U	35 U	37 U	37 U	2600	36 U
PHENANTHRENE	1300	14	28	20	13	19	7.1	6.2	720	88
PYRENE	1400	110	82	80	25	28	120	120	5400	210
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC							0.39 U	0.39 U		
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM							3	4.3	174	
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH									494	

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-023	SS-023	SS-018	SS-024	SS-129	SS-201	SS-202	SS-203	SS-204	SS-207
Sample Number (CEF-P45-)(Note 1)	SS-126-02	SS-DU06	SS-127-02	SS-128-02	SS-129-02	SS-201-01	SS-202-01	SS-203-01	SS-204-01	SS-207-01
Sample Date	06/30/99	06/30/99	06/30/99	06/30/99	06/29/99	09/10/99	09/10/99	09/10/99	09/10/99	09/10/99
Depth, feet below ground surface	1 - 2	1 - 2	1 - 2	1 - 2	1 - 2	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE			35 U	37 U						
2-METHYLNAPHTHALENE			210	37 U						
ACENAPHTHENE			340	37 U						
ACENAPHTHYLENE			71 U	74 U						
ANTHRACENE			35	5.5 U						
BENZO(A)ANTHRACENE			280	16						
BENZO(A)PYRENE			500	38						
BENZO(B)FLUORANTHENE			610	53						
BENZO(G,H,I)PERYLENE			450	100						
BENZO(K)FLUORANTHENE			270	20						
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE			250	25						
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE			13	9.2 U						
DIBENZOFURAN										
FLUORANTHENE			260	45						
FLUORENE			7.1	7.4 U						
INDENO(1,2,3-CD)PYRENE			260	44						
NAPHTHALENE			35 U	37 U						
PHENANTHRENE			79	13						
PYRENE			320	39						
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC						3.6	1.5 U			0.39 U
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY					0.07					
NICKEL										
SILVER										
VANADIUM								45.9		8.7
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH	90 U	90 U							16.5	3380

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-208	SS-211	SS-301	SS-302	SS-302	SS-303	SS-401	SS-401	SS-402	SS-501
Sample Number (CEF-P45-)(Note 1)	SS-208-01	SS-211-01	SS-301-01	SS-302-01	SS-DU03	SS-303-01	SS-401-01	SS-DU04	SS-402-01	SS-501-02
Sample Date	09/10/99	09/13/99	10/14/99	10/14/99	10/14/99	10/22/99	01/21/00	01/21/00	01/21/00	03/08/00
Depth, feet below ground surface	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	1 - 2
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE		71 U				73 U				170 U
2-METHYLNAPHTHALENE		71 U				73 U				170 U
ACENAPHTHENE		71 U				73 U				170 U
ACENAPHTHYLENE		71 U				73 U				170 U
ANTHRACENE		71 U				73 U				170 U
BENZO(A)ANTHRACENE		11 U				25.4				26 U
BENZO(A)PYRENE		11 U				51.9				26 U
BENZO(B)FLUORANTHENE		15				122				26 U
BENZO(G,H,I)PERYLENE		11 U				11 U				26 U
BENZO(K)FLUORANTHENE		11 U				11 U				26 U
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE		30				11 U				26 U
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE		11 U				11 U				26 U
DIBENZOFURAN										
FLUORANTHENE		11.1				133				26 U
FLUORENE		71 U				73 U				170 U
INDENO(1,2,3-CD)PYRENE		21.2				11 U				26 U
NAPHTHALENE		71 U				73 U				170 U
PHENANTHRENE		71 U				73 U				170 U
PYRENE		11.9				84.8				26 U
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC	0.66 U								0.4 U	
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM	9.7		16.4 J	18.9 J	9.3 J		5.4	5		
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH	344									

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-503	SS-505	SS-507	SS-509	SS-511	SS-511	SS-512	SS-513	SS-514	SS-515
Sample Number (CEF-P45-)(Note 1)	SS-503-02	SS-505-02	SS-507-02	SS-509-02	SS-511-01	SS-DU06	SS-512-01	SS-513-02	SS-514-02	SS-515-02
Sample Date	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00
Depth, feet below ground surface	1 - 2	1 - 2	1 - 2	1 - 2	0 - 1	0 - 1	0 - 1	1 - 2	1 - 2	1 - 2
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE	170 U		180 U		180 U	180 U	246	170 U	170 U	
2-METHYLNAPHTHALENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
ACENAPHTHENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
ACENAPHTHYLENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
ANTHRACENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
BENZO(A)ANTHRACENE	26 U		27 U		28 J	57.6 J	140	26.3	26 U	
BENZO(A)PYRENE	26 U		27 U		14.3 J	33.4 J	226	16.8 J	26 U	
BENZO(B)FLUORANTHENE	26 U		27 U		90.6 J	164 J	888	34.7	26 U	
BENZO(G,H,I)PERYLENE	26 U		27 U		64.4	103	569	26 U	26 U	
BENZO(K)FLUORANTHENE	26 U		27 U		39.3 J	69.7 J	310	26 U	26 U	
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE	26 U		27 U		48.3 J	99.2 J	317	37.9	26 U	
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE	26 U		27 U		27 UJ	28.7 J	27 U	26 U	26 U	
DIBENZOFURAN										
FLUORANTHENE	26 U		27 U		117 J	251 J	663	79.7	26 U	
FLUORENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
INDENO(1,2,3-CD)PYRENE	26 U		27 U		55	91.4	435	26 U	26 U	
NAPHTHALENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
PHENANTHRENE	170 U		180 U		180 U	180 U	180 U	170 U	170 U	
PYRENE	26 U		27 U		86.3 J	157 J	435	53.2	26 U	
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM	13.8			15	12.3	15.9	5.6			3.9
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH		29.2								

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-516	SU-209	SU-209	SS-210	SU-304	SU-305	SU-403	SU-404	SS-501	SS-503
Sample Number (CEF-P45-)(Note 1)	SS-516-02	SU-209-03	SU-DU07	SU-210-03	SU-304-03	SU-305-04	SU-403-04	SU-404-03	SU-502-03	SU-504-03
Sample Date	03/08/00	09/13/99	09/13/99	09/13/99	10/22/99	10/22/99	01/21/00	01/21/00	03/08/00	03/08/00
Depth, feet below ground surface	1 - 2	2 - 3	2 - 3	2 - 3	2 - 3	3 - 4	3 - 4	2 - 3	2 - 3	2 - 3
Volatile Organics (ug/kg)										
TRICHLOROETHENE										
Semivolatile Organics (ug/kg)										
1-METHYLNAPHTHALENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
2-METHYLNAPHTHALENE		74 U	79 U	69.3		77 U		77 U	170 U	170 U
ACENAPHTHENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
ACENAPHTHYLENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
ANTHRACENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
BENZO(A)ANTHRACENE		11 U	12 U	131		14.8		61.7	26 U	26 U
BENZO(A)PYRENE		11 U	42	458		20.9		23.5	26 U	26 U
BENZO(B)FLUORANTHENE		11 U	12 U	574		12.9		49	26.3	26 U
BENZO(G,H,I)PERYLENE		11 U	12 U	519		12 U		67.4	26 U	26 U
BENZO(K)FLUORANTHENE		11 U	12 U	195		12 U		37.9	26 U	26 U
BIS(2-ETHYLHEXYL)PHTHALATE										
BUTYLBENZYL PHTHALATE										
CARBAZOLE										
CHRYSENE		11 U	12 U	186		37.1		73.1	26 U	26 U
DI-N-BUTYL PHTHALATE										
DIBENZO(A,H)ANTHRACENE		11 U	12 U	10 U		12 U		23.7	26 U	26 U
DIBENZOFURAN										
FLUORANTHENE		11 U	12 U	58.2		36.3		178	26 U	26 U
FLUORENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
INDENO(1,2,3-CD)PYRENE		11 U	12 U	518		12 U		60	26 U	26 U
NAPHTHALENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
PHENANTHRENE		74 U	79 U	69 U		77 U		77 U	170 U	170 U
PYRENE		11 U	12 U	157		22.9		124	26 U	26 U
Pesticides/PCBs (ug/kg)										
4,4'-DDD										
4,4'-DDE										
4,4'-DDT										
ALDRIN										
ALPHA-CHLORDANE										
AROCLOR-1254										
ENDOSULFAN I										
ENDRIN										
ENDRIN KETONE										
GAMMA-CHLORDANE										
HEPTACHLOR EPOXIDE										
Inorganics (mg/kg)										
ALUMINUM										
ARSENIC										
BARIUM										
BERYLLIUM										
CADMIUM										
CHROMIUM										
COBALT										
COPPER										
CYANIDE										
IRON										
LEAD										
MANGANESE										
MERCURY										
NICKEL										
SILVER										
VANADIUM	10.3				23.7		4.3			4.8
ZINC										
Petroleum Hydrocarbons (mg/kg)										
TRPH					30.3					

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1)	SS-503	SS-505	SS-507	SS-509
Sample Number (CEF-P45-)(Note 1)	SU-DU05	SU-506-03	SU-508-03	SU-510-03
Sample Date	03/08/00	03/08/00	03/08/00	03/08/00
Depth, feet below ground surface	2 - 3	2 - 3	2 - 3	2 - 3
Volatile Organics (ug/kg)				
TRICHLOROETHENE				
Semivolatile Organics (ug/kg)				
1-METHYLNAPHTHALENE	170 U		180 U	
2-METHYLNAPHTHALENE	170 U		180 U	
ACENAPHTHENE	170 U		180 U	
ACENAPHTHYLENE	170 U		180 U	
ANTHRACENE	170 U		180 U	
BENZO(A)ANTHRACENE	26 U		26 U	
BENZO(A)PYRENE	26 U		26 U	
BENZO(B)FLUORANTHENE	26 U		26 U	
BENZO(G,H,I)PERYLENE	26 U		26 U	
BENZO(K)FLUORANTHENE	26 U		26 U	
BIS(2-ETHYLHEXYL)PHTHALATE				
BUTYLBENZYL PHTHALATE				
CARBAZOLE				
CHRYSENE	26 U		26 U	
DI-N-BUTYL PHTHALATE				
DIBENZO(A,H)ANTHRACENE	26 U		26 U	
DIBENZOFURAN				
FLUORANTHENE	26 U		26 U	
FLUORENE	170 U		180 U	
INDENO(1,2,3-CD)PYRENE	26 U		26 U	
NAPHTHALENE	170 U		180 U	
PHENANTHRENE	170 U		180 U	
PYRENE	26 U		26 U	
Pesticides/PCBs (ug/kg)				
4,4'-DDD				
4,4'-DDE				
4,4'-DDT				
ALDRIN				
ALPHA-CHLORDANE				
AROCLOR-1254				
ENDOSULFAN I				
ENDRIN				
ENDRIN KETONE				
GAMMA-CHLORDANE				
HEPTACHLOR EPOXIDE				
Inorganics (mg/kg)				
ALUMINUM				
ARSENIC				
BARIUM				
BERYLLIUM				
CADMIUM				
CHROMIUM				
COBALT				
COPPER				
CYANIDE				
IRON				
LEAD				
MANGANESE				
MERCURY				
NICKEL				
SILVER				
VANADIUM	4.2			40.7
ZINC				
Petroleum Hydrocarbons (mg/kg)				
TRPH		10.2		

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIT STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location (CEF-P45-)(Note 1) Sample Number (CEF-P45-)(Note 1) Sample Date Depth, feet below ground surface	USEPA Region 9 Residential PRG	USEPA Region 9 Industrial PRG	FDEP Residential SCTL	FDEP Industrial SCTL	FDEP Leachability SCTL	Cecil Field IBDS
Volatile Organics (ug/kg)						
TRICHLOROETHENE	2800	6100	6000	8500	30	none
Semivolatile Organics (ug/kg)						
1-METHYLNAPHTHALENE	none	none	68000	470000	2200	none
2-METHYLNAPHTHALENE	none	none	80000	560000	6100	none
ACENAPHTHENE	3700000	38000000	1900000	18000000	2100	none
ACENAPHTHYLENE	none	none	1100000	11000000	27000	none
ANTHRACENE	22000000	100000000	18000000	260000000	2500000	none
BENZO(A)ANTHRACENE	620	2900	1400	5000	3200	none
BENZO(A)PYRENE	62	290	100	500	8000	none
BENZO(B)FLUORANTHENE	620	2900	1400	4800	10000	none
BENZO(G,H,I)PERYLENE	none	none	2300000	41000000	32000000	none
BENZO(K)FLUORANTHENE	6200	29000	15000	52000	25000	none
BIS(2-ETHYLHEXYL)PHTHALATE	35000	180000	76000	280000	3600000	none
BUTYLBENZYL PHTHALATE	12000000	100000000	15000000	320000000	310000	none
CARBAZOLE	24000	120000	53000	190000	600	none
CHRYSENE	62000	290000	140000	450000	77000	none
DI-N-BUTYL PHTHALATE	6100000	88000000	7300000	140000000	47000	none
DIBENZO(A,H)ANTHRACENE	62	290	100	500	30000	none
DIBENZOFURAN	290000	5100000	280000	5000000	15000	none
FLUORANTHENE	2300000	30000000	2900000	48000000	1200000	none
FLUORENE	2600000	33000000	2200000	28000000	160000	none
INDENO(1,2,3-CD)PYRENE	620	2900	1500	5300	28000	none
NAPHTHALENE	56000	190000	40000	270000	1700	none
PHENANTHRENE	none	none	2000000	30000000	250000	none
PYRENE	2300000	54000000	2200000	37000000	880000	none
Pesticides/PCBs (ug/kg)						
4,4'-DDD	2400	17000	4600	18000	4000	none
4,4'-DDE	1700	12000	3300	13000	18000	none
4,4'-DDT	1700	12000	3300	13000	11000	none
ALDRIN	29	150	70	300	500	none
ALPHA-CHLORDANE	1600 T	11000 T	3100 T	12000 T	9600 T	none
AROCLOR-1254	220	1000	500 T	2100 T	17000 T	none
ENDOSULFAN I	370000	5300000	410000	6700000	3800	none
ENDRIN	18000	260000	21000	340000	1000	none
ENDRIN KETONE	none	none	none	none	none	none
GAMMA-CHLORDANE	1600 T	11000 T	3100 T	12000 T	9600 T	none
HEPTACHLOR EPOXIDE	53	270	100	400	600	none
Inorganics (mg/kg)						
ALUMINUM	76000	100000	72000	NA	none	4430
ARSENIC	0.39	2.7	0.8	3.7	29	2.04
BARIUM	5400	100000	110	87000	1600	14.4
BERYLLIUM	150	2200	120	800	63	0.35
CADMIUM	37	810	75	1300	8	1.72
CHROMIUM	210 T	450 T	210 H	420 H	38 H	7.75
COBALT	4700	100000	4700	110000	none	3.11
COPPER	2900	76000	110	76000	none	5.97
CYANIDE	11	35	none	none	none	1.19
IRON	23000	100000	23000	480000	none	1490
LEAD	400	750	400	920	none	197
MANGANESE	1800	32000	1600	22000	none	22
MERCURY	23	610	3.4	26	2.1	0.16
NICKEL	1600	41000	110	28000	130	3.89
SILVER	390	10000	390	9100	17	2.13
VANADIUM	550	14000	15	7400	980	6.3
ZINC	23000	100000	23000	560000	6000	37
Petroleum Hydrocarbons (mg/kg)						
TRPH	none	none	340	2500	340	none

See Notes at end of table.

TABLE 1-1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

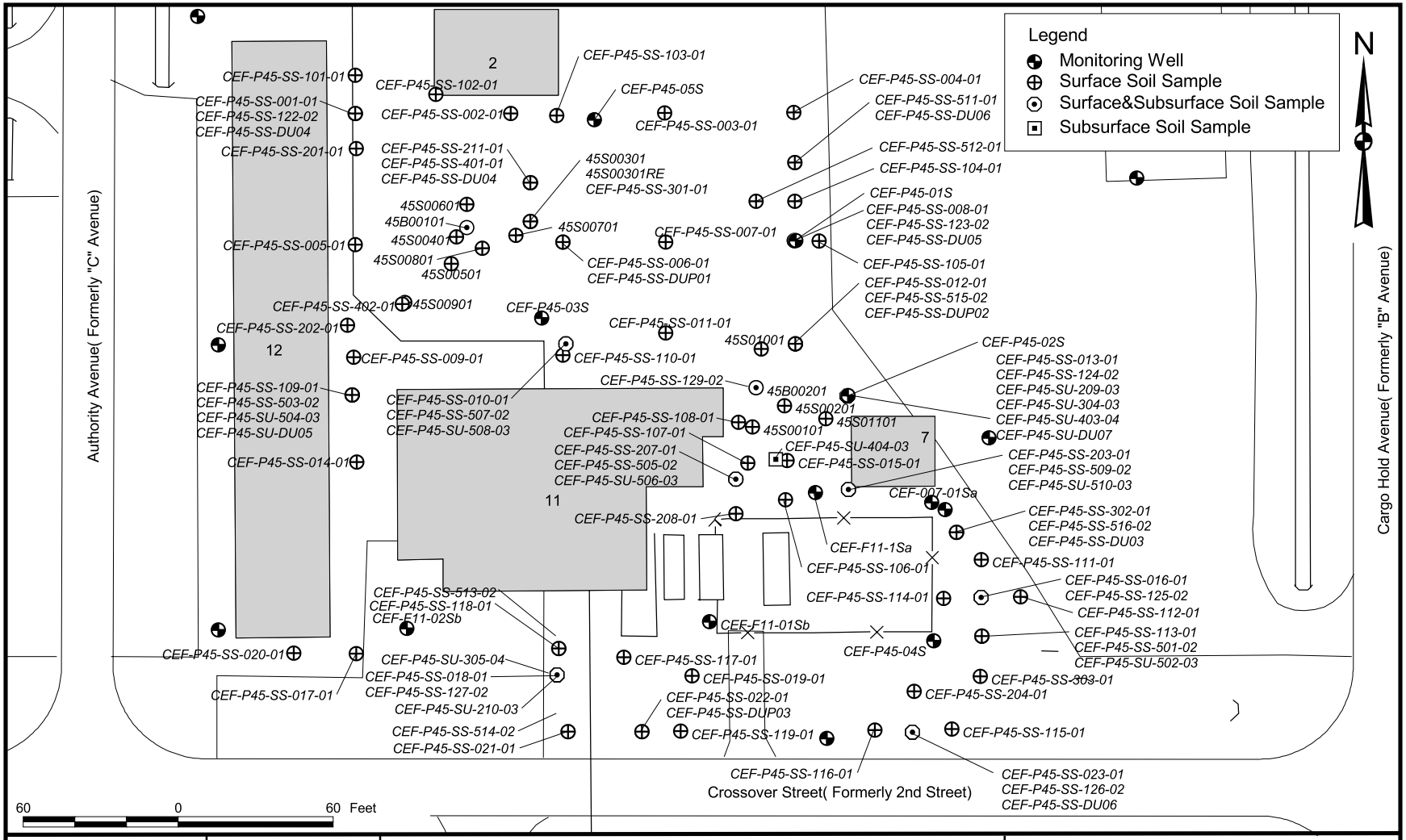
Notes:
1. Samples with "SS" or "SU" are preceded by this prefix.
2. Blank means not analyzed for.
3. U indicates not detected at the detection limit shown.
4. J indicates estimated value.
5. T indicates Total, such as total chlordane, total PCBs, and total chromium.
6. H indicates hexavalent chomium.

PRG - Preliminary Remediation Goal.
SCTL - Soil Cleanup Target Level.
none - no value provided.
NA - not applicable.
IBDS - Inorganic Background Data Set.

TABLE 1-2

SOIL ANALYTICAL RESULTS SUMMARY (PRE-EXCAVATION)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive Detections
Volatile Organic Compounds (ug/kg)				
Trichloroethene	1/4	3	45S00201 [11/16/95]	5
Semivolatile Organic Compounds (ug/kg)				
1-Methylnaphthalene	3/70	38 - 246	CEF-P45-SS-512-01	51
2-Methylnaphthalene	24/75	20 - 7400	CEF-P45-SS-109-01	385
Acenaphthene	25/75	42 - 14000	CEF-P45-SS-109-01	580
Acenaphthylene	7/75	18 - 1240	CEF-P45-SS-013	78
Anthracene	29/75	6.4 - 4700	CEF-P45-SS-109-01	180
Benzo(a)anthracene	50/75	10 - 6400	CEF-P45-SS-109-01	526
Benzo(a)pyrene	52/75	14.3 - 7300	CEF-P45-SS-113-01	559
Benzo(b)fluoranthene	54/75	12.9 - 16000	CEF-P45-SS-113-01	917
Benzo(g,h,i)perylene	47/75	27 - 9790	CEF-P45-SS-008	544
Benzo(k)fluoranthene	46/75	5.8 - 7500	CEF-P45-SS-113-01	400
Bis(2-Ethylhexyl)phthalate	4/5	120 - 580	45S00101 [11/16/95]	253
Butylbenzyl Phthalate	2/5	27 - 260	45S00101 [11/16/95]	162
Carbazole	3/5	90 - 490	45S00301 [11/16/95]	207
Chrysene	50/75	6.8 - 9500	CEF-P45-SS-113-01	660
Di-n-butyl phthalate	2/5	36 - 78	45S00201 [11/16/95]	128
Dibenzo(a,h)anthracene	31/75	10 - 2000	45B00201 [09/23/98]	110
Dibenzofuran	1/5	93	45S00301 [11/16/95]	162
Fluoranthene	54/75	9.6 - 19000	CEF-P45-SS-109-01	1202
Fluorene	24/75	7.1 - 2400	CEF-P45-SS-109-01	124
Indeno(1,2,3-cd)pyrene	48/75	21.2 - 7076	CEF-P45-SS-008	439
Naphthalene	14/75	38 - 2600	CEF-P45-SS-124-02	122
Naphthalene	14/75	38 - 2600	CEF-P45-SS-124-02	122
Phenanthrene	38/75	5 - 17000	CEF-P45-SS-109-01	602
Pyrene	54/75	9.3 - 15000	CEF-P45-SS-113-01	1025
Pesticides/PCBs (ug/kg)				
4,4'-DDD	1/4	8.3	45S00401 [11/16/95]	3
4,4'-DDE	4/4	0.21 - 160	45S00401 [11/16/95]	47
4,4'-DDT	2/4	22 - 44	45S00401 [11/16/95]	17
Aldrin	1/4	0.4	45S00301 [11/16/95]	2
Alpha-Chlordane	4/4	0.2 - 18	45S00401 [11/16/95]	6
Aroclor-1254	2/4	73 - 280	45S00201 [11/16/95]	115
Endosulfan I	3/4	0.42 - 4.1	45S00201 [11/16/95]	1
Endrin	1/4	0.39	45S00401 [11/16/95]	1
Endrin Ketone	1/4	0.83	45S00201 [11/16/95]	3
Gamma-Chlordane	3/4	1.6 - 15	45S00401 [11/16/95]	5
Heptachlor Epoxide	1/4	1.4	45S00401 [11/16/95]	1
Inorganics (mg/kg)				
Aluminum	4/4	1460 - 4430	45S00201 [11/16/95]	2695
Arsenic	19/31	0.72 - 9.6	CEF-P45-SS-001	2
Barium	4/4	3.4 - 54.4	45S00201 [11/16/95]	21
Beryllium	1/4	0.33	45S00201 [11/16/95]	0.16
Cadmium	2/4	0.34 - 0.54	45S00201 [11/16/95]	0.27
Calcium	4/4	573 - 20500	45S00201 [11/16/95]	9431
Chromium	4/4	2.5 - 14.3	45S00201 [11/16/95]	8
Cobalt	3/4	0.22 - 1.3	45S00201 [11/16/95]	1
Copper	4/4	8.7 - 73.3	45S00201 [11/16/95]	38
Cyanide	1/4	0.17	45S00101 [11/16/95]	0.08
Iron	4/4	1780 - 6000	45S00201 [11/16/95]	3390
Lead	4/4	10.5 - 112	45S00201 [11/16/95]	42
Magnesium	4/4	55.6 - 3080	45S00201 [11/16/95]	1007
Manganese	4/4	11.2 - 118	45S00201 [11/16/95]	45
Mercury	5/9	0.05 - 5.2	45S00201 [11/16/95]	1
Nickel	4/4	4.6 - 24.8	45S00201 [11/16/95]	12
Potassium	4/4	19.3 - 470	45S00201 [11/16/95]	168
Silver	2/4	0.26 - 0.29	45S00301 [11/16/95]	0.19
Sodium	4/4	164 - 802	45S00201 [11/16/95]	372
Vanadium	42/42	1.8 - 276	CEF-P45-SS-109-01	35
Zinc	4/4	22.6 - 144	45S00201 [11/16/95]	64
Petroleum Hydrocarbons (mg/kg)				
TPH	4/4	23 - 770	45S00101 [11/16/95]	396
TPH (c8-c40)	24/27	10.2 - 3380	CEF-P45-SS-207-01	298



DRAWN BY: MJJ	DATE: 30Jun00	EXISTING SAMPLE LOCATIONS SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER: 0039
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE: AS NOTED			DRAWING NO.: FIGURE 1-5 / REV: 1

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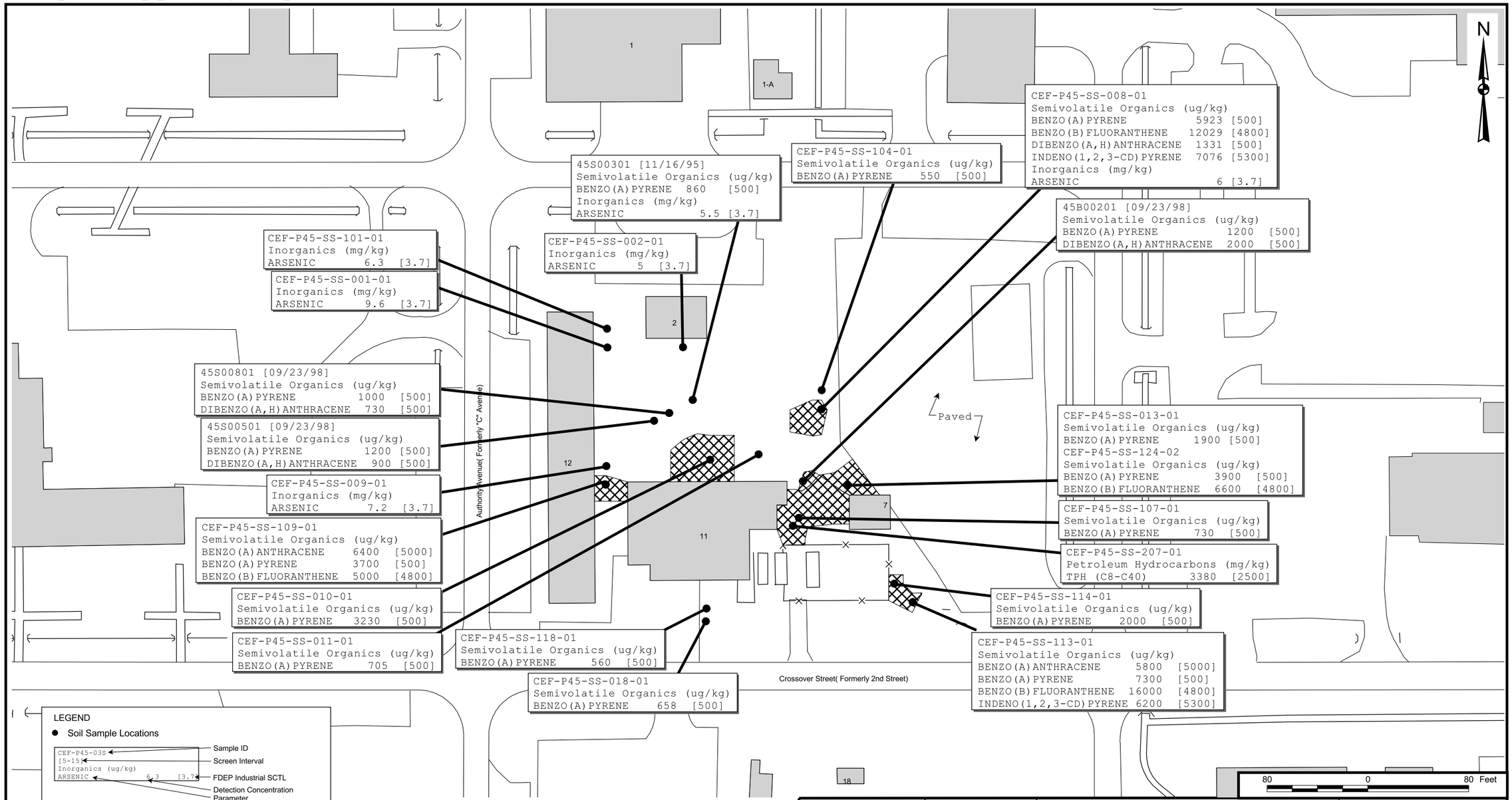

LEGEND

- Soil Sample Locations

CEF-P45-03S — Sample ID
[5-15] — Screen Interval
Inorganics (ug/kg)
ARSENIC 6.3 [3.7] — FDEP Industrial SCTL; Detection Concentration; Parameter

Excavation Area

Note:

1. Bap and Arsenic pickup levels were based on a sitewide statistical evaluation to achieve a UCL below the industrial SCTLs. The pickup level for BaP was 1,200 ug/kg and for Arsenic was 9.6 mg/kg.

DRAWN BY MJJ	DATE 02Jan01	SOIL CONCENTRATIONS GREATER THAN SCTLs (PRE-EXCAVATION) SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-6 / REV. 1

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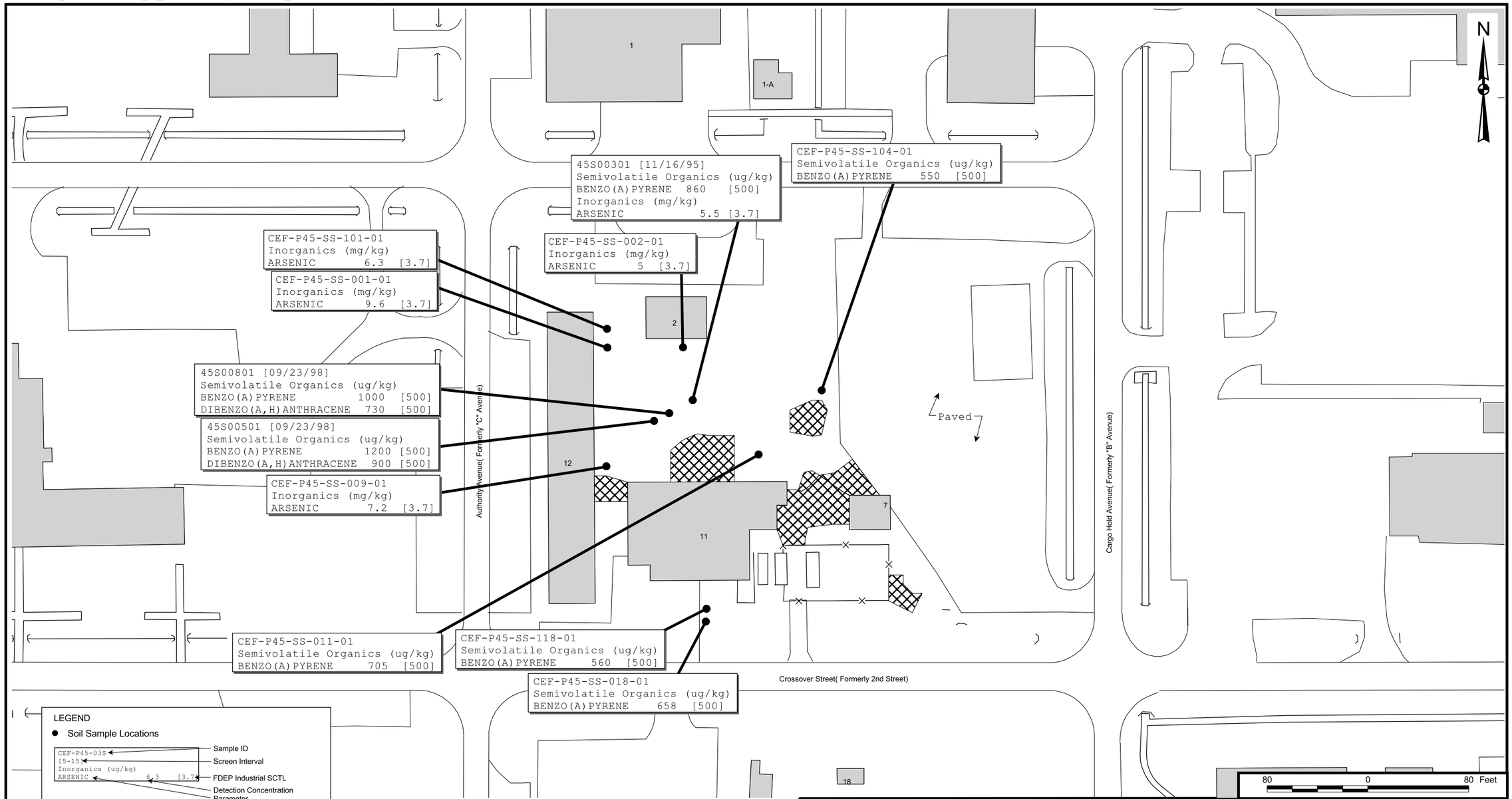

LEGEND

● Soil Sample Locations

CEF-P45-03S ← Sample ID
[5-15] ← Screen Interval
Inorganics (ug/kg)
ARSENIC 6.3 [3.7] ← FDEP Industrial SCTL
← Detection Concentration Parameter

Excavation Area

Note:

1. Bap and Arsenic pickup levels were based on a sitewide statistical evaluation to achieve a UCL below the industrial SCTLs. The pickup level for BaP was 1,200 ug/kg and for Arsenic was 9.6 mg/kg.

DRAWN BY MJJ	DATE 02Jan01	SOIL CONCENTRATIONS GREATER THAN INDUSTRIAL SCTLs (POST-EXCAVATION) SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-7 REV. 1

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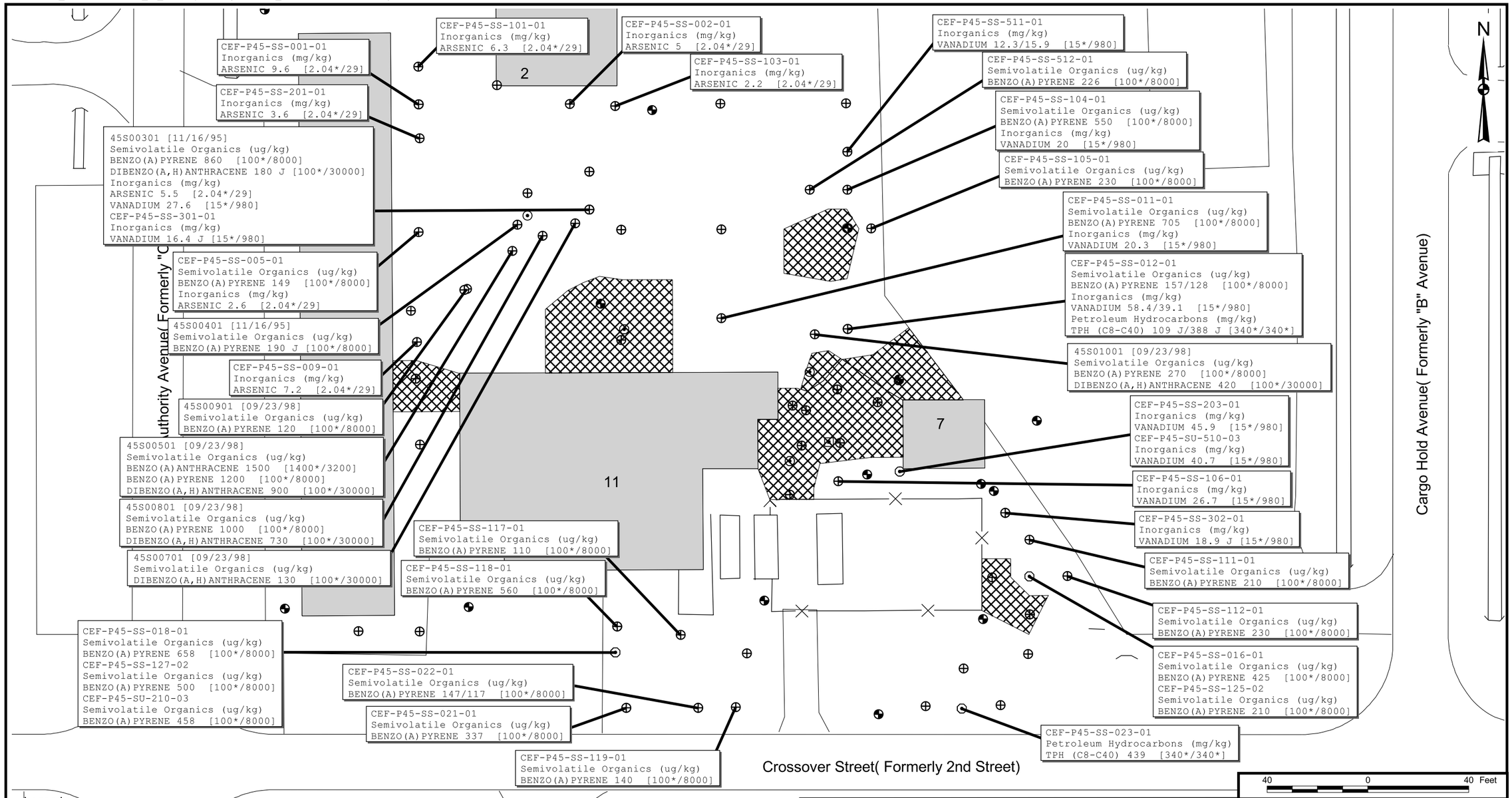


Legend

- Monitoring Well
- Surface Soil Sample
- Surface and Subsurface Soil Sample
- Subsurface Soil Sample
- Buildings
- Excavation Area

CEF-P46-SS-001 — Sample ID
Fraction (ug/kg) — FDEP Residential SCTL / FDEP Leachability SCTL
PARAMETER 500 [100/100] — Detection Concentration / Parameter

DRAWN BY MJJ	DATE 15May00	SOIL CONCENTRATIONS GREATER THAN RESIDENTIAL SCTLs (POST-EXCAVATION) SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-8 REV. 1

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sb	CEF-011-01Sb
Sample Number	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03
Sampling Date	2/22/96	2/22/96	10/28/98	10/28/98	10/14/99	10/14/99
Depth, feet	14	15	15	15	15	15
Volatile Organic Compounds (ug/L)						
1,2-DICHLOROETHENE (TOTAL)	1 U	2				
TRICHLOROETHENE	1 U	1			1 U	1 U
Semivolatile Organic Compounds (ug/L)						
1-METHYLNAPHTHALENE					1.5	1.3
BENZO(A)ANTHRACENE	10 U	10 U			0.16 J	0.16 UJ
PHENANTHRENE	10 U	10 U			1.3	1.2
Inorganics (ug/L)						
ALUMINUM	3530	**14300**	260	310		
ANTIMONY	2 U	2.2				
BARIUM	10.1	13.8				
CALCIUM	53000	28700				
CHROMIUM	4.3	29.7				
COBALT	2 U	2 U				
COPPER	4.9	18.4				
CYANIDE	4.5	2.2				
IRON	218	1470				
LEAD	2 U	9.7			1.6 U	1.6 U
MAGNESIUM	1310	3100				
MANGANESE	5.6	101	59	62		
MERCURY	0.2 U	0.2 U				
NICKEL	2 U	16.5				
POTASSIUM	1050	3140				
SELENIUM	3 U	5.8				
SODIUM	12300	**235000**	44000	35000		
VANADIUM	**147**	**195**	**740**	**720**	3.1 U	3 U
ZINC	6.2	40.3				

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria or IBDS value.
4. Values for CIS-1,2-DCE are shown.
5. None indicates that there is no PRG or MCL.
6. Value for hexavalent chromium.

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-011-01Sb	CEF-011-01Sb	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa
Sample Number	CEF-11-01S-02-F	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F
Sampling Date	10/14/99	10/14/99	7/14/99	7/14/99	7/15/99	7/15/99
Depth, feet	15	15	15	15	14	14
Volatile Organic Compounds (ug/L)						
1,2-DICHLOROETHENE (TOTAL)						
TRICHLOROETHENE						
Semivolatile Organic Compounds (ug/L)						
1-METHYLNAPHTHALENE			1 U		1 U	
BENZO(A)ANTHRACENE			0.15 U		0.15 U	
PHENANTHRENE			0.15 U		0.15 U	
Inorganics (ug/L)						
ALUMINUM			3340	303	943	392
ANTIMONY			2.4 U		3.1 U	
BARIUM			16	12.4	13.5	12.8
CALCIUM			35900	34700	59600	62400
CHROMIUM			4.8 U	83	19.2	1.4 U
COBALT			1.6	2	0.8 U	0.8 U
COPPER			0.88	8	2.6	0.84
CYANIDE						
IRON			1060	900	32 U	32 U
LEAD	1.6 U	1.6 U	5 U	**18.8**	3.9 U	3.2 U
MAGNESIUM			1140	1110	765	818
MANGANESE			25.3	34.4	3.4 U	1.4 U
MERCURY			0.06 U		0.06 U	
NICKEL			3 U	31.4	7.4 U	1 U
POTASSIUM			1810	1720	660	888
SELENIUM			2 U		8.1 U	
SODIUM			3750	3650	1550	1660
VANADIUM	3.3 U	3.6 U	31.4	30	**695**	**744**
ZINC			28.6		31.4	

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria or IBDS value.
4. Values for CIS-1,2-DCE are shown.
5. None indicates that there is no PRG or MCL.
6. Value for hexavalent chromium.

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S
Sample Number	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F
Sampling Date	7/15/99	7/15/99	7/15/99	7/15/99	7/14/99	7/14/99
Depth, feet	15	15	15	15	15	15
Volatile Organic Compounds (ug/L)						
1,2-DICHLOROETHENE (TOTAL)						
TRICHLOROETHENE						
Semivolatile Organic Compounds (ug/L)						
1-METHYLNAPHTHALENE	1 U	1 U			1 U	
BENZO(A)ANTHRACENE	0.15 U	0.15 U			0.15 U	
PHENANTHRENE	0.15 U	0.15 U			0.15 U	
Inorganics (ug/L)						
ALUMINUM	2160	2330	473	195	7650	231
ANTIMONY	2.4 U	2.4 U			17.3	
BARIUM	18.5	17.8	13.1	11.1	5.8	12
CALCIUM	53200	49200	42600	39600	2910	42500
CHROMIUM	4.1 U	7.8 U	1.4 U	1.2 U	7.9 U	2.1 U
COBALT	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
COPPER	3.1	2.3	0.75 U	0.75 U	1.5	0.75 U
CYANIDE						
IRON	32 U	32 U	32 U	32 U	636	32 U
LEAD	13.1	3.8 U	3 U	1.6 U	5.7 U	1.8 U
MAGNESIUM	2310	2130	1860	1730	463	1860
MANGANESE	3.7	4.2	3.1 U	2.6 U	4.2	2.9 U
MERCURY	0.06 U	0.06 U			0.08	
NICKEL	3.1 U	4 U	2.3 U	1.8 U	3.7 U	2.1 U
POTASSIUM	9950	10300	11000	10000	545	10400
SELENIUM	2 U	2.5 U			4.1 U	
SODIUM	16500	16900	18700	21000	9880	21200
VANADIUM	**290**	**271**	**240**	**230**	33	**250**
ZINC	25.2	21.7 U			28.9	

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria or IBDS value.
4. Values for CIS-1,2-DCE are shown.
5. None indicates that there is no PRG or MCL.
6. Value for hexavalent chromium.

TABLE 1-3

SUMMARY OF POSITIVE DETECTIONS IN EXISTING GROUNDWATER DATA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

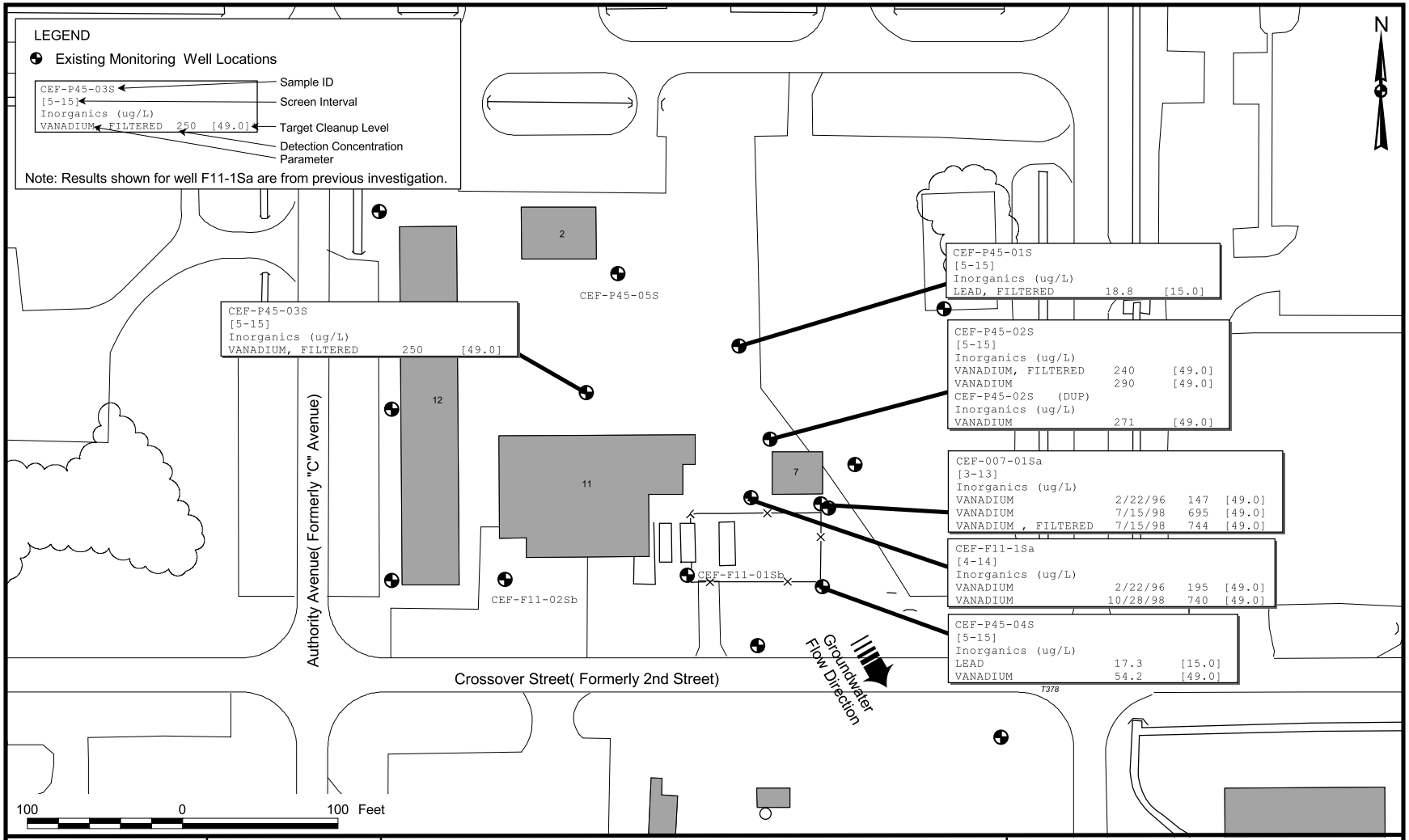
Location Sample Number Sampling Date Depth, feet	CEF-P45-04S CEF-P45-GW-04S-1 9/9/99 15	CEF-P45-05S CEF-P45-GW-05S-1 9/9/99 15	CEF-P45-05S CEF-P45-GW-DU-02 9/9/99 15	USEPA Maximum Contaminants Levels	USEPA Region 9 PRGs	FDEP Groundwater Cleanup Target Level, Groundwater Criteria	NAS Cecil Field, IBDS Value
Volatile Organic Compounds (ug/L)							
1,2-DICHLOROETHENE (TOTAL)				70[4]	61[4]	63	
TRICHLOROETHENE				5	1.6	3	
Semivolatile Organic Compounds (ug/L)							
1-METHYLNAPHTHALENE				NONE	NONE	20	
BENZO(A)ANTHRACENE				NONE	0.092	0.2	
PHENANTHRENE				NONE	NONE	210	
Inorganics (ug/L)							
ALUMINUM				NONE	36,000	200	13100
ANTIMONY				6	15	6	44.5
BARIUM				2000	2,600	2000	88.2
CALCIUM				NONE	NONE	no criteria	81100
CHROMIUM				100	110[6]	100	18
COBALT				NONE	2,200	420	12.8
COPPER				1300	1,400	1000	12.5
CYANIDE				200	6.2	200	22
IRON				NONE	11,000	300	7760
LEAD	**17.3**	2.8 U	2.3 U	15	NONE	15	5.35
MAGNESIUM				NONE	NONE	no criteria	10000
MANGANESE				NONE	880	50	150
MERCURY				2	11	2	0.34
NICKEL				NONE	730	100	24.5
POTASSIUM				NONE	NONE	no criteria	4330
SELENIUM				50	180	50	7
SODIUM				NONE	NONE	160000	16500
VANADIUM	**54.2**	3.8	4.5	NONE	260	49	20.2
ZINC				NONE	11,000	5000	76.8

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria or IBDS value.
4. Values for CIS-1,2-DCE are shown.
5. None indicates that there is no PRG or MCL.
6. Value for hexavalent chromium.

TABLE 1-4

GROUNDWATER ANALYTICAL RESULTS SUMMARY (EXISTING DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive Detections
Volatile Organic Compounds (ug/L)				
1,2-Dichloroethene (total)	1/2	2	45G00101 [02/22/96]	2
Trichloroethene	1/3	1	45G00101 [02/22/96]	1
Semivolatile Organic Compounds (ug/L)				
1-Methylnaphthalene	1/5	1.3 - 1.5	CEF-11-01S-02	1
Benzo(a)anthracene	1/7	0.16	CEF-11-01S-02	0.12
Phenanthrene	1/7	1.2 - 1.3	CEF-11-01S-02	1
Inorganics (ug/L)				
Aluminum	7/7	260 - 14300	45G00101 [02/22/96]	4610
Antimony	2/6	2.2 - 17.3	CEF-P45-GW-03S-1	10
Barium	6/6	5.8 - 18.5	CEF-P45-GW-02S-1	13
Calcium	6/6	2910 - 59600	CEF-P45-GW-01SA-1	38552
Chromium	3/6	4.3 - 29.7	45G00101 [02/22/96]	18
Cobalt	1/6	1.6	CEF-P45-GW-01S-1	2
Copper	6/6	0.88 - 18.4	45G00101 [02/22/96]	5
Cyanide	2/2	2.2 - 4.5	43G00101 [02/22/96]	3
Iron	4/6	218 - 1470	45G00101 [02/22/96]	846
Lead	3/9	9.7 - 17.3	CEF-P45-GW-04S-1	12
Magnesium	6/6	463 - 3100	45G00101 [02/22/96]	1500
Manganese	6/7	3.7 - 101	45G00101 [02/22/96]	33
Mercury	1/6	0.08	CEF-P45-GW-03S-1	0.08
Nickel	1/6	16.5	45G00101 [02/22/96]	17
Potassium	6/6	545 - 10300	CEF-P45-GW-02S-1-D	2888
Selenium	1/6	5.8	45G00101 [02/22/96]	6
Sodium	7/7	1550 - 235000	45G00101 [02/22/96]	46169
Vanadium	9/10	3.8 - 740	45G00102	242
Zinc	6/6	6.2 - 40.3	45G00101 [02/22/96]	26
Inorganics, Filtered (ug/L)				
Aluminum, Filtered	5/5	195 - 473	CEF-P45-GW-02S-1-F	314
Barium, Filtered	4/4	11.1 - 13.1	CEF-P45-GW-02S-1-F	12
Calcium, Filtered	4/4	34700 - 62400	CEF-P45-GW-01SA-1-F	45175
Chromium, Filtered	1/4	83	CEF-P45-GW-01S-1-F	83
Cobalt, Filtered	1/4	2	CEF-P45-GW-01S-1-F	2
Copper, Filtered	2/4	0.84 - 8	CEF-P45-GW-01S-1-F	4
Iron, Filtered	1/4	900	CEF-P45-GW-01S-1-F	900
Lead, Filtered	1/5	18.8	CEF-P45-GW-01S-1-F	19
Magnesium, Filtered	4/4	818 - 1860	CEF-P45-GW-02S-1-F	1396
Manganese, Filtered	2/5	34.4 - 62	45G00102-F	48
Nickel, Filtered	1/4	31.4	CEF-P45-GW-01S-1-F	31
Potassium, Filtered	4/4	888 - 11000	CEF-P45-GW-02S-1-F	5877
Sodium, Filtered	5/5	1660 - 35000	45G00102-F	16272
Vanadium, Filtered	5/6	30 - 744	CEF-P45-GW-01SA-1-F	396
Petroleum Hydrocarbons (mg/L)				
TRPH	1/5	1.26 - 1.33	CEF-11-01S-02	1



DRAWN BY MJJ	DATE 13Oct99	EXISTING GROUNDWATER SAMPLE LOCATIONS AND RESULTS ABOVE CRITERIA SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-9 / REV 1

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The existing groundwater data consist of results from several studies. Groundwater samples collected by ABB-ES in February 1996 are identified with the prefix “45G.” Samples collected during the PSC investigation have a prefix “P45-.”

1.3 DOCUMENT ORGANIZATION

This RI Report has been organized with the intent of meeting the general format requirements specified in the October 1988 Remedial Investigation/Feasibility Study (RI/FS) guidance document (USEPA, 1988) and the requirements of the RIWP (TtNUS, 2000a).

Section 1.0, Introduction, summarizes the purpose of the report, provides site background information, summarizes previous investigations, and provides the report outline.

Section 2.0, Study Area Investigation, provides a summary of investigative procedures (e.g., groundwater sampling and analysis, water level measurement, hydraulic testing, etc.) used at the site.

While Sections 1.0 and 2.0 are generally consistent with the format required by the RI/FS guidance document, Section 3.0, General Data Evaluation Procedures, is an additional section that describes data analysis and interpretation methods. Section 3.0 includes a discussion of data validation procedures, general contaminant fate and transport characteristics (e.g., chemical and physical properties, persistence, and environmental mobility), and the human health and environmental risk assessment components such as data evaluation, toxicity assessment, and exposure assessment. The results of the data validation and quality control samples are also discussed in this section.

Section 4.0, Physical Characteristics of the Study Area, conforms to the typical Section 3.0 of a RI report.

Section 5.0, Nature and Extent of Contamination, describes the nature and extent of contamination at the site.

Section 6.0, Contaminant Fate and Transport, describes site-specific contaminant fate and transport for the site.

Section 7.0, Human Health Preliminary Risk Evaluation, describes the data evaluation, exposure assessment, and risk characterization.

Section 8.0, Ecological Risk Assessment, describes the ecological risk assessment.

Section 9.0, Summary, Conclusions, and Recommendations, provides an overall summary, conclusions, and recommendations. Supplemental information for this report is included in the Appendices.

2.0 STUDY AREA INVESTIGATION

The field investigation for the RI at Site 45 was performed from April 3 to August 3, 2000. During the field investigation, permanent monitoring wells were installed, groundwater samples were collected from these and existing wells, geotechnical soil samples were collected, and aquifer tests were conducted. Information collected during the investigation was used to determine risks in the Preliminary Risk Evaluation (PRE) and to evaluate remedial alternatives in the Focused Feasibility Study (FFS). The following sections discuss the field investigation activities conducted at Site 45. The site layout for Site 45 is shown on Figure 1-3. Sample locations are shown on Figure 2-1.

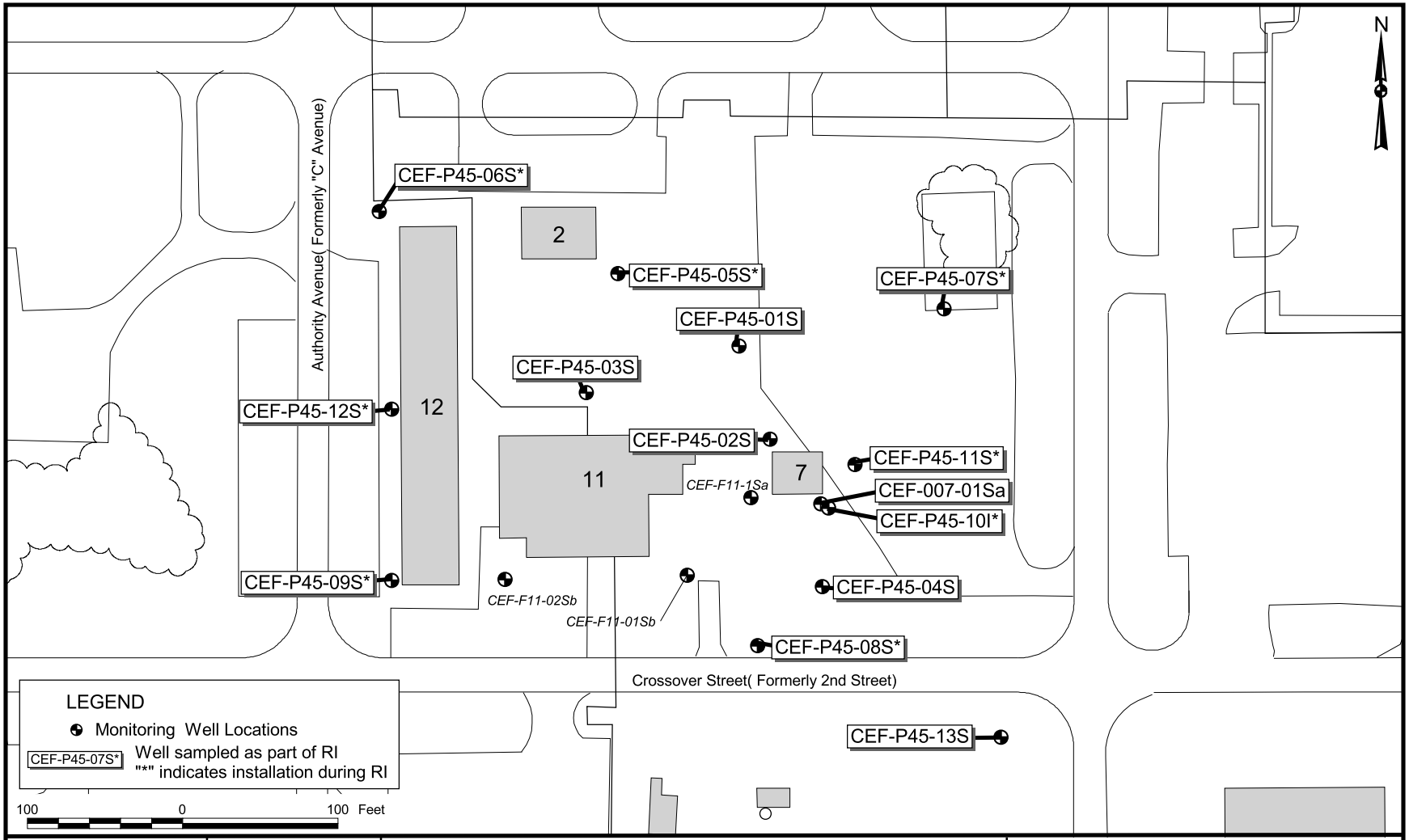
2.1 GROUNDWATER INVESTIGATION

2.1.1 Monitoring Well Construction and Installation

Figure 1-5 presents exceedances of FDEP Groundwater Cleanup Target Levels (GCTLs) at Site 45. As shown in this figure, lead and vanadium concentrations exceed GCTLs. Based on an evaluation of the pre-RI groundwater elevation data, the area surrounding well CEF-P45-02S appeared to be a groundwater high, with flow to the southeast and northwest from this area. Based on the groundwater exceedances and flow directions, seven shallow wells and one intermediate monitoring well were proposed to delineate groundwater contamination at PSC 45. To investigate upgradient groundwater conditions, CEF-P45-06S was installed northwest (upgradient) of CEF-P45-03S, and CEF-P45-11S was installed just east (upgradient) of CEF-007-01S. CEF-P45-07S was installed northeast CEF-P45-01S to determine the northeast extent of groundwater contamination. Wells CEF-P45-08S, CEF-P45-09S, CEF-P45-12S and CEF-P45-13S were installed southeast, southwest or west of contaminated wells to determine the extent of contamination in these directions. An intermediate well, CEF-P45-10I, was installed near the CEF-007-01S location, where the highest vanadium concentrations were detected, to investigate vertical migration of contamination.

Prior to installing the permanent wells, the proposed well locations were reviewed and approved by the BCT. The rationale for well placement is discussed below. Table 2-1 lists the construction and installation details for the newly installed and existing monitoring wells at the site. Monitoring well construction logs are included in Appendix B. New and existing wells are shown on Figure 2-1.

Groundwater monitoring wells installed as part of this investigation were installed in general accordance with applicable Department of the Navy, Southern Division Naval Facilities Engineering Command, Monitoring Well Design, Installation, Construction, and Development Guidelines, State of Florida Well Standards and Regulations, and USEPA Region IV Environmental Investigations Standard Operating



DRAWN BY MJJ	DATE 14Aug00	MONITORING WELL LOCATIONS SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV 1

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TABLE 2-1

MONITORING WELL CONSTRUCTION DATA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Monitoring Well Number	Existing/New	Total Depth, feet bgs	Screened Interval, feet bgs	Top of casing elevation, feet
CEF-P45-1S	Existing	15	5 to 15	75.56
CEF-P45-2S	Existing	15	5 to 15	75.89
CEF-P45-3S	Existing	15	5 to 15	77.06
CEF-P45-4S	Existing	15	5 to 15	76.49
CEF-P45-5S	Existing	15	5 to 15	76.68
CEF-P45-6S	New	15	5 to 15	76.27
CEF-P45-7S	New	15	5 to 15	77.15
CEF-P45-8S	New	15	5 to 15	76.80
CEF-P45-9S	New	15	5 to 15	76.42
CEF-P45-10I	New	40	35 to 40	75.97
CEF-P45-11S	New	15	5 to 15	76.46
CEF-P45-12S	New	15	5 to 15	76.99
CEF-P45-13S	New	15	5 to 15	76.30
CEF-7-1Sa	Existing	13	3 to 13	76.12
CEF-11-1Sa	Existing	14	4 to 14	76.37
CEF-11-1Sb	Existing	13	3 to 13	76.59
CEF-11-2Sb	Existing	14	4 to 14	76.25

NOTES
Elevation is referenced to 1988 National Geodetic Vertical Datum (NGVD)
bgs - below ground surface.
All wells are PVC construction, 2 inches in diameter with 0.010 inch slotted screens.

Procedure and Quality Assurance Manual (EISOPQAM) (USEPA, 1996a). In some cases, site conditions, geologic settings, or other factors, required slight modifications in well installation and/or construction methods.

Shallow monitoring wells were installed using the hollow stem auger (HSA) drilling method and were advanced to depths of approximately 15 feet bgs. The intermediate monitoring well also was installed using HSA techniques and was advanced to a depth of approximately 40 feet bgs. Monitoring wells were constructed of 2-inch inside diameter (ID), Schedule 40, flush-threaded, National Sanitation Foundation (NSF)-approved polyvinyl chloride (PVC) well screen and compatibly threaded PVC well casing riser.

The shallow wells were installed to monitor the top of the surficial aquifer. The top of the screened interval for the shallow wells was placed above the water table to allow for the measurement of thickness of free phase petroleum product, if present. The intermediate well monitors the middle of the surficial aquifer and was installed to determine if contaminated groundwater has migrated vertically.

Well screens for shallow monitoring wells were 10 feet long with 0.010-inch slots. The intermediate well screen was 5 feet long with 0.010-inch slots.

A primary filter pack of clean silica sand was installed around the well screen. This filter pack consisted of a sand mixture retained by U.S. Standard Sieve Nos. 20-30 (20/30 sand). The sand pack was installed flush with the bottom of the well to a minimum of 2 feet above the top of the well screen.

Based on previous experience with the use of bentonite pellets during the Sites 36 and 37 RI, monitoring wells were constructed with a very fine sand or “choke sand” as the primary seal material instead of bentonite which had the tendency to bridge within the auger flights. This “choke sand” is more commonly referred to as a secondary filter pack. The sand used for the secondary filter pack passes U.S. Standard Sieve No. 30 (30/65 sand).

The annular space above the secondary filter pack was backfilled with a 10 percent bentonite/cement grout mixture to within approximately 2 feet of land surface. The cement material used was Portland Cement Type I. In the shallow wells, the bentonite/cement grout was poured into the borehole from land surface. In the intermediate well, the bentonite/cement grout was pressure-grouted into the borehole from the top of the primary seal to within 2 feet of land surface. The concrete used to form the protective pad filled the remaining annular space.

All of the monitoring wells were completed with 8-inch ID, flush-mounted, protective steel covers with bolt-on lids. A 2-foot- by 2-foot-wide by 6-inch-thick concrete surface pad was installed flush with the ground surface.

At the conclusion of the well installation activities, all new well locations were surveyed. At each well location, the vertical elevation of the ground surface, the protective cover, and the measuring point on the PVC well casing were surveyed. In addition, the horizontal position of each well was surveyed. The vertical elevations are based upon the National Geodetic Vertical Datum (NGVD) 1988, and the horizontal locations are based upon the State Plan Coordinates for Florida East Zone, North American Datum, 1983/90. The survey data for each new and existing well are listed in Appendix A. Well elevation data are included in Table 2-1.

2.1.2 Monitoring Well Development

Following installation, each monitoring well was developed to remove drill cuttings and formation fines from the area around the well screen. The monitoring wells were developed 6 to 7 calendar days after well installation. Prior to development, an oil/water interface probe was used to determine the potential presence of both light and dense non-aqueous phase liquids in each well. Wells were developed by surging and pumping. During development, pH, temperature, turbidity, and specific conductivity measurements were collected after each borehole volume was removed. Wells were considered developed after these readings stabilized as determined using the following criteria: pH ±0.1 unit, temperature ±1.0°C, turbidity $\leq$ 10 nephelometric turbidity units (NTU), and specific conductivity ±10 percent.

A minimum of 5 times the standing water volume in the well casing plus 5 times the water volume in the saturated gravel pack (assuming 30 percent porosity) was removed. Water quality measurements and the volumes removed were recorded for each well on the well development forms, included in Appendix C.

2.1.3 Water-Level Measurements

One round of synoptic water level measurements was collected from the wells on April 19, 2000. These groundwater elevations were used to generate the potentiometric surface map.

The referenced measuring point for each well was clearly marked on each permanent well and is located on the north side of the PVC well casing. Water-level measurements were noted with the time and recorded to the nearest 0.01 foot. The log book notations for the water level measurements are included in Appendix C.

2.1.4 Groundwater Sampling

Groundwater samples were obtained from 5 existing and 8 newly installed monitoring wells:

- CEF-7-1Sa (Existing)
- CEF-P45-1S (Existing)
- CEF-P45-2S (Existing)
- CEF-P45-3S (Existing)
- CEF-P45-4S (Existing)
- CEF-P45-5S (New)
- CEF-P45-6S (New)
- CEF-P45-7S (New)
- CEF-P45-8S (New)
- CEF-P45-9S (New)
- CEF-P45-10I (New)
- CEF-P45-11S (New)
- CEF-P45-12S (New)
- CEF-P45-13S (New)

Existing wells CEF-11-1Sb was not sampled because no vanadium was detected in the well. Existing well CEF-11-2Sb was not sampled because the new wells provided sufficient coverage to define the site. Existing well CEF-F11-1Sa was not sampled because of its close proximity to and similarity of results to well CEF-7-1Sa.

Groundwater sampling was conducted in accordance procedures described in Section 7.2.3 of the Field Sampling Plan (FSP) for the Sites 36 and 37 RI (TtNUS, 1998). Groundwater samples were collected on April 20 and 21, 2000 using low-flow sampling techniques. Because of high turbidity in the sample collected from monitoring well CEF-P45-8S, this well was resampled on August 3, 2000. Well CEF-P45-13S was installed in January 2001 and sampled on February 6, 2001.

Prior to obtaining a groundwater sample from each monitoring well, the static water level in the well was measured to within 0.01-foot accuracy from a marked location on the top of the well riser pipe. A headspace reading was obtained in the well's riser pipe using a photoionization detector (PID).

Groundwater samples were collected from monitoring wells using dedicated medical-grade flexible silicon and rigid polyethylene tubing and a peristaltic pump. The tubing was lowered in the wells to approximately the midpoint of the well screens. The wells were then purged in accordance with the low-

flow sampling techniques specified in Section 7.2.3 of the FSP for the Sites 36 and 37 RI (TtNUS, 1998). During purging, water quality parameters (pH, temperature, specific conductance, turbidity, and dissolved oxygen) were measured using an Horiba U-10 meter and recorded about every 10 minutes until the parameters stabilized and the minimum purge volume was removed. The minimum purge volume with negligible drawdown (0.3 feet or less) was two saturated screen length volumes. Stabilization of the above parameters was defined as follows: temperature ±1.0ºC, pH ±0.1 units, and specific conductance ±3 percent. Water level data, flow rates, and water quality data collected during purging were recorded on Low Flow Purge Data Sheets and included in Appendix A.

Immediately prior to sampling, the temperature, pH, specific conductance, turbidity, and dissolved oxygen of the water were measured and recorded on the Groundwater Sample Log Sheet (see Appendix A). Sample containers were filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. Samples for dissolved metals analysis were collected by using an in-line, 1-micron, disposable particulate filter. The 1-micron filter was an FDEP requirement (FDEP, 1994). Sample containers were immediately labeled and placed in a cooler with ice.

Sample preservation, packaging, and shipping requirements were followed per Section 7.3.1 of the FSP for the RI for Sites 36 and 37 (TtNUS, 1998).

Groundwater samples collected from existing and newly installed monitoring wells at Site 45 as part of the RI were analyzed for total and dissolved lead and vanadium by USEPA Method SW-846 6010B.

2.2 GEOLOGIC AND HYDROGEOLOGIC INVESTIGATION

Geologic and hydrogeologic information was obtained as part of the RI to investigate the existing and potential fate and transport mechanisms for groundwater and contaminants of concern (COCs) at the site. Furthermore, site-specific geologic and hydrogeologic information is required to evaluate remediation alternatives. The following sections describe the procedures used during this investigation to collect site-specific geologic and hydrogeologic information.

2.2.1 Geotechnical Analysis

Geotechnical samples were collected during this investigation for the analysis of engineering parameters and for use in contaminant fate and transport evaluations. A sample was collected from soil sample location CEF-P45-SS-012, northwest of Building 7, and analyzed for total organic carbon (TOC). Undisturbed soil samples (Shelby tube samples) were collected in general accordance with procedures outlined in Section 2.3.2 of the RI report for Sites 36 and 37 (TtNUS, 1999) and were analyzed for the following geotechnical parameters:

- Grain-size analysis
- Porosity
- pH
- Specific gravity
- Bulk density

One Shelby tube sample was collected from within the screened interval of shallow well CEF-P45-7S at approximately 4 to 6 feet below ground surface (bgs), and one was collected from the screened interval of CEF-P45-10I at a depth of approximately 37 to 39 feet bgs. The Shelby tubes that were used consisted of a 3-inch ID by 24-inch long, thin-walled, seamless aluminum sleeve, which was connected to a drilling rod for advancement. The Shelby tube was pushed in a rapid continuous motion without using any rotation or hammering so that an undisturbed soil sample was collected. Once the Shelby tube was advanced to the desired depth, the tube was allowed to remain in the ground for approximately 5 minutes. After 5 minutes, the tube was rotated approximately 180 degrees to break the undisturbed soil sample from the formation, then was slowly withdrawn to land surface. Upon retrieving the sample tube, the tube was inspected to check for damage that may have affected the sample and to confirm that the tube was full. Following the inspection, each end was capped by filling the ends with paraffin wax and reinforcing them with duct tape. The tube was then labeled with the proper sample identification number and orientation (top and bottom). These samples were stored in an upright position in a secure location until shipment to the off-site soil laboratory.

2.2.2 Specific Capacity Testing

Specific capacity (SPECAP) tests were performed at two shallow monitoring wells, CEF-P45-4S and CEF-P45-7S. The objective of the SPECAP tests was to determine the productivity or yield per unit of drawdown of the aquifer in which the well is screened in order to estimate hydraulic conductivity and transmissivity. Although there is published information concerning formation hydraulic conductivities at NAS Cecil Field, SPECAP tests were conducted to verify and confirm the hydraulic conductivity values previously determined.

Specific capacity is defined as yield divided by drawdown and is normally expressed as gallons per minute per feet of drawdown. Both pumping rate and drawdown are measured simultaneously in the tested well after a given amount of time has elapsed. Dividing the yield rate by the stabilized drawdown, when both are measured simultaneously, gives the specific capacity. SPECAP tests are advantageous because they are conducted immediately following development, and automatic data-logging equipment is not necessary. Specific capacity can vary with pumping duration, and specific capacity decreases as pumping time increases. Additionally, specific capacity generally decreases as the discharge rate

increases. Both of these responses are due to dewatering of the aquifer within the cone of depression. For a given amount of drawdown, the yield progressively decreases as the saturated thickness of the aquifer is reduced. Specific capacity may also vary with yield as a function of the well efficiency.

The procedure for conducting a SPECAP test consisted of the following general steps:

1. After the well was properly developed, pumping was continued at a constant rate.

2. The pumping rate and drawdown were measured simultaneously at regular and frequent intervals, and the data were recorded on the Monitoring Well Development Record, included in Appendix A. Drawdown was measured using an electronic water level indicator (M-scope).

3. Pumping continued until drawdown stabilized (generally measurements within 0.03 feet over a 10-minute interval were considered stable).

4. Pumping was terminated and water level recovery was measured.

5. Water levels were measured at frequent intervals during recovery to make sure that the original static water level was reached; if not, the water level measured when residual drawdown stabilized was used as the static water level.

To perform the SPECAP tests, a submersible pump was used to pump the well. Aquifer parameters were calculated from the SPECAP test data using a computer program developed by Bradbury and Rothschild (1985) based on equations presented in Lohman (1972). The results are included in Appendix C.

3.0 GENERAL DATA EVALUATION PROCEDURES

3.1 DATA QUALITY

Various data quality control measures were implemented during the field investigation performed for NAS Cecil Field. These quality measures were conducted to ensure that the resultant data were suitable for their intended uses (i.e., nature and extent determination, risk assessment, etc.). A brief summary of the measures is provided in this report. Section 3.1.1 contains a summary of the Data Quality Objectives (DQOs). Field Quality Control Samples are discussed in Section 3.1.2. A summary of the data validation procedures and the results of the data validation process appear in Section 3.1.3.

3.1.1 Data Quality Objectives

DQOs established for this project considered existing site information and data, identification of the problem, development of a strategic site plan, specification of control and monitoring criteria, and an evaluation of the data collected during the investigation to determine the nature and extent of groundwater contamination.

The data obtained during the investigation were evaluated and were used to satisfy and support the DQOs. As part of the evaluation process and in order to provide data of satisfactory quality, all field and laboratory analyses include requirements for precision, accuracy, and completeness. These parameters are briefly summarized in this section.

3.1.1.1 Precision

Precision characterizes the amount of variability and bias inherent in a data set. This parameter also describes the reproducibility of measurements of the same parameters for samples under similar conditions. Precision is expressed as a Relative Percent Difference (RPD), which is defined as the relation of the range relative to the mean RPDs. RPDs, which are typically expressed as percentages, are used to evaluate both field and laboratory duplicate precision and are calculated as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where RPD = relative percent difference
V1, V2 = two results obtained by analyzing duplicate samples

The precision objectives for parameters are specified in the associated analytical protocols. General precision objectives such as ±50 percent for solid matrices and ±30 percent for aqueous matrices were employed for this project.

Field duplicates monitor the consistency with which environmental samples were obtained and analyzed. RPDs were calculated for each set of field and laboratory duplicates generated for the investigation.

One field duplicate was collected for aqueous samples. The total number of aqueous samples collected was twenty-six. Therefore, the 10 percent frequency criterion was not met.

3.1.1.2 Accuracy

The degree of accuracy of a measurement, which is expressed as a percent recovery, is based on a comparison of the measured value with an accepted reference or true value. Accuracy measurements are determined by the analysis of "spiked" samples (i.e., blank, surrogate, or matrix spikes). These analyses measure the accuracy of the laboratory operations as affected by the sample matrix. Percent recovery is calculated using the following equation:

$$\%R = \frac{Ss - So}{S} \times 100$$

where	%R	=	percent recovery
	Ss	=	result of spiked sample
	So	=	result of non-spiked sample
	S	=	concentration of spiked amount.

In general, a percent recovery range of 75 to 125 defines the accuracy objective for the analytical data. It should be noted, however, that the analytical laboratory details analyte-specific percent recoveries. All accuracy objectives were met. Therefore, no qualifiers were assigned for failure to meet the accuracy objectives (per data validation protocols) of the associated analytical data.

3.1.1.3 Completeness

Completeness is a measure of the amount of valid data obtained from the laboratory analyses in relation to the total amount of data collected. Completeness is typically expressed as a percentage and is determined using the following equation:

$$\%C = \frac{V}{T} \times 100$$

where	%C	=	percent completeness
	V	=	number of results determined to be valid
	T	=	total number of results

Under ideal conditions, the completeness objective would be 100 percent. However, samples can be rendered unusable during shipping and preparation (e.g., bottles broken or extracts accidentally destroyed) or analysis (e.g., loss of instrument sensitivity, strong matrix effects). The calculated percent completeness for all chemical analytical data collected during the field investigation is 100 percent (i.e., 0 chemical analytical results out of a total of 48 data points were qualified as unusable), indicating that the data completeness objective for the project was achieved.

3.1.2 Field Quality Control Samples

One field duplicate pair (CEF-P45-GW-07S-01/CEF-P45-GW-DUP07) was collected for both filtered and unfiltered samples in support of the groundwater sampling effort. Analytical results for the field duplicate samples satisfied project precision objectives (RPD < 30%).

Trip blanks and rinse blanks were not collected as part of the environmental sampling program as agreed to by the BCT for all investigations at NAS Cecil Field.

3.1.3 Data Validation

All samples were subjected to a limited data validation. Data validation is an objective systematic process in which analytical data are reviewed to ascertain the validity of the reported results and to identify for the data user the possible limitation of these results. The limited data validation review consisted of an evaluation of the data to eliminate false positives and to preclude false negatives. The limited data validation review evaluated environmental samples for data completeness, holding time compliance, calibration compliance, and laboratory blank contamination. The limited data validation review was primarily limited to the aforementioned criteria; however, if noncompliances compromising false negatives or false positives were noted the reviewer would take appropriate action to qualify the data. This section summarizes the various aspects of the data validation process.

3.1.3.1 General Data Validation Procedures

Validation of data generated for samples collected during the field effort was completed in accordance with the procedures outlined in Navy guidance (Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NFESC 20.2-047B). A limited data validation was performed for all samples analyzed via the SW-846 methods. Data were validated in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review.

The limited data validation process included consideration of the following: data completeness, holding time compliance, calibration compliance, laboratory-generated blanks, and detection limits.

Data completeness considered a review and evaluation of the hardcopy data deliverables and the electronic data files received from the analytical laboratory. All hardcopy analytical results and electronic data were reviewed for accuracy.

An evaluation of holding time compliance was performed on all environmental samples. All environmental soil samples met holding time requirements.

Calibration standards were evaluated to assess compliance with the analytical method. An evaluation of the calibration standards aided in the elimination of false negatives. An assessment of calibration non-compliance also was used to qualify positive and non-detected results.

Evaluation of laboratory blank analyses aided in the elimination of false positive results. Laboratory artifacts and contaminants present in method blanks were used to establish action levels and were correlated to associated environmental samples. Positive results in environmental samples less than the established blank action level for an associated group of environmental samples were considered false positives.

The overall determination of data utility or reliability was based upon laboratory compliance with specified methods and adherence to QC requirements. Noncompliances observed during the validation process typically resulted in the qualification of the associated analytical data. The qualifiers alert the data user to imprecise or estimated results and, in the worst case, unreliable and unusable data.

The net results of the validation process were summarized in sample delivery group-specific technical reports consisting of a memorandum, a section of qualified analytical results, and a supporting documentation section that provided the rationale for changes and/or qualification of the data. These memoranda provide a detailed explanation of the results of the data validation review.

3.1.3.2 Data Validation Qualifiers

As mentioned previously, the qualification of analytical data during the validation process (i.e., application of U, J, UJ, UR, and R qualifiers) was conducted as required by the USEPA Functional Guidelines. The attachment of the data qualifiers to analytical results signifies the occurrence of QC noncompliances that were noted during the course of data validation. The various data qualifiers are defined as follows:

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is also added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

J - Indicates that the chemical was detected. However, the associated numerical result is not a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

UR - Indicates that the chemical may or may not be present. The nondetected analytical result reported by the laboratory is considered to be unreliable and unuseable. This qualifier is applied in cases of gross technical deficiencies (i.e., holding times missed by a factor of two times the specified time limit, severe calibration noncompliances, and extremely low quality control recoveries).

R - Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.

The preceding data qualifiers may be categorized as indicative of major or minor problems. Major problems are defined as issues that result in the rejection of data, qualified with UR and R data validation qualifiers. These data are considered invalid and are not used for risk assessment and decision making purposes. Minor problems are defined as issues resulting in the estimation of data, qualified with U, J, and UJ data validation qualifiers. Estimated analytical results are considered to be suitable for risk assessment and decision making purposes.

3.1.3.3 Summary of Data Validation Results

A brief summary of the data validation results for the analytical data effort is provided in the remainder of this section.

Lead was detected in the laboratory blanks at varying concentrations. Positive results for lead, at concentrations less than the established action level that is determined for each Sample Delivery Group, are considered to be false positives.

3.2 CHEMICAL FATE AND TRANSPORT ANALYSIS

Various aspects of contaminant fate and transport at Site 45 are discussed in this section. Properties that affect chemical migration are presented in Section 3.2.1. Section 3.2.2 presents a brief discussion of chemical persistence. Section 3.2.3 presents an overview of chemical fate and transport.

3.2.1 Chemical and Physical Properties

Various chemical and physical properties of the detected site compounds are presented and discussed in this section. These parameters may be used to estimate the environmental behavior of site chemicals. Physical and chemical properties of the organic and inorganic chemicals found at Site 45 are presented in Tables 3-1 and 3-2.

Literature values of the specific gravity, vapor pressure, water solubility, octanol/water partition coefficient, organic carbon partition coefficient, Henry's Law constant, and distribution coefficient are presented when available. Calculated values, which were obtained using approximation methods, are presented when literature values are not available. A discussion of the environmental significance of each of these parameters follows.

3.2.1.1 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. Its primary use is to determine whether a contaminant will have a tendency to float or sink in water if it is present as a pure compound or at very high concentrations. Contaminants with a specific gravity greater than 1 will tend to sink, whereas contaminants with a specific gravity less than 1 will tend to float. This parameter becomes important in discussions regarding the potential presence of free product or nonaqueous-phase liquids.

Of the commonly detected chemicals at these site, PAHs have specific gravities greater than 1.

TABLE 3-1

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR ORGANIC CHEMICALS
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Chemical	Specific Gravity (@ 20/4°C)(2)	Vapor Pressure (mm Hg @ 20°C)(2)	Solubility (mg/L @ 20°C)(2)	Octanol/ Water Partition Coefficient(2)	Organic Carbon Partition Coefficient(3)	Henry's Law Constant (atm-m3/mole)(2)
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	1.0242 (90/4°C)	1E+1 (131°C)	3.42E+0 (25°C)	8.32E+03	7.08E+03 (5)	2.41E-4 (25°C)
Acenaphthylene	0.8988 (16/2°C)	2.90E-02	3.93E+0 (25°C)	1.17E+04	2.50E+03	1.14E-4 (25°C)
Anthracene	1.283 (25/4°C)	1.95E-4 (25°C)	1.29E+0 (25°C)	2.82E+04	2.95E+04 (5)	8.6E-5 (25°C)
Benzo(a)anthracene	1.274	5.00E-09	1E-2 (24°C)	4.07E+05	3.98E+05 (5)	6.60E-07
Benzo(b)fluoranthene	NA	5.00E-07	1.2E-3 (25°C)	3.72E+06	1.23E+06 (5)	1.20E-05
Benzo(k)fluoranthene	NA	9.59E-11	5.5E-4 (25°C)	6.92E+06	1.23E+06 (5)	1.04E-03
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)
Benzo(a)pyrene	1.351	5.00E-09	3.8E-3 (25°C)	9.55E+05	1.02E+06 (5)	4.9E-7 (25°C)
Chrysene	1.274 (20°C)	6.3E-9 (25°C)	6E-3 (25°C)	4.07E+05	3.98E+05 (5)	1.05E-6 (25°C)
Dibenz(a,h)anthracene	1.282	1.00E-10	5E-4 (25°C)	9.33E+05	3.80E+06 (5)	7.3E-8 (25°C)
Fluoranthene	1.252	5.0E-6 (25°C)	2.65E-1 (25°C)	2.14E+05	1.07E+05 (5)	6.5E-6 (25°C)
Fluorene	1.202	1E+1 (146°C)	1.9E+0 (25°C)	1.51E+04	1.38E+04 (5)	1.17E-4 (25°C)
Indeno(1,2,3-cd)pyrene	NA	1E-10 (25°C)	6.20E-02	4.57E+07	3.47E+06 (5)	6.95E-8 (25°C)
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)
Naphthalene	1.162	8.2E-2 (25°C)	3E+1 (25°C)	2.34E+03	2.00E+03 (5)	4.83E-4 (25°C)
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)
Pyrene	1.271 (23/4°C)	2.5E+0 (200°C)	1.6E-1 (26°C)	1.51E+05	1.05E+05 (5)	5.1E-6 (25°C)
Pesticides						
Chlordane	1.61 (25°C)	1E-5 (25°C)	5.60E-02	6.03E+02	1.20E+05 (5)	4.79E-5 (25°C)
4,4'-DDT	1.5 (15/4°C)	1.50E-07	3.1E-3 (25°C)	1.55E+06	2.63E+06 (5)	3.89E-5 (25°C)
Dieldrin	1.75	1.8E-7 (25°C)	1.86E-01	1.23E+04	2.14E+04 (5)	5.84E-5 (25°C)
PCBs						
Aroclor-1254	1.50 (25°C)(3)	7.71E-5(3)	3.1E-2(3)	1.1E+6(3)	5.30E+05	2.6E-3(3)
Aroclor-1260	1.58 (25°C)(3)	4.05E-5(3)	2.7E-3(3)	1.4E+7(3)	6.70E+06	7.4E-1(3)

1 NA - Not Available
2 USEPA, September 1992, Handbook of RCRA Groundwater Monitoring Constituents: Chemical and Physical Properties.
3 USEPA, December 1982, Aquatic Fate Process Data for Organic Priority Pollutants.
4 Lyman et al., 1990; Equation 4-5
5 USEPA, July 1996b, Soil Screening Guidance.

TABLE 3-2

ENVIRONMENTAL FATE AND TRANSPORT PARAMETERS FOR INORGANIC CHEMICALS
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Element	Molecular Weight (g/mole)	Soil / Water Distribution Coefficient (Kd) (mL/g) 1
Aluminum	26.98	NA
Arsenic	74.92	29
Barium	137.34	41
Cadmium	112.4	75
Calcium	40.08	1.2 - 9.8
Chromium III	52	1600000
Chromium VI	52	19
Cobalt	58.93	0.2 - 3,800
Copper	63.54	1.4 - 333
Iron	55.847	NA
Lead	207.19	4.5 - 7,640
Magnesium	24.312	1.6 - 13.5
Manganese	54.93	0.2 - 10,000
Mercury	200.59	52
Nickel	58.71	65
Potassium	39.1	2.0 - 9.0
Selenium	78.96	5
Sodium	22.99	NA
Vanadium	50.94	NA
Zinc	65.38	62

1 Dragun, 1988, The Soil Chemistry of Hazardous Materials.
NA - Not Available

3.2.1.2 Vapor Pressure

Vapor pressure provides an indication of the rate at which a chemical volatilizes from both soil and water. It 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 ketones, monocyclic aromatics, halogenated aliphatics, and nitrogen-containing compounds are generally many times higher than vapor pressures for pesticides and PCBs. 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. Volatilization is not significant for inorganics. Surface soils at the site do not contain high concentrations of VOCs. This fact most likely indicates that volatilization has occurred from surface spills and surface disposal of volatile chemicals.

3.2.1.3 Solubility

The rate at which a chemical is leached from a 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 3-1 indicate that the VOCs (ketones, monocyclic aromatics, and halogenated aliphatics) and nitrogen-containing compounds are usually several orders of magnitude more water-soluble than pesticides and PCBs.

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, and other ionic species in solution (the Debye-Huckel theory). The solubility products reported in the literature vary with the type of complex formed.

3.2.1.4 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 determined (Lyman et al., 1990). It is also useful in characterizing the sorption of compounds by organic soils where experimental values are not available. Pesticides and PCBs are several orders of magnitude 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.

3.2.1.5 Organic Carbon Partition Coefficient

The organic carbon partition coefficient (K_{oc}) indicates the tendency of a chemical to bind to soil particles containing organic carbon. Chemicals with high K_{oc}s 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) are transported in the groundwater. Chemicals such as most pesticides, PAHs, and PCBs are relatively immobile in the soil and are preferentially bound to the soil. These compounds are not subject to groundwater transport to the extent that compounds with higher water solubilities are.

3.2.1.6 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 or equal to 1×10^{-5} atm-m^3/mole, such as pesticides and PCBs, 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, such as many of the halogenated aliphatics, volatilization and diffusion in soil gas could be significant.

3.2.1.7 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. Soil and clay distribution coefficients for inorganics are shown in Table 3-2.

3.2.2 <u>Contaminant Persistence</u>

The persistence of various classes of chemicals is discussed in this section. Several transformation mechanisms affect chemical persistence, such as hydrolysis, biodegradation, photolysis, and oxidation/reduction reactions. The following general classes of compounds are discussed:

- PAHs

- Petroleum Hydrocarbons
- Metals

3.2.2.1 Polycyclic Aromatic Hydrocarbons

PAHs have very low solubilities, vapor pressures, and Henry's Law constants, and high K_{oc}s and K_{ow}s. The low-molecular-weight PAHs (e.g., acenaphthene, anthracene, fluorene, phenanthrene) may volatilize from surface waters, while 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 and be transported by groundwater movement. 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.

Bioconcentration of PAHs in aquatic organisms is greater for the higher-molecular-weight compounds than the lower-molecular-weight compounds. PAHs can be bioaccumulated from water, sediments, or lower organisms in the food chain.

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 (ATSDR, 1990).

The most important fate of PAHs in water are photo-oxidation, chemical oxidation, and biodegradation. PAHs do not contain functional groups that are susceptible to hydrolytic action, and hydrolysis is considered to be an insignificant degradation mechanism. The rate of photodegradation is influenced by water depth, turbidity, and temperature. Benzo(a)pyrene, chrysene, fluorene, and pyrene are reported to be resistant to photodegradation. PAHs may also be oxidized by chlorination and ozonation, and may be metabolized by microbes under oxygenated conditions (ATSDR, 1990).

3.2.2.2 Petroleum Hydrocarbons

Total petroleum hydrocarbons consist of a mixture of aromatic and aliphatic hydrocarbons containing anywhere between five and perhaps greater than 40 carbon atoms. Consequently, solubility, vapor pressure, volatility and K_{oc}'s vary with the size of the hydrocarbon fraction. The lower carbon fractions have lower K_{oc}'s and higher solubilities than the higher carbon fractions. Therefore, the lower carbon fractions would be expected to be more mobile than the higher carbon fractions. Also, the lower carbon aromatic fractions are more volatile. Soil conditions such as water content and organic carbon content

influence the mobility of hydrocarbons. The weathering of the hydrocarbons also makes them more persistent.

3.2.2.3 Metals

Metals are highly persistent environmental contaminants. They do not biodegrade, photolyze, hydrolyze, etc. The major fate mechanisms for metals are adsorption to the soil matrix (as compared to being part of the soil structure) and bioaccumulation.

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 Eh, and cation exchange capacity. The mobility of metals generally increases with decreasing soil pH and cation exchange capacity.

3.2.3 Contaminant Fate and Transport

This section presents a brief overview of contaminant fate and transport issues at Site 45. This discussion focuses on some of the major types of contaminants found at the site.

3.2.3.1 Polycyclic Aromatic Hydrocarbons

PAHs are generally considered to be fairly immobile chemicals in the environment. They are large molecules with high organic carbon partition coefficients and low solubilities when compared to the VOCs. 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.

PAHs were generally not detected in significant concentrations at the site.

3.2.3.2 Petroleum Hydrocarbons

TRPH consist of a mixture of aromatic and aliphatic hydrocarbons containing anywhere between five and perhaps greater than 40 carbon atoms. Consequently, fate and transport, which are affected by solubility, vapor pressure, volatility and Koc's, vary with the size of the hydrocarbon fraction. The lower carbon fractions have lower Koc's and higher solubilities than the higher carbon fractions. Therefore, the lower carbon fractions would be expected to be more mobile than the higher carbon fractions, and are more likely to be found farther from the source of the contamination. Soil conditions such as water content and organic carbon content influence the mobility of hydrocarbons. Under both aerobic and anaerobic conditions, TRPH compounds are subject to biological degradation.

3.2.3.3 Inorganics

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). The larger particles (>0.45 microns, which are removed via the filtration step prior to water analysis) are not generally considered to be mobile in groundwater. The metals detected in unfiltered groundwater samples may be representative of suspended soil material in the samples.

Vanadium and lead, in addition to aluminum, calcium, iron, manganese, sodium and potassium, were detected in groundwater samples at the site. Arsenic, although present in soil samples, was not detected in the groundwater samples.

3.3 HUMAN HEALTH RISK ASSESSMENT PROCEDURES

The objective of a Human Health Risk Assessment is to characterize the risks associated with potential exposures to site-related constituents. For Site 45 at Cecil Field, the Human Health Risk Assessment for groundwater is being conducted as a PRE. The Human Health PRE is a screening-level evaluation of potential risks from site constituents to human receptors at the site. While a site may have numerous hypothetical receptors, as a site-screening tool it is common to use the most sensitive human receptor for risk calculations. At Site 45, the focus of the investigation is on the groundwater. Therefore, for groundwater, the residential receptor will be used to evaluate potential risks at the site.

The soil removal action has already occurred. Therefore, risk assessment for exposure to soil will be conducted, based on the post-removal site conditions. For soil, the industrial worker and resident will be used to evaluate risks at the site. Also for soil, the potential for constituents to leach into groundwater will be considered.

3.3.1 <u>Data Evaluation</u>

3.3.1.1 Groundwater

Groundwater screening values are taken from USEPA's Current Drinking Water Standards (USEPA, 1998) as listed in FAC 62-550 and FDEP GCTLs (FDEP, 1999) as provided in FAC 62-777. These criteria meet or are more restrictive than USEPA Federal Maximum Contaminant Levels (MCLs). Selection of the appropriate FDEP GCTL is contingent on the yield and water quality of the aquifer. The aquifer being investigated at Site 45 is regarded as being of sufficient yield and quality. Therefore, the groundwater criteria for sufficient-yield aquifers will be used in this PRE.

The documents described above contain both primary drinking water standards that are mostly human health-based and secondary standards that are established for potability or aesthetic reasons. Risk-based drinking water standards were also developed for those compounds with standards that are not health-based. These were developed in accordance with the protocol set forth in FAC 62-777. These values are presented in the human health PRE. Also, the BCT has established a site-specific inorganic background data set (IBDS) (refer to Section 3.6). The IBDS has only been developed for inorganic constituents. Data were also compared to USEPA Region 9 Preliminary Remediation Goals (PRGs). These four sets of values are presented in the human health PRE.

Analytes detected in groundwater in at least one sample at concentrations greater than their respective groundwater screening values or the NAS Cecil Field screening values are further evaluated in the human health PRE.

3.3.1.2 Soil

For this risk assessment, soil can be considered a potential source to the groundwater plumes being evaluated. Exposure concentrations for soil, represented by the lesser of the 95% upper confidence limit (UCL) of the mean or the maximum detected concentration, are compared to appropriate screening criteria. However, in accordance with the RI Work Plan, soil excavated as a result of a removal action will not be evaluated. The Source Removal Report for Site 45 (CH2M Hill, 2001) identifies those soil locations that were removed according to the Action Memorandum (TtNUS, 2000b).

Soil screening values are taken from FDEP SCTLs (FDEP, 1999) as provided in FAC 62-777. These cleanup levels address both direct exposure and leachability to groundwater. For direct exposure, the commercial/industrial values are used for screening in the human health risk assessment because the reuse plan classified the area for industrial use. The post-excavation condition of the site is also evaluated for residential use. For leachability, the values to be used for screening are contingent on the yield and water quality of the aquifer. Also, the NAS Cecil Field IBDS criteria for inorganic constituents are used.

Analytes detected in subsurface soil in at least one sample at concentrations greater than their respective soil screening values and the NAS Cecil Field IBDS values are further evaluated in the risk assessment.

3.3.2 Toxicity Screening

The human health PRE for groundwater is conducted in two steps. First, all analytes detected in at least one sample in groundwater are compared to the medium-specific screening values described above. All analytes detected at concentrations less than these screening values are dropped from further

consideration. Analytes detected in at least one sample at a concentration greater than the medium-specific screening values or the NAS Cecil Field IBDS concentration, whichever is greater, are further evaluated. The PRE is conducted by simply generating a ratio between the maximum detected analyte concentration and the appropriate screening value.

For groundwater, a ratio greater than one based on a comparison to a primary health-based drinking water standard suggests a potential risk to human health. It is inappropriate to use secondary drinking water standards to calculate a health-based risk ratio because these standards are based on the aesthetic qualities of water. However, this ratio may serve as a useful risk management tool. To determine potential health risk from these constituents, a comparison will be made to the USEPA Region 9 Preliminary Remediation Goals (PRGs). Ultimately, comparison of the data to the NAS Cecil Field IBDS identifies whether the groundwater constituents are truly site-related.

For soil, the direct exposure cleanup levels correspond to a carcinogenic risk of 1×10^{-6} and a hazard quotient (HQ) of 1.0 for carcinogens and noncarcinogens, respectively. The ratio between the exposure concentration and the screening value provides an indication of the total carcinogenic or noncarcinogenic risk associated with the constituents. For example, a ratio of 3 for a carcinogen indicates that the risk associated for that constituent is equivalent to 3×10^{-6}. This risk may exceed Florida's action level but be within the USEPA National Oil and Hazardous Substances Pollution Contingency Plan target risk range of 1×10^{-6} to 1×10^{-4}. A ratio of 3 for a noncarcinogen indicates that the hazard quotient is greater than one and that there is a potential for noncarcinogenic effects to manifest upon exposure to that concentration of constituent. Also, as with groundwater, comparison of the data to the NAS Cecil Field IBDS identifies whether the soil constituents are truly site-related.

For soil, the leachability cleanup levels correspond to levels protective of groundwater screening levels. A comparison to these levels is only relevant if groundwater data indicate that the constituent is present in the groundwater. Leachability criteria are based on conservative assumptions regarding site conditions. Therefore, the absence of a constituent's detection in groundwater in conjunction with an exceedance of its leachability screening value is sufficient evidence that site-specific conditions do not favor leaching.

At Site 45, a soil removal action has been conducted. Data prior to and after the removal will be presented to demonstrate that the removal action was warranted and that post-removal conditions are protective of public health.

3.4 ECOLOGICAL RISK ASSESSMENT PROCEDURES

This section provides an outline of the general approach that was taken to assess the impacts of site contamination on ecological receptors. This assessment followed the general approach recommended in

the most recent USEPA guidance for performing ecological risk assessments (USEPA, 1997; 2000), and was conducted in accordance with Navy policy (DON, 1999).

An ecological risk assessment starts with Preliminary Problem Formulation. This first phase of an ecological risk assessment includes general descriptions of the site, with emphasis on the habitats and ecological receptors that are present. This phase also involves characterization of contaminant sources and migration pathways, evaluation of routes of contaminant exposure.

For this site, no suitable habitats were identified, so no additional steps in the assessment were required.

3.5 FLORIDA STANDARDS

Analytical data were compared to FDEP GCTLs. The groundwater criteria meet or exceed Federal Maximum Contaminant Levels (MCLs). These criteria were originally contained in FAC 62-785. The rules were finalized in August 1999 and these criteria are now in FAC 62-777. FAC 62-777 cites FAC 62-550 for primary and secondary standards. The results of the comparison will serve as the initial step towards determining compliance with state standards. Comparisons to the criteria are provided in the Section 5.0, Nature and Extent of Contamination.

For water, there are four sets of criteria to consider: Groundwater Criteria; Freshwater Surface Water Criteria; Marine Surface Water Criteria; and Groundwater of Low Yield/Poor Quality. For each contaminant, the Groundwater Criteria must be considered. The Low Yield/Poor Quality Criteria were not considered since the groundwater does not fall into the category covered by this criteria.

3.6 SITE INORGANIC BACKGROUND CONCENTRATIONS

An IBDS was developed for NAS Cecil Field (HLA, 1998c). The NAS Cecil Field BCT agreed to a new approach for excluding constituents on the basis of comparison to background. This inorganic background data set is referred to as the “hi-cut” values. Data from wells throughout the base were used for this data set. A non-parametric outside values test described in *Understanding Robust and Exploratory Data Analysis* (Hoaglin, 1983) was selected to develop the IBDS. This method is based on the definition of the “fourth spread” which is the numerical difference between the lower fourth (25th percentile) and the upper fourth (75th percentile) of the background data. By using the distance between fourths as an indicator to the “natural spread” of the values, extreme values at either end of the distribution have no effect on the measure of the spread of the population around its central value.

According to Hoaglin et al. (Hoaglin, 1983), any value that lies more than 1.5 times the fourth spread above the upper fourth value or 1.5 times the fourth spread below the lower fourth value is considered an

"outside value." These values are not true statistical outliers but are distributed far enough from the sample's central value to be questionable. The NAS Cecil Field BCT agreed to use these IBDS values as the sentinel values to trigger further investigation at BRAC and IR sites. In essence, inorganic constituents with maximum concentrations exceeding these IBDS values would be retained in the risk assessment. Inorganic constituents with maximum concentrations less than these IBDS values would not be considered further. Thus, the remediation goal for any site should not be less than the IBDS values. If an FDEP criterion is greater than the IBDS value, then the FDEP criterion is regarded as the remediation goal. The IBDS values are presented in Table 3-3.

TABLE 3-3

SITE-SPECIFIC INORGANIC BACKGROUND DATA SET
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
CECIL FIELD, FLORIDA

Inorganic Analytes	Media			
	Surface Soil (in mg/kg)	Groundwater (in µg/l)	Sediment (in µg/kg)	Surface water (in µg/l)
Aluminum	4,430	13,100	10,200,000	1,040.
Antimony	9.44	44.5	15,100	46
Arsenic	2.04	7.1	2,620	5.45
Barium	14.4	88.2	36,100	43.7
Beryllium	0.35	3.5	625	2.16
Cadmium	1.72	6	2,050	2.25
Calcium	9.44	81,100	5,920,000	43,000
Chromium	7.75	18	16,000	4.75
Cobalt	3.11	12.8	3,000	10.5
Copper	5.97	12.5	12,500	7.35
Iron	1,490	7,760	3,330,000	3,030
Lead	197	5.35	44,600	5.35
Magnesium	329	10,000	379,000	5,580
Manganese	22	96.2	17,000	49.3
Mercury	0.16	0.34	305	0.38
Nickel	3.89	24.5	7,000	20.
Potassium	102	4,330	289,000	2,060
Selenium	1.68	7	2,270	7.6
Silver	2.13	6	1,870	2.29
Sodium	343	16,500	388,000	12,200
Thallium	2.84	13.3	2,670	10.1
Vanadium	6.3	20.2	15,000	4.5
Zinc	37	76.8	92,100	51.4
Cyanide	1.19	22	1,230	3.75

4.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

4.1 SURFACE FEATURES

The site is essentially flat, with very little change in elevation. The site is primarily unpaved in the center, with paved parking lots or buildings along each of the four borders. The land to the north, east, and west is occupied by buildings and parking lots. To the south, there are few structures and several parking lots. Further south is the flightline. Refer to Figures 1-2 and 1-3.

4.2 SURFACE HYDROLOGY/STORM SEWERS

According to base maps, storm drainage from the site is collected by drainage ditches along the north, south, and west sides of the site. This water flows to the drainage system that leads to Lake Fretwell. Runoff on the extreme east side of the site may flow into a drainage ditch along Cargo Hold Avenue (formerly “B” Avenue) and ultimately into the drainage system that flows into Sal Taylor Creek. Figure 4-1 shows the storm water drainage lines and ditches.

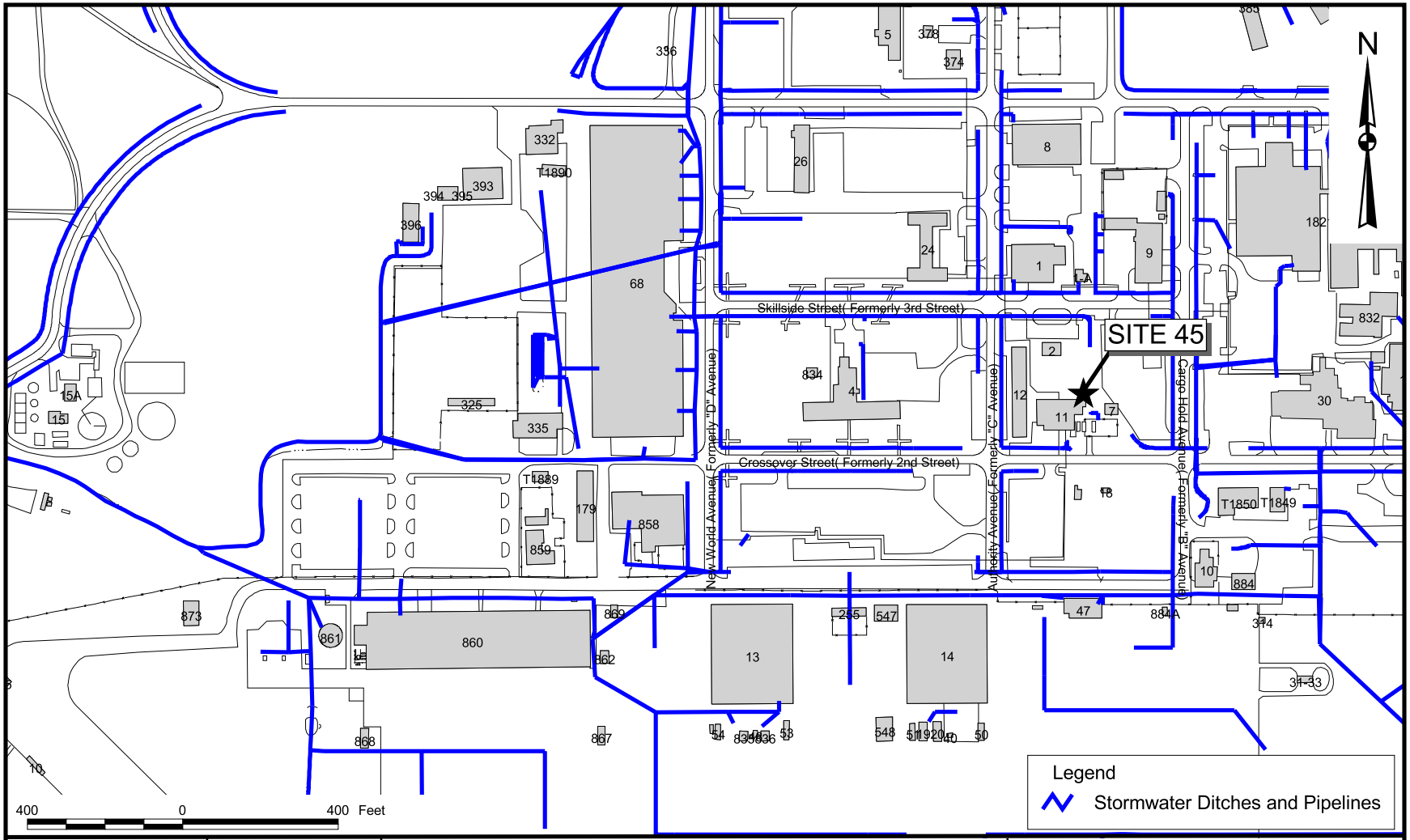
4.3 SOILS

Soils in the area of NAS Cecil Field occupied by Site 45 are classified as Leon-Urban land complex (SCS, 1978). This soil complex is made up of approximately 40 to 70 percent Leon fine sand and 25 to 45 percent Urban land. Areas of Leon fine sand occur in lawns and other unpaved areas interspersed with areas of Urban land covered by buildings, parking lots, and other man-made structures. Leon series soils, including Leon fine sand, are nearly level, poorly drained soils that formed in thick marine sediments.

4.4 GEOLOGY

4.4.1 Physiography

White (1970) divided the state of Florida into three major physiographic regions: the Northern Zone, the Central Zone, and the Southern Zone. NAS Cecil Field is located within a broad, continuous highland of the Northern Zone called the Duval Upland. The Duval Upland is an irregular flat plain consisting of a series of marine terraces of Pleistocene age. During the Pleistocene, a series of drops in sea level resulted in the formation of ancient shorelines or “scarps” and ancient seafloors or “terraces” (Cooke, 1945). The eastern boundary of the Duval Upland is formed by a scarp at approximately 25 feet above mean sea level (msl), and the scarp forming the western boundary of this feature is at approximately 100 feet above msl.



DRAWN BY MJJ	DATE 30Jun00	SURFACE WATER DRAINAGE SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV 1

P:\GIS\NAS_CecilField\PSC45_RI_Rev1.apr 15May01 MJJ 4-1_Surface Water Drainage Layout

Eight marine terraces have been identified in northeast Florida, and seven of those terraces have been identified in Duval County (Fairchild, 1972). In order of ascending age, the terraces are called Coharie, Sunderland, Wicomico, Penholoway, Talbot, Pamlico, and Silver Bluff. The Wicomico, Penholoway, and Talbot terraces occur between 25 and 100 feet above msl. As previously described, those elevations set the boundaries for the Duval Upland. NAS Cecil Field is located on remnants of the Wicomico and Penholoway terraces.

4.4.2 Regional Geology

The basement rocks of North Florida are Jurassic and earlier and consist principally of tholeiitic basalts and diabases (Heatherington and Mueller, 1997). A significant structural low called the Jacksonville Basin formed during the Paleocene or Eocene beneath the area now known as Duval County (Goodell and Yon, 1960). The late Mesozoic and early Paleogene were periods of carbonate deposition intersected by evaporite sediments that formed the sub-Floridan confining unit. North Florida's Paleogene geologic history is principally one of marine carbonate deposition that gave rise to an extensive aquifer system called the Floridan Aquifer System (Scott, 1992). These carbonates remained relatively pure without a siliciclastic sediment supply due to the presence of the Gulf Trough (Suwannee Straits). However, in the late Oligocene to early Miocene, the Appalachian mountain range experienced renewed uplift and erosion resulting in a flood of siliciclastics (sands and clays) that filled the Straits (and the Jacksonville Basin) and covered the carbonate platform of Florida. Though there was initial mixing of the carbonates and siliciclastics, the Miocene-age sediments were principally sands and clays that formed an effective aquitard called the Hawthorn Group (Scott, 1988). The thickness of the Hawthorn Group sediments, ranging from 250 feet in southern Duval County to about 500 feet in north-central Duval County (Leve, 1965) is a result of the filling of the Jacksonville Basin. The sediments of the Hawthorn Group are principally identifiable by the occurrence of phosphate as well as a mixture of carbonates and siliciclastics (Scott, 1988). The sediments overlying the Hawthorn consist of siliciclastics (mostly sands), without phosphates and carbonates, deposited during the Pleistocene and Holocene series.

4.4.3 Site Geology

Appendix B contains boring logs for the 11 shallow wells (approximately 15 feet bgs) and one intermediate well (approximately 40 feet bgs) installed as part of this investigation. Surficial sediments encountered during drilling at the site included undifferentiated silty fine sands of various colors. As described in Section 2.2.1, Shelby tube samples were collected from CEF-P45-7S at approximately 4 to 6 feet bgs and from CEF-P45-10I at approximately 35 to 37 feet bgs. Geotechnical analyses performed on these samples included sieve analysis, moisture content, pH, dry unit weight, specific gravity, and porosity.

The sieve analyses indicated that the sample from the shallow screened interval (6 feet bgs) was composed of approximately 91 percent fine sand and approximately 9 percent silts and clays. The USCS soil classification for soils with this composition is well-sorted to silty sand (SW-SM). The sample from the intermediate screened interval (37 feet bgs) was composed of approximately 98 percent fine sand and 2 percent silts and clays and has a USCS classification of well-sorted sand (SW). The specific gravity of the samples ranged from 2.58 to 2.63 which corresponds with their overall composition (sand) and mineralogy (quartz). The porosity for the samples ranged from 31.8 to 46.3 percent, which is in general agreement with that of an unconsolidated, well-sorted sand (25 to 50 percent) (Fetter, 1980).

Appendix F contains the geotechnical laboratory data.

4.5 HYDROGEOLOGY

4.5.1 Regional Hydrogeology

Table 4-1 describes the local lithology and associated hydrogeologic units of southern Duval County and adjacent northern Clay County. The table was compiled from well log data from three wells within 10 miles of NAS Cecil Field (Johnson, 1986).

Three main hydrogeologic units underlie the site. These units, in ascending order, are the Floridan aquifer system, the intermediate aquifer system or confining unit, and the surficial aquifer system (Southeastern Geological Society, 1986).

4.5.1.1 Floridan Aquifer System

The Floridan aquifer system in Duval County consists of several units. These units, in ascending order, are the Oldsmar Limestone, Lake City Limestone, Avon Park Limestone, and Ocala Group. Because an effective aquiclude is present above the Floridan, only the Ocala Group will be discussed. Several authors (Leve, 1965 and Scott, 1992) consider the lower basal deposits of the Hawthorn Group, which are transmissive limestones and sands, as part of the Floridan. The Ocala Group consists of massive, fossiliferous limestones of Eocene age. The top of the Floridan is approximately 290 to 430 feet bgs in the vicinity of the site. The Ocala Group is about 520 feet thick (Leve, 1965). The Floridan is under confined conditions and is the major source of public water supply in the area.

4.5.1.2 Intermediate Aquifer System or Confining Unit

Overlying the Ocala Group are the sediments of the Hawthorn Group that consist of interbedded phosphatic carbonates and siliciclastics (Scott, 1992). As shown by Table 4-1, the individual formations of the Hawthorn from oldest to youngest are the Coosawhatchie, Marks Head, and Penney Farms. These

TABLE 4-1

LOCAL HYDROSTRATIGRAPHY
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

System	Series	Stratigraphic Unit	Depth to Top of Unit (feet, bgs)	Thickness of Unit (feet)	General Lithology	Hydrogeologic Unit	Aquifer Use
Quarternary	Holocene	Undifferentiated	0	40 to 70	Quartz sand, fine- to medium-grained, unconsolidated to poorly indurated, nonclayey to clayey, trace heavy minerals, sandy, clayey shell bed and limestone at base, fossiliferous.	Surficial Aquifer System	Lawn irrigation, stock, and domestic use.
	Pleistocene						
Tertiary	Miocene	Hawthorn Group	40 to 70	252 to 370	Interbedded sand, clay, limestone and dolomite. Also contains phosphate and mollusk molds.	Intermediate Aquifer System or Confining Unit. As a whole, this unit acts as a confining unit. Limestone and dolomite units within the Hawthorn Group may act as small intermediate aquifers.	Small domestic and irrigation wells.
		Coosawhatchie Formation	40 to 70	102 to 119			
		Marks Head Formation	142 to 180	56 to 101			
		Penney Farms Formation	224 to 280	68 to 150			
	Eocene	Ocala Group	292 to 430	110 to 520*	Limestone, white to light gray, grainstone to wackestone, fossiliferous, Bryozoan facies, moderately recrystallized.	Floridan Aquifer System. The top of the aquifer may be present in basal limestone and sand units of the Hawthorn Group.	Public and domestic supply wells and industrial uses.

Notes: Compiled from lithologic logs of Florida Geological Survey wells W-14179, W-14193, and W-14219 (Johnson, 1986).
Some terminology from Scott (1992) and Southeastern Geological Society (1986).
feet, bls - feet, below land surface.
* Thickness of Ocala Group taken from Leve (1966).

sediments are predominantly siliciclastic and typically have low permeabilities that restrict groundwater flow and form a confining unit. The top of the Hawthorn is approximately 40 to 100 feet bgs (Halford, 1998) at NAS Cecil Field. Limestone and dolomite units in the Hawthorn may act as isolated intermediate aquifers suitable for small domestic and irrigation wells.

4.5.1.3 Surficial Aquifer System

The surficial aquifer system consists of sandy (nonclayey to clayey) Pleistocene and Recent deposits, and sandy, clayey shell beds and limestones of the upper part of the Hawthorn Group. Halford (1998) specifically subdivides these deposits into an upper surficial sand aquifer, a blue-marl confining unit, and an upper-rock aquifer. These deposits are generally 40 feet to 100 feet thick and are 85 feet to 95 feet thick beneath the site. They are susceptible to contamination because of their shallow depth.

4.5.2 Site Hydrogeology

4.5.2.1 General Description

Depth to groundwater at Site 45, as measured in April 2000, ranged from approximately 7 to 9 feet bgs. The surficial aquifer system in which the wells are installed is approximately 90 to 100 feet thick at NAS Cecil Field, although wells at Site 45 monitor only the shallow and intermediate portions to depths of 15 and 40 feet, respectively. Based on boring logs for wells installed at the site, aquifer materials were composed of silty fine sand with a trace to some clay in the shallow zone and fine sand to silty fine sand in the intermediate zone.

4.5.2.2 Aquifer Characteristics

Specific capacity (SPECAP) tests were performed on two wells (CEF-P45-MW-4S and CEF-P45-MW-07S). The tests were used to determine each well's specific capacity, hydraulic conductivity, and transmissivity. The data were analyzed and values were estimated using a computerized technique from Bradbury and Rothschild (1985). The data and calculations are provided in Appendix C.

In the calculations, the storage coefficient (S) is the same as the specific yield (Sy) of the aquifer for unconfined aquifers. The storage coefficient used was estimated to be 0.15. This value was estimated based on referenced information published by C.W. Fetter (1988) and by M. Kasenow and P. Pare, (1995). According to Fetter (1988), the Storage Coefficient in unconfined aquifers ranges from 0.02 to 0.30. In addition, according to Kasenow and Pare (1995) the specific yield for gravel and coarse grain sand formations equals 0.20 and the specific yield for medium to fine grain sand formations equals 0.10. A value of 0.15 was used in calculations to be consistent with the porosity (0.15).

In general, hydraulic conductivities for unconsolidated sediments like silty sands and fine sands range from 2.8 x 10^{-2} to 2.8 feet per day (ft/day) (Fetter, 1980). Halford (1998) estimates the horizontal hydraulic conductivity for NAS Cecil Field at 0.6 to 5 ft/day for the surficial aquifer. The calculated values for the two wells are 2.18 feet/day and 2.62 feet/day, respectively.

4.5.2.3 Groundwater Flow

The monitoring wells at the site were surveyed to establish the elevation of the top of casing and ground elevation to the nearest 0.01 feet. All elevations are based on NGVD 1988. Table 4-2 presents the groundwater level measurements and groundwater elevation data from April 19, 2000. Based on the water level data, groundwater flows to the southeast across the site. The groundwater high at well CEF-P45-2S was not observed during the RI. Figure 4-2 shows the groundwater contours and the direction of groundwater flow in the shallow surficial aquifer system.

The direction of groundwater flow is consistent with nearby sites, such as Sites 36 and 37. The groundwater gradient is approximately 0.003, similar to the gradients measured at Sites 36 and 37 (0.001 to 0.007).

The velocity of groundwater flow can be calculated from a modified form of Darcy's equation:

$V_h = K_h \times i/n_e$

Where,

V_h is horizontal velocity, ft/day
K_h is horizontal hydraulic conductivity, ft/day
i is hydraulic gradient, dimensionless
n_e is effective porosity, dimensionless (assumed at 0.15 for fine sands)

Because the contamination is limited to the shallow zone of the surficial aquifer, only the velocity in the shallow zone was evaluated. The K_h value used was the average of the values derived from the specific capacity test data for wells CEF-P45-4S and CEF-P45-5S.

K_h = 3.8 ft/day
i = 0.003
n_e = 0.15.

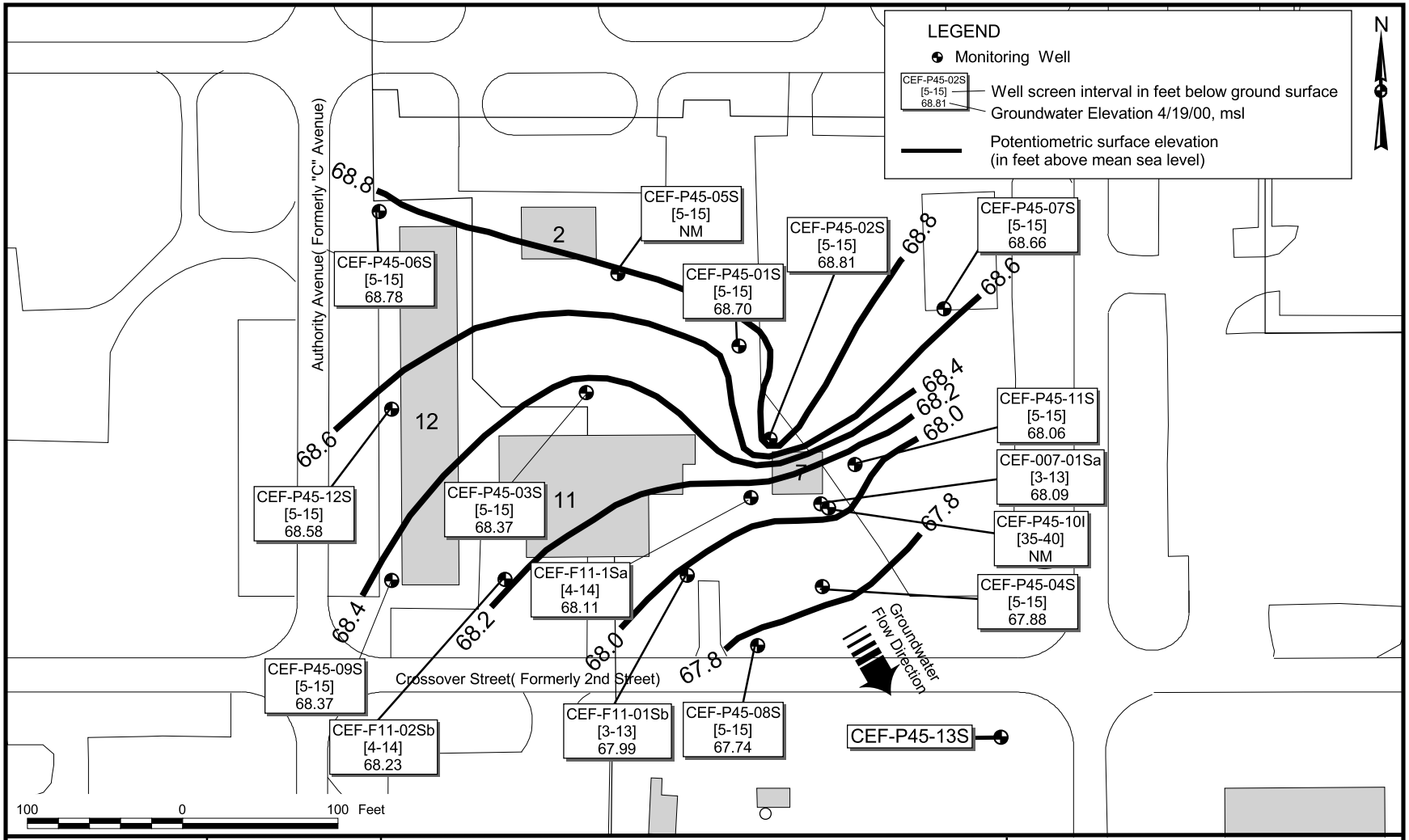
The resulting V_h is 0.08 ft/day or 28 ft/year.

TABLE 4-2

SYNOPTIC WATER LEVELS
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Monitoring Well Number	Total Depth, feet bgs	Screened Interval, feet bgs	Top of Casing Elevation, feet	Depth to Water, feet	Elevation, feet
CEF-P45-1S	15	5 to 15	75.56	6.86	68.70
CEF-P45-2S	15	5 to 15	75.89	7.08	68.81
CEF-P45-3S	15	5 to 15	77.06	8.69	68.37
CEF-P45-4S	15	5 to 15	76.49	8.61	67.88
CEF-P45-5S	15	5 to 15	76.68	NM	NM
CEF-P45-6S	15	5 to 15	76.27	7.49	68.78
CEF-P45-7S	15	5 to 15	77.15	8.49	68.66
CEF-P45-8S	15	5 to 15	76.80	9.06	67.74
CEF-P45-9S	15	5 to 15	76.42	8.05	68.37
CEF-P45-10I	40	35 to 40	75.97	7.98	67.99
CEF-P45-11S	15	5 to 15	76.46	8.40	68.06
CEF-P45-12S	15	5 to 15	76.99	8.41	68.58
CEF-P45-13S	15	5 to 15	76.30	NM	NM
CEF-7-1Sa	13	3 to 13	76.12	8.03	68.09
CEF-11-1Sa	14	4 to 14	76.37	8.26	68.11
CEF-11-1Sb	13	3 to 13	76.59	8.60	67.99
CEF-11-2Sb	14	4 to 14	76.25	8.02	68.23

NOTES
Elevation is referenced to 1988 National Geodetic Vertical Datum (NGVD)
bgs - below ground surface
Depth to water measured from top of casing 4/19/00
NM - Not measured



DRAWN BY MJJ	DATE 07Oct00	POTENTIOMETRIC SURFACE - SHALLOW GROUNDWATER ZONE SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-2 / REV 1

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The elevation of the groundwater in the intermediate depth well CEF-P45-10I (67.99 feet) was less than the elevation in an adjacent shallow depth well CEF-007-01Sa (68.09 feet), indicating that the direction of the vertical gradient is downward.

4.6 FDEP GROUNDWATER CLASSIFICATION

According to FAC 62-520.410 (Classification of Ground Water, Usage, Reclassification), the surficial aquifer system in northeast Florida comes under the classification of G-II. The code's definition of G-II is as follows: "Potable water use, ground water in aquifers which has a total dissolved solids content of less than 10,000 mg/L, unless otherwise classified by the Commission." The total dissolved solids levels of the surficial aquifer system in the area of NAS Cecil Field have been shown by Fairchild (1972) to be between 146 and 309 mg/L. Also, Leve (1965) has indicated that the surficial aquifer system is suitable for domestic use.

4.7 FUTURE LAND USE

According to the plans made by the City of Jacksonville, the anticipated future land use of Site 45 (and the area around) is for Manufacturing.

5.0 NATURE AND EXTENT OF CONTAMINATION

5.1 SOILS

PAHs, TRPH, arsenic, and mercury were detected at concentrations in excess of the industrial SCTLs. The presence of these contaminants is probably the result of burning fuels at the facility. Vanadium was detected in the soil but at concentrations less than the industrial SCTL. The BCT reviewed analytical results, and a decision was made to delineate the extent of contaminated soil. A statistical evaluation was conducted to determine the areas requiring removal to achieve a site-wide upper confidence level (UCL) that was below the industrial SCTLs. Additional site background information may be obtained through reference to the Action Memorandum (TtNUS, 2000b).

To determine how much excavation would be performed, a statistical-based approach was used. It was determined that not all samples with contaminant concentrations greater than the Florida industrial SCTLs would need to be removed. The exceedance of a criterion by an individual sample does not necessarily indicate a significant exceedance of a risk level. Exposure to the contaminants in the soil is a result of exposure to an area not an individual sampling location. Therefore, the entire data set was used to determine a post-excavation exposure concentration that would be less than the industrial SCTL. The evaluation of the soil data is presented in the Action Memorandum for PSC 45 (TtNUS, 2000b).

This removal action was completed on August 18, 2000 so that UCLs of the concentrations of PAHs, TRPH, arsenic, and mercury in the soil conform to FDEP industrial exposure criteria (CH2M Hill, 2001). The areas of excavation coincidentally included the locations where the highest concentrations of vanadium were identified.

5.2 GROUNDWATER

Samples of groundwater were collected from permanent monitoring wells. Positive detections from the permanent monitoring well samples collected during the RI are presented in Table 5-1, and the concentration ranges and maximum concentrations are summarized in Table 5-2. A complete database summary is provided in Appendix D.

The results are depicted on Figure 5-1. Results are only shown where the concentration is greater than the detection limits. The figure also shows the isoconcentration contour lines. The plume outline is defined by the FDEP groundwater criteria for vanadium in FAC 62-777.

TABLE 5-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-7-01Sa	CEF-7-01Sa	CEF-P45-01S	CEF-P45-01S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S
Sample Number	CEF-B07-GW-01SA-02	CEF-B07-GW-01SA-02-F	CEF-P45-GW-01S-02	CEF-P45-GW-01S-02-F	CEF-P45-GW-02S-02	CEF-P45-GW-02S-02-F	CEF-P45-GW-03S-02
Sample Date	04/20/00	04/20/00	04/21/00	04/21/00	04/21/00	04/21/00	04/21/00
Depth, feet bgs	14	14	15	15	15	15	15
Inorganics (ug/L)							
LEAD	1.6 U	1.6 U	3.6 U	1.6 U	1.6 U	1.6 U	5.8 U
VANADIUM	**240**	**233**	13.3	6.5	**74.9**	**85**	49

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria.
4. U indicates not detected at the detection limit shown.
5. NM - Not Measured.

TABLE 5-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-P45-03S	CEF-P45-04S	CEF-P45-04S	CEF-P45-06S	CEF-P45-06S	CEF-P45-07S	CEF-P45-07S
Sample Number	CEF-P45-GW-03S-02-F	CEF-P45-GW-04S-02	CEF-P45-GW-04S-02-F	CEF-P45-GW-06S-01	CEF-P45-GW-06S-01-F	CEF-P45-GW-07S-01	CEF-P45-GW-DU07
Sample Date	04/21/00	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00
Depth, feet bgs	15	15	15	15	15	15	15
Inorganics (ug/L)							
LEAD	1.6 U	5.4 U	3.1 U	1.6 U	1.6 U	1.8 U	1.6 U
VANADIUM	40.4	**68.2**	**53.6**	3	1.7	4.9	5.1

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria.
4. U indicates not detected at the detection limit shown.
5. NM - Not Measured.

TABLE 5-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-P45-07S	CEF-P45-07S	CEF-P45-08S	CEF-P45-08S	CEF-P45-08S	CEF-P45-08S	CEF-P45-09S
Sample Number	CEF-P45-GW-07S-01-F	CEF-P45-GW-DU07-F	CEF-P45-GW-08S-01	CEF-P45-GW-08S-01-F	CEF-P45-GW-08S-02	CEF-P45-GW-08S-02-F	CEF-P45-GW-09S-01
Sample Date	04/20/00	04/20/00	04/20/00	04/20/00	08/03/00	08/03/00	04/21/00
Depth, feet bgs	15	15	15	15	15	15	15
Inorganics (ug/L)							
LEAD	1.6 U	1.7 U	**34.6**	10.2	5.3	2.9 U	1.6 U
VANADIUM	3.5	3.7	5.4	3.7	NM	NM	0.72 U

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria.
4. U indicates not detected at the detection limit shown.
5. NM - Not Measured.

TABLE 5-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Location	CEF-P45-09S	CEF-P45-10I	CEF-P45-10I	CEF-P45-11S	CEF-P45-11S	CEF-P45-12S	CEF-P45-12S
Sample Number	CEF-P45-GW-09S-01-F	CEF-P45-GW-10I-01	CEF-P45-GW-10I-01-F	CEF-P45-GW-11S-01	CEF-P45-GW-11S-01-F	CEF-P45-GW-12S-01	CEF-P45-GW-12S-01-F
Sample Date	04/21/00	04/20/00	04/20/00	04/20/00	04/20/00	04/21/00	04/21/00
Depth, feet bgs	15	40	40	15	15	15	15
Inorganics (ug/L)							
LEAD	1.6 U	12.6	1.6 U	1.6	1.6 U	1.6 U	1.6 U
VANADIUM	0.72 U	26.5	3.9	4.3	3.9	2	2.1

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria.
4. U indicates not detected at the detection limit shown.
5. NM - Not Measured.

TABLE 5-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

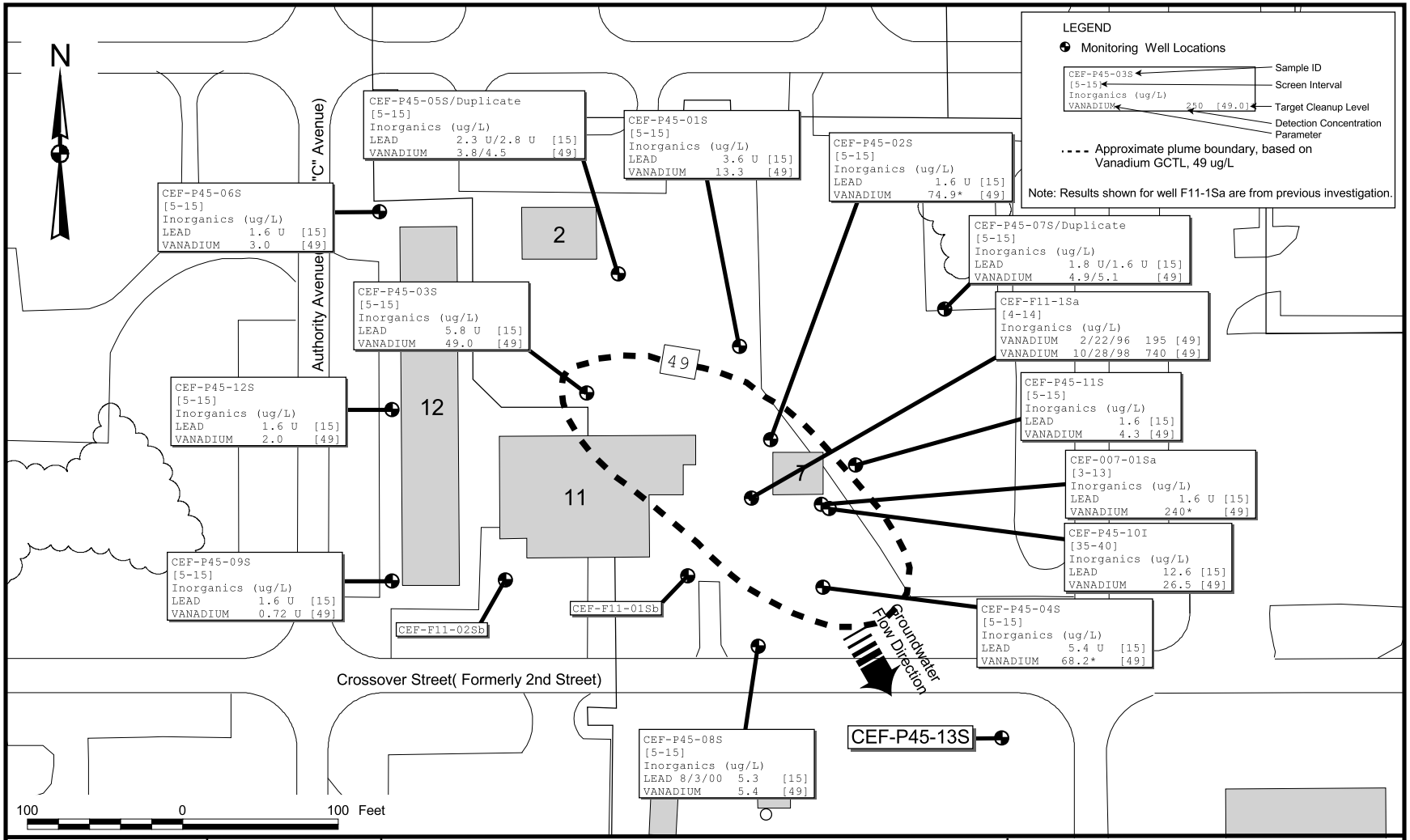
Location Sample Number Sample Date Depth, feet bgs	CEF-P45-13S CEF-P45-GW-13S-01-F 02/06/01 15	CEF-P45-13S CEF-P45-GW-13S-01-F 02/06/01 15	USEPA MCL	USEPA Region 9 PRG	FDEP Groundwater Cleanup Target Level, Groundwater Criteria	NAS Cecil Field, IBDS Value
Inorganics (ug/L)						
LEAD	NM	NM	15	none	15	5.35
VANADIUM	3.0 U	2.9 U	none	260	49	20.2

NOTES:
1. "-F" in the sample number denotes that the sample was filtered.
2. Blank means not analyzed.
3. Shaded/bolded results are greater than FDEP criteria.
4. U indicates not detected at the detection limit shown.
5. NM - Not Measured.

TABLE 5-2

GROUNDWATER ANALYTICAL RESULTS SUMMARY (RI DATA)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive Detections
Inorganics, Total (mg/L)				
Lead	3/12	1.6 - 34.6	CEF-P45-GW-08S-01	16
Vanadium	11/14	2 - 240	CEF-B07-GW-01SA-02	41
Inorganics, Filtered (mg/L)				
Lead, Filtered	1/12	10.2	CEF-P45-GW-08S-01-F	10
Vanadium, Filtered	11/13	1.7 - 233	CEF-B07-GW-01SA-02-F	37



DRAWN BY MJJ	DATE 02Oct00	GROUNDWATER RESULTS - RI SITE 45 REMEDIAL INVESTIGATION REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5-1 / REV 0

P:\GIS\NAS_CecilField\PSC45_RI_Rev1.apr 21May01 MJJ 5-1_RI Groundwater Results Layout

Only lead and vanadium had been detected at concentrations greater than FDEP criteria during previous investigations. No other organic compounds or inorganics were detected during previous investigations; therefore, no other compounds were evaluated in the RI. The presence of vanadium is probably the result of burning fuels at the facility.

In a previous sampling round, the concentration of total lead in well CEF-P45-04S was 17.3 µg/L, and the lead concentration in well CEF-P45-01S was 18.8 µg/L, both of which are greater than the FDEP criterion of 15 µg/L. However, in the RI sampling event, the total lead concentration in both wells was less than the detection limit. In the RI sampling event, the total lead concentration was greater than the FDEP criterion only in well CEF-P45-8S. This well had been installed to delineate the perimeter of the plume and, based on existing data, the lead concentration had been expected to be low. However, the concentration of lead in the filtered sample was less than the FDEP criterion, and the turbidity of the sample was relatively high, 160 NTU. Because the high lead concentration was possibly the result of the suspended solids, this well was resampled and analyzed for lead. The total lead concentration in the second sample was 5.3 µg/L, which is less than the FDEP criterion, and the dissolved lead concentration was less than the detection limit. In the RI sampling event, the total vanadium concentration was greater than the FDEP criterion only in wells CEF-7-01Sa, CEF-P45-2S, CEF-P45-3S, and CEF-P45-4S. The perimeter wells delineated the plume. Lead and vanadium concentrations in the intermediate depth well were less than the FDEP criteria.

A comparison of the filtered and unfiltered sample results suggest that lead is associated primarily with suspended solids but that vanadium is present primarily in the dissolved form.

5.3 SUMMARY

One plume, as defined by the 49 µg/L vanadium criterion, was identified. No lead was detected at concentrations greater than the FDEP criterion. The plume is centered on Building 7 and is about 260 feet by 110 feet. The contamination is limited to the shallow zone of the surficial aquifer. No other contaminants are present at concentrations greater than the FDEP criteria.

5.4 COMPARISON TO STATE CRITERIA AND USEPA PRGS

The following were detected in at least one monitoring well sample at concentrations greater than the FDEP criteria. For the metals, only the total metals results were considered.

- Vanadium

The following were detected in at least one monitoring sample at concentrations greater than the Region 9 PRGs. For the metals, only the total metals results were considered.

- Vanadium

6.0 CONTAMINANT FATE AND TRANSPORT

The analytical data for samples collected at Site 45 indicate that chemical migration may have occurred. Arsenic, vanadium, lead, TRPH, and PAHs were detected in soil. Of these contaminants, only vanadium was detected in groundwater during the RI at concentrations exceeding criteria. The detection of metals in groundwater is consistent with the relatively mobile properties of these components. PAHs and TRPH were not detected in groundwater, which would not be unexpected because they are relatively immobile.

Lead and vanadium have been transported through the groundwater but are at concentrations greater than GCTLs in the shallow zone. The concentrations of the inorganics in the intermediate zone are less than the GCTLs. The direction of horizontal groundwater flow is toward the southsoutheast.

Transport of contaminants through the groundwater is attenuated by several factors such as adsorption/desorption to soil particles. As described previously in this report, the surface aquifer is fairly consistent and is composed of silty sands. There are few zones of low permeability material that affect the flow of contaminants through the groundwater.

The size of the plume, based on the FDEP vanadium criteria of 49 µg/L, is about 260 feet by 110 feet. The site is located near the groundwater divide, based on the direction of groundwater flow at other nearby sites such as Site 37. The gradient is not very steep, and this also appears to have limited the expansion of the plume.

Several of the highest concentrations of vanadium in the soil were to the north of Building 7. These soil samples were located above the highest concentrations of vanadium in the groundwater. The contaminated soil was removed per the Action Memorandum (TtNUS, 2000b) and as described in the Source Removal Report (CH2M Hill, 2000). The origin of the vanadium is believed to be the result of burning fuel oil at the facility.

Sal Taylor Creek is more than 5,000 feet to the south and east, and Rowell Creek is more than 2,000 feet to the west. Because of these large distances and relatively low contaminant concentration, it is unlikely that detectable concentrations of vanadium could reach either waterway.

7.0 HUMAN HEALTH PRELIMINARY RISK EVALUATION

A Human Health PRE was conducted for groundwater and a baseline risk assessment was conducted for soil to evaluate the potential risks to human receptors at Site 45. The risk evaluations assume residential use of groundwater and industrial exposure to soil. Residential use of groundwater is assumed because GCTLs are based on residential exposure. Industrial exposure to soil is assumed based on the BCT's decision to remediate the site to meet the JEDC's re-use plan for the area. The risk assessment methodology was discussed in Section 3.3.

7.1 GROUNDWATER EVALUATION

In the groundwater at Site 45 (Table 7-1), no VOCs, SVOCs, pesticides or PCBs were detected at concentrations exceeding USEPA's current Drinking Water Standards (USEPA, 2000) as provided in FAC 62-550, FDEP GCTLs (FDEP, 1999) as listed in FAC 62-777, or Region 9 PRGs. Only the metals aluminum, antimony, iron, manganese, and vanadium were detected at concentrations exceeding their FDEP criteria. Lead was initially detected at a concentration exceeding the FDEP criterion, but during subsequent sampling events, results were less than the FDEP criterion. However, using the most recent sampling results (Table 7-2), aluminum, antimony, iron and manganese concentrations were less than the NAS Cecil Field IBDS concentrations. Based on comparison to the IBDS, vanadium is the only remaining constituent of potential concern. The maximum detected vanadium concentration exceeds its FDEP GCTL, Region 9 PRG, and NAS Cecil Field IBDS concentration.

7.2 SOIL EVALUATION

In the soil at Site 45 prior to the removal action (Table 7-3), no VOCs, pesticides, or PCBs were detected at concentrations greater than the FDEP direct exposure residential or industrial/commercial criteria. Of the SVOCs, benzo(a)pyrene and dibenzo(a,h)anthracene were detected at maximum concentrations greater than their direct exposure residential and industrial/commercial criteria. Acenaphthene was detected at a maximum concentration greater than its leachability criterion, but not at a concentration greater than its residential or industrial/commercial criteria. However, acenaphthene was not detected in groundwater. Of the metals, arsenic was detected at a maximum concentration greater than its direct exposure residential and industrial/commercial criteria. Mercury was detected at a maximum concentration greater than its direct exposure residential criterion, but less than its direct exposure industrial/commercial criterion. Mercury was detected at a maximum concentration greater than its leachability criterion, but it was not detected in groundwater at a concentration greater than its FDEP criterion. TRPH was detected at a maximum concentration greater than its direct exposure residential and industrial/commercial criterion. TRPH was also detected at a maximum concentration greater than its

TABLE 7-1

GROUNDWATER ANALYTES DETECTED ABOVE SCREENING CRITERIA
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency Of Detection[1]	Screening Concentration[2]	NAS Cecil Field IBDS[3]	Regulatory Level[4]	FDEP Criterion[5]	Region IX PRG[6]	Risk Ratio[7]	C or N[8]
Volatile Organic Compounds (ug/L)								
None detected above screening levels								
Semivolatile Organic Compounds (ug/L)								
None detected above screening levels								
Pesticides/PCBS (ug/L)								
None detected above screening levels								
Inorganic Analytes (ug/L)								
Aluminum	5/5	14,300	13,100	5 – 200 SMCL	200 S	36,000	0.4	N
Antimony	2/5	17.3	44.5	6 MCL	6 P	15	1.2	N
Iron	4/5	1,470	7,760	300 SMCL	300 S	11,000	0.1	N
Lead	6/32	34.6	5.35	15 Action Level	15 P	NA	NA	N
Manganese	4/5	101	150	50 SMCL	50 S	880	0.1	N
Vanadium	28/32	740	20.2	NA	49 Min	260	2.8	N

1. Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed.
2. Maximum detected concentration selected for screening criteria.
3. NAS Cecil Field Inorganic Background Data Set.
4. Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL).
5. FDEP Groundwater Cleanup Target Levels (FAC 62-777 and FAC 62-550) (August 1999).
6. USEPA Region 9 Preliminary Remediation Goal (PRG).
7. Ratio of screening concentration and Region 9 PRG.
8. Carcinogen (C) or Noncarcinogen (N)

NA Not Available
P Primary Standard
S Secondary Standard
Min Minimum criteria

TABLE 7-2

GROUNDWATER ANALYTE CONCENTRATIONS FROM MOST RECENTLY COLLECTED SAMPLES
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

	Aluminum	**Antimony**	**Iron**	**Lead**	**Manganese**	**Vanadium**
FDEP GCTL	200	6	300	15	50	49
USEPA Region IX PRG	36000	15	11000	NA	880	260
NAS Cecil Field IBDS	13100	44.5	7760	5.35	150	20.2
Maximum Detected	7650	17.3	1470	9.7	59	740
Average Concentration	2888	5	640	2	18	93
Risk Ratio	NA	NA	NA	NA	NA	2.8
CEF-007-01Sa	943	**1.6**	**16**	**0.8**	**1.7**	240
CEF-011-01Sa	260	2.2	1470	9.7	59	740
CEF-011-01Sb				***0.8***		***1.5***
CEF-P45-01S	3340	**1.2**	1060	**1.8**	25.3	13.3
CEF-P45-02S	*2245*	***1.2***	***16***	**0.8**	***0.03***	74.9
CEF-P45-03S	7650	17.3	636	**2.9**	4.2	49
CEF-P45-04S				**2.7**		68.2
CEF-P45-06S				**0.8**		3
CEF-P45-07S				***1.7***		*5*
CEF-P45-08S				5.3		5.4
CEF-P45-09S				**0.8**		**0.36**
CEF-P45-11S				1.6		4.3
CEF-P45-12S				**0.8**		2
CEF-P45-13S						**1.5**

NOTES:
Italics--average of duplicate samples.
Bold--value is equal to one-half the detection limit.
Concentrations are from the most recently collected samples.
Blanks indicate no data.
Units are ug/L
NA - Not applicable for aluminum, antimony, iron, and manganese because maximum detected concentrations are less than IBDS. Not applicable for lead because GCTL is not a value based on a reference dose or slope factor.

TABLE 7-3

SOIL ANALYTES DETECTED ABOVE SCREENING CRITERIA (PRE-REMOVAL)
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte[1]	Frequency of Detection[2]	Screening Concentration[3]	NAS Cecil Field IBDS[4]	FDEP Direct Exposure Residential[5]	FDEP Direct Exposure Industrial[5]	FDEP Leachability[5]	Risk Ratio[6]	C or N[7]
Volatile Organic Compounds (µg/Kg)								
None detected above screening levels.								
Semivolatile Organic Compounds (µg/Kg)								
Acenaphthene	18/75	2,300	NA	1,900,000	18,000,000	2,100	0.0001	N
Benzo(a)pyrene	45/75	1,200	NA	100	500	8,000	2.4	C
Dibenzo(a,h)anthracene	25/75	2,000	NA	100	500	30,000	4.0	C
Pesticides/PCBS (µg/Kg)								
None detected above screening levels								
Inorganic Constituents (mg/Kg)								
Arsenic	17/31	9.6	2.04	0.8	3.7	29	2.6	C
Mercury	4/9	5.2	0.16	3.4	26	2.1	0.2	N
Total Recoverable Petroleum Hydrocarbons (mg/Kg)								
TRPH	26/29	3380	NA	340	2500	340	1.4	N

1. Constituents with maximum concentration exceeding FDEP direct exposure criteria or exceed FDEP leachability criteria.
2. Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excludes those samples excavated as part of the removal action).
3. Maximum detected concentration selecting for screening criteria.
4. NAS Cecil Field Inorganic Background Data Set.
5. FDEP Soil Cleanup Target Levels (FAC 62-777) (August 1999).
6. Ratio of screening concentration and FDEP Direct Exposure Industrial value.
7. Carcinogen (C) or Noncarcinogen (N).

NA Not Available

leachability criterion, but TRPH was not detected in groundwater at concentrations greater than its FDEP groundwater criterion.

Benzo(a)pyrene, dibenzo(a,h)anthracene and arsenic are the carcinogenic compounds detected in soil at maximum concentrations greater than the direct exposure industrial/commercial criteria. Together, the potential carcinogenic risks estimated for the maximum detected concentrations of these constituents is 9.0×10^{-6} for industrial workers. This value falls within USEPA's target risk range. Acenaphthene and mercury are present at maximum concentrations that are less than their respective direct exposure industrial/commercial criteria. Therefore, the risk ratios are less than one and would not be expected to pose a significant noncarcinogenic risk to human health. TRPH is present at a maximum concentration greater than its direct exposure industrial/commercial criterion. However, it only slightly exceeds the risk ratio of 1.0.

To determine how much excavation would need to be performed to attain levels protective of industrial exposure, a statistical-based approach was used. It was determined that not all samples with constituent concentrations greater than the FDEP industrial/commercial criteria would need to be removed. When assessing risk, the 95% UCL of the mean best represents the exposure concentration. If a constituent's UCL was less than the industrial/commercial criterion, then the criterion was attained.

In accordance with the Action Memorandum for PSC 45, removal of soil with benzo(a)pyrene concentrations greater than 1,500 µg/kg would result in a UCL concentration of benzo(a)pyrene less than 500 µg/kg. This removal of soil results in a concomitant reduction in the UCL concentrations of other carcinogenic PAHs and other constituents that exceed criteria. Consequently, the potential risk associated with the constituents remaining on site results in the attainment of all risk-based criteria for carcinogenic and noncarcinogenic exposure (Table 7-4).

Because carcinogenic PAHs (cPAHs) were detected at concentrations greater than SCTLs, the BCT agreed that cPAHs should be regarded as a family of compounds and their concentrations should be defined in terms of benzo(a)pyrene equivalents (BaPEqs). Total BaPEq concentrations were derived for each sample using the USEPA toxicity equivalent factors (USEPA, 1995). If a specific cPAH within a sample was not detected, one-half of its detection limit was used in the calculation of BaPEq. These concentrations are included with the soil data in Appendix D.

The removed soil at Site 45 was replaced with clean fill from the North Fuel Farm (NFF). Post-removal concentrations of BaPEq and TRPH at Site 45 were derived by replacing the removed soil sample results with laboratory data from the NFF (Appendix G). Post-removal concentrations of metals at Site 45 were derived by replacing the removed samples with one-half the value of the UCL of the detection limits of

TABLE 7-4

POST-REMOVAL ACTION RISK EVALUATION
INDUSTRIAL RECEPTOR
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Minimum Concentration	Maximum Concentration	Mean	UCL	FDEP Direct Exposure Industrial[1]	FDEP Leachability[1]	Risk Ratio[2]	Cancer Risk	Hazard Quotient
BaPEq[3]	4	2,478	247	258	500	8,000	0.5	$5x10^{-7}$	NA
Arsenic	0.1	9.6	1.9	2.0	3.7	29	0.5	$5x10^{-7}$	NA
Mercury	0.02	0.07	0.05	0.05	26	2.1	0.002	NA	0.002
Vanadium	1.8	49	11	12	7,400	980	0.002	NA	0.002
TRPH	10	439	79	83	2,500	340	0.03	NA	0.03
							TOTAL	$1x10^{-6}$	0.034

1. FDEP Soil Cleanup Target Levels (FAC 62-777) (August 1999).
2. Ratio of UCL and FDEP Direct Exposure Industrial value.
3. BaPEq – Benzo(a)pyrene equivalents
4. NA - Not Applicable
5. BaPEq concentrations are µg/kg, all others are mg/kg.

those samples at Site 45 where the metals were not detected. For arsenic and mercury, these values are 0.45 mg/kg and 0.06 mg/kg, respectively. There was only one nondetect sample for vanadium. Therefore, one-half the detection limit was used as a replacement value (1.2 mg/kg).

The post-removal UCLs of all constituents of potential concern at Site 45 are less than their respective industrial SCTLs. All samples have concentrations less than their respective leachability criteria, except for TRPH. TRPH was detected in one sample greater than its leachability criterion, but the soil sample collected from the depth interval below it had a TRPH concentration less than the criterion.

Overall, for industrial exposure, the cumulative hazard index for the post-removal soil is significantly less than 1.0. The cumulative cancer risk is approximately 1×10^{-6}, with arsenic at a UCL concentration approximately equal to its IBDS value.

The post-removal UCLs of mercury, vanadium, and TRPH are less than their respective residential PRGs. The post-removal UCL for arsenic exceeds its residential PRG, but is approximately equal to its Cecil Field IBDS value. The pos-removal UCL for BaPEq exceeds its residential PRG. Overall, for residential exposure, the cumulative hazard index for the post-removal soil is less than 1.0. The cumulative cancer risk is 9.3×10^{-6}, with arsenic at a UCL concentration approximately equal to its IBDS value. The carcinogenic risk value is within EPA's target risk range, but is greater than FDEP's target risk of 10^{-6} (Table 7-5).

TABLE 7-5

POST-REMOVAL ACTION RISK EVALUATION
RESIDENTIAL RECEPTOR
SITE 45 REMEDIAL INVESTIGATION REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Minimum Concentration	Maximum Concentration	Mean	UCL	EPA Region 9 Residential PRG[1]	FDEP Leachability[2]	Risk Ratio[3]	Cancer Risk	Hazard Quotient
BaPEq[4]	4	2,478	247	258	62	8,000	4.2	4.2×10^{-6}	NA
Arsenic	0.1	9.6	1.9	2.0	0.39	29	5.1	5.1×10^{-6}	NA
Mercury	0.02	0.07	0.05	0.05	23	2.1	0.002	NA	0.002
Vanadium	1.8	49	11	12	550	980	0.02	NA	0.02
TRPH	10	439	79	83	340[2]	340	0.24	NA	0.24
							TOTAL	9.3×10^{-6}	0.262

1. EPA Region 9 Preliminary Remediation Goals
2. FDEP Soil Cleanup Target Levels (FAC 62-777) (August 1999).
3. Ratio of UCL and EPA Region 9 PRG value.
4. BaPEq – Benzo(a)pyrene equivalents
5. NA - Not Applicable
6. BaPEq concentrations are µg/kg, all others are mg/kg.

8.0 ECOLOGICAL RISK ASSESSMENT

PSC 45 is located in a highly developed portion of NAS Cecil Field. The site consists of buildings and parking lots. The only terrestrial habitat consists of small areas of turf grass and ornamental shrubbery. The site is surrounded by parking lots, paved streets, and other structures and developed areas. No surface water is present at or near the site. Thus, PSC 45 and the adjacent areas provide only limited terrestrial habitat of poor quality in an urban or industrial-type setting. Ecological receptors in the vicinity of PSC 45 consist of those typically found in urban areas, such as terrestrial invertebrates, lizards, songbirds, and exotic rodents such as the Norway rat, black rat, and house mouse.

The flow of groundwater appears to be primarily toward the southeast. As described in Section 6.0, contaminants are unlikely to discharge to surface water. For this reason, the groundwater exposure route is not applicable for ecological receptors.

A complete exposure pathway has three components: a source of contaminants that can be released to the environment; a route of contaminant transport through an environmental medium; and an exposure or contact point for an ecological receptor. The source of contaminants was removed when the soil was removed in August 2000. Groundwater contaminants will remain, but because the low concentrations and great distance, it is unlikely that significant contaminant concentrations could reach surface water. Terrestrial wildlife receptors consist only of species acclimated to urban conditions, and a route of contaminant exposure to these species is largely absent. In addition, the gravel and paved areas largely preclude any wildlife exposure to soil. For these reasons, a complete exposure pathway to wildlife does not exist at Site 45. Effects to soil invertebrates may occur, but they would not be widespread. Therefore, the potential for ecological impacts from site-related contaminants is negligible.

9.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

9.1 SUMMARY

9.1.1 Nature and Extent of Contamination

Soil

Soil contaminated with arsenic, mercury, PAHs, and TRPH had been previously delineated and removed such that the site UCLs of the contaminants meet FDEP industrial criteria. Arsenic, mercury, PAHs, and TRPH still remain in the soil but at concentrations that do not pose a risk to human health under industrial uses or the environment. The concentrations of PAHs, arsenic, and vanadium in some individual samples are greater than the residential SCTLs.

Groundwater

Vanadium was detected in groundwater samples at concentrations greater than the FDEP GCTL. Monitoring wells were used to delineate the horizontal and vertical extent of the plume. The maximum concentration of vanadium was 740 µg/L. The plume, as defined by the GCTL of 49 µg/L for vanadium, is about 260 feet by 110 feet. The contaminants are limited to the shallow groundwater depths, although lead and vanadium were detected at concentrations less than GCTLs in samples from the intermediate depth well.

The source of the metals in the groundwater appears to be from the soil in the unsaturated zone. Lead and vanadium were detected in soil samples but only at concentrations less than the FDEP SCTLs based on leachability to groundwater. However, the origin of the metals is believed to be related to the burning of fuel oil at the site.

9.1.2 Fate and Transport

Vanadium was detected in groundwater at concentrations greater than the FDEP criterion. Vanadium and lead were also detected in the soil. These findings are consistent with expectations in that these elements are relatively mobile. Failure to detect PAHs and TRPH in groundwater is consistent with expectations in that these compounds are relatively immobile in the soil.

9.1.3 Human Health Risk Assessment

The UCLs of the concentrations of the soil remaining at the site are less than the FDEP industrial SCTLs. In effect, the cumulative cancer risk is approximately 1×10^{-6} and the cumulative hazard index is

significantly less than 1.0. In essence, the UCL concentration for arsenic is approximately equal to the IBDS concentration.

However, the UCLs of the contaminants at the site are greater than FDEP residential SCTLs. The cumulative cancer risk is $9x10^{-6}$ and the cumulative hazard index is less than 1.0.

The PRE for groundwater indicates that some sample concentrations of vanadium in groundwater exceed the FDEP GCTL and the Region 9 PRG. This would suggest that exposure to vanadium in groundwater for these locations may result in noncarcinogenic effects.

9.1.4 Ecological Risk Assessment

The site consists primarily of buildings and parking lots. Most areas are either paved or consist of buildings. The limited terrestrial habitat is of marginal quality and results in little use of the site by terrestrial wildlife. Therefore, the soil exposure pathway is negligible, and soil contaminants were not investigated.

9.2 CONCLUSIONS

9.2.1 Data Limitations and Recommendations for Future Work

The primary purpose of the RI was to delineate the contaminant plume in the groundwater. Existing data had shown that specific metals were the primary contaminants. Thus, the majority of the analyses were for lead and vanadium.

Because remediation alternatives have yet to be evaluated, there may be data gaps for particular alternatives. Some additional data may be required for a particular remedial option.

The results of the RI were successful in identifying the nature and extent of the contaminant plume as defined by the FDEP GCTL for vanadium and site geology.

Soil sampling indicated the presence of metals and other contaminants in the soil at concentrations greater than SCTLs. The soil contamination was delineated based on industrial use criteria and removed. Because this delineation is complete, no additional soil sampling is needed, and no further action is recommended for soil. Institutional controls to prevent residential uses of the soil will be required.

9.2.2 Recommended Remedial Action Objectives

Based on the results of the investigation, the following Remedial Action Objectives are recommended:

- Prevent ingestion of groundwater having vanadium concentrations greater than the FDEP criteria of 49 µg/L.

- Prevent residential exposure to site soils having BaPEq and arsenic concentrations that exceed the FDEP residential risk criteria.

Recommended actions to meet these objectives include:

- Remediate the contaminated groundwater to conform to FDEP criteria, or
- Implement institutional controls to prevent the use of the groundwater as a potable water source.
- Implement institutional controls to prevent residential uses of the site.
- Continue to monitor the plume.

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APPENDIX A

SAMPLE LOG SHEETS, CHAIN OF CUSTODY RECORDS AND SURVEY DATA

A.1 Sample Log Sheets For Groundwater
- Monitoring Wells
- Low Flow Purge Data Sheets

A.2 Chain of Custody Records
- Existing Monitoring Wells
- Newly Installed Monitoring Wells

A.3 Survey Data

A.1 Sample Log Sheets For Groundwater Monitoring Wells
Low Flow Purge Data Sheets

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-007-GW-015a-02
Sample Location: CEF-007-MW-015a-02

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: ALAN PATE

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4/20/00 Time: 1512 Method: PERISTALTIC	clear	6.10	.266	23.5	-10	3.56		

PURGE DATA

Date: 4/20/00
Method: PERISTALTIC
Monitor Reading (ppm):
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 12.92
Static Water Level (WL in feet): 8.09
One Casing Volume(gal/L): 3.0
Start Purge (hrs): 1415
End Purge (hrs): 1505
Total Purge Time (min): 50
Total Vol. Purged (gal/L): 12.75L

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ Vd (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
Pb, ~~As, Sb~~ Vd	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:
[ ] MS / MSD [ ] DUPLICATE / ID No.:

Signature(s): Alan L Pate

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 WELL ID.: CEF-007-MW-015a-02
PROJECT NUMBER: 0039.DS0.05P.S20 DATE: 4/20/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1415	8.09	—	—	6.51	.268	346	5.75	25.7		Lt BROWN
1420	8.48	1.375	275	6.55	.252	40	5.51	24.0		Lt BROWN
1425	8.70	2.750	275	~~5.81~~ 6.54	.259	-10	5.57	23.8		Lt BROWN
1430	8.72	4.00	250	6.46	.260	-10	4.97	23.6		ALMOST CLEAR
1435	8.79	5.25	250	6.43	.261	-10	4.89	23.6		CLEAR
1440	8.81	6.50	250	6.37	.262	-10	4.80	23.6		CLEAR
1445	8.85	7.75	250	6.30	.264	-10	4.58	23.5		CLEAR
1450	8.86	9.0	250	6.22	.265	-10	4.35	23.5		CLEAR
1455	8.86	10.25	250	6.16	.266	-10	4.18	23.4		CLEAR
1500	8.87	11.50	250	6.12	.266	-10	3.93	23.4		CLEAR
1505	8.87	12.75	250	6.10	.266	-10	3.56	23.5		CLEAR

SIGNATURE(S): Alan Wade

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-01S-02
Sample Location: CEF-P45-MW-01S-02

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: ALAN PATE

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4/21/00 Time: 1332 Method: PERISTALTIC	NOT TAKEN	6.00	.173	22.5	259	0.47		

PURGE DATA

Date: 4/21/00
Method: PERISTALTIC
Monitor Reading (ppm): 0.8
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 15
Static Water Level (WL in feet): 6.96
One Casing Volume(gal/L): 5.0L
Start Purge (hrs): 1135
End Purge (hrs): 1330
Total Purge Time (min): 115
Total Vol. Purged (gal/L): 24.75L

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ V (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
Pb, ~~As, Sb~~ V	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Alan Pate

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 WELL ID.: CEF-P45-MW-013-02
PROJECT NUMBER: 0039.DS0.05P.S20 DATE: 4/21/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1135	6.96	–	–	6.08	.191	64	0.79	22.3		Lt. BROWN
1140	8.15	2.0	400	6.07	.186	54	0.45	21.8		Lt BROWN
1145	8.91	3.5	300	6.09	.187	87	0.27	21.8		" "
1150	9.07	4.75	250	6.10	.181	110	0.78	21.9		" "
1200	9.32	6.75	200	6.07	.175	279	0.57	22.3		" "
1210	9.15	8.75	200	5.99	.169	223	0.10	22.5		MED BROWN
1220	9.35	10.75	200	5.99	.167	458	0.40	22.2		MED BROWN
1230	9.20	12.75	200	5.97	.169	902	0.44	22.5		MED BROWN
1240	9.27	14.75	200	6.03	.175	624	0.61	22.8		MED BROWN
1250	9.28	16.75	200	6.01	.175	616	0.42	22.8		" "
1300	9.29	18.75	200	6.00	.174	568	0.39	22.9		" "
1310	9.31	20.75	200	5.99	.172	395	0.33	22.8		" "
1320	9.22	22.75	200	6.02	.173	268	0.61	22.6		" "
1330	9.24	24.75	200	6.00	.173	259	0.47	22.5		" "

SIGNATURE(S): Alan Pate

Page___ of ___

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45

Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF- P45-MW025

Sample Location: CEF-

[X] Monitoring Well

[ ] Domestic Well

[ ] Other:

Sampler: Louis Knight

SAMPLING DATA

	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	
Date: 4-21-00		S.U.	mS/cm	°C	NTU	mg/L	mV	
Time: 1330	O-BR							
Method:		6.5	.329	22.2	26	2.25		

PURGE DATA

Date: 4-21-00

Method:

Monitor Reading (ppm):

Well Casing Diameter: 2"

Well Casing Material: SCH 40 PVC

Total Well Depth (TD in feet): 15.00

Static Water Level (WL in feet): 7.18

One Casing Volume(gal/L): 1.256

Start Purge (hrs): 1056

End Purge (hrs): 1330

Total Purge Time (min): 154

Total Vol. Purged (gal/L): 6.5

See Attached Low Flow Purge Data Sheet for Purge Data

7.82
·16
4692
782
1.2512

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb (F)~~	SW846 6010B	HNO3	1-500 ml bottle	Accutest	
Pb, ~~As, Sb~~	SW846 6010B	HNO3	1-500 ml bottle	Accutest	
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811

COC #: P45-

LAB:

COC #:

Check if Collected:

[ ] MS / MSD [ ] DUPLICATE / ID No.:

Signature(s): Louis Knight

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 **WELL ID.:** 025 CEF-P45-MW-025
PROJECT NUMBER: 0039.DS0.05P.S20 **DATE:** 4-21-00

Time (Hrs.)	Water Level (Ft. below TOC)	(2) Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1056	7.18	—	300							
1100	7.68	.40G	"	6.45	.361	52	1.00	22.0		
1105	7.89	.80G	"	6.58	.360	33	3.54	21.8		
1110	8.02	1.15G	250	6.46	.369	47	1.33	21.9		5-MINUTE INTERVALS
1115	8.14	1.4G	225	6.47	.391	43	2.10	21.9		
1120	8.19	1.7G	200	6.47	.405	39	1.82	22.1		
1125	8.23	2.0G	"	6.47	.412	36	1.79	22.1		
1130	8.25	2.2G	"	6.45	.414	29	1.67	22.1		
1140	8.30	2.4G	"	6.42	.413	20	1.00	22.2		
1150	8.34	2.7G	"	6.41	.402	28	0.76	22.2		
NOON	8.36	3.0G	"	6.49	.388	28	1.77	22.1		10-MINUTE INTERVALS
1210	8.37	3.3G	"	6.49	.376	38	1.90	22.2		
(1) 1220	8.35	3.6G	"	6.43	.366	60	1.31	22.4		
1230	8.37	4.0G	"	6.41	.352	48	1.14	22.1		
1240	8.39	4.4G	"	6.47	.349	51	1.79	22.2		
1250	8.41	4.8G	"	6.42	.343	39	0.96	22.4		
1300	8.45	5.2G	"	6.45	.341	42	1.14	22.3		
1310	8.47	5.8G	"	6.51	.336	28	1.34	22.4		
1320	8.48	6.2G	"	6.46	.333	14	0.86	22.2		
1330		6.6G	"	6.51	.329	26	2.25	22.2		

(1) WATER LEVEL BEGINS TO RECOVER
(2) CUMULATIVE VOLUME IS CORRECTED OCCASIONALLY BASED ON ON-GOING OBSERVATIONS/MEASUREMENTS

SIGNATURE(S): Jerrie Knight

PAGE___OF___

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF- P45-GW-035-02
Sample Location: CEF- P45-MW-035

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: CW

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4-21-00								
Time: 1303								
Method: Peristaltic	Cloudy	5.75	0.086	21.42	210	2.3	224	

PURGE DATA

Date: 4-21-00
Method: Peristaltic
Monitor Reading (ppm): 0.0
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 15.0
Static Water Level (WL in feet): 8.75
One Casing Volume(gal/L): 3.96
Start Purge (hrs): 1137
End Purge (hrs): 1258
Total Purge Time (min): 81
Total Vol. Purged (gal/L): 20.2

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As~~ ~~Sb~~ (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
Pb, ~~As~~ ~~Sb~~	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Charles Walker

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 WELL ID.: CEF-P45-MW-03S
PROJECT NUMBER: 0039.DS0.05P.S20 DATE: 4-21-00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1137	8.75	—	—	5.80	0.101	97	4.3	21.58	185	slightly cloudy, no odor
1145	9.08	2.80	350	5.73	0.093	210	3.1	21.12	215	cloudy, no odor
1153	9.10	5.60	350	5.74	0.088	490	2.8	21.04	224	cloudy, no odor
1154	Turned Pump Down		to 300	mL/min						
1158	9.06	6.80	300	5.72	0.115	350	3.1	21.11	228	cloudy, no odor
1208	9.02	9.80	300	5.72	0.088	450	2.9	20.85	220	cloudy, no odor
1209	Turned pump down		to 200	mL/min						
1215	8.98	11.60	200	5.74	0.087	440	1.6	21.20	236	cloudy, no odor
1222	8.98	13.0	200	5.79	0.087	430	2.3	21.47	230	cloudy, no odor
1228	8.98	14.2	200	5.75	0.101	290	2.1	21.38	234	cloudy, no odor
1235	8.98	15.6	200	5.76	0.088	310	1.8	21.51	228	cloudy, no odor
1243	8.98	17.2	200	5.75	0.086	360	2.0	21.35	229	cloudy, no odor
1250	8.98	18.6	200	5.77	0.085	360	2.3	21.60	221	cloudy, no odor
1257	8.98	20.0	200	5.75	0.086	210	2.3	21.42	224	cloudy, no odor
1258	8.98	20.2	200	END	PURGE					

SIGNATURE(S): Charles Waller

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-045-02
Sample Location: CEF- P45-MW-045-02

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: ALAN PATE

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4/20/00 Time: 1715 Method: PERISTALTIC	LT BROWN	4.98	.372	23.3	9	0.08		

PURGE DATA

Date: 4/20/00
Method: PERISTALTIC
Monitor Reading (ppm):
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.98
Static Water Level (WL in feet): 8.69
One Casing Volume(gal/L): 3.86
Start Purge (hrs): 1615
End Purge (hrs): 1715
Total Purge Time (min): 60
Total Vol. Purged (gal/L): 19.25

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
Pb, ~~As, Sb~~	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

[x] MS / MSD [ ] DUPLICATE / ID No.: CEF-P45-GW-MSMD06

Signature(s): Alan E. Pate

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45

PROJECT NUMBER: 0039.DS0.05P.S20

WELL ID.: CEF-P45-MW-045-02

DATE: 4/20/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1615	8.69	—	—	5.32	.397	-10	0.52	25.2		MED-DARK BROWN SLIGHT SULFUR SMELL
1620	9.23	2.0	400	5.33	.386	42	0.64	24.0		" " " "
1625	9.26	3.75	350	5.30	.370	122	0.60	23.5		" " " "
1630	9.28	5.50	350	5.21	.365	142	0.35	23.6		" " " "
1635	9.26	7.25	350	5.11	.246	96	0.92	23.3		MED BROWN
1640	9.24	8.75	300	5.07	.341	98	0.70	23.3		LT. BROWN
1645	9.23	10.25	300	5.00	.371	83	0.24	23.4		" "
1650	9.25	11.75	300	4.97	.385	81	0.21	23.4		" "
1655	9.24	13.25	300	4.98	.370	58	0.09	23.4		" "
1700	9.27	14.75	300	4.96	.363	30	0.08	23.4		" "
1705	9.26	16.25	300	4.96	.367	18	0.08	23.3		" "
1710	9.25	17.75	300	4.96	.371	15	0.08	23.3		" "
1715	9.25	19.25	300	4.98	.372	9	0.08	23.3		" "

SIGNATURE(S): Alan T Pate

Page___ of ___

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	Cecil Field PSC 45	Sample ID No.:	CEF-P45-GW-06S-01
Project No.:	N0039.DS0.05P.S20	Sample Location:	CEF-

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: Louis Knight

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4·20·00								
Time:								
Method: Peristaltic	V.pale orange	5.53	·040	24.5	93	3.18		

PURGE DATA

Date: 4·20·00	See Attached Low Flow Purge Data Sheet for Purge Data
Method:	
Monitor Reading (ppm):	
Well Casing Diameter: 2"	
Well Casing Material: SCH 40 PVC	
Total Well Depth (TD in feet): 14.42	
Static Water Level (WL in feet): 7.54	
One Casing Volume(gal/L): 1.1 G	
Start Purge (hrs): 1110	
End Purge (hrs): 1615	
Total Purge Time (min): 105 (intermittent)	
Total Vol. Purged (gal/L): 5.5	

6.88'
.16
4128
688
1108

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	
Pb, ~~As, Sb~~	SW846 6010B	HNO3	1-500 ml bottle	Accutest	
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter WELL PURGES & RECHARGES VERY SLOWLY and at erratic rates. Very little yield...

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Louis Knight

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: PSC-45 **NAS CECIL FIELD** **PSC 45** **WELL ID.:** CEF-P45-MW-06S
PROJECT NUMBER: 0039.DS0.05P.S20 **DATE:** 4.20.00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1110	7.54	—	175							
1115	7.92	.3G	175	5.88	.061	39	1.03	22.6		
1125	8.24	.75G	175	5.95	.043	27	1.16	22.4		
1135	8.65	1.20G	175	6.00	.056	28	2.69	22.3		RECOVERY
1145	8.98	1.65G	"	5.96	.056	32	2.99	22.2		TIME DTW
1155	9.55	2.10G	"	5.89	.052	61	2.05	22.2		1217 13.00
1205	11.15	2.55G	"	5.80	.048	117	1.78	22.4		TIME DTW
1215	13.10	3.00G		5.81	.046	127		22.5		1224 11.40
1216	DRY —	TURN	OFF	PUMP						1231 11.62 !!!
1405	8.50	3.00G	175	RESTART		PUMP	—	—		1246 10.23
1410	8.80	3.2G	175	5.70	.052	144	3.64	24.4		1301 9.11
1420	9.18	3.65	175	5.68	.044	95	3.84	24.3		1320 8.90
1435	10.78	4.30	175	5.60	.041	120	2.35	24.4		1403 8.50
1445	13.57	4.75	175	5.61	.041	144	3.71	24.1		RECOVERY
1446	DRY	STOP	PUMP					24.2		TIME DTW
1601	8.88 —	RESTART	PUMP							1446 13.58
1605	9.24	4.95	175	5.46	.045	82	4.08	24.2		1505 13.00
1615	11.70	5.40		5.53	.040	93	3.18	24.5		1516 10.90
										1524 10.30
										1534 9.45
										1544 9.08
										1554 8.95
										1601 8.88

NOTES: DRAWDOWN & RECHARGE RATES OF THIS WELL ARE ABSURDLY IRREGULAR.. e.g. During time period 1446-1505 (19 min), well recharged .58'. OVER following 9-min span (1505-1516), it recharged 2.1 ft. ALSO, when first pumping, (175 ml/min), drawdown was fairly consistent, ~0.4 ft every 10 minutes.. but drawdown rate accelerated to almost 2' per 10 minute period before well went dry. This well is a pain in the ---. Abandon it and drill another with a 15-ft screen 4-19 ft bls.

SIGNATURE(S): Louis Knight

PAGE___OF___

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	Cecil Field PSC 45	Sample ID No.:	CEF- P45-GW-~~06~~ 07 CW-01
Project No.:	N0039.DS0.05P.S20	Sample Location:	CEF- P45-MW-~~06~~ 07 CW
[X] Monitoring Well		Sampler:	CW
[ ] Domestic Well			
[ ] Other:			

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4/20/00 Time: 1219								
Method: Peristaltic	med. brn	5.83	0.245	23.35	240	1.2	-191	

PURGE DATA

Date: 4/20/00
Method: Peristaltic
Monitor Reading (ppm): 2.5
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.83
Static Water Level (WL in feet): 8.52
One Casing Volume(gal/L): 3.9L
Start Purge (hrs): 1105
End Purge (hrs): 1201
Total Purge Time (min): 56
Total Vol. Purged (gal/L): 20.45

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~Ac, Sb~~ Vol CW (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
Pb, ~~Ac, Sb~~ Vol CW	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

[ ] MS / MSD [X] DUPLICATE / ID No.: CEF-P45-GW-DU07

Signature(s): Charles Waller

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45

PROJECT NUMBER: 0039.DS0.05P.S20

WELL ID.: CEF- P45-MW-~~06S~~ 07S

DATE: 4-20-00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1105	8.52	—	—	5.86	0.316	360	1.2	24.23	-143	med. brn, sulfur smell
1113	8.79	3.2	400	5.86	0.256	360	1.6	23.33	-158	med. brn, sulfur smell
1121	8.83	6.4	400	5.86	0.253	340	1.7	23.22	-170	med. brn., sulfur smell
1122	Turned	pump down to		350 mL/min						
1131	8.82	9.45	350	5.87	0.254	320	1.4	23.29	-175	med. brn, sulfur smell
1140	8.82	13.10	350	5.86	0.255	300	1.4	23.31	-178	med. brn., sulfur smell
1150	8.82	16.60	350	5.84	0.254	310	0.9	23.34	-186	med. brn., sulfur smell
1200	8.82	20.10	350	5.83	0.245	240	1.2	23.35	-191	med. brn., sulfur smell
1201		20.45	350	END	PURGE					

SIGNATURE(S): Charles Wallace

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-08S-01
Sample Location: CEF-P45-MW-08S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: C.W.

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4-20-00								
Time: 1705								
Method: Peristaltic	tan, cloudy	5.11	0.250	24.24	160	1.3	-90	

PURGE DATA

Date: 4/20/00
Method: Peristaltic
Monitor Reading (ppm): 3.1
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.51
Static Water Level (WL in feet): 9.10
One Casing Volume(gal/L): 2.1
Start Purge (hrs): 1619
End Purge (hrs): 1701
Total Purge Time (min): 42
Total Vol. Purged (gal/L): 13.65

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Pb~~ (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
Pb, ~~As, Se~~ Cu	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:
☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Charles Waller

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45

PROJECT NUMBER: 0039.DS0.05P.S20

WELL ID.: CEF- P45-MW-8S

DATE: 4-20-00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1619	9.10		325	5.20	0.297	440	3.3	24.79	-6	light tan, cloudy, no odor
1627	9.28	2.60	325	5.07	0.288	390	1.8	24.24	-73	light tan, cloudy, no odor
1637	9.29	5.85	325	5.16	0.209	310	1.7	24.25	-74	light tan, cloudy, no odor
1643	9.29	7.80	325	5.08	0.263	420	1.3	24.33	-98	light tan, cloudy, no odor
1649	9.29	9.75	325	5.09	0.260	260	1.0	24.32	-93	light tan, cloudy, no odor
1655	9.29	11.70	325	5.10	0.250	180	1.3	24.26	-94	light tan, cloudy, no odor
1700	9.29	13.33	325	5.11	0.250	160	1.3	24.24	-90	light tan, cloudy, no odor
1701	9.29	13.65	END PURGE							

SIGNATURE(S): Charles Walker

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	Cecil Field PSC 45	Sample ID No.:	CEF-P45-GW-08S-02
Project No.:	N0039.DS0.05E.300	Sample Location:	CEF-P45-MW-08S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: AP/SF

SAMPLING DATA

Date: 8/3/00 Time: 0935	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Method: Peristaltic	clear	4.80	0.323	26.8	9.1	0.4	-15	

PURGE DATA

Date: 8/3/00
Method: Peristaltic
Monitor Reading (ppm): 0.0
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.5
Static Water Level (WL in feet): 7.88
One Casing Volume (gal/L): 1.05
Start Purge (hrs): 0805
End Purge (hrs): 0930
Total Purge Time (min): 85
Total Vol. Purged (gal/L): 17 Liters

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
Pb (total)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	✓
Pb (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	✓

OBSERVATIONS / NOTES

F = filtered with 1 micron filte

14.50 − 7.88 = 6.62

6.62 × 0.16 = 1.0592

1.05 × 3 = 3.15 gal

3.15 × 3.8 = 11.970

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-14
LAB:
COC #:

Check if Collected:

☐ MS / MSD ☐ DUPLICATE / ID No.: None

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 **WELL ID.:** CEF-P45-MW-08S
PROJECT NUMBER: 0039.DS0.05E.300 **DATE:** 8/17/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0805	7.88	–	200	–	–	–	–	–	–	
0810	7.98	1.0	200	5.09	0.402	999-	2.6	26.4	-52	
0820	7.98	3.0	200	5.00	0.377	999-	1.9	26.6	-54	
0830	7.99	5.0	200	4.92	0.346	279.0	0.8	26.6	-52	
0840	7.97	7.0	200	4.92	0.341	141.0	1.0	26.6	-47	
0850	7.99	9.0	200	4.92	0.323	61.5	1.5	26.6	-43	
0900	7.99	11.0	200	4.87	0.322	37.1	0.5	26.6	-39	
0905	7.99	12.0	200	4.85	0.323	31.0	0.5	26.6	-37	
0915	7.98	14.0	200	4.82	0.323	14.1	1.0	26.6	-30	
0925	7.98	16.0	200	4.79	0.322	9.4	0.4	26.8	-18	
0930	7.98	17.0	200	4.80	0.323	9.1	0.4	26.8	-15	
0935	- sample									

SIGNATURE(S): [illegible]

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-095-01
Sample Location: CEF-P45-MW-095

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: C.W.

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4-21-00								
Time: 1040								
Method: Peristaltic	Clear	4.99	0.095	23.22	<-10	3.1	276	

PURGE DATA

Date: 4-21-00
Method: Peristaltic
Monitor Reading (ppm): 0.0
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.62
Static Water Level (WL in feet): 8.13
One Casing Volume(gal/L): 4.0
Start Purge (hrs): 0945
End Purge (hrs): 1035
Total Purge Time (min): 50
Total Vol. Purged (gal/L): 20

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As~~ ~~Sb~~ V CW (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
Pb, ~~As~~ ~~Sb~~ V CW	SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

[ ] MS / MSD [ ] DUPLICATE / ID No.:

Signature(s): Charles Walker

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45
PROJECT NUMBER: 0039.DS0.05P.S20

WELL ID.: CEF-P45-MW-09S
DATE: 4-21-00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0945	8.13	—	—	5.03	0.111	45	3.5	23.02	248	very slightly cloudy, no odor
0953	8.37	3.20	400	5.02	0.103	40	3.3	23.05	257	very slightly cloudy, no odor
1002	8.38	6.80	400	4.95	0.096	40	3.3	23.14	272	clear, no odor
1007	8.38	8.80	400	4.99	0.096	< -10	3.3	23.26	277	clear, no odor
1013	8.38	11.20	400	4.99	0.098	< -10	3.0	23.33	274	clear, no odor
1019	8.38	13.60	400	5.02	0.096	< -10	3.2	23.27	275	clear, no odor
1024	8.38	15.60	400	5.01	0.097	< -10	3.2	23.34	271	clear, no odor
1030	8.38	18.0	400	4.99	0.097	-7	3.0	23.30	277	clear, no odor
1035	8.38	20.0	400	4.99	0.095	< -10	3.1	23.22	276	clear, no odor
1035	8.38	20.0	END	PURGE						

SIGNATURE(S): Charles Walker

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-10I-01
Sample Location: CEF-P45-MW-10I

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: CW

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4-20-00								
Time: 1521								
Method: Peristaltic	tan, cloudy	5.22	0.044	25.10	7990	2.0	-99	

PURGE DATA

Date: 4/20/00
Method: Peristaltic
Monitor Reading (ppm): — NC
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 38.12
Static Water Level (WL in feet): 7.99
~~Sat. Screen Volume~~ ~~One Casing Volume~~ (gal/L): 3.1 L
Start Purge (hrs): 1408
End Purge (hrs): 1517
Total Purge Time (min): 69
Total Vol. Purged (gal/L): 16.58

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Laboratory	Collected
			Accutest	
Pb, ~~As, Sb~~ (F) SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
Pb, ~~As, Sb~~ SW846 6010B	HNO3	1-500 ml bottle	Accutest	Yes
			Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:
[ ] MS / MSD [ ] DUPLICATE / ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 **WELL ID.:** CEF-P45-MW-10I

PROJECT NUMBER: 0039.DS0.05P.S20 **DATE:** 4/20/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1408	7.99	—	225	5.21	0.054	>990	2.2	25.44	-87	tan color, cloudy, no odor
1419	8.06	2.48	225	5.29	0.048	>990	2.0	25.09	-93	tan, cloudy, no odor
1426	8.07	4.23	250	5.24	0.046	>990	1.6	25.19	-90	tan, cloudy, no odor
1432	8.07	5.73	250	5.23	0.046	>990	1.5	25.22	-90	tan, cloudy, no odor
1439	8.07	7.48	250	5.23	0.046	>990	1.7	25.16	-89	tan, cloudy, no odor
1452	8.07	10.73	250	5.22	0.045	>990	1.6	25.17	-92	tan, cloudy, no odor
1501	8.07	12.98	250	5.22	0.045	>990	2.1	25.12	-83	tan, cloudy, no odor
1509	8.07	14.58	250	5.21	0.044	>990	1.4	25.13	-91	tan, cloudy, no odor
1516	8.07	16.33	250	5.22	0.044	>990	2.0	25.10	-99	tan, cloudy, no odor
1517		16.58	End	Purge						

SIGNATURE(S): Charles Waller

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: Cecil Field PSC 45
Project No.: N0039.DS0.05P.S20

Sample ID No.: CEF-P45-GW-115-01
Sample Location: CEF-P45-MW-115

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: ALAN PATE

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 4/20/00 Time: 1254								
Method: PERISTALTIC	CLEAR	5.43	.159	24.3	-10	0.14		

PURGE DATA

Date: 4/20/00
Method: PERISTALTIC
Monitor Reading (ppm): 1.4
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.69
Static Water Level (WL in feet): 8.47
One Casing Volume(gal/L): 3.8L
Start Purge (hrs): 1208
End Purge (hrs): 1250
Total Purge Time (min): 44
Total Vol. Purged (gal/L): 12.4L

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ Vd (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
Pb, ~~As, Sb~~ Vd	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:
☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Alan Pate

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 **WELL ID.:** CEF- P45-MW-11S
PROJECT NUMBER: 0039.DS0.05P.S20 **DATE:** 4/20/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1208	8.47	—	—	5.81	.221	24	2.01	24.5		Lt. BROWN, NO ODOR
1216	9.01	3.2L	400	5.64	.199	52	1.18	24.2		Lt BROWN
1222	8.89	5.0L	300	5.60	.197	58	0.85	24.4		Lt. BROWN
1228	8.92	6.8L	300	5.77	.181	20	0.76	24.3		BEIGE ALMOST CLEAR
1235	8.94	8.9L	300	5.43	.178	10	0.42	24.4		ALMOST CLEAR
1240	8.95	10.4L	300	5.46	.171	4	0.17	24.3		CLEAR
1245	8.94	11.9	300	5.46	.165	-10	0.19	24.3		CLEAR
1250	8.96	12.4	300	5.43	.159	-10	0.14	24.3		

SIGNATURE(S): Alan G Pate

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	Cecil Field PSC 45	Sample ID No.:	CEF-P45-GW-125-01
Project No.:	N0039.DS0.05P.S20	Sample Location:	CEF-P45-MW-125-01

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: ALAN PATE

SAMPLING DATA

Date: 4/21/00 Time: 1040	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Method: PERISTALTIC	CLEAR	5.41	.061	22.8	4	0.19		

PURGE DATA

Date: 4/21/00	See Attached Low Flow Purge Data Sheet for Purge Data
Method: PERISTALTIC	
Monitor Reading (ppm): 1.4	
Well Casing Diameter: 2"	
Well Casing Material: PVC	
Total Well Depth (TD in feet): 14.49	
Static Water Level (WL in feet): 8.48	
One Casing Volume(gal/L): 4.0	
Start Purge (hrs): 0940	
End Purge (hrs): 1035	
Total Purge Time (min): 55	
Total Vol. Purged (gal/L): 20.0L	

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
				Accutest	
Pb, ~~As, Sb~~ V (F)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
Pb, ~~As, Sb~~ V	SW846 6010B	HNO3	1-500 ml bottle	Accutest	YES
				Accutest	

OBSERVATIONS / NOTES

F = filtered with 1 micron filter

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-
LAB:
COC #:

Check if Collected:

☐ MS / MSD ☐ DUPLICATE / ID No.:

Signature(s): Alan G Pate

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45
PROJECT NUMBER: 0039.DS0.05P.S20

WELL ID.: CEF-P45-MW-125-01
DATE: 4/21/00

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0940	8.48	—	—	5.42	.066	43	1.06	22.6		CLEAR
0945	8.67	2.0	400	5.40	.061	83	0.74	22.6		CLEAR
0950	8.67	4.0	400	5.40	.060	35	0.68	22.6		CLEAR
0955	8.66	6.0	400	5.40	.063	22	0.54	22.7		CLEAR
1000	8.65	8.0	400	5.39	.061	17	0.35	22.7		CLEAR
1005	8.66	10.0	400	5.40	.061	15	0.31	22.7		CLEAR
1010	8.66	12.0	400	5.41	.061	15	0.26	22.8		CLEAR
1020	8.66	14.0	400	5.40	.061	9	0.22	22.8		CLEAR
1025	8.66	16.0	400	5.40	.061	5	0.20	22.8		CLEAR
1030	8.66	18.0	400	5.41	.061	4	0.20	22.8		CLEAR
1035	8.66	20.0	400	5.41	.061	4	0.19	22.8		CLEAR

SIGNATURE(S): Alan S. Pate

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	Cecil Field PSC 45	Sample ID No.:	CEF-P45-GW-13S-01
Project No.:	N0039.DS0.05G.120	Sample Location:	CEF-P45-MW-13S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: L. MIDDLETON, L. KNIGHT

SAMPLING DATA

	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Date: 2/6/01								
Time: 1025								
Method: Peristaltic	Yellow	5.86	0.183	21.7	-4.8	0.30	16	

PURGE DATA

Date: 2/6/01
Method: Peristaltic
Monitor Reading (ppm): 0.7
Well Casing Diameter: 2"
Well Casing Material: PVC
Total Well Depth (TD in feet): 14.85
Static Water Level (WL in feet): 8.72
One Casing Volume(gal/L): 3.7
Start Purge (hrs): 0945
End Purge (hrs): 1022
Total Purge Time (min): 37
Total Vol. Purged (gal/L): 11.1

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis		Preservative	Container Requirements	Laboratory	Collected
V (total)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	X
V (dissolved)	SW846 6010B	HNO3	1-500 ml bottle	Accutest	X

OBSERVATIONS / NOTES

F = filtered with 1 micron filte
Sample ID for filtered sample is CEF-P45-GF-13S-01

BKGRD = 0.0

LAB INFO

LAB: Accutest
4405 Vineland Rd. C-15
Orlando, FL 32811
COC #: P45-15
LAB:
COC #:

Check if Collected:

[ ] MS / MSD [ ] DUPLICATE / ID No.: None

Signature(s): R. [illegible]

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD PSC 45 WELL ID.: CEF-P45-MW-13S
PROJECT NUMBER: 0039.DS0.05G.120 DATE: 2/6/01

Time (Hrs.)	Water Level (Ft. below TOC)	Cum. Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0945	8.72	—	—	—	—	—	—	—	—	
0950	8.95	1.5	300	5.89	0.196	124	2.08	21.2	127	LT BROWN-RED
0955	8.96	3	300	5.92	0.187	59.5	.36	21.5	74	
1000	8.96	4.5	300	5.91	0.187	38.0	0.01	21.6	50	
1005	8.96	6.0	300	5.88	0.186	26.6	1.03	21.6	36	CLEARER
1010	8.96	7.5	300	5.94	0.186	17	0.43	21.7	25	
1015	8.96	9.0	300	5.95	0.185	13.9	0.21	21.6	17	
1020	8.96	10.5	300	5.85	0.182	3.8	0.36	21.6	16	
1022	8.96	11.1	300	5.86	0.183	-4.9	0.30	21.7	16	~~CLEAR~~ YELLOWISH CLEAR
END PURGE										

SIGNATURE(S): [illegible]

A.2 Chain of Custody Records
Existing Monitoring Wells
Newly Installed Monitoring Wells

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER P45-13 | PAGE 1 OF 1

PROJECT NO: N0039
SITE NAME: PSC 45
PROJECT MANAGER AND PHONE NUMBER: Joe Logan @ 412 921-7231
LABORATORY NAME AND CONTACT: Accutest H. Behfodi
SAMPLERS (SIGNATURE): Louis Knight, Flan Dale, Charles Walker
FIELD OPERATIONS LEADER AND PHONE NUMBER: Merv Dane 904 281-0400
ADDRESS: 4405 Vineland Rd C-15
CARRIER/WAYBILL NUMBER: FEDEX 8185 2037 5110
CITY, STATE: ORLANDO, FL 32811

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☒ 14 day

F6332

	DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: SW 846 6010B LEAD	TYPE OF ANALYSIS: SW846 6010B (FILTERED) DISSOLVED LEAD/VANADIUM							COMMENTS
							CONTAINER TYPE PLASTIC (P) or GLASS (G)		P	P					
							PRESERVATIVE USED		None	None					
1	4/20	1219	CEF-P45-GW-[redacted]075-01	GW	G	2	✓	✓							Cool to 4°C
2	4/20	1254	CEF-P45-GW-11S-01	GW	G	2	✓	✓							
3	4/20	1512	CEF-007-GW-01SA-02	GW	G	2	✓	✓							Work Release 13
4	4/20	1521	CEF-P45-GW-10I-01	GW	G	2	✓	✓							
5	4/20	1615	CEF-P45-GW-06S-01	GW	G	2	✓	✓							
6	4/20	1705	CEF-P45-GW-8S-01	GW	G	2	✓	✓							
7	4/20	1715	CEF-P45-GW-04S-02	GW	G	2	✓	✓							
	4/20	1715	CEF-P45-GW-MSMSD06	GW	G	4	✓(2)	✓(2)							Total =
8	4/20	0000	CEF-P45-GW-DU07	GW	G	2	✓	✓							30 containers
9	4/21	1040	CEF-P45-GW-09S-01	GW	G	2	✓	✓							
10	4/21	1040	CEF-P45-GW-12S-01	GW	G	2	✓	✓							
11	4/21	1303	CEF-P45-GW-03S-02	GW	G	2	✓	✓							
12	4/21	1330	CEF-P45-GW-02S-02	GW	G	2	✓	✓							
13	4/21	1332	CEF-P45-GW-01S-02	GW	G	2	✓	✓							

	DATE	TIME		DATE	TIME
RELINQUISHED BY: Louis Knight	4.21.00	1815	1. RECEIVED BY: Abby Wilson	4/21/00	0700
RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

05E.300
N0039 DJO.05P.S20

0.0°C

WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TINUS-001

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER P45-15 | PAGE 1 OF 1

PROJECT NO: 0039	SITE NAME: 45	PROJECT MANAGER AND PHONE NUMBER: Joe Logan 412 921 7231	LABORATORY NAME AND CONTACT: Accutest M Bezuli
SAMPLERS (SIGNATURE): [signature]		FIELD OPERATIONS LEADER AND PHONE NUMBER: Mary Dale 904 281 1414 x.14	ADDRESS: 4405 Vineland Rd. C-15
		CARRIER/WAYBILL NUMBER: Fedex 8219 5407 1063	CITY, STATE: Orlando, FL 32811

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☒ 72 hr. ☐ 7 day ☐ 14 day

F7265

	DATE YEAR 2000	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Total lead SW 846 6010B	TYPE OF ANALYSIS: Filtered lead SW 846 6010B	COMMENTS
			CONTAINER TYPE PLASTIC (P) or GLASS (G)				P	P	
			PRESERVATIVE USED				HNO3	HNO3	
-1	8/3	0935	CEF-P45-GW-085-02	GW	G	2	1	1	Cool to 4°C
									Work Release 16

F7265-1-5.30
F7265-1A-23.0
ppb

004

1. RELINQUISHED BY [signature]	DATE 8/4/00	TIME 1600	1. RECEIVED BY Mike Jendl	DATE 8/5/00	TIME 1030
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS N0039.050.05E.306

WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TINUS-001

CHAIN OF CUSTODY

ACCUTEST

4405 VINELAND ROAD • SUITE J15
ORLANDO, FL 32811
TEL: 407-425-6700 • FAX: 407-425-0707

FTP 45-9

ACCUTEST JOB #:

ACCUTEST QUOTE #: 04

CLIENT INFORMATION

TTNUS
Joe Logan 412-921-7231
NAME (Proj. Mgr) 904-281-6100
Merry Dale
ADDRESS Name (FOL)
CITY Fedex # 8180 STATE 4594 ZIP 3740
SEND REPORT TO:
PHONE # 412 921 7231

FACILITY INFORMATION

PSC 45
PROJECT NAME NASCF
LOCATION 0039. D50. 05P. $20
PROJECT NO.
FAX # 412 921 4040

ANALYTICAL INFORMATION

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	COLLECTION TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	H2SO4	NONE		TOC										LAB USE ONLY
FS999-1	CEF-P45-SS-TOC-01	3-3-00	1642	EJMD	Sil	1					X		1										Cool to 4°C
																							Work Release 11

DATA TURNAROUND INFORMATION

- ☐ STANDARD
- ☐ 48 HOUR RUSH
- ☐ 24 HOUR EMERGENCY
- ☒ OTHER 7 DAY TAT

APPROVED BY:

EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- ☐ STANDARD
- ☐ COMMERCIAL "B"
- ☐ DISK DELIVERABLE
- ☐ STATE FORMS
- ☐ OTHER (SPECIFY)

COMMENTS/REMARKS

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1. M. Lee	3/3/00 1800	1. Mike Jewell	2.		2.
RELINQUISHED BY:	DATE TIME:	RECEIVED BY: 3/4/00 0935	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
		3.	4.		4.
RELINQUISHED BY:	DATE TIME:	RECEIVED BY:	SEAL #	PRESERVE WHERE APPLICABLE ☐	ON ICE ☐ TEMPERATURE ____ C
		5.			

TETRA TECH NUS, INC. CHAIN OF CUSTODY RECORD NUMBER P45-15 PAGE 1 OF 1

PROJECT NO: N0039.DS0.056.120
SITE NAME: SITE 45
SAMPLERS (SIGNATURE)
PROJECT MANAGER AND PHONE NUMBER: Joe Logan 412 921 7231
FIELD OPERATIONS LEADER AND PHONE NUMBER: Merv Diaz 904 281 0400
CARRIER/WAYBILL NUMBER: Fedex 8217 5906 4697
LABORATORY NAME AND CONTACT: Accutest H. Behbodi
ADDRESS: 4405 Vineland Road C-15
CITY, STATE: ORLANDO, FL 32811

STANDARD TAT ☐
RUSH TAT ☒
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☒ 14 day

DATE YEAR 2001	TIME	SAMPLE ID	MATRIX	GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: VOA + Dioxin SW846 6010B								COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)						P								
PRESERVATIVE USED						HNO3								
2/6	1025	CEF-P45-GW-135'-01	GW	G	1	X								Cool to 4°C
2/6	1025	CEF-P45-GF-135'-01	GW	G	1	X								
														Work Release CF-19

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	2/6/01	1605	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY		

COMMENTS: N0039.DS0.056.120

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

3/99
FORM NO. TINUS-001

A.3 Survey Data

SURVEY DATA
MONITORING WELLS
SITE 45
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Well	NORTHING	EASTING	GROUND SURFACE EL, Feet	TOP OF CASING EL, Feet
CEF-007-01Sa	2142242.5700	376264.9900	76.40	76.12
CEF-F11-01Sb	2142196.3400	376179.0300	76.88	76.59
CEF-F11-02Sb	2142193.7800	376061.7500	76.38	76.25
CEF-F11-1Sa	2142246.3700	376219.9000	76.50	76.37
CEF-P45-01S	2142344.0400	376212.3000	75.86	75.56
CEF-P45-02S	2142284.0600	376232.5200	76.20	75.89
CEF-P45-03S	2142314.1100	376114.0500	77.29	77.06
CEF-P45-04S	2142189.0700	376265.8800	76.50	76.49
CEF-P45-05S	2142390.8300	376134.4600	76.60	76.68
CEF-P45-06S	2142430.7400	375980.7400	76.50	76.27
CEF-P45-07S	2142368.2700	376344.3200	77.40	77.15
CEF-P45-08S	2142151.2600	376224.3400	77.00	76.80
CEF-P45-09S	2142193.1600	375988.7800	76.60	76.42
CEF-P45-10I	2142239.7900	376270.1500	76.30	75.97
CEF-P45-11S	2142267.6800	376287.1800	76.70	76.46
CEF-P45-12S	2142303.5800	375988.8000	77.10	76.99
CEF-P45-13S	2142092.0200	376381.1300	76.60	76.30

Horizontal datum: Florida State Plane Coordinate System, North American Datum of 1983, Florida 1990 Adjustment (NAD 83/90), Florida East Zone.

Vertical datum: National Geodetic Vertical Datum, 1988 (NGVD 88)

APPENDIX B

BORING AND WELL RECORDS

B.1 Boring Logs
B.2 Monitoring Well Construction Sheets
B.3 Conformance Reports

B.1 Boring Logs

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GROUNDWATER PROTECTION
DRILLING RIG: BOBCAT 0-25
BORING NUMBER: CEF-PUS-001
DATE: 7/7/99
GEOLOGIST: A WILCOX
DRILLER: SHANE NOWLIN

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Samples	Sampler	Borehole	Driller
	0-4		N/A			DKBRN/DBRN	FSILTY SAND, LOTS OF HA ROOTS, ORG SMELL	SC	DAMP	0			0
	4-5					DK BRN	FSILTY SAND	SC	DAMP				
	5-9					RED BRN	FSILTY SAND	SC	MOIST	0			
	9-15					DK BRN	F SILTY SAND W/ SOME CLAY	SC-SM	WET				
							EOB 15'						

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): 0.00

Remarks: Screened 5-15' BLS

Converted to Well: Yes ✓ No ____ Well I.D. #: CEF-PUS-25

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: Groundwater Protection
DRILLING RIG: Deidrich D-25
BORING NUMBER: CEF-P45-002
DATE: 7/7/99
GEOLOGIST: A Wilcox
DRILLER: J Nowlen

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness*	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Bkgd	Breathing Zone	Drill Area
	0-4		N/A			DKBRN/ LTBRN	FS SILTY SAND, ROOTS MA	SM	DAMP	K			0
							ORG. SMELL						
	4-5					DKBRN	FS SILTY SAND	SM	DAMP				
	5-9					RED BRN	FS SILTY SAND	SM	MOIST	—			
	9-15					DK BRN	FS SILTY SAND W/CLAY	SM-SC	WET				
							EOB 15' BLS						

* 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): 0.00

Remarks: Hand Auger to 4' BLS. Boring Completed 7/7, next day. Installed Screened from 5-15
* PID not working, Bzone w/ OVA

Converted to Well: Yes ✓ No _____ Well I.D. #: CEF-P45-15

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: Groundwater Protection
DRILLING RIG: Dentrich D-25

BORING NUMBER: CEF-P45-003
DATE: 7/8/99
GEOLOGIST: A Wilcox
DRILLER: S Nowlen

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm)				
	0-4		N/A			LT BROWN	FSILTY SAND N/A	SC	DAMP	PID=395** OVA=0.00				0
	5-9		↓			RED BRN	FSILTY SAND w/ SLT. CLAY	SC	DAMP	PID=400 OVA=0.00				↓
	9-15		↓			DK BRN	FSILTY SAND w/ CLAY ▽ EOB 15'	SC-SM	SATURATED					↓

* 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): 0.00

Remarks: *Will recalibrate PID to ensure that the readings are correct. Screened from 5-15' will continue to use OVA

Converted to Well: Yes ✓ No ____ Well I.D. #: CEF-P45-35

→ move location from sample #2 - 0.0 [illegible] [illegible]

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD PSC 45 BORING NUMBER: 003 = 45
PROJECT NUMBER: 0039 DATE: 09/07/99
DRILLING COMPANY: Groundwater Protection GEOLOGIST: M. DALE
DRILLING RIG: Diedrich D-25 DRILLER: S. NOWLEN

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density or Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm) Sample	Sample Zone	Background	Drilling Area
	0-4					Lt. GRAY	Fine Silty Sd.	SP	dry			0	0
	4-6					DK BRN	Fine Silty Sd.	SP/SM	clay @ 4-5 ft. bls.				
	6-8					BRN	Fine silty sd.	SP/SM	wet between 5-6 ft. bls.				
	8-15					Lt BRN	Fine silty sd.	SM	wet				
							EOB = 15 ft. bls						

* When rock coring, enter rock brokeness.
Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: installed next to fence and near 2nd ST.

Drilling Area Background (ppm): 0

Converted to Well: Yes X No

Well I.D. #: CEF-P45-MW-045

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD PSC 45 BORING NUMBER: 004 = SS
PROJECT NUMBER: 0039 DATE: 09/07/99
DRILLING COMPANY: Groundwater Protection GEOLOGIST: M. DALE
DRILLING RIG: Diedrich D-25 DRILLER: S. Nowlen

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	Sample Dup.	Breathing Zone	Drilling Area
	0-4				LT	GRAY	FINE SILTY SAND	SP/	dry			0	0
	4-5					white	Fine silty sand	SP/SM	damp				
	5-15					DK. BRN	Fine silty sand	SM	wet at 5-6 ft. bls.				
							EOB at 15 ft. bls.						

* When rock coring, enter rock brokeness.

Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: installed about 15 feet West of CEF-P45-SS-703-01

Drilling Area Background (ppm): 0

Converted to Well: Yes X No ____ Well I.D. #: CEF-P45-MW-05S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DIEDRICH D-120
BORING NUMBER: 003
DATE: 4/4/00
GEOLOGIST: E. PARKER
DRILLER: N. SMARITTO

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**
	0-2					GRAY	SILTY FINE SAND	SM	DAMP			0.0	
	2-4					White	SILTY FINE SAND	SM	DAMP			0.0	
	4-15					BRN	SILTY FINE SAND	SM	DAMP TO WET				
							EOB AT 15 FT. BGS.						

* 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 X No ____ Well I.D. #: CEF-P45-65

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: Diedrich D-120
BORING NUMBER: 001
DATE: 4/3/00
GEOLOGIST: M. DALE
DRILLER: N. SMARRITTO

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**
	0-1					GRY BRN	SILTY FINE SAND	SP/SM	organics, dry				0.0
	1-4					GRY BRN	SILTY FINE SAND	SP/SM	dry				0.0
	4-6		2/2			GRY BRN	SILTY FINE SAND	SP/SM	damp				
	6-7					GRY BRN	SILTY FINE SAND	SP/SM	moist				
	7-15.5					DK. GRY	SILTY FINE SAND	SP/SM	wet @ 7 FT.				
							EOB @ 15.5 FT.						

* 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: shelby tube @ 4-6 FT.

Converted to Well: Yes X No _____ Well I.D. #: CRF-PZ5-7S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DIEDRICH D-120
BORING NUMBER: 004
DATE: 04/03/00
GEOLOGIST: M. DALE
DRILLER: N. SMARITTO

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**
	0-1					LT. BRN GRAY	SLIGHTLY SILTY FINE SD.	SP	ORGANICS, DRY				
	1-3					LT. BRN GRAY	SLIGHTLY SILTY FINE SD.	SP	DRY				
	3-4					LT. GRAY	SLIGHTLY SILTY FINE SAND	SP	DRY			0.0	
	4-5					DK. BRN	SILTY FINE SAND	SM	DAMP				
	5-9					BRN	SILTY FINE SAND	SM	MOIST				
	9-15.5					BRN	SILTY FINE SAND	SM	WET, ▽ at 9 FT.				
							EOB at 15.5 FT BLS.						

* 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 X No _____ Well I.D. #: CEF-P45-8S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DIEDRICH D-120
BORING NUMBER: 001
DATE: 4/4/00
GEOLOGIST: E. PARKER
DRILLER: N. SMARITTO

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**
	0-2					White	silty fine sand	SM	DAMP			0.0	
	2-4					White	silty fine sand	SM	DAMP			0.0	
	4-15					BRN	silty fine sand	SM	DAMP TO WET				
							EOB AT 15FT. BLS.						

* 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 X No ____ Well I.D. #: CKT-P45-9S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DIEDRICH D-120
BORING NUMBER: 003
DATE: 04/03/00
GEOLOGIST: M. DALE
DRILLER: N. SMARETTO

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**
	0-1					GRY	FINE SILTY SAND	SM	W/ORGANICS/DRY			0.0	
	1-4		1/3 of 2'			GRN GRAY	FINE SILTY SAND	SM	DRY				
	4-5						SAME AS 1-4' interval.						
	5-7					BRN	SILTY FINE SAND	SM	moist SOME ORGANICS ▽ = 7'				
	7-10		1/3 of 2'			BRN	SILTY FINE SAND	SM	WET				
	10-15						SAME AS 7-10' interval.						0.0
	15-20						SAME AS 10-15' int.						
	20-25						SAME AS 15-20' int. except very wet, flowing sand						
	25-30						SAME AS 20-25' int.						
	30-35						SAME AS 25-30' int.						0.0
	35-37		FULL				SAME AS 30-35' int.						
	37-40		0/2										
							EOB AT 40 FT. BLS.						

* 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: Shelby tube attempts at 2-4' INT. and 6-8 FT. INT. not successful
Shelby Tube at 34.5-36.5 foot interval collected and full.
Shelby tube attempt at 37 to 39 FT. unsuccessful.

Converted to Well: Yes X No ____ Well I.D. #: CEF-745-10I

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: Diedrich D-120
BORING NUMBER: 002
DATE: 4/3/00
GEOLOGIST: M. DALE
DRILLER: N. SMARITTO

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**
	0-1"						Asphalt						
	1"-3"						limerock base						
	3"-6"					black	fine silty sand	SP/SM	dry				
	6"-4'					Lt. Brn	fine silty sand	SP/SM	dry			0.0	0.0
	4'-5'		2/2				same as above						
	5'-7'					BRN	fine, silty sand	SP/SM	slight orange tint to soil. moist w/ tree roots				
	7'-9'					BRN	SILTY FINE SAND	SP/SM	Moist, wet at 9'				
	9'-12'					BLK	SILTY FINE SAND	SP/SM	wet			0.0	0.0
	12'-15.5'					BRN	SILTY FINE SAND	SP/SM	wet				
							EOB at 15.5 ft bls.						

* 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: collected shelby tube at 4-6 ft. bls.

Converted to Well: Yes X No ____ Well I.D. #: CEF-P45-115

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS CECIL FIELD
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DIEDRICH D-120
BORING NUMBER: 002
DATE: 4/4/00
GEOLOGIST: E. PARKER
DRILLER: N. SMARITTO

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**
	0-2					WHITE	SILTY FINE SAND	SM	DAMP			0.0	
	2-4					WHITE	SILTY FINE SAND	SM	DAMP			0.0	
	4-15					BRN	SILTY FINE SAND	SM	DAMP TO WET				
							EOB AT 15 FT. BLS.						

* 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 X No ____ Well I.D. #: CEF-P45-12S

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NAS Cecil Field
PROJECT NUMBER: 0039
DRILLING COMPANY: GPI
DRILLING RIG: DT6600
BORING NUMBER: 001
DATE: 1-18-01
GEOLOGIST: ~~Jeff Ziegler~~ M. O'Neill
DRILLER: Jeff Ziegler

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	Sample	Borehole	Borehole
	1						fill material					0	0
	2					med gry	silty sand					0	0
	3					lgt gry	same as above					0	0
	4					lgt brn	same as above					0	0
	8					dark brown	same as above		Hit H_2O between			0	0
	10					med brn	same as above		8-10'				
	12					drk brn	same as above		saturated			0	0
	14					same as above							
	15					same as above						1.8	0
					TD of borehole 16'							0	
							Soil Drum 45-1A						

* 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 X No _____ Well I.D. #: CEF-P45-135

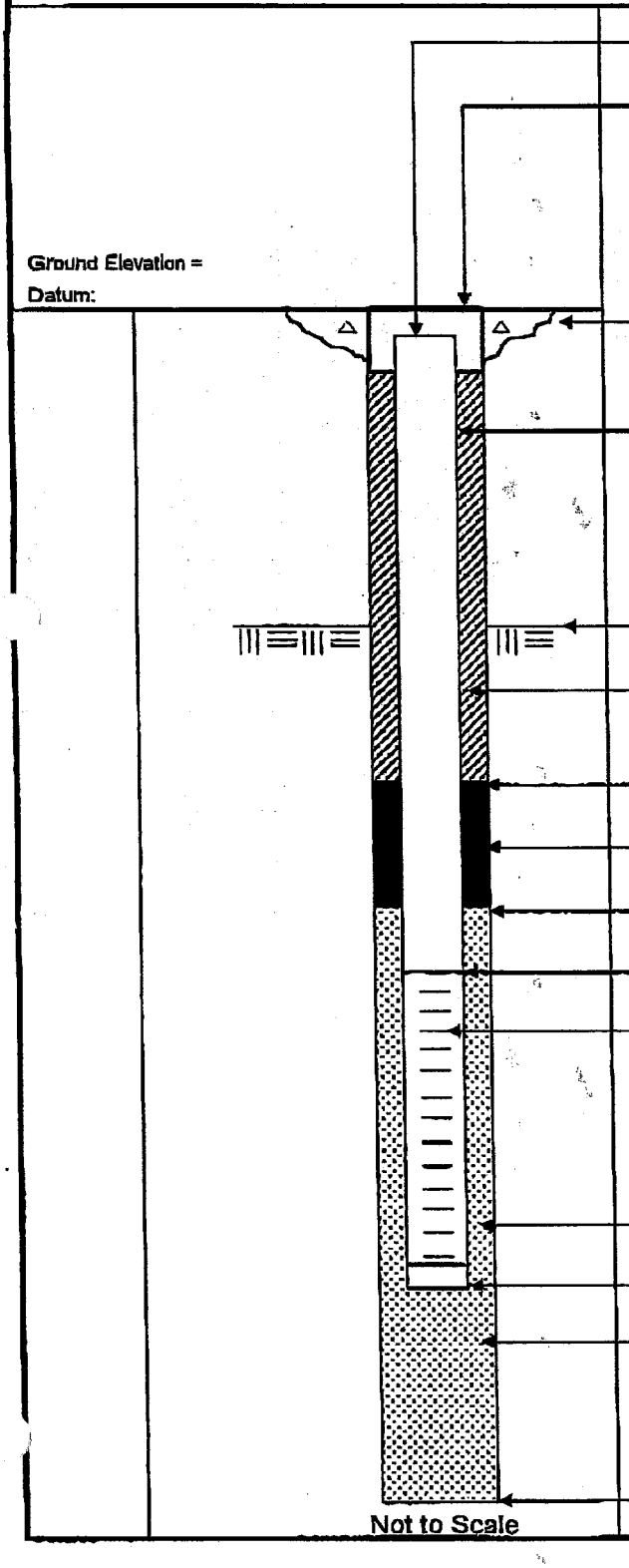
B.2 Monitoring Well Construction Sheets

Tetra Tech NUS, Inc.

WELL No.: CEF-P45-15

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	Groundwater Protection	BORING No.:	CEF-P45-002
PROJECT No.:	0039	DRILLER:	Shane Wooten	DATE COMPLETED:	7/8/99
SITE:	PSC 45	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	A. Willcox	DEV. METHOD:	Submersible	EASTING:	



Elevation / Depth of Top of Riser: +

Elevation / Height of Top of Surface Casing: +

I.D. of Surface Casing: 8"

Type of Surface Casing: SS Manhole

Type of Surface Seal: QUICKRETE

I.D. of Riser: 2"

Type of Riser: PVC 2" SCH 40

Borehole Diameter: 8"

Elevation / Depth Top of Rock: 1 –

Type of Backfill: QUICKRETE

Elevation / Depth of Seal: 11'

Type of Seal: 30/65 SAND

Elevation / Depth of Top of Filter Pack: 13'

Elevation / Depth of Top of Screen: 15'

Type of Screen: PVC SCH 40

Slot Size x Length: 0.010 x 10'

I.D. of Screen: 2"

Type of Filter Pack: 20/30 Sand

Elevation / Depth of Bottom of Screen: 15'

Elevation / Depth of Bottom of Filter Pack: 15'

Type of Backfill Below Well: SOIL

Elevation / Total Depth of Borehole: 15'

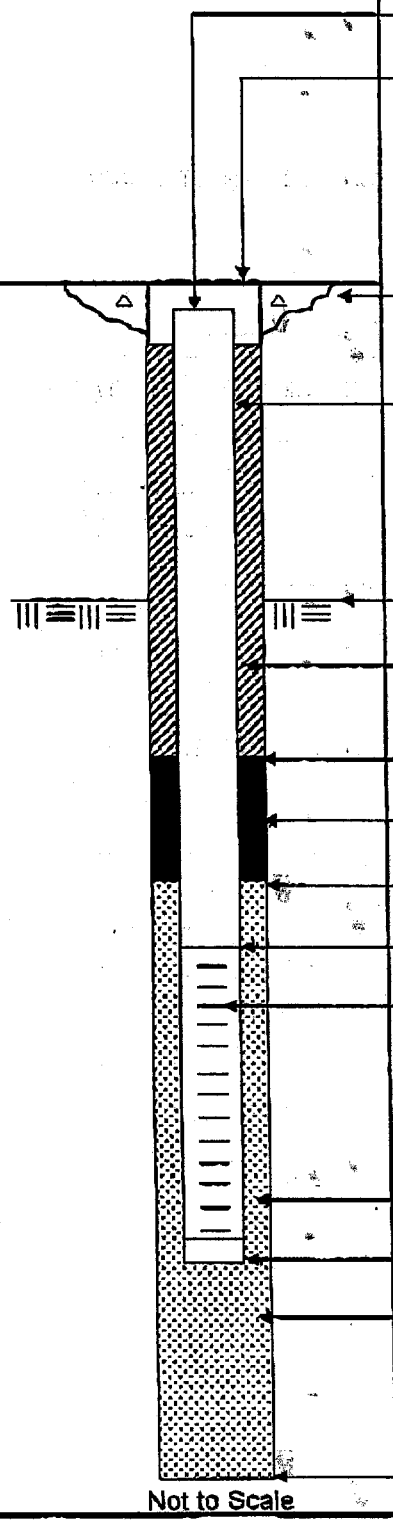
Tetra Tech NUS, Inc.

WELL No.: CEF-P45-25

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	Groundwater Protection	BORING No.:	45-001
PROJECT No.:	0039	DRILLER:	Shane Nowlen	DATE COMPLETED:	7/7/99
SITE:	PSC 45	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	A Wilcox	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	8" SS manhole
Type of Surface Seal:	Quickrete
I.D. of Riser:	2"
Type of Riser:	PVC Sch 40
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	+
Type of Backfill:	Quickrete
Elevation / Depth of Seal:	/ 1'
Type of Seal:	30/65 sand
Elevation / Depth of Top of Filter Pack:	/ 3'
Elevation / Depth of Top of Screen:	/ 5'
Type of Screen:	PVC Sch 40
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 15'
Elevation / Depth of Bottom of Filter Pack:	/ 15'
Type of Backfill Below Well:	Soil
Elevation / Total Depth of Borehole:	/ 15'

Tetra Tech NUS, Inc.

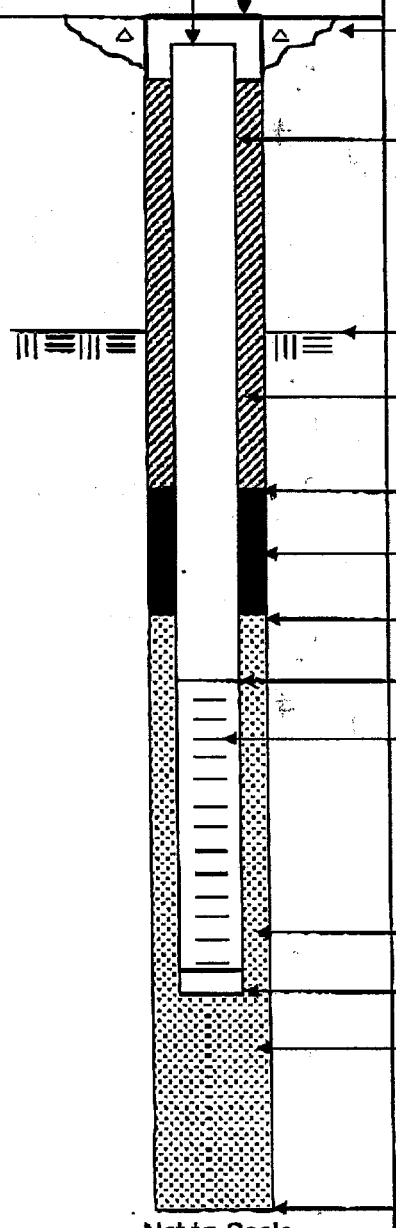
WELL No.: CEF-P45-35

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	Grandwich Probe	BORING No.:	CEF-P45-003
PROJECT No.:	0039	DRILLER:	Shane Nowles	DATE COMPLETED:	7/8/99
SITE:	NAS CEF PSC	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	A Wilcox	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	/
Elevation / Height of Top of Surface Casing:	/
I.D. of Surface Casing:	8"
Type of Surface Casing:	SS Manhole
Type of Surface Seal:	Quickcrete
I.D. of Riser:	2"
Type of Riser:	PVC Sch 40
Borehole Diameter:	8"
Elevation / Depth Top of Rock:	/
Type of Backfill:	Quickcrete
Elevation / Depth of Seal:	/ 1'
Type of Seal:	30/65 Sand
Elevation / Depth of Top of Filter Pack:	/ 3'
Elevation / Depth of Top of Screen:	/ 5'
Type of Screen:	PVC Sch 40
Slot Size x Length:	0.010 x 10'
I.D. of Screen:	2"
Type of Filter Pack:	20/30 Sand
Elevation / Depth of Bottom of Screen:	/ 15'
Elevation / Depth of Bottom of Filter Pack:	/ 15'
Type of Backfill Below Well:	Soil
Elevation / Total Depth of Borehole:	/ 15'

Tetra Tech NUS, Inc.

WELL No.: CEF-P45-MW-045

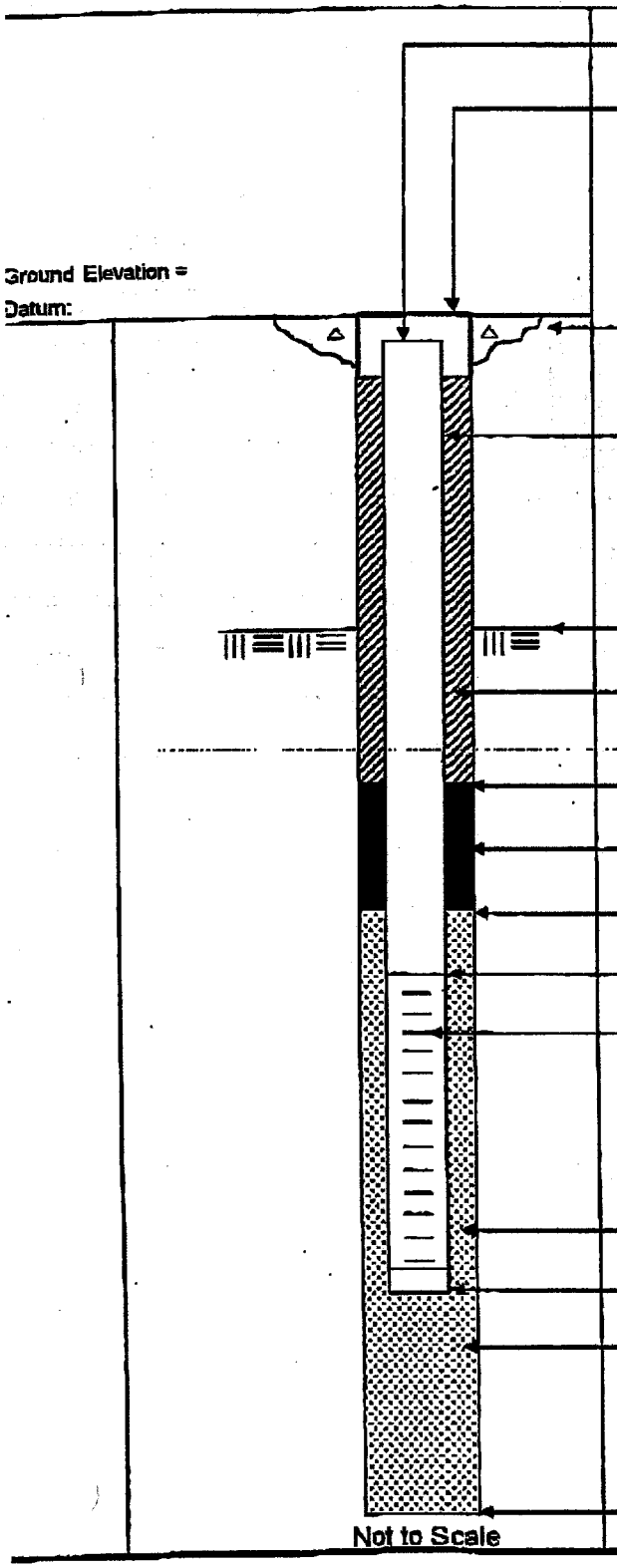
MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD
PROJECT No.: 0039
SITE: PSC 45
GEOLOGIST: M. DALE

DRILLING Co.: Groundwater Protection
DRILLER: S. NOWLEN
DRILLING METHOD: Hollow Stem
DEV. METHOD: Submersible

BORING No.: 003
DATE COMPLETED: 09/07/99
NORTHING:
EASTING:

Ground Elevation =
Datum:



Not to Scale

Elevation / Depth of Top of Riser: 1 2 IN.

Elevation / Height of Top of Surface Casing: 1 Q FT.

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Steel Manhole (8 inch)

Type of Surface Seal: Quikrete

I.D. of Riser: 2 inch

Type of Riser: Sch. 40 PVC

Borehole Diameter: 8.25 inch

Elevation / Depth Top of Rock: NA

Type of Backfill: Portland Cement Type 1

Elevation / Depth of Seal: 1 2 FT.

Type of Seal: 30/65 Silica Sand

Elevation / Depth of Top of Filter Pack: 1 4 FT.

Elevation / Depth of Top of Screen: 1 5 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 inch x 10 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Silica Sand

Elevation / Depth of Bottom of Screen: 1 15 FT.

Elevation / Depth of Bottom of Filter Pack: 1 15 FT.

Type of Backfill Below Well: Native Soil

Elevation / Total Depth of Borehole: 1 15 FT.

Tetra Tech NUS, Inc.

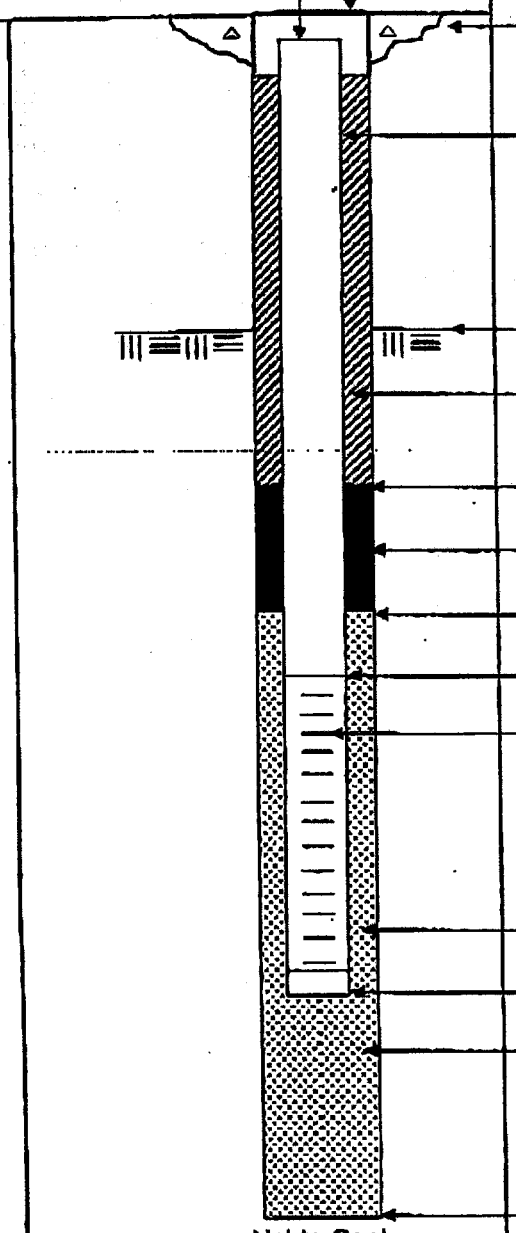
WELL No.: CEF-P45-MW-05S

MONITORING WELL SHEET

PROJECT: NAS CECIL FIELD	DRILLING Co.: Groundwater Protection	BORING No.:	004
PROJECT No.: 0039	DRILLER: S. NOWLEN	DATE COMPLETED:	09/07/99
SITE: PSC 45	DRILLING METHOD: Hollow Stem	NORTHING:	
GEOLOGIST: M. DALE	DEV. METHOD: Submersible	EASTING:	

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser:	12 IN.
Elevation / Height of Top of Surface Casing:	1 8 FT.
I.D. of Surface Casing:	8 inch
Type of Surface Casing:	Steel Manhole (8 inch)
Type of Surface Seal:	Quikrete
I.D. of Riser:	2 inch
Type of Riser:	Sch. 40 PVC
Borehole Diameter:	8.25 inch
Elevation / Depth Top of Rock:	NA
Type of Backfill:	Portland Cement Type 1
Elevation / Depth of Seal:	11.5 FT.
Type of Seal:	30/65 Silica Sand
Elevation / Depth of Top of Filter Pack:	13 FT
Elevation / Depth of Top of Screen:	15 FT.
Type of Screen:	Sch. 40 PVC
Slot Size x Length:	0.010 inch x 10 FT.
I.D. of Screen:	2 inch
Type of Filter Pack:	20/30 Silica Sand
Elevation / Depth of Bottom of Screen:	115 FT.
Elevation / Depth of Bottom of Filter Pack:	115 FT.
Type of Backfill Below Well:	Native Soil
Elevation / Total Depth of Borehole:	115 FT.

Tetra Tech NUS, Inc.

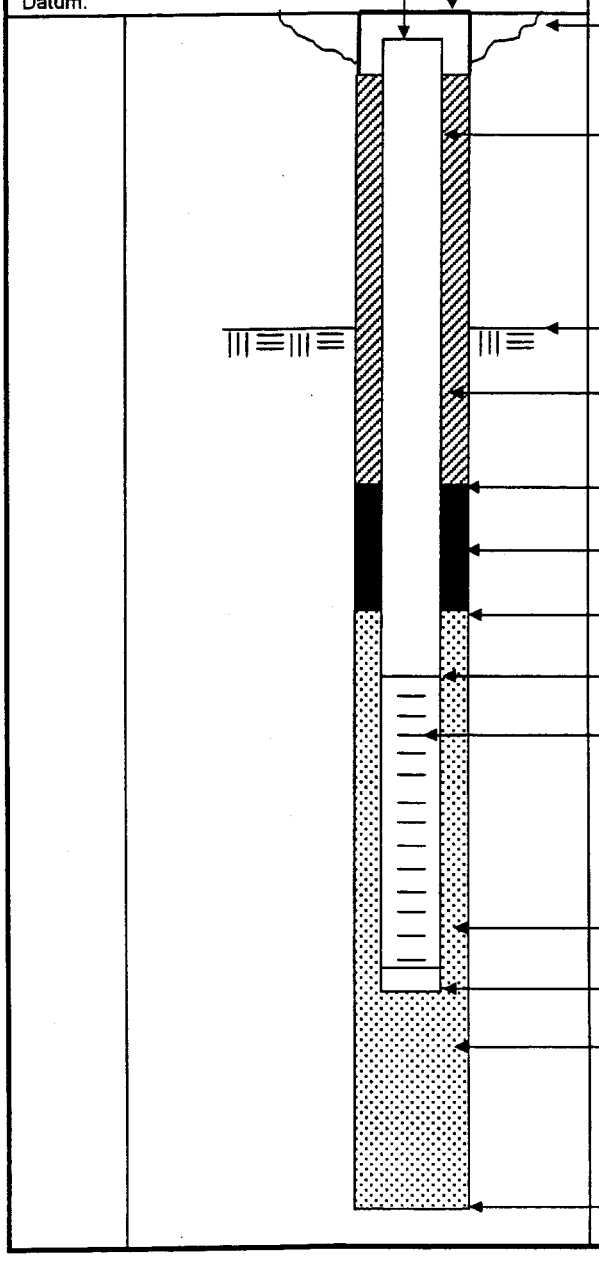
WELL No.: CEF-P45-6S

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	003
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/04/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 1

Elevation / Height of Top of Surface Casing: 1

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete PAD 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 11.5 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 13 FT.

Elevation / Depth of Top of Screen: 15 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 in. x 10 FT.

I.D. of Screen: 2 INCH

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 115 FT.

Elevation / Depth of Bottom of Filter Pack: 115 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 115 FT.

Tetra Tech NUS, Inc.

WELL No.: CEF-P45-7S

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	001
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/3/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

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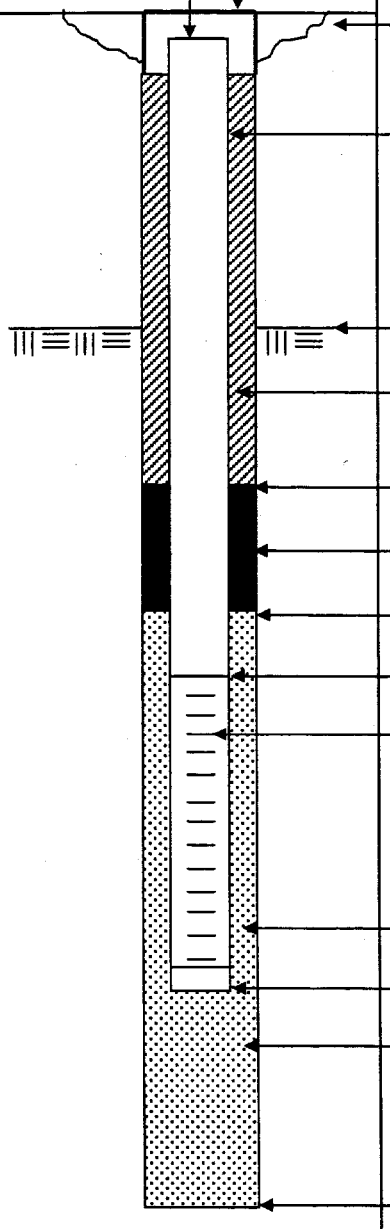


Elevation / Depth of Top of Riser: 12-3 in. bls.

Elevation / Height of Top of Surface Casing: 1 Ø FT.

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete pad 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I and bentonite

Elevation / Depth of Seal: 11.5 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 13 FT.

Elevation / Depth of Top of Screen: 15 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 IN. x 10 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 115 FT.

Elevation / Depth of Bottom of Filter Pack: 115.5 FT.

Type of Backfill Below Well: 20/30 GRADE SAND

Elevation / Total Depth of Borehole: 115.5 FT.

Tetra Tech NUS, Inc.

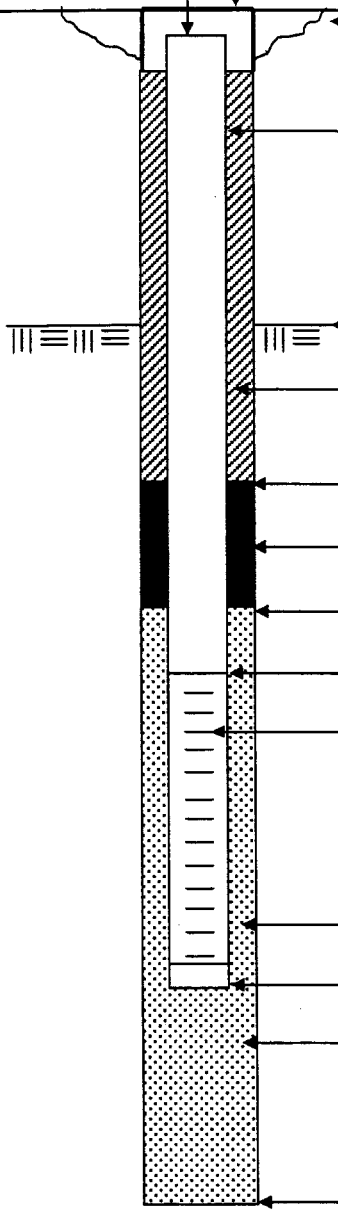
WELL No.: CEF-P45-85

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	004
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/03/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete PAD 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I And Bentonite

Elevation / Depth of Seal: 11.5 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 13 FT.

Elevation / Depth of Top of Screen: 15 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 IN. x 10 FT.

I.D. of Screen: 2 INCH

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 115 FT.

Elevation / Depth of Bottom of Filter Pack: 115.5 FT.

Type of Backfill Below Well: 20/30 Clean Sand

Elevation / Total Depth of Borehole: 115.5 FT.

Tetra Tech NUS, Inc.

WELL No.: CEF-P45-9N

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	001
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/4/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

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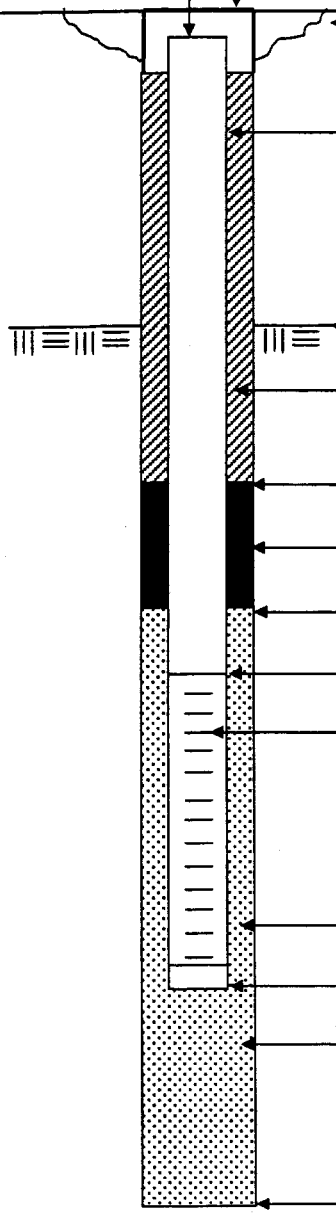


Elevation / Depth of Top of Riser: /

Elevation / Height of Top of Surface Casing: /

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete PAD 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 1/.5 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 13 FT.

Elevation / Depth of Top of Screen: 15 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 IN. x 10 FT.

I.D. of Screen: 2 INCH

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 115 FT.

Elevation / Depth of Bottom of Filter Pack: 115 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 115 FT.

Tetra Tech NUS, Inc.

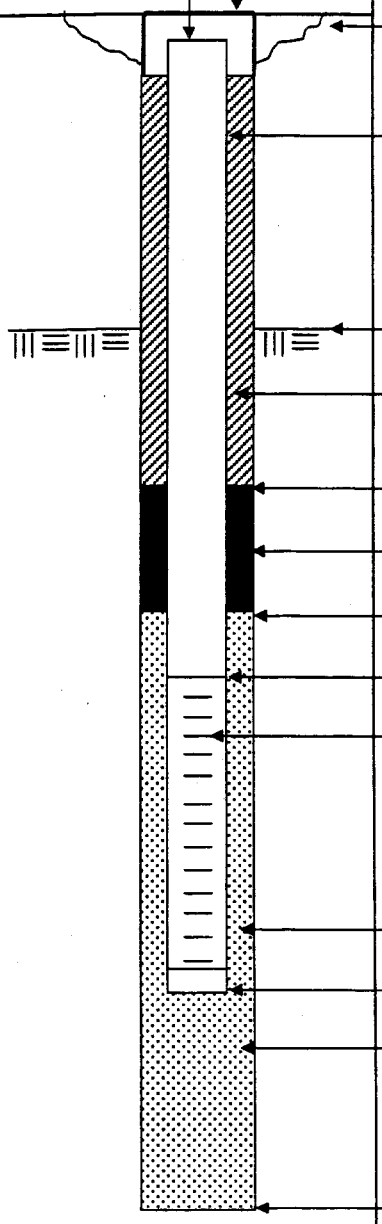
WELL No.: CEF-P45-10I

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	003
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/03/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 1

Elevation / Height of Top of Surface Casing: 1

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete PAD 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I and bentonite

Elevation / Depth of Seal: 131 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 133 FT.

Elevation / Depth of Top of Screen: 135 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 IN. x 5 FT.

I.D. of Screen: 2 INCH

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 140 FT.

Elevation / Depth of Bottom of Filter Pack: 40.5 FT. ~~140 FT.~~ MA

Type of Backfill Below Well: MA ~~NATIVE SOIL~~ 20/30 Sand

Elevation / Total Depth of Borehole: 40.5 FT. ~~140 FT.~~

Tetra Tech NUS, Inc.

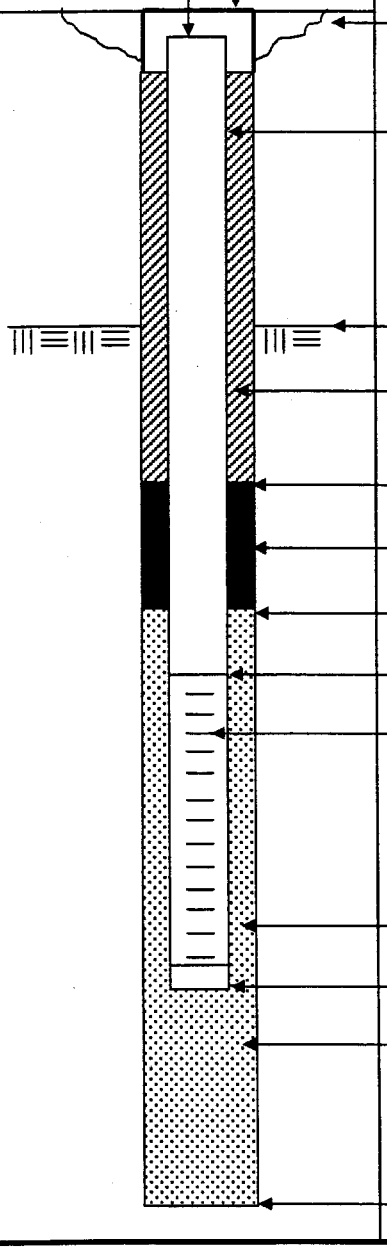
WELL No.: CEF-P45-115

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	002
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/3/00
SITE:	PSC	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 12-3 in. bls.

Elevation / Height of Top of Surface Casing: 1 & FT.

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Bolthown Cover

Type of Surface Seal: Concrete pad 2'x2'x6"

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 Cement Type I and bentonite

Elevation / Depth of Seal: 11.5 FT.

Type of Seal: 30/65 Grade sand

Elevation / Depth of Top of Filter Pack: 13 FT.

Elevation / Depth of Top of Screen: 15 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 in. x 10 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Grade Clean Sand

Elevation / Depth of Bottom of Screen: 115 FT.

Elevation / Depth of Bottom of Filter Pack: 115.5 FT.

Type of Backfill Below Well: 20/30 Grade sand

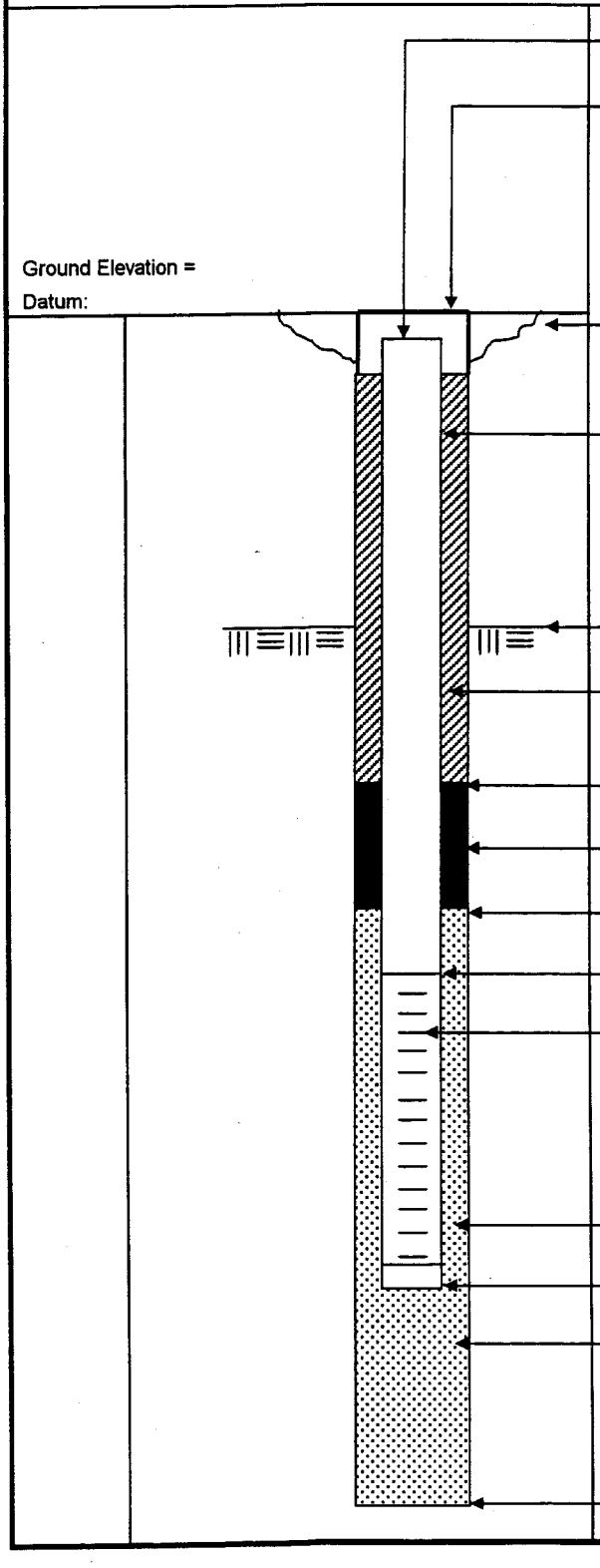
Elevation / Total Depth of Borehole: 115.5 FT.

Tetra Tech NUS, Inc.

WELL No.: CEF-P45-12S

MONITORING WELL SHEET

PROJECT:	NAS Cecil Field	DRILLING Co.:	Groundwater Precision	BORING No.:	002
PROJECT No.:	0039	DRILLER:	N. SMARITTO	DATE COMPLETED:	4/4/00
SITE:	PSC 45	DRILLING METHOD:	Hollow Stem	NORTHING:	
GEOLOGIST:	MERVIN DALE	DEV. METHOD:	Submersible	EASTING:	



Elevation / Depth of Top of Riser: 1

Elevation / Height of Top of Surface Casing: 1

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Stainless Steel Boltdown Cover

Type of Surface Seal: Concrete PAD 2'x2'x6"

I.D. of Riser: 2 inch

Type of Riser: PVC, Sch. 40

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: 1 1.5 FT.

Type of Seal: 30/65 Clean Sand

Elevation / Depth of Top of Filter Pack: 1 3 FT.

Elevation / Depth of Top of Screen: 1 5 FT.

Type of Screen: PVC, Sch. 40

Slot Size x Length: 0.010 IN. x 10 FT.

I.D. of Screen: 2 INCH

Type of Filter Pack: 20/30 Clean Sand

Elevation / Depth of Bottom of Screen: 1 15 FT.

Elevation / Depth of Bottom of Filter Pack: 1 15 FT.

Type of Backfill Below Well: NATIVE SOIL

Elevation / Total Depth of Borehole: 1 15 FT.

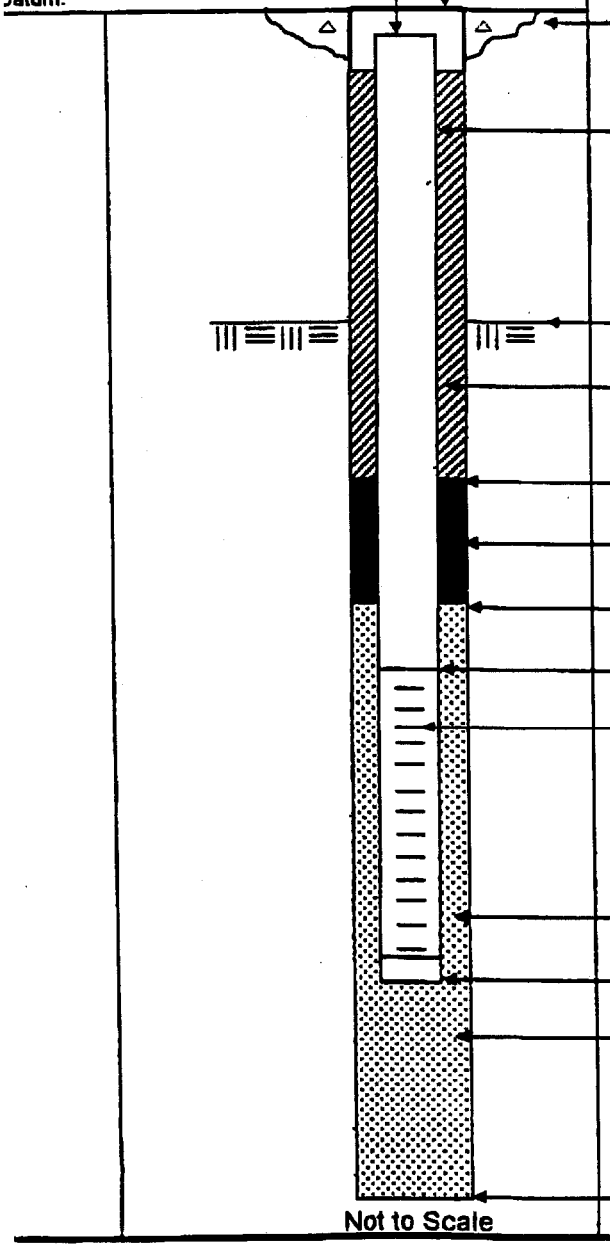
Tetra Tech NUS, Inc.

WELL No.: CEF-P45-13S

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	GPI	BORING No.:	001
PROJECT No.:	0039	DRILLER:	Jeff Ziegler	DATE COMPLETED:	1-18-01
SITE:	Site 45	DRILLING METHOD:	HSA	NORTHING:	
GEOLOGIST:	Michele O'Neill	DEV. METHOD:	Submersible	EASTING:	

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: 1 2"

Elevation / Height of Top of Surface Casing: 1 0

I.D. of Surface Casing: 8 MDO 2"

Type of Surface Casing: ~~PVC Sch 40~~ MDO Steel

Type of Surface Seal: Concrete

I.D. of Riser: 2"

Type of Riser: PVC Sch 40

Borehole Diameter: 8"

Elevation / Depth Top of Rock: 1 NA

Type of Backfill: Typal Portland Cement

Elevation / Depth of Seal: 11 1/2'

Type of Seal: 30-65 sand

Elevation / Depth of Top of Filter Pack: 1 3'

Elevation / Depth of Top of Screen: 1 5'

Type of Screen: PVC sch 40

Slot Size x Length: .010" x 10'

I.D. of Screen: 2"

Type of Filter Pack: 20-30 sand

Elevation / Depth of Bottom of Screen: 1 15'

Elevation / Depth of Bottom of Filter Pack: 1 16'

Type of Backfill Below Well: 20-30 sand

Elevation / Total Depth of Borehole: 1 16'

B.3 Conformance Reports

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-745-65
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/04/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER Protection, Inc.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 5 FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 10 FT	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, " ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A		
Annular Filter Pack	GRADE 20/30 Filter SAND	Standard SAND, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	GRADE 30/65 Fine SAND	Standard SAND, JACKSONVILLE, FL	NO
Annular Grout	PORTLAND Cement Type 1	HOLNAM, TAMPA, FL	NO
Surface Cement	QUIKRETE	QUIKRETE Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-P45-7S
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/03/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER PROTECTION, INC.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 5FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 10 FT	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, " ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1 / QUIKGEL BENTONITE	HOLNAM, TAMPA, FL / BAROID HOUSTON, TX	NO
Surface Cement	Quikrete	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-P45-05
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/03/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER PROTECTION, INC.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, " ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1 / QUIKGEL BENTONITE	HOLNAM, TAMPA, FL / BAROID, HOUSTON, TX	NO
Surface Cement	Quikrete	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-745-9S
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/04/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER PROTECTION, INC.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 5 FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 10 FT.	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1	HOLNAM, TAMPA, FL	NO
Surface Cement	Quikrete	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-P45-10I
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/03/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER Protection, Inc.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 35 FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 5 FT	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1 / QUIKGEL BENTONITE	HOLNAM, TAMPA, FL / BAROID HOUSTON, TX	NO
Surface Cement	Quikrete	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin D. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-P45-115
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/03/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER Protection, Inc.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 5 FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 10 FT.	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1 and QUIKGEL BENTONITE	HOLNAM, TAMPA, FL / BAROID HOUSTON, TX	NO
Surface Cement	Quikrete	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CERTIFICATE OF CONFORMANCE

Well Designation: CEF-P45-125'
Site Name: SITE 45, NAS CECIL FIELD
Date Installed: 04/04/00
Project Name: Remedial Investigation for Site 45

Site Geologist: MERVIN DALE
Drilling Company: GROUNDWATER Protection, INC.
Driller: NICK SMARITTO
Project Number: N0039.DS0.05E.300

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing	PVC. Sch. 40, 2 inch I.D., 5 FT.	Toney Drilling Supply, ORLANDO, FL	NO
Well Screen	PVC. Sch. 40, 2 inch. I.D., 0.010 in. slots, 10 FT.	Toney Drilling Supply, ORLANDO, FL	NO
End Cap	PVC, 6 inch well point, Sch. 40	Toney Drilling, ORLANDO, FL	NO
Drilling Fluid	N/A	N/A	
Drilling Fluid Additives	N/A	N/A	
Backfill Material	N/A	N/A	
Annular Filter Pack	Grade 20/30 Filter Sand	Standard Sand, JACKSONVILLE, FL	NO
~~Bentonite~~ Seal	Grade 30/65 Fine Sand	Standard Sand, JACKSONVILLE, FL	NO
Annular Grout	Portland Cement Type 1	HOLNAM, TAMPA, FL	NO
Surface Cement	Quikreto	Quikrete Companies, Atlanta, GA	NO
Protective Casing	8 inch steel boltdown cover (Flush mt.)	Toney Drilling Supply, ORLANDO, FL	NO
Paint	N/A	N/A	
Rod Lubricant	N/A	N/A	
Compressor Oil	N/A	N/A	

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CEF- P45-135
CEF-824-10S
CEF-428-1SR

MONITORING WELL MATERIALS CERTIFICATE OF CONFORMANCE

Well Designation: CEF-428-2SR
Site Name: Cecil Field
Date Installed: 01/18/01
Project Name: PSC 45, B. 824, B. 428

Site Geologist: M. ONeill
Drilling Company: GROUNDWATER PROTECTION
Driller: Charles Bucher / Jeff Ziegler
Project Number: N0039, N0486

Material	Brand/Description	Source/Supplier		Sample Collected ?
Well Casing	Sch. 40 PVC, 2 IN. DIAM.	Toney Drilling	MIAMI, FL	NO
Well Screen	Sch. 40 PVC 2 IN. DIAM., 10 slot	Toney Drilling	MIAMI, FL	NO
End Cap	Sch. 40 PVC, 2 IN. DIAM, 6 IN. long point	Toney Drilling	MIAMI, FL	NO
Drilling Fluid	None			
Drilling Fluid Additives	None			
Backfill Material	20/30 Sand (below well screen)	Std. Sand	JAX, FL.	NO
Annular Filter Pack	20/30 Sand	Std. Sand	JAX, FL.	NO
~~Bentonite~~ Seal, Fine Sand	30/65 Sand	Std. Sand	JAX FL	NO
Annular Grout	Type I Portland Cement	~~Std.~~ HOLNAM	TAMPA, FL	NO
Surface Cement	Quikrete	Quikrete Co.	Atlanta, GA	NO.
Protective Casing	8 IN. I.D. Steel boltdown	PEMCO	Hollywood, FL	NO
Paint	No			
Rod Lubricant	No			
Compressor Oil	No			

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: [signature]

APPENDIX C

AQUIFER CHARACTERISTICS, CALCULATIONS AND RECORDS

C.1 Monitoring Well Development
C.2 Synoptic Groundwater Level Measurements
C.3 Aquifer Test Data And Calculations

C.1 Monitoring Well Development

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-65'
Site: PSC 45, CECIL FIELD
Date Installed: 4-4-00
Date Developed: 4-11-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.34' TOC
Static Water Level Before (ft.): 7.63' TOC
Static Water Level After (ft.): dry
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Waller / J. Elliott
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
1028	—	—	7.63' TOC	22.4	5.09	0.186	>999	dk. brn, no odor, well going dry
1305				22.6	5.25	0.141	>999	" using peristaltic pump
1312		~3 gal	stop pump	22.3	5.34	0.090	695	somewhat cloudy, runs dry
1330			start pump	22.9	5.48	0.071	702	"
1332		~3.5 gal	stop pump					
1403			start pump	23.0	5.42	0.062	196	slightly cloudy
1406		~3.8 gal	stop pump					

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-~~Part A~~ PSE P45-MW-05S
Site: PSC 45
Date Installed: 4-4-00
Date Developed: 4-12-00
Dev. Method: PERISTALTIC
Pump Type: "

Depth to Bottom (ft.): 14.34
Static Water Level Before (ft.): 7.62
Static Water Level After (ft.): dry
Screen Length (ft.): 10'
Specific Capacity: N/A
Casing ID (in.): 2"

Responsible Personnel: LOUIS KNIGHT / JEN ELLIOTT
Drilling Co.: Groundwater Protection, Inc.
Project Name: NASCF
Project Number: 0031.050.05PS20

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 (odor, color, etc.)
1430			7.62	24.2	5.28	.090	15	
1435		0.5	8.40	22.6	5.32	.064	2	
1440		1.0	8.80	22.5	5.32	.067	(-10)	
1445		1.4	9.01	22.8	5.33	.065	(-10)	
1450		1.8	9.44	22.8	4.95	.059	160	
1500		2.6	12.32	23.0	4.89	.056	>K	"SWEPT" WELL W/ TUBING to INCREASE TURBIDITY
1510		3.0	DRY (14.5)					WELL PUMPED DRY... SLIGHTLY < 2 WELL
								VOLUMES TOTAL IN 40 MINUTES PUMP TIME

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

3rd Development of GS 4-13-00

Well: CEF-P45-MW-06S
Site: PSC 45
Date Installed: 4- -00
Date Developed: 4-11-00 4-12 4-13-00
Dev. Method: Peristaltic
Pump Type: "

Depth to Bottom (ft.): 14.34'
Static Water Level Before (ft.): 7.64'
Static Water Level After (ft.): dry
Screen Length (ft.): 10'
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: J. Elliott / C. Waller
Drilling Co.: GPT
Project Name: NAS CECIL FIELD
Project Number: 0039

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 (odor, color, etc.)
1557	—	—	7.64'	22.9	5.17	0.102	85	Somewhat cloudy / flow 200 mb/min
1625	—	~1 gal	9.17'	22.1	5.11	0.052	70	slightly cloudy / 200 mb/min
1640	—	~2 gal	12.70'	22.0	5.00	0.050	-10	"
1650	well runs		dry					

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-MW-7S
Site: P45
Date Installed: 4-3-00
Date Developed: 4-10-00 4-12-00
Dev. Method: Pump
Pump Type: Submersible

Depth to Bottom (ft.): 14.48'
Static Water Level Before (ft.): 8.42'
Static Water Level After (ft.): —
Screen Length (ft.): 10
Specific Capacity: NA
Casing ID (in.): 2"

Responsible Personnel: J. Elliott / L. Knight
Drilling Co.: GPT
Project Name: NAS CECIL FIELD
Project Number: 0039

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 (odor, color, etc.)
1102		—		23.3	5.32	0.200	>999	Cloudy Brn, w/ sd & silt
1115				22.8	5.67	0.271	>999	"
~~1122~~		~4 gal		22.8	5.50	0.250	>999	"
1130		~5 gal		22.8	5.39	0.238	>999	"
1140		~7 gal		22.8	5.35	0.240	>999	"
1213		~13 gal		22.8	5.53	0.248	>999	"

MONITORING WELL DEVELOPMENT RECORD

PID Reading - 0.6

Well: CEF-P45-7S
Site: PSC 45, CECIL FIELD
Date Installed: 4-3-00
Date Developed: 4-10-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.48
Static Water Level Before (ft.): 8.43
Static Water Level After (ft.): 9.93
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: E. Parke
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
1445	—	—	8.43	—	—	—	—	brn - no odor / start
1505	—	9	—	24.1	5.31	.139	999	well is pumping dry
1525	—	18	—	23.6	5.38	.122	999	brn - no odor / purge dry
1550	—	24	—	23.8	5.51	.129	999	same
1615	—	26	—	23.9	5.49	.130	999	same
1640	—	~~28~~ 30	—	23.8	5.51	.136	999	same

End

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-85
Site: PSC 45, CECIL FIELD
Date Installed: 4-3-00
Date Developed: 4.11.00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.59'
Static Water Level Before (ft.): 9.61'
Static Water Level After (ft.): 9.17'
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Waller / J. Elliott
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
1436	—	—	9.61	24.3	5.40	0.263	>999	Cloudy Brown
1449	—	~20 gals		23.9	5.08	0.278	809	Cloudy Brown, no odor
1457	—	~32 gals		24.0	4.99	0.262	238	much less cloudy brown, no odor
1505	—	~37 gals		24.0	4.94	0.252	185	light brown, no odor
1510	—	~45 gals		23.8	4.92	0.248	104	very light brown, no odor
1515		~52 gals		23.8	4.89	0.246	87	brownish tint, no odor
1516		~53 gals	9.17	End Development				

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-9S
Site: PSC 45, CECIL FIELD
Date Installed: 4-4-00
Date Developed: 4-11-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.66'
Static Water Level Before (ft.): 8.17'
Static Water Level After (ft.): 8.17'
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Waller / J. Elliott
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
1240	—	—	8.17'	23.1	3.99	0.149	>999	Cloudy Tan, Initial Reading
1252	—	~18 gal.		23.1	3.96	0.119	62	slightly cloudy, no odor
1300	—	~27 gals.		23.0	3.93	0.112	10	clear, no odor
1308	—	~32 gals		23.2	3.87	0.111	-10	clear, no odor
1316	—	~37 gals		23.1	3.87	0.109	-10	clear, no odor
1322	—	~46 gals		23.0	3.81	0.109	-10	clear, no odor
1325	—	~52 gals	~~End De~~	End Development				

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-10I
Site: PSC 45, CECIL FIELD
Date Installed: 4-3-00
Date Developed: 4-11-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 38.02' TOC
Static Water Level Before (ft.): 8.32' TOC
Static Water Level After (ft.): —
Screen Length (ft.): 5
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Waller
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
~~1500~~	—	—	8.32'	25.3	4.07	0.150	~~>999~~	~~Lt~~ Light Brown Cloudy
1513		~22 gal		24.9	4.00	0.074	>999	Light Brown Cloudy
1521		~33 gal		24.7	4.01	0.069	>999	Tan Cloudy
1529		~44 gal		24.6	4.00	0.066	>999	"
1536		~52 gal		24.7	3.90	0.063	>999	"
1545				24.6	4.01	0.060	>999	"
1555		~78 gal		24.5	3.99	0.058	>999	"
1608		~95 gal		24.7	4.03	0.056	824	"
1617		~~105~~ 110 gal		24.4	4.05	0.056	803	"

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-PLD-MW-10I
Site: PSC 45
Date Installed: 4-3-00
Date Developed: 4-11-00 & 4-12-00
Dev. Method: Submersible
Pump Type: Whaler

Depth to Bottom (ft.): 38.12' TOC
Static Water Level Before (ft.): 8.16' TOC
Static Water Level After (ft.): 8.17' TOC
Screen Length (ft.): 5'
Specific Capacity: N/A
Casing ID (in.): 2" PVC

Responsible Personnel: J. Elliott / L. Knight
Drilling Co.: GPT
Project Name: NAS CECIL FIELD
Project Number: 0039

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 (odor, color, etc.)
1037		—	8.16	26.3	5.55	.111	>999	TURBID ; BROWN
1042		10		25.4	5.36	.048	>999	
1052		30		25.2	5.33	.048	>K	
1102		40		24.5	5.29	.046	804	
1112		50		24.8	5.27	.045	653	
1122		70		24.7	5.28	.044	580	
1132		80		24.6	5.24	.044	524	
1142		110		24.7	5.23	.045	446	
1152		130		23.7	5.23	.043	410	
1202		140		24.8	5.17	.042	394	
~~1212~~		150		24.7	5.20	.042	373	
1217		160		24.7	5.17	.042	350	

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

4-12-00 2nd Time Developing

Well: CEF-PSC-MW-115
Site: PSC45
Date Installed: 4-3-00
Date Developed: 4-10-00 & 4-12-00
Dev. Method: Peristaltic
Pump Type: "

Depth to Bottom (ft.): 14.70
Static Water Level Before (ft.): 8.54' TOC
Static Water Level After (ft.): —
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2"

Responsible Personnel: Jim Knight / JE
Drilling Co.: GPI
Project Name: NAS CECIL FIELD
Project Number: 0039

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 (odor, color, etc.)
1045								MURKY - dark brown
1048		800 ml/min		24.3	5.73	.163	>K	
1055		2.5	9.81	24.0	5.62	.139	381	Translucent
1100		3.5	9.81	23.9	5.56	.126	401	"
1105		4.0	9.89	23.9	5.55	.120	261	"
1110		5.5	9.90	23.9	5.51	.110	128	"
1115		6.0	9.91	23.9	5.49	.104	65	"
1120		7.5	9.91	23.8	5.47	.101	24	
1125		8.5	9.90	23.8	5.48	.096	10	
1130		9.5	9.90	23.8	5.47	.096	10	
1135		10.5	9.90	23.7	5.43	.091	10	
1140		11.5	9.90	23.8	5.43	.088	10	
1145		12.5	9.89	23.8	5.38	.084	10	
1155		15.0	9.89	23.7	5.36	.082	10	
1205		17.5	9.88	23.8	5.39	.080	10	

MONITORING WELL DEVELOPMENT RECORD

PID Reading 1.8

Well: CEF-P45-11S
Site: PSC 45, CECIL FIELD
Date Installed: 4-3-00
Date Developed: 4-10-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.70
Static Water Level Before (ft.): 8.48
Static Water Level After (ft.): 8.58'
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Waller
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

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 (odor, color, etc.)
1429	—							Well goes dry After 5-~~10~~ 25 sec of pumping
1447	—	4.5.	~~9.34~~ ow	24.5	4.95	0.231	>999	dark brown, no odor, well still going dry
1507	—	9.0		23.7	4.90	0.154	>999	dark brown, sulfurous smell, well going dry
1523	—	15.0		23.7	4.85	0.123	>999	dark brown, sulfurous smell, well going dry
1527	—	17.0		23.4	4.86	0.123	>999	dark brown, sulfurous smell, well still going dry
1536	—	19.0		23.6	4.82	0.111	>999	~~lighter~~ med. brown, sulfur smell, well still going dry
1549	—	22.0		23.4	4.83	0.101	>999	med. brown, sulfur smell, well still going dry
1559	—	24.0		23.6	4.70	0.096	>999	med. brown, sulfur smell, well still going dry
1615	—	27.5		23.6	4.77	0.091	685	med. brown, sulfur smell, well still going dry
1630	—	End of	~~Development~~	Final Water Level = 8.58'				

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-12S
Site: PSC 45, CECIL FIELD
Date Installed: 4-4-00
Date Developed: 4-11-00
Dev. Method: PUMP
Pump Type: SUBMERSIBLE

Depth to Bottom (ft.): 14.5' TOC
Static Water Level Before (ft.): 8.50' TOC
Static Water Level After (ft.):
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: C. Walker, J. Elliott
Drilling Co.: GROUNDWATER PROTECTION, INC.
Project Name: CECIL FIELD PSC INVESTIGATIONS
Project Number: N0039. DS0. 05P. S20

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units ~~S~~/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)	Flow Rate
1030		—	8.50' TOC	22.6	3.76	0.182	>999	Cloudy Brown, initial reading	1 L per .145
1040		~15 gal	11.24' TOC	22.5	3.89	0.089	>999	Light Cloudy Brown	
1047				22.4	3.75	0.082	580		
1052		~35 gal.		22.4	3.67	0.076	210	~~light cloudy brown~~ Slightly cloudy	
1100		~43 gal		22.4	3.63	0.072	175	Slightly Cloudy	
1105		~50 gal		22.4	3.61	0.071	72	"	
1107	End	Development							

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Well: CEF-P45-13S
Site: Site 45 Cecil
Date Installed: 01/18/01
Date Developed: 01/19/01
Dev. Method: Pump
Pump Type: Submersible

Depth to Bottom (ft.): 14.99
Static Water Level Before (ft.): 8.76
Static Water Level After (ft.): —
Screen Length (ft.): 10
Specific Capacity: N/A
Casing ID (in.): 2

Responsible Personnel: ELENA RODRIGUEZ
Drilling Co.: GROUNDWATER PROTECTION
Project Name: NAS CECIL FIELD
Project Number: 0039

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume est. (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH S.U.	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
0910		~~8.76~~	8.76					
0915	5	~~13.85~~	13.85	23.1	5.62	0.191	>990	opaque muddy brown
0920	15		14.31	23.1	5.56	0.150	>990	cloudy brown
0925		25	14.31	23.1	5.52	0.127	170	cloudy white
0940		35	14.31	23.1	5.46	0.116	60	clear
0945		40	14.28	23.2	5.45	0.114	55	clear
0950		45	14.31	23.2	5.44	0.111	41	clear
0955		50	14.31	23.2	5.41	0.110	40	clear

C.2 Synoptic Groundwater Level Measurements

N0039
Book 129

CT078

142 cont'd from pg. 141

WATER LEVEL READINGS (PSC 45)

11CEF-P45-"

WELL ID	TIME	DTW
MW-75	1430	8.49
MW-65	1436	7.49
MW-12S	1439	8.41
MW-09S	1441	8.05
MW-08S	1444	9.06
MW-01S	1447	6.86
MW-03S	1449	8.69
F11-25B	1451	8.02
F11-15B	1454	8.60
MW-04S	1456	8.61
MW-10I	1500	7.98
007-15A	1502	8.03
MW-11S	1504	8.40
MW-02S	1507	7.08
F11-15A	1511	8.26
MW-05S	ANT INFESTATION	

READINGS (PSC-75)

WELL ID	TIME	WATER DTW	LEVEL PID READ
80-65	16:15	5.39	M
80-95	16:19	7.21	A
80-15	1621	6.57	L
80-85	1623	7.19	F
80-145	1627	7.11	U
80-135	1630	6.62	N
80-125	1632	7.05	C
80-75	1634	5.79	T
81-65	1638	6.21	I
81-75	1644	6.19	O
81-85	1647	6.18	N

C.3 Aquifer Test Data And Calculations

```
*****************************************************************
DETERMINATION OF AQUIFER PROPERTIES BASED ON ANALYSIS OF
                  SPECIFIC CAPACITY TESTS
*****************************************************************
```

Copied from: Bradbury, K. R. and Rothschild, E. R., 1985. A computerized technique for estimating the hydraulic conductivity of aquifers from specific capacity data, Ground Water, 23(2), pp. 240-246.

WELL NUMBER CEF-P45-04S

```
WELL DIAMETER (IN) =          2
STATIC WATER LEVEL (FT) =     8.96
DEPTH TO WATER DURING TEST (FT) =          9.8
THE LENGTH OF THE TEST (HR) =              .2
PUMPING RATE (GPM) =          .13
THICKNESS OF AQUIFER (FT) =                81
OPEN INTERVAL (FT) =          6.04
STORAGE COEFFICIENT =         .15
WELL-LOSS COEFFICIENT =       1
```

```
SPECIFIC CAPACITY (GPM/FT) =  .1547619

TRANSMISSIVITY:  (FT*FT/SEC) =  3.242165E-03
                 (FT*FT/DAY) =  280.1231
                 (GAL/DAY/FT) =  2095.461
           USING A STORAGE COEFFICIENT =  .15
           NUMBER OF ITERATIONS =  2

HYDRAULIC CONDUCTIVITY:  (FT/SEC) =  4.002673E-05
                         (FT/DAY) =  3.45831
                         (GAL/DAY/FT*FT) =  22.97534
```

WELL NUMBER CEF-P45-07S

```
WELL DIAMETER (IN) =          2
STATIC WATER LEVEL (FT) =     8.72
DEPTH TO WATER DURING TEST (FT) =          9.350001
THE LENGTH OF THE TEST (HR) =              .43
PUMPING RATE (GPM) =          .116
THICKNESS OF AQUIFER (FT) =                81
OPEN INTERVAL (FT) =          6.03
STORAGE COEFFICIENT =         .15
WELL-LOSS COEFFICIENT =       1
```

```
SPECIFIC CAPACITY (GPM/FT) =  .184127

TRANSMISSIVITY:  (FT*FT/SEC) =  3.894142E-03
```

```
        (FT*FT/DAY) =  336.4539
        (GAL/DAY/FT) =  2516.843
    USING A STORAGE COEFFICIENT =  .15
    NUMBER OF ITERATIONS =  2

HYDRAULIC CONDUCTIVITY:  (FT/SEC) =  4.807583E-05
                         (FT/DAY) =  4.153751
                         (GAL/DAY/FT*FT) =  27.59553

THE NUMBER OF WELLS IN THIS RECORD IS  2
```

SPECAP DATA FOR WELL P45-4S

Tetra Tech NUS, Inc.

SPECIAL ~~PUMPING TEST~~ DATA SHEET

PROJECT NAME: N0039
PROJECT NUMBER: Site 45, RI (ecl)
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEE-P45-045

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00
MEASUREMENT METHOD: Humm 3000 / W.L.I.
TEST NUMBER: DR-P45-45
STATIC WATER LEVEL (ft): 8.96
PERSONNEL: C. WALKER, M. DALE
REMARKS: Resistance (0006 from Field Env.)
MONITORING POINT:
DEPTH CORRECTION (ft): 0
PUMP SETTING (Ft. below monitoring point):
DISTANCE FROM PUMPING WELL (ft): N/A

MILITARY TIME HH:MM:SS	~~ELAPSED~~ TIME SINCE ~~PUMP START~~ OR STOP (~~Min.~~)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR ~~RECOVERY~~ (Ft.)	CUM. ~~FLOW METER READING (Gals.)~~ VOL. (Liters)	PUMPING RATE ~~(GPM)~~ ML/MIN	REMARKS
	09:43:32	8.96			0	0	Start
		8.97					
	09:43:38	8.98					
		8.99					
		9.00					
		9.01					
		9.02					
		9.03					
		9.04					
	09:43:52	9.05					
		9.06					
		9.07					
		9.08					
		9.09					
		9.10					
		9.11					
	4358	9.12					
MD	09:43:56	9.13					
		9.14					
		9.15					
		9.16					
		9.17					
	09:44:04	9.18					
		9.19					
		9.20					
		9.21					
		9.22					
		9.23					
		9.24					
		9.25					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

Tetra Tech NUS, Inc.

SPECIAL ~~PUMPING TEST~~ DATA SHEET

PROJECT NAME: N0039
PROJECT NUMBER: Site 45, RI (Cea)
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-04S

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00
MEASUREMENT METHOD: Hermit 3000/W.L. I
TEST NUMBER: DR-P45-4S
STATIC WATER LEVEL (ft): 8.96
PERSONNEL: C. WALKER, M. DALE
MONITORING POINT:
DEPTH CORRECTION (ft): 0
PUMP SETTING (Ft. below monitoring point):
DISTANCE FROM PUMPING WELL (ft): N/A

REMARKS: Peristaltic (0006 from Field Eqn.).

MILITARY TIME	~~ELAPSED TIME SINCE PUMP START OR STOP (Min.)~~	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN ~~OR RECOVERY~~ (Ft.)	FLOW METER READING ~~(Gals.)~~ L	PUMPING RATE ~~(GPM)~~ ML/MIN	REMARKS
	09:4423	9.26					cont. test
	09:4445	9.33					
	09:4506	9.39					
	09:4521	9.42					
	09:4536	9.44			1	500	Kept same rate thru test.
	09:4559	9.47					
	09:4622	9.49					
	094633	9.50					
	094702	9.52					
	094723	9.54					
	094750	9.56					
	094820	9.58					
	094859	9.61					
	095007	9.65					
	095153	9.70					
	095316	9.75					
	095542	9.80					end test
		09:45:36					
		09:43:32					
		2:04					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

PS 2 of 2

Tetra Tech NUS, Inc. **PUMPING TEST DATA SHEET**

PROJECT NAME: N0039
PROJECT NUMBER: Site 45, RF Cecil

PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-45

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00	MONITORING POINT:
MEASUREMENT METHOD: Hermit Jojo / W.L.I.	DEPTH CORRECTION (ft): 0
TEST NUMBER: REC-P45-45	PUMP SETTING (Ft. below monitoring point):
STATIC WATER LEVEL (ft): 8.96	DISTANCE FROM PUMPING WELL (ft): N/A
PERSONNEL: C. WALKER, M. DAVE	
REMARKS: Peristaltic (0006 from Field ENV.).	

MILITARY TIME HH:MM:SS	~~ELAPSED TIME SINCE PUMP START OR STOP~~ (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	~~DRAW DOWN~~ OR RECOVERY (Ft.)	FLOW METER READING (Gals.)	PUMPING RATE (GPM)	REMARKS
		9.86	N/A		—	stopped	start
	095749	9.85					
		9.84					
		9.83					
		9.82					
	095757	9.81					
		9.80					
		9.79					
	095800	9.78					
		9.77					
		9.76					
		9.75					
	095803	9.74					
		9.73					
	095806	9.72					
		9.71					
		9.70					
		9.69					
	095811	9.68					
		9.67					
		9.66					
		9.65					
		9.64					
		9.63					
		9.62					
	095818	9.61					
		9.60					
	095821	9.59					
		9.58					
	095826	9.53					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

Tetra Tech NUS, Inc. **PUMPING TEST DATA SHEET**

PROJECT NAME: NOV39
PROJECT NUMBER: Site 45, RI (cont)

PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-045

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00
MEASUREMENT METHOD: Hermit 3000 / W.L.I.
TEST NUMBER: REC-P45-45
STATIC WATER LEVEL (ft): 8.96
PERSONNEL: C. Walker, M. Dale
REMARKS: Peristaltic

MONITORING POINT:
DEPTH CORRECTION (ft): 0
PUMP SETTING (Ft. below monitoring point):
DISTANCE FROM PUMPING WELL (ft): N/A

MILITARY TIME HH:MM:SS	~~ELAPSED TIME SINCE PUMP START OR STOP (Min.)~~	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	FLOW METER READING (Gals.)	PUMPING RATE (GPM)	REMARKS
	095833	9.50					cont. test
	095840	9.46					
	095845	9.43					
	095848	9.41					
	095851	9.40					
	095855	9.38					
	095902	9.36					
	095906	9.34					
	095911	9.32					
	095915	9.31					
	095918	9.30					
	095922	9.29					
	095926	9.28					
	095931	9.26					
	095940	9.24					
	095947	9.22					
	095958	9.20					
	100010	9.18					
	100025	9.16					
	100043	9.14					
	100053	9.13					
	100123	9.10					
	100140	9.09					
	100210	9.08					
	100236	9.06					
	100340	9.04					
	100445	9.02					
	100634	9.00					
	100911	8.98					end test

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

IN_SITU INC. Hermit 3000

Report generated: 05/12/00 11:28:59
Report from file: C:\WINDOWS\TEMP\~bin392B.TMP
DataMgr Version 2.18.0.0

Serial number: 00045299
Firmware Version 7.05
Unit name: HERMIT 3000#2

Test name: REC-P45-4S

Test defined on: 05/05/00 09:35:52
Test started on: 05/05/00 09:57:49
Test stopped on: 05/05/00 10:09:56
Test extracted on: 05/12/00 11:28:52

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 123

TOTAL DATA SAMPLES 123

Channel number [4]
Measurement type: Pressure/Level
Channel name: PXD-260
Linearity: 0.2843000
Scale: 29.7417000
Offset: -0.0822000
Warmup: 50
Specific gravity: 1.000
Baro Reference: 1.000 PSI

Channel number [0]
Measurement type: Barometric Pressure
Channel name: Barometric
Linearity: 0.0000000
Scale: 0.0000000
Offset: 0.0000000
Warmup: 50

Date	Time	ET (min)	Chan[4] Meters H2O	Chan[0] Inches Hg
05/05/00	09:57:49	0.0000	11.078	30.129
05/05/00	09:57:49	0.0110	11.078	30.129
05/05/00	09:57:50	0.0220	11.078	30.129
05/05/00	09:57:50	0.0330	11.078	30.129
05/05/00	09:57:51	0.0440	11.078	30.129
05/05/00	09:57:52	0.0550	11.078	30.129
05/05/00	09:57:52	0.0660	11.078	30.131
05/05/00	09:57:53	0.0770	11.078	30.129
05/05/00	09:57:54	0.0880	11.076	30.127
05/05/00	09:57:54	0.0990	11.077	30.127
05/05/00	09:57:55	0.1100	11.077	30.127
05/05/00	09:57:56	0.1210	11.077	30.127
05/05/00	09:57:56	0.1320	11.078	30.129
05/05/00	09:57:57	0.1430	11.076	30.129
05/05/00	09:57:58	0.1540	11.078	30.129
05/05/00	09:57:58	0.1650	11.077	30.127
05/05/00	09:57:59	0.1760	11.076	30.129
05/05/00	09:58:00	0.1870	11.077	30.127
05/05/00	09:58:00	0.1980	11.076	30.127
05/05/00	09:58:01	0.2090	11.077	30.127
05/05/00	09:58:02	0.2200	11.077	30.127
05/05/00	09:58:02	0.2310	11.076	30.127
05/05/00	09:58:03	0.2427	11.076	30.127
05/05/00	09:58:04	0.2552	11.078	30.129

05/05/00	09:58:05	0.2683	11.077	30.127
05/05/00	09:58:05	0.2823	11.078	30.129
05/05/00	09:58:06	0.2972	11.078	30.129
05/05/00	09:58:07	0.3128	11.076	30.127
05/05/00	09:58:08	0.3295	11.077	30.127
05/05/00	09:58:09	0.3472	11.078	30.129
05/05/00	09:58:10	0.3658	11.077	30.127
05/05/00	09:58:12	0.3857	11.077	30.127
05/05/00	09:58:13	0.4067	11.077	30.127
05/05/00	09:58:14	0.4288	11.077	30.127
05/05/00	09:58:16	0.4523	11.077	30.127
05/05/00	09:58:17	0.4772	11.077	30.127
05/05/00	09:58:19	0.5035	11.075	30.125
05/05/00	09:58:20	0.5315	11.078	30.125
05/05/00	09:58:22	0.5612	11.078	30.129
05/05/00	09:58:24	0.5925	11.078	30.127
05/05/00	09:58:26	0.6257	11.079	30.129
05/05/00	09:58:28	0.6608	11.079	30.129
05/05/00	09:58:30	0.6982	11.080	30.127
05/05/00	09:58:33	0.7377	11.080	30.127
05/05/00	09:58:35	0.7795	11.080	30.127
05/05/00	09:58:38	0.8238	11.080	30.127
05/05/00	09:58:41	0.8708	11.080	30.125
05/05/00	09:58:44	0.9207	11.081	30.127
05/05/00	09:58:47	0.9733	11.080	30.125
05/05/00	09:58:50	1.0292	11.082	30.127
05/05/00	09:58:54	1.0883	11.082	30.127
05/05/00	09:58:58	1.1510	11.084	30.127
05/05/00	09:59:02	1.2173	11.084	30.127
05/05/00	09:59:06	1.2877	11.083	30.125
05/05/00	09:59:10	1.3622	11.084	30.125
05/05/00	09:59:15	1.4412	11.084	30.125
05/05/00	09:59:20	1.5248	11.084	30.125
05/05/00	09:59:25	1.6133	11.084	30.125
05/05/00	09:59:31	1.7072	11.084	30.123
05/05/00	09:59:37	1.8065	11.086	30.123
05/05/00	09:59:43	1.9118	11.086	30.123
05/05/00	09:59:50	2.0233	11.087	30.123
05/05/00	09:59:57	2.1415	11.087	30.123
05/05/00	10:00:05	2.2667	11.087	30.121
05/05/00	10:00:12	2.3992	11.085	30.121
05/05/00	10:00:21	2.5397	11.085	30.121
05/05/00	10:00:30	2.6885	11.087	30.121
05/05/00	10:00:39	2.8460	11.083	30.117
05/05/00	10:00:49	3.0127	11.087	30.129
05/05/00	10:00:59	3.1793	11.090	30.139
05/05/00	10:01:09	3.3460	11.095	30.149
05/05/00	10:01:19	3.5127	11.098	30.157
05/05/00	10:01:29	3.6793	11.099	30.159
05/05/00	10:01:39	3.8460	11.100	30.163
05/05/00	10:01:49	4.0127	11.101	30.165
05/05/00	10:01:59	4.1793	11.103	30.167
05/05/00	10:02:09	4.3460	11.104	30.171
05/05/00	10:02:19	4.5127	11.104	30.171
05/05/00	10:02:29	4.6793	11.106	30.176
05/05/00	10:02:39	4.8460	11.106	30.176
05/05/00	10:02:49	5.0127	11.108	30.182
05/05/00	10:02:59	5.1793	11.110	30.184
05/05/00	10:03:09	5.3460	11.111	30.186
05/05/00	10:03:19	5.5127	11.111	30.186
05/05/00	10:03:29	5.6793	11.113	30.190
05/05/00	10:03:39	5.8460	11.115	30.190
05/05/00	10:03:49	6.0127	11.113	30.190
05/05/00	10:03:59	6.1793	11.113	30.190
05/05/00	10:04:09	6.3460	11.115	30.194
05/05/00	10:04:19	6.5127	11.115	30.194
05/05/00	10:04:29	6.6793	11.114	30.192
05/05/00	10:04:39	6.8460	11.117	30.196
05/05/00	10:04:49	7.0127	11.116	30.194
05/05/00	10:04:59	7.1793	11.117	30.196

05/05/00	10:05:09	7.3460	11.117	30.196
05/05/00	10:05:19	7.5127	11.119	30.200
05/05/00	10:05:29	7.6793	11.119	30.198
05/05/00	10:05:39	7.8460	11.118	30.200
05/05/00	10:05:49	8.0127	11.117	30.198
05/05/00	10:05:59	8.1793	11.119	30.202
05/05/00	10:06:09	8.3460	11.118	30.200
05/05/00	10:06:19	8.5127	11.119	30.200
05/05/00	10:06:29	8.6793	11.121	30.202
05/05/00	10:06:39	8.8460	11.120	30.202
05/05/00	10:06:49	9.0127	11.120	30.202
05/05/00	10:06:59	9.1793	11.120	30.202
05/05/00	10:07:09	9.3460	11.120	30.202
05/05/00	10:07:19	9.5127	11.120	30.202
05/05/00	10:07:29	9.6793	11.122	30.206
05/05/00	10:07:39	9.8460	11.121	30.204
05/05/00	10:07:49	10.0127	11.121	30.204
05/05/00	10:07:59	10.1793	11.122	30.206
05/05/00	10:08:09	10.3460	11.123	30.206
05/05/00	10:08:19	10.5127	11.122	30.204
05/05/00	10:08:29	10.6793	11.123	30.206
05/05/00	10:08:39	10.8460	11.122	30.204
05/05/00	10:08:49	11.0127	11.122	30.204
05/05/00	10:08:59	11.1793	11.124	30.206
05/05/00	10:09:09	11.3460	11.125	30.204
05/05/00	10:09:19	11.5127	11.122	30.204
05/05/00	10:09:29	11.6793	11.126	30.208
05/05/00	10:09:39	11.8460	11.123	30.198
05/05/00	10:09:49	12.0127	11.119	30.188

IN_SITU INC. Hermit 3000

Report generated: 05/12/00 11:26:55
Report from file: C:\WINDOWS\TEMP\~bin2646.TMP
DataMgr Version 2.18.0.0

Serial number: 00045299
Firmware Version 7.05
Unit name: HERMIT 3000#2

Test name: DR-P45-4S

Test defined on: 05/05/00 09:32:33
Test started on: 05/05/00 09:43:32
Test stopped on: 05/05/00 09:57:25
Test extracted on: 05/12/00 11:26:48

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 134

TOTAL DATA SAMPLES 134

Channel number [4]
Measurement type: Pressure/Level
Channel name: PXD-260
Linearity: 0.2843000
Scale: 29.7417000
Offset: -0.0822000
Warmup: 50
Specific gravity: 1.000
Baro Reference: 1.000 PSI

Channel number [0]
Measurement type: Barometric Pressure
Channel name: Barometric
Linearity: 0.0000000
Scale: 0.0000000
Offset: 0.0000000
Warmup: 50

Date	Time	ET (min)	Chan[4] Meters H2O	Chan[0] Inches Hg
05/05/00	09:43:32	0.0000	11.243	30.110
05/05/00	09:43:32	0.0110	11.240	30.110
05/05/00	09:43:33	0.0220	11.241	30.112
05/05/00	09:43:33	0.0330	11.240	30.110
05/05/00	09:43:34	0.0440	11.240	30.110
05/05/00	09:43:35	0.0550	11.239	30.110
05/05/00	09:43:35	0.0660	11.242	30.110
05/05/00	09:43:36	0.0770	11.240	30.110
05/05/00	09:43:37	0.0880	11.242	30.112
05/05/00	09:43:37	0.0990	11.239	30.110
05/05/00	09:43:38	0.1100	11.242	30.112
05/05/00	09:43:39	0.1210	11.242	30.110
05/05/00	09:43:39	0.1320	11.242	30.110
05/05/00	09:43:40	0.1430	11.239	30.110
05/05/00	09:43:41	0.1540	11.242	30.110
05/05/00	09:43:41	0.1650	11.242	30.110
05/05/00	09:43:42	0.1760	11.242	30.110
05/05/00	09:43:43	0.1870	11.239	30.110
05/05/00	09:43:43	0.1980	11.242	30.110
05/05/00	09:43:44	0.2090	11.242	30.110
05/05/00	09:43:45	0.2200	11.240	30.110
05/05/00	09:43:45	0.2310	11.242	30.110
05/05/00	09:43:46	0.2427	11.241	30.108
05/05/00	09:43:47	0.2552	11.240	30.110

05/05/00	09:43:48	0.2683	11.240	30.110
05/05/00	09:43:48	0.2823	11.241	30.112
05/05/00	09:43:49	0.2972	11.242	30.110
05/05/00	09:43:50	0.3128	11.242	30.112
05/05/00	09:43:51	0.3295	11.242	30.110
05/05/00	09:43:52	0.3472	11.240	30.110
05/05/00	09:43:53	0.3658	11.242	30.110
05/05/00	09:43:55	0.3857	11.240	30.108
05/05/00	09:43:56	0.4067	11.241	30.108
05/05/00	09:43:57	0.4288	11.242	30.110
05/05/00	09:43:59	0.4523	11.242	30.110
05/05/00	09:44:00	0.4772	11.242	30.110
05/05/00	09:44:02	0.5035	11.240	30.110
05/05/00	09:44:03	0.5315	11.243	30.110
05/05/00	09:44:05	0.5612	11.242	30.110
05/05/00	09:44:07	0.5925	11.243	30.110
05/05/00	09:44:09	0.6257	11.243	30.110
05/05/00	09:44:11	0.6608	11.243	30.110
05/05/00	09:44:13	0.6982	11.244	30.112
05/05/00	09:44:16	0.7377	11.244	30.112
05/05/00	09:44:18	0.7795	11.243	30.110
05/05/00	09:44:21	0.8238	11.244	30.108
05/05/00	09:44:24	0.8708	11.244	30.110
05/05/00	09:44:27	0.9207	11.244	30.110
05/05/00	09:44:30	0.9733	11.244	30.110
05/05/00	09:44:33	1.0292	11.244	30.110
05/05/00	09:44:37	1.0883	11.244	30.110
05/05/00	09:44:41	1.1510	11.245	30.112
05/05/00	09:44:45	1.2173	11.244	30.110
05/05/00	09:44:49	1.2877	11.238	30.110
05/05/00	09:44:53	1.3622	11.227	30.110
05/05/00	09:44:58	1.4412	11.230	30.110
05/05/00	09:45:03	1.5248	11.225	30.108
05/05/00	09:45:08	1.6133	11.227	30.110
05/05/00	09:45:14	1.7072	11.217	30.108
05/05/00	09:45:20	1.8065	11.213	30.108
05/05/00	09:45:26	1.9118	11.214	30.110
05/05/00	09:45:33	2.0233	11.214	30.110
05/05/00	09:45:40	2.1415	11.208	30.110
05/05/00	09:45:48	2.2667	11.204	30.110
05/05/00	09:45:55	2.3992	11.201	30.110
05/05/00	09:46:04	2.5397	11.198	30.110
05/05/00	09:46:13	2.6885	11.192	30.110
05/05/00	09:46:22	2.8460	11.188	30.106
05/05/00	09:46:32	3.0127	11.194	30.121
05/05/00	09:46:42	3.1793	11.198	30.133
05/05/00	09:46:52	3.3460	11.195	30.141
05/05/00	09:47:02	3.5127	11.196	30.149
05/05/00	09:47:12	3.6793	11.191	30.153
05/05/00	09:47:22	3.8460	11.192	30.157
05/05/00	09:47:32	4.0127	11.187	30.161
05/05/00	09:47:42	4.1793	11.189	30.165
05/05/00	09:47:52	4.3460	11.189	30.167
05/05/00	09:48:02	4.5127	11.184	30.171
05/05/00	09:48:12	4.6793	11.184	30.171
05/05/00	09:48:22	4.8460	11.182	30.174
05/05/00	09:48:32	5.0127	11.182	30.176
05/05/00	09:48:42	5.1793	11.184	30.178
05/05/00	09:48:52	5.3460	11.178	30.180
05/05/00	09:49:02	5.5127	11.178	30.180
05/05/00	09:49:12	5.6793	11.173	30.180
05/05/00	09:49:22	5.8460	11.175	30.184
05/05/00	09:49:32	6.0127	11.174	30.184
05/05/00	09:49:42	6.1793	11.168	30.186
05/05/00	09:49:52	6.3460	11.168	30.186
05/05/00	09:50:02	6.5127	11.163	30.186
05/05/00	09:50:12	6.6793	11.163	30.186
05/05/00	09:50:22	6.8460	11.164	30.188
05/05/00	09:50:32	7.0127	11.165	30.188
05/05/00	09:50:42	7.1793	11.159	30.190

05/05/00	09:50:52	7.3460	11.160	30.188
05/05/00	09:51:02	7.5127	11.161	30.192
05/05/00	09:51:12	7.6793	11.160	30.190
05/05/00	09:51:22	7.8460	11.155	30.190
05/05/00	09:51:32	8.0127	11.156	30.192
05/05/00	09:51:42	8.1793	11.156	30.190
05/05/00	09:51:52	8.3460	11.157	30.192
05/05/00	09:52:02	8.5127	11.151	30.192
05/05/00	09:52:12	8.6793	11.151	30.190
05/05/00	09:52:22	8.8460	11.153	30.194
05/05/00	09:52:32	9.0127	11.146	30.194
05/05/00	09:52:42	9.1793	11.145	30.192
05/05/00	09:52:52	9.3460	11.146	30.194
05/05/00	09:53:02	9.5127	11.145	30.192
05/05/00	09:53:12	9.6793	11.141	30.194
05/05/00	09:53:22	9.8460	11.141	30.194
05/05/00	09:53:32	10.0127	11.141	30.194
05/05/00	09:53:42	10.1793	11.136	30.194
05/05/00	09:53:52	10.3460	11.134	30.194
05/05/00	09:54:02	10.5127	11.136	30.194
05/05/00	09:54:12	10.6793	11.136	30.196
05/05/00	09:54:22	10.8460	11.130	30.196
05/05/00	09:54:32	11.0127	11.132	30.196
05/05/00	09:54:42	11.1793	11.131	30.196
05/05/00	09:54:52	11.3460	11.134	30.200
05/05/00	09:55:02	11.5127	11.123	30.188
05/05/00	09:55:12	11.6793	11.121	30.178
05/05/00	09:55:22	11.8460	11.117	30.167
05/05/00	09:55:32	12.0127	11.115	30.161
05/05/00	09:55:42	12.1793	11.106	30.157
05/05/00	09:55:52	12.3460	11.107	30.153
05/05/00	09:56:02	12.5127	11.105	30.147
05/05/00	09:56:12	12.6793	11.104	30.143
05/05/00	09:56:22	12.8460	11.099	30.141
05/05/00	09:56:32	13.0127	11.098	30.139
05/05/00	09:56:42	13.1793	11.092	30.137
05/05/00	09:56:52	13.3460	11.092	30.135
05/05/00	09:57:02	13.5127	11.092	30.133
05/05/00	09:57:12	13.6793	11.087	30.133
05/05/00	09:57:22	13.8460	11.087	30.133

SPECAP DATA FOR WELL P45-7S

Tetra Tech NUS, Inc. **PUMPING TEST DATA SHEET**

PROJECT NAME: Site 45 RI Cecil
PROJECT NUMBER: N0639
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: C&F-P45-75

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00
MEASUREMENT METHOD: Hermit 2000 / W.L.
TEST NUMBER: DR-P45-7
STATIC WATER LEVEL (ft): ~~8.71~~ 8.72 MD
PERSONNEL: C. Walker, M. Dove
REMARKS:

MONITORING POINT:
DEPTH CORRECTION (ft): 0
PUMP SETTING (Ft. below monitoring point):
DISTANCE FROM PUMPING WELL (ft): N/A

MILITARY TIME HH:MM:SS	ELAPSED TIME SINCE PUMP START OR STOP (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	CUM. VOL. ~~FLOW METER READING (Gals.)~~ Liters	PUMPING RATE ~~(GPM)~~ ml/MIN	REMARKS
~~153~~		~~8.71~~ MD					~~Start~~
1533 30		8.72			0	0	delay, start
		8.73					
		8.74					
		8.75					
1533 40		8.76					
1533 43		8.77					
1533 ~~50~~		8.78					
1533 55		8.79					
1534 09		8.80					
1534 19		8.81					
1534 29		8.82					
1534 40		8.83					
1534 54		8.84					
1535 08		8.85					
1535 21		8.86					
1535 43		8.87					
1536 04		8.88				430	@ 13:35:52 = 1 liter
1536 25		8.89					
1536 44		8.90					1 liter / 2:00:5 =
1537 12		8.91					
1537 32		8.92					
1538 04		8.93					
1538 24		8.94					
1538 51		8.95					
1539 21		8.96					
1539 52		8.97					
1540 26		8.98					
1540 54		8.99					
1541 35		9.00					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

Tetra Tech NUS, Inc. **PUMPING TEST DATA SHEET**

PROJECT NAME: Site 45, RI Cont'd
PROJECT NUMBER: N0039
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-75

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00	MONITORING POINT:
MEASUREMENT METHOD: Hermit 2000 / W.L.I.	DEPTH CORRECTION (ft): 0
TEST NUMBER: DR-P45-7	PUMP SETTING (Ft. below monitoring point):
STATIC WATER LEVEL (ft): 8.72	DISTANCE FROM PUMPING WELL (ft): N/A
PERSONNEL: C. Waller, M. Dale	
REMARKS:	

MILITARY TIME HH:MM:SS	ELAPSED TIME SINCE PUMP START OR STOP (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	Cum. ~~FLOW METER READING (Gals.)~~ ~~VOL.~~ (Liters)	PUMPING RATE ~~(GPM)~~ ml/min	REMARKS
154204		9.01					
154238		9.02					
154318		9.03					
154337		9.04					
154415		9.05					
154440		9.06					
154544		9.08					
154613		9.09					
154635		9.10					
154707		9.11					
154733		9.12					
154758		9.13					
154853		9.15				430-450 ml/min	
154927		9.16					clearing up
155126		9.20					
155351		9.25					
155625		9.30					
155843		9.35					
		9.38					STEP TEST (1) stop pump
		9.37					
		9.36					Note: Hermit 2000 was synchronized with my watch.
160111		9.35					
		9.34					
		9.33					
		9.32					
		9.31					
		9.30					
		9.29					
160117		9.28					
		9.27					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

Tetra Tech NUS, Inc. **PUMPING TEST DATA SHEET**

PROJECT NAME: Site 45, RI Ceil
PROJECT NUMBER: N0039
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-7S

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00	MONITORING POINT:
MEASUREMENT METHOD: Hermit 2000, W.L. I	DEPTH CORRECTION (ft): 0
TEST NUMBER: DR-P45-7	PUMP SETTING (Ft. below monitoring point):
STATIC WATER LEVEL (ft): 8.72	DISTANCE FROM PUMPING WELL (ft): N/A
PERSONNEL: C. Weller, M. DAME	
REMARKS:	

MILITARY TIME	ELAPSED TIME SINCE PUMP START OR STOP (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	FLOW METER READING (Gals.)	PUMPING RATE (GPM)	REMARKS
	160125	9.26					
	160131	9.24					
	160135	9.22					
	160139	9.21					
	160145	9.20					
	160149	9.19					
	160154	9.18					
	160159	9.17					
	160211	9.16					
	160218	9.14					
	160223	9.13					
	160232	9.12					
	160238	9.11					
	160246	9.10					
	160252	9.09					
	160300	9.08					
	160308	9.07					
	160318	9.06					
	160325	9.05					
	160337	9.04					
	160344	9.03					
	160354	9.02					
	160405	9.01					
	160416	9.00					
	160429	8.99					
	160442	8.98					
	160456	8.97					
	160511	8.96					
	160520	8.95					
	160534	8.94					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

Tetra Tech NUS, Inc.

PUMPING TEST DATA SHEET

PROJECT NAME: Site 45, RI Cont'd
PROJECT NUMBER: N0039
PUMPING WELL NUMBER: N/A
MEASURED WELL NUMBER: CEF-P45-75

[ ] PUMPING TEST
[X] STEP DRAW DOWN TEST

DATE(s): 5/5/00	MONITORING POINT:
MEASUREMENT METHOD: Hermit 2000 / W.L.I.	DEPTH CORRECTION (ft): 0
TEST NUMBER: DR-P45-7	PUMP SETTING (Ft. below monitoring point):
STATIC WATER LEVEL (ft): 8.7	DISTANCE FROM PUMPING WELL (ft): N/A
PERSONNEL: C. Waller, M. Dale	
REMARKS:	

MILITARY TIME	ELAPSED TIME SINCE PUMP START OR STOP (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	FLOW METER READING (Gals.)	PUMPING RATE (GPM)	REMARKS
160551		8.93					
160608		8.92					
160630		8.91					
160644		8.90					
160710		8.89					
160736		8.88					
160806		8.87					
160829		8.86					
160910		8.85					
160939		8.84					
161037		8.83					
161119		8.82					
161208		8.81					
161259		8.80					
161418		8.79					
161543		8.78					
161718		8.77					
161933		8.76					
2252		8.75					

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

SE2000
Environmental Logger
05/12 15:30

Unit# 89613801 Test 1

Setups:	INPUT 1
Type	Level (F)
Mode	Surface
I.D.	DR-P45-7
Reference	0.000
PSI at Ref.	1.025
SG	1.000
Linearity	0.284
Scale factor	29.471
Offset	-0.082
Delay mSEC	50.000

Step 1 05/05 16:01:08

Elapsed Time	INPUT 1
0.0000	-0.603
0.0083	-0.603
0.0166	-0.603
0.0250	-0.603
0.0333	-0.603
0.0416	-0.603
0.0500	-0.603
0.0583	-0.603
0.0666	-0.603
0.0750	-0.603
0.0833	-0.603
0.0916	-0.603
0.1000	-0.603
0.1083	-0.594
0.1166	-0.603
0.1250	-0.603
0.1333	-0.603
0.1416	-0.603
0.1500	-0.603
0.1583	-0.603
0.1666	-0.603
0.1750	-0.603
0.1833	-0.603
0.1916	-0.603
0.2000	-0.603
0.2083	-0.603
0.2166	-0.603
0.2250	-0.603
0.2333	-0.603
0.2416	-0.603
0.2500	-0.603
0.2583	-0.594
0.2666	-0.603
0.2750	-0.603
0.2833	-0.603
0.2916	-0.603

0.3000	-0.594
0.3083	-0.603
0.3166	-0.594
0.3250	-0.603
0.3333	-0.594
0.3500	-0.594
0.3666	-0.603
0.3833	-0.594
0.4000	-0.594
0.4166	-0.594
0.4333	-0.594
0.4500	-0.603
0.4666	-0.603
0.4833	-0.594
0.5000	-0.594
0.5166	-0.603
0.5333	-0.594
0.5500	-0.594
0.5666	-0.594
0.5833	-0.594
0.6000	-0.594
0.6166	-0.603
0.6333	-0.594
0.6500	-0.594
0.6666	-0.603
0.6833	-0.594
0.7000	-0.594
0.7166	-0.594
0.7333	-0.594
0.7500	-0.594
0.7666	-0.594
0.7833	-0.594
0.8000	-0.594
0.8166	-0.594
0.8333	-0.594
0.8500	-0.594
0.8666	-0.603
0.8833	-0.594
0.9000	-0.603
0.9166	-0.594
0.9333	-0.594
0.9500	-0.594
0.9666	-0.594
0.9833	-0.594
1.0000	-0.594
1.2000	-0.594
1.4000	-0.594
1.6000	-0.603
1.8000	-0.603
2.0000	-0.594
2.2000	-0.594
2.4000	-0.594
2.6000	-0.594
2.8000	-0.585
3.0000	-0.594
3.2000	-0.594
3.4000	-0.585
3.6000	-0.585
3.8000	-0.585
4.0000	-0.585
4.2000	-0.585

4.4000	-0.585
4.6000	-0.585
4.8000	-0.585
5.0000	-0.585
5.2000	-0.575
5.4000	-0.585
5.6000	-0.585
5.8000	-0.585
6.0000	-0.585
6.2000	-0.575
6.4000	-0.575
6.6000	-0.585
6.8000	-0.585
7.0000	-0.585
7.2000	-0.585
7.4000	-0.585
7.6000	-0.575
7.8000	-0.575
8.0000	-0.585
8.2000	-0.566
8.4000	-0.575
8.6000	-0.566
8.8000	-0.575
9.0000	-0.575
9.2000	-0.566
9.4000	-0.566
9.6000	-0.566
9.8000	-0.566
10.0000	-0.566
12.0000	-0.575
14.0000	-0.575
16.0000	-0.566
18.0000	-0.557
20.0000	-0.548

SE2000
Environmental Logger
05/12 15:28

Unit# 89613801 Test 1

Setups:	INPUT 1
Type	Level (F)
Mode	Surface
I.D.	DR-P45-7
Reference	0.000
PSI at Ref.	1.025
SG	1.000
Linearity	0.284
Scale factor	29.471
Offset	-0.082
Delay mSEC	50.000

Step 0 05/05 15:33:30

Elapsed Time	INPUT 1
0.0000	-0.027
0.0083	-0.027
0.0166	-0.027
0.0250	-0.027
0.0333	-0.027
0.0416	-0.027
0.0500	-0.027
0.0583	-0.027
0.0666	-0.027
0.0750	-0.027
0.0833	-0.027
0.0916	-0.027
0.1000	-0.018
0.1083	-0.037
0.1166	-0.037
0.1250	-0.037
0.1333	-0.037
0.1416	-0.037
0.1500	-0.037
0.1583	-0.037
0.1666	-0.037
0.1750	-0.046
0.1833	-0.055
0.1916	-0.046
0.2000	-0.055
0.2083	-0.046
0.2166	-0.046
0.2250	-0.046
0.2333	-0.046
0.2416	-0.046
0.2500	-0.046
0.2583	-0.046
0.2666	-0.046
0.2750	-0.046
0.2833	-0.046
0.2916	-0.046

0.3000	-0.046
0.3083	-0.055
0.3166	-0.065
0.3250	-0.055
0.3333	-0.074
0.3500	-0.074
0.3666	-0.074
0.3833	-0.074
0.4000	-0.074
0.4166	-0.074
0.4333	-0.074
0.4500	-0.074
0.4666	-0.074
0.4833	-0.074
0.5000	-0.074
0.5166	-0.074
0.5333	-0.074
0.5500	-0.074
0.5666	-0.074
0.5833	-0.074
0.6000	-0.074
0.6166	-0.065
0.6333	-0.074
0.6500	-0.083
0.6666	-0.083
0.6833	-0.074
0.7000	-0.083
0.7166	-0.083
0.7333	-0.083
0.7500	-0.083
0.7666	-0.083
0.7833	-0.083
0.8000	-0.083
0.8166	-0.083
0.8333	-0.083
0.8500	-0.083
0.8666	-0.083
0.8833	-0.083
0.9000	-0.083
0.9166	-0.102
0.9333	-0.102
0.9500	-0.092
0.9666	-0.092
0.9833	-0.092
1.0000	-0.092
1.2000	-0.111
1.4000	-0.111
1.6000	-0.120
1.8000	-0.139
2.0000	-0.130
2.2000	-0.148
2.4000	-0.148
2.6000	-0.157
2.8000	-0.157
3.0000	-0.167
3.2000	-0.167
3.4000	-0.185
3.6000	-0.185
3.8000	-0.185
4.0000	-0.195
4.2000	-0.185

4.4000	-0.204
4.6000	-0.213
4.8000	-0.213
5.0000	-0.232
5.2000	-0.222
5.4000	-0.222
5.6000	-0.222
5.8000	-0.241
6.0000	-0.241
6.2000	-0.241
6.4000	-0.250
6.6000	-0.260
6.8000	-0.269
7.0000	-0.269
7.2000	-0.260
7.4000	-0.269
7.6000	-0.269
7.8000	-0.269
8.0000	-0.269
8.2000	-0.269
8.4000	-0.278
8.6000	-0.269
8.8000	-0.287
9.0000	-0.287
9.2000	-0.297
9.4000	-0.297
9.6000	-0.297
9.8000	-0.306
10.0000	-0.306
12.0000	-0.352
14.0000	-0.399
16.0000	-0.445
18.0000	-0.473
20.0000	-0.510
22.0000	-0.548
24.0000	-0.603
26.0000	-0.622

APPENDIX D

DATABASE

GROUNDWATER DATA PRIOR TO APRIL 2000

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	43G00101 [02/22/96]	45G00101 [02/22/96]	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-01S-02-AVG	CEF-11-01S-02-D	CEF-11-01S-02-F	CEF-11-01S-02-F-AVG
sample	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03	CEF-11-DU03	CEF-11-01S-02-F	CEF-11-DU03-F
gis_date	19960222	19960222	19981028	19981028	19991014	19991014	19991014	19991014	19991014
Volatiles (ug/L)									
1,1,1-TRICHLOROETHANE	1 U	1 U			1 U	1 U	1 U		
1,1,2,2-TETRACHLOROETHANE	1 U	1 U			1 U	1 U	1 U		
1,1,2-TRICHLOROETHANE	1 U	1 U			1 U	1 U	1 U		
1,1-DICHLOROETHANE	1 U	1 U			1 U	1 U	1 U		
1,1-DICHLOROETHENE	1 U	1 U			1 U	1 U	1 U		
1,2-DIBROMOETHANE					1 U	1 U	1 U		
1,2-DICHLOROBENZENE					1 U	1 U	1 U		
1,2-DICHLOROETHANE	1 U	1 U			1 U	1 U	1 U		
1,2-DICHLOROETHENE(TOTAL)	1 U	2							
1,2-DICHLOROPROPANE	1 U	1 U			1 U	1 U	1 U		
1,3-DICHLOROBENZENE					1 U	1 U	1 U		
1,4-DICHLOROBENZENE					1 U	1 U	1 U		
2-BUTANONE	2 U	2 U							
2-CHLOROETHYLVINYLETHER					1 U	1 U	1 U		
2-HEXANONE	2 U	2 U							
4-METHYL-2-PENTANONE	2 U	2 U							
ACETONE	2 U	2 U							
BENZENE	1 U	1 U			1 U	1 U	1 U		
BROMODICHLOROMETHANE	1 U	1 U			1 U	1 U	1 U		
BROMOFORM	1 U	1 U			1 U	1 U	1 U		
BROMOMETHANE	2 U	2 U			1 U	1 U	1 U		
CARBONDISULFIDE	1 U	1 U							
CARBONTETRACHLORIDE	1 U	1 U			1 U	1 U	1 U		
CHLOROBENZENE	1 U	1 U			1 U	1 U	1 U		
CHLOROETHANE	2 U	2 U			1 U	1 U	1 U		
CHLOROFORM	1 U	1 U			1 U	1 U	1 U		
CHLOROMETHANE	2 U	2 U			1 U	1 U	1 U		
CIS-1,2-DICHLOROETHENE					1 U	1 U	1 U		
CIS-1,3-DICHLOROPROPENE	1 U	1 U			1 U	1 U	1 U		
DIBROMOCHLOROMETHANE	1 U	1 U			1 U	1 U	1 U		
DICHLORODIFLUOROMETHANE					1 UR	1 UR	1 UR		
ETHYLBENZENE	1 U	1 U			1 U	1 U	1 U		
METHYLTERT-BUTYLETHER					1 U	1 U	1 U		
METHYLENECHLORIDE	1 U	1 U			5 U	5 U	5 U		
STYRENE	1 U	1 U							
TETRACHLOROETHENE	1 U	1 U			1 U	1 U	1 U		
TOLUENE	1 U	1 U			1 U	1 U	1 U		
TRANS-1,2-DICHLOROETHENE					1 U	1 U	1 U		
TRANS-1,3-DICHLOROPROPENE	1 U	1 U			1 U	1 U	1 U		
TRICHLOROETHENE	1 U	1			1 U	1 U	1 U		
TRICHLOROFLUOROMETHANE					1 U	1 U	1 U		
VINYLCHLORIDE	2 U	2 U			1 U	1 U	1 U		
XYLENES,TOTAL	1 U	1 U			3 U	3 U	3 U		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	43G00101 [02/22/96]	45G00101 [02/22/96]	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-01S-02-AVG	CEF-11-01S-02-D	CEF-11-01S-02-F	CEF-11-01S-02-F-AVG
sample	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03	CEF-11-DU03	CEF-11-01S-02-F	CEF-11-DU03-F
gis_date	19960222	19960222	19981028	19981028	19991014	19991014	19991014	19991014	19991014
Semivolatiles (ug/L)									
1,2,4-TRICHLOROBENZENE	10 U	10 U							
1,2-DICHLOROBENZENE	10 U	10 U							
1,3-DICHLOROBENZENE	10 U	10 U							
1,4-DICHLOROBENZENE	10 U	10 U							
1-METHYLNAPHTHALENE					1.5	1.4	1.3		
2,2'-OXYBIS(1-CHLOROPROPANE)	10 U	10 U							
2,4,5-TRICHLOROPHENOL	25 U	25 U							
2,4,6-TRICHLOROPHENOL	10 U	10 U							
2,4-DICHLOROPHENOL	10 U	10 U							
2,4-DIMETHYLPHENOL	10 U	10 U							
2,4-DINITROPHENOL	25 U	25 U							
2,4-DINITROTOLUENE	10 U	10 U							
2,6-DINITROTOLUENE	10 U	10 U							
2-CHLORONAPHTHALENE	10 U	10 U							
2-CHLOROPHENOL	10 U	10 U							
2-METHYLNAPHTHALENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
2-METHYLPHENOL	10 U	10 U							
2-NITROANILINE	25 U	25 U							
2-NITROPHENOL	10 U	10 U							
3,3'-DICHLOROBENZIDINE	10 U	10 U							
3-NITROANILINE	25 U	25 U							
4,6-DINITRO-2-METHYLPHENOL	25 U	25 U							
4-BROMOPHENYL PHENYL ETHER	10 U	10 U							
4-CHLORO-3-METHYLPHENOL	10 U	10 U							
4-CHLOROANILINE	10 U	10 U							
4-CHLOROPHENYL PHENYL ETHER	10 U	10 U							
4-METHYLPHENOL	10 U	10 U							
4-NITROANILINE	25 U	25 U							
4-NITROPHENOL	25 U	25 U							

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	43G00101 [02/22/96]	45G00101 [02/22/96]	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-01S-02-AVG	CEF-11-01S-02-D	CEF-11-01S-02-F	CEF-11-01S-02-F-AVG
sample	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03	CEF-11-DU03	CEF-11-01S-02-F	CEF-11-DU03-F
gis_date	19960222	19960222	19981028	19981028	19991014	19991014	19991014	19991014	19991014
ACENAPHTHENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
ACENAPHTHYLENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
ANTHRACENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
BENZO(A)ANTHRACENE	10 U	10 U			0.16 J	0.12	0.16 UJ		
BENZO(A)PYRENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
BENZO(B)FLUORANTHENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
BENZO(G,H,I)PERYLENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
BENZO(K)FLUORANTHENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
BIS(2-CHLOROETHOXY)METHANE	10 U	10 U							
BIS(2-CHLOROETHYL)ETHER	10 U	10 U							
BIS(2-ETHYLHEXYL)PHTHALATE	10 U	10 U							
BUTYLBENZYL PHTHALATE	10 U	10 U							
CARBAZOLE	10 U	10 U							
CHRYSENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
DI-N-BUTYL PHTHALATE	10 U	10 U							
DI-N-OCTYL PHTHALATE	10 U	10 U							
DIBENZO(A,H)ANTHRACENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
DIBENZOFURAN	10 U	10 U							
DIETHYL PHTHALATE	10 U	10 U							
DIMETHYL PHTHALATE	10 U	10 U							
FLUORANTHENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
FLUORENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
HEXACHLOROBENZENE	10 U	10 U							
HEXACHLOROBUTADIENE	10 U	10 U							
HEXACHLOROCYCLOPENTADIENE	10 U	10 U							
HEXACHLOROETHANE	10 U	10 U							
INDENO(1,2,3-CD)PYRENE	10 U	10 U			0.16 U	0.16 U	0.16 U		
ISOPHORONE	10 U	10 U							
N-NITROSO-DI-N-PROPYLAMINE	10 U	10 U							
N-NITROSODIPHENYLAMINE	10 U	10 U							
NAPHTHALENE	10 U	10 U			1.1 U	1.1 U	1.1 U		
NITROBENZENE	10 U	10 U							
PENTACHLOROPHENOL	25 U	25 U							
PHENANTHRENE	10 U	10 U			1.3	1.25	1.2		
PHENOL	10 U	10 U							
PYRENE	10 U	10 U			1.1 U	1.1 U	1.1 U		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	43G00101 [02/22/96]	45G00101 [02/22/96]	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-01S-02-AVG	CEF-11-01S-02-D	CEF-11-01S-02-F	CEF-11-01S-02-F-AVG
sample	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03	CEF-11-DU03	CEF-11-01S-02-F	CEF-11-DU03-F
gis_date	19960222	19960222	19981028	19981028	19991014	19991014	19991014	19991014	19991014
Pesticide/PCBs (ug/L)									
4,4'-DDD	0.1 U	0.1 U							
4,4'-DDE	0.1 U	0.1 U							
4,4'-DDT	0.1 U	0.1 U							
ALDRIN	0.05 U	0.05 U							
ALPHA-BHC	0.05 U	0.05 U							
ALPHA-CHLORDANE	0.05 U	0.05 U							
AROCLOR-1016	1 U	1 U							
AROCLOR-1221	2 U	2 U							
AROCLOR-1232	1 U	1 U							
AROCLOR-1242	1 U	1 U							
AROCLOR-1248	1 U	1 U							
AROCLOR-1254	1 U	1 U							
AROCLOR-1260	1 U	1 U							
BETA-BHC	0.05 U	0.05 U							
DELTA-BHC	0.05 U	0.05 U							
DIELDRIN	0.1 U	0.1 U							
ENDOSULFANI	0.05 U	0.05 U							
ENDOSULFANII	0.1 U	0.1 U							
ENDOSULFANSULFATE	0.1 U	0.1 U							
ENDRIN	0.1 U	0.1 U							
ENDRINALDEHYDE	0.1 U	0.1 U							
ENDRINKETONE	0.1 U	0.1 U							
GAMMA-BHC(LINDANE)	0.05 U	0.05 U							
GAMMA-CHLORDANE	0.05 U	0.05 U							
HEPTACHLOR	0.05 U	0.05 U							
HEPTACHLOREPOXIDE	0.05 U	0.05 U							
METHOXYCHLOR	0.5 U	0.5 U							
TOXAPHENE	5 U	5 U							

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-007-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01Sa	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S	CEF-011-01S
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW
nsample	43G00101 [02/22/96]	45G00101 [02/22/96]	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-01S-02-AVG	CEF-11-01S-02-D	CEF-11-01S-02-F	CEF-11-01S-02-F-AVG
sample	43G00101	45G00101	45G00102	45G00102-F	CEF-11-01S-02	CEF-11-DU03	CEF-11-DU03	CEF-11-01S-02-F	CEF-11-DU03-F
gis_date	19960222	19960222	19981028	19981028	19991014	19991014	19991014	19991014	19991014
Inorganics (ug/L)									
ALUMINUM	3530	14300	260	310					
ANTIONY	2 U	2.2							
ARSENIC	3 U	3 U							
BARIUM	10.1	13.8							
BERYLLIUM	1 U	1 U							
CADIUM	1 U	1 U							
CALCIUM	53000	28700							
CHROMIUM	4.3	29.7							
COBALT	2 U	2 U							
COPPER	4.9	18.4							
CYANIDE	4.5	2.2							
IRON	218	1470							
LEAD	2 U	9.7			1.6 U	1.6 U	1.6 U		
MAGNESIUM	1310	3100							
MANGANESE	5.6	101	59	62					
ERCURY	0.2 U	0.2 U							
NICKEL	2 U	16.5							
POTASSIUM	1050	3140							
SELENIUM	3 U	5.8							
SILVER	1 U	1 U							
SODIUM	12300	235000	44000	35000					
THALLIUM	4 U	4 U							
VANADIUM	147	195	740	720	3.1 U	3.05 U	3 U		
ZINC	6.2	40.3							
Petroleum Hydrocarboons (mg/L)									
TPH (C8-C40)	0.5 U	0.5 U			1.33	1.295	1.26		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-011-01S	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S
matrix	GW	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-11-01S-02-F-D	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-02S-1-AVG	CEF-P45-GW-02S-1-D
sample	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-DU01
gis_date	19991014	19990714	19990714	19990715	19990715	19990715	19990715	19990715
Volatiles (ug/L)								
1,1,1-TRICHLOROETHANE								
1,1,2,2-TETRACHLOROETHANE								
1,1,2-TRICHLOROETHANE								
1,1-DICHLOROETHANE								
1,1-DICHLOROETHENE								
1,2-DIBROMOETHANE								
1,2-DICHLOROBENZENE								
1,2-DICHLOROETHANE								
1,2-DICHLOROETHENE(TOTAL)								
1,2-DICHLOROPROPANE								
1,3-DICHLOROBENZENE								
1,4-DICHLOROBENZENE								
2-BUTANONE								
2-CHLOROETHYLVINYLETHER								
2-HEXANONE								
4-METHYL-2-PENTANONE								
ACETONE								
BENZENE								
BROMODICHLOROMETHANE								
BROMOFORM								
BROMOMETHANE								
CARBONDISULFIDE								
CARBONTETRACHLORIDE								
CHLOROBENZENE								
CHLOROETHANE								
CHLOROFORM								
CHLOROMETHANE								
CIS-1,2-DICHLOROETHENE								
CIS-1,3-DICHLOROPROPENE								
DIBROMOCHLOROMETHANE								
DICHLORODIFLUOROMETHANE								
ETHYLBENZENE								
METHYLTERT-BUTYLETHER								
METHYLENECHLORIDE								
STYRENE								
TETRACHLOROETHENE								
TOLUENE								
TRANS-1,2-DICHLOROETHENE								
TRANS-1,3-DICHLOROPROPENE								
TRICHLOROETHENE								
TRICHLOROFLUOROMETHANE								
VINYLCHLORIDE								
XYLENES,TOTAL								

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-011-01S	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S
matrix	GW	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-11-01S-02-F-D	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-02S-1-AVG	CEF-P45-GW-02S-1-D
sample	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-DU01
gis_date	19991014	19990714	19990714	19990715	19990715	19990715	19990715	19990715
Semivolatiles (ug/L)								
1,2,4-TRICHLOROBENZENE								
1,2-DICHLOROBENZENE								
1,3-DICHLOROBENZENE								
1,4-DICHLOROBENZENE								
1-METHYLNAPHTHALENE		1 U		1 U		1 U	1 U	1 U
2,2'-OXYBIS(1-CHLOROPROPANE)								
2,4,5-TRICHLOROPHENOL								
2,4,6-TRICHLOROPHENOL								
2,4-DICHLOROPHENOL								
2,4-DIMETHYLPHENOL								
2,4-DINITROPHENOL								
2,4-DINITROTOLUENE								
2,6-DINITROTOLUENE								
2-CHLORONAPHTHALENE								
2-CHLOROPHENOL								
2-METHYLNAPHTHALENE		1 U		1 U		1 U	1 U	1 U
2-METHYLPHENOL								
2-NITROANILINE								
2-NITROPHENOL								
3,3'-DICHLOROBENZIDINE								
3-NITROANILINE								
4,6-DINITRO-2-METHYLPHENOL								
4-BROMOPHENYL PHENYL ETHER								
4-CHLORO-3-METHYLPHENOL								
4-CHLOROANILINE								
4-CHLOROPHENYL PHENYL ETHER								
4-METHYLPHENOL								
4-NITROANILINE								
4-NITROPHENOL								

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-011-01S	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S
matrix	GW	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-11-01S-02-F-D	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-02S-1-AVG	CEF-P45-GW-02S-1-D
sample	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-DU01
gis_date	19991014	19990714	19990714	19990715	19990715	19990715	19990715	19990715
ACENAPHTHENE		1 U		1 U		1 U	1 U	1 U
ACENAPHTHYLENE		2 U		2 U		2 U	2 U	2 U
ANTHRACENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
BENZO(A)ANTHRACENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
BENZO(A)PYRENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
BENZO(B)FLUORANTHENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
BENZO(G,H,I)PERYLENE		0.2 U		0.2 U		0.2 U	0.2 U	0.2 U
BENZO(K)FLUORANTHENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
BIS(2-CHLOROETHOXY)METHANE								
BIS(2-CHLOROETHYL)ETHER								
BIS(2-ETHYLHEXYL)PHTHALATE								
BUTYLBENZYL PHTHALATE								
CARBAZOLE								
CHRYSENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
DI-N-BUTYL PHTHALATE								
DI-N-OCTYL PHTHALATE								
DIBENZO(A,H)ANTHRACENE		0.25 U		0.25 U		0.25 U	0.25 U	0.25 U
DIBENZOFURAN								
DIETHYL PHTHALATE								
DIMETHYL PHTHALATE								
FLUORANTHENE		0.2 U		0.2 U		0.2 U	0.2 U	0.2 U
FLUORENE		0.2 U		0.2 U		0.2 U	0.2 U	0.2 U
HEXACHLOROBENZENE								
HEXACHLOROBUTADIENE								
HEXACHLOROCYCLOPENTADIENE								
HEXACHLOROETHANE								
INDENO(1,2,3-CD)PYRENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
ISOPHORONE								
N-NITROSO-DI-N-PROPYLAMINE								
N-NITROSODIPHENYLAMINE								
NAPHTHALENE		1 U		1 U		1 U	1 U	1 U
NITROBENZENE								
PENTACHLOROPHENOL								
PHENANTHRENE		0.15 U		0.15 U		0.15 U	0.15 U	0.15 U
PHENOL								
PYRENE		0.2 U		0.2 U		0.2 U	0.2 U	0.2 U

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-011-01S	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S
matrix	GW	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-11-01S-02-F-D	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-02S-1-AVG	CEF-P45-GW-02S-1-D
sample	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-DU01
gis_date	19991014	19990714	19990714	19990715	19990715	19990715	19990715	19990715
Pesticide/PCBs (ug/L)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALDRIN								
ALPHA-BHC								
ALPHA-CHLORDANE								
AROCLOR-1016								
AROCLOR-1221								
AROCLOR-1232								
AROCLOR-1242								
AROCLOR-1248								
AROCLOR-1254								
AROCLOR-1260								
BETA-BHC								
DELTA-BHC								
DIELDRIN								
ENDOSULFANI								
ENDOSULFANII								
ENDOSULFANSULFATE								
ENDRIN								
ENDRINALDEHYDE								
ENDRINKETONE								
GAMMA-BHC(LINDANE)								
GAMMA-CHLORDANE								
HEPTACHLOR								
HEPTACHLOREPOXIDE								
METHOXYCHLOR								
TOXAPHENE								

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-011-01S	CEF-P45-01S	CEF-P45-01S	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S
matrix	GW	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-11-01S-02-F-D	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-02S-1-AVG	CEF-P45-GW-02S-1-D
sample	CEF-11-DU03-F	CEF-P45-GW-01S-1	CEF-P45-GW-01S-1-F	CEF-P45-GW-01SA-1	CEF-P45-GW-01SA-1-F	CEF-P45-GW-02S-1	CEF-P45-GW-DU01	CEF-P45-GW-DU01
gis_date	19991014	19990714	19990714	19990715	19990715	19990715	19990715	19990715
Inorganics (ug/L)								
ALUMINUM		3340	303	943	392	2160	2245	2330
ANTIONY		2.4 U	2.4 U	3.1 U	2.4 U	2.4 U	2.4 U	2.4 U
ARSENIC		3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U
BARIUM		16	12.4	13.5	12.8	18.5	18.15	17.8
BERYLLIUM		1.2 U	0.99 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U
CADIUM		0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
CALCIUM		35900	34700	59600	62400	53200	51200	49200
CHROMIUM		4.8 U	83	19.2	1.4 U	4.1 U	5.95 U	7.8 U
COBALT		1.6	2	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
COPPER		0.88	8	2.6	0.84	3.1	2.7	2.3
CYANIDE								
IRON		1060	900	32 U	32 U	32 U	32 U	32 U
LEAD		5 U	18.8	3.9 U	3.2 U	13.1	7.5	3.8 U
MAGNESIUM		1140	1110	765	818	2310	2220	2130
MANGANESE		25.3	34.4	3.4 U	1.4 U	3.7	3.95	4.2
ERCURY		0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
NICKEL		3 U	31.4	7.4 U	1 U	3.1 U	3.55 U	4 U
POTASSIUM		1810	1720	660	888	9950	10125	10300
SELENIUM		2 U	2.8 U	8.1 U	8.9 U	2 U	2.25 U	2.5 U
SILVER		0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U
SODIUM		3750	3650	1550	1660	16500	16700	16900
THALLIUM		2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U
VANADIUM		31.4	30	695	744	290	280.5	271
ZINC		28.6	18.8 U	31.4	23.4 U	25.2	18.025	21.7 U
Petroleum Hydrocarboons (mg/L)								
TPH (C8-C40)		0.5 U		0.5 U		0.5 U	0.5 U	0.5 U

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S	CEF-P45-04S	CEF-P45-05S
matrix	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-P45-GW-02S-1-F	CEF-P45-GW-02S-1-F-AVG	CEF-P45-GW-02S-1-F-D	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
sample	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
gis_date	19990715	19990715	19990715	19990714	19990714	19990909	19990909
Volatiles (ug/L)							
1,1,1-TRICHLOROETHANE							
1,1,2,2-TETRACHLOROETHANE							
1,1,2-TRICHLOROETHANE							
1,1-DICHLOROETHANE							
1,1-DICHLOROETHENE							
1,2-DIBROMOETHANE							
1,2-DICHLOROBENZENE							
1,2-DICHLOROETHANE							
1,2-DICHLOROETHENE(TOTAL)							
1,2-DICHLOROPROPANE							
1,3-DICHLOROBENZENE							
1,4-DICHLOROBENZENE							
2-BUTANONE							
2-CHLOROETHYLVINYLETHER							
2-HEXANONE							
4-METHYL-2-PENTANONE							
ACETONE							
BENZENE							
BROMODICHLOROMETHANE							
BROMOFORM							
BROMOMETHANE							
CARBONDISULFIDE							
CARBONTETRACHLORIDE							
CHLOROBENZENE							
CHLOROETHANE							
CHLOROFORM							
CHLOROMETHANE							
CIS-1,2-DICHLOROETHENE							
CIS-1,3-DICHLOROPROPENE							
DIBROMOCHLOROMETHANE							
DICHLORODIFLUOROMETHANE							
ETHYLBENZENE							
METHYLTERT-BUTYLETHER							
METHYLENECHLORIDE							
STYRENE							
TETRACHLOROETHENE							
TOLUENE							
TRANS-1,2-DICHLOROETHENE							
TRANS-1,3-DICHLOROPROPENE							
TRICHLOROETHENE							
TRICHLOROFLUOROMETHANE							
VINYLCHLORIDE							
XYLENES,TOTAL							

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S	CEF-P45-04S	CEF-P45-05S
matrix	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-P45-GW-02S-1-F	CEF-P45-GW-02S-1-F-AVG	CEF-P45-GW-02S-1-F-D	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
sample	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
gis_date	19990715	19990715	19990715	19990714	19990714	19990909	19990909
Semivolatiles (ug/L)							
1,2,4-TRICHLOROBENZENE							
1,2-DICHLOROBENZENE							
1,3-DICHLOROBENZENE							
1,4-DICHLOROBENZENE							
1-METHYLNAPHTHALENE				1 U			
2,2'-OXYBIS(1-CHLOROPROPANE)							
2,4,5-TRICHLOROPHENOL							
2,4,6-TRICHLOROPHENOL							
2,4-DICHLOROPHENOL							
2,4-DIMETHYLPHENOL							
2,4-DINITROPHENOL							
2,4-DINITROTOLUENE							
2,6-DINITROTOLUENE							
2-CHLORONAPHTHALENE							
2-CHLOROPHENOL							
2-METHYLNAPHTHALENE				1 U			
2-METHYLPHENOL							
2-NITROANILINE							
2-NITROPHENOL							
3,3'-DICHLOROBENZIDINE							
3-NITROANILINE							
4,6-DINITRO-2-METHYLPHENOL							
4-BROMOPHENYL PHENYL ETHER							
4-CHLORO-3-METHYLPHENOL							
4-CHLOROANILINE							
4-CHLOROPHENYL PHENYL ETHER							
4-METHYLPHENOL							
4-NITROANILINE							
4-NITROPHENOL							

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S	CEF-P45-04S	CEF-P45-05S
matrix	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-P45-GW-02S-1-F	CEF-P45-GW-02S-1-F-AVG	CEF-P45-GW-02S-1-F-D	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
sample	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
gis_date	19990715	19990715	19990715	19990714	19990714	19990909	19990909
ACENAPHTHENE				1 U			
ACENAPHTHYLENE				2 U			
ANTHRACENE				0.15 U			
BENZO(A)ANTHRACENE				0.15 U			
BENZO(A)PYRENE				0.15 U			
BENZO(B)FLUORANTHENE				0.15 U			
BENZO(G,H,I)PERYLENE				0.2 U			
BENZO(K)FLUORANTHENE				0.15 U			
BIS(2-CHLOROETHOXY)METHANE							
BIS(2-CHLOROETHYL)ETHER							
BIS(2-ETHYLHEXYL)PHTHALATE							
BUTYLBENZYL PHTHALATE							
CARBAZOLE							
CHRYSENE				0.15 U			
DI-N-BUTYL PHTHALATE							
DI-N-OCTYL PHTHALATE							
DIBENZO(A,H)ANTHRACENE				0.25 U			
DIBENZOFURAN							
DIETHYL PHTHALATE							
DIMETHYL PHTHALATE							
FLUORANTHENE				0.2 U			
FLUORENE				0.2 U			
HEXACHLOROBENZENE							
HEXACHLOROBUTADIENE							
HEXACHLOROCYCLOPENTADIENE							
HEXACHLOROETHANE							
INDENO(1,2,3-CD)PYRENE				0.15 U			
ISOPHORONE							
N-NITROSO-DI-N-PROPYLAMINE							
N-NITROSODIPHENYLAMINE							
NAPHTHALENE				1 U			
NITROBENZENE							
PENTACHLOROPHENOL							
PHENANTHRENE				0.15 U			
PHENOL							
PYRENE				0.2 U			

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S	CEF-P45-04S	CEF-P45-05S
matrix	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-P45-GW-02S-1-F	CEF-P45-GW-02S-1-F-AVG	CEF-P45-GW-02S-1-F-D	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
sample	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
gis_date	19990715	19990715	19990715	19990714	19990714	19990909	19990909
Pesticide/PCBs (ug/L)							
4,4'-DDD							
4,4'-DDE							
4,4'-DDT							
ALDRIN							
ALPHA-BHC							
ALPHA-CHLORDANE							
AROCLOR-1016							
AROCLOR-1221							
AROCLOR-1232							
AROCLOR-1242							
AROCLOR-1248							
AROCLOR-1254							
AROCLOR-1260							
BETA-BHC							
DELTA-BHC							
DIELDRIN							
ENDOSULFANI							
ENDOSULFANII							
ENDOSULFANSULFATE							
ENDRIN							
ENDRINALDEHYDE							
ENDRINKETONE							
GAMMA-BHC(LINDANE)							
GAMMA-CHLORDANE							
HEPTACHLOR							
HEPTACHLOREPOXIDE							
METHOXYCHLOR							
TOXAPHENE							

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-02S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S	CEF-P45-04S	CEF-P45-05S
matrix	GW	GW	GW	GW	GW	GW	GW
nsample	CEF-P45-GW-02S-1-F	CEF-P45-GW-02S-1-F-AVG	CEF-P45-GW-02S-1-F-D	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
sample	CEF-P45-GW-02S-1-F	CEF-P45-GW-DU01-F	CEF-P45-GW-DU01-F	CEF-P45-GW-03S-1	CEF-P45-GW-03S-1-F	CEF-P45-GW-04S-1	CEF-P45-GW-05S-1
gis_date	19990715	19990715	19990715	19990714	19990714	19990909	19990909
Inorganics (ug/L)							
ALUMINUM	473	334	195	7650	231		
ANTIONY	2.4 U	2.4 U	2.4 U	17.3	2.4 U		
ARSENIC	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U		
BARIUM	13.1	12.1	11.1	5.8	12		
BERYLLIUM	0.36 U	0.36 U	0.36 U	1.3 U	0.36 U		
CADIUM	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U		
CALCIUM	42600	41100	39600	2910	42500		
CHROMIUM	1.4 U	1.3 U	1.2 U	7.9 U	2.1 U		
COBALT	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U		
COPPER	0.75 U	0.75 U	0.75 U	1.5	0.75 U		
CYANIDE							
IRON	32 U	32 U	32 U	636	32 U		
LEAD	3 U	2.3 U	1.6 U	5.7 U	1.8 U	17.3	2.8 U
MAGNESIUM	1860	1795	1730	463	1860		
MANGANESE	3.1 U	2.85 U	2.6 U	4.2	2.9 U		
ERCURY	0.06 U	0.06 U	0.06 U	0.08	0.06 U		
NICKEL	2.3 U	2.05 U	1.8 U	3.7 U	2.1 U		
POTASSIUM	11000	10500	10000	545	10400		
SELENIUM	2 U	2 U	2 U	4.1 U	2 U		
SILVER	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U		
SODIUM	18700	19850	21000	9880	21200		
THALLIUM	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U		
VANADIUM	240	235	230	33	250	54.2	3.8
ZINC	18.1 U	19.75 U	21.4 U	28.9	19.2 U		
Petroleum Hydrocarboons (mg/L)							
TPH (C8-C40)				0.5 U			

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-05S	CEF-P45-05S
matrix	GW	GW
nsample	CEF-P45-GW-05S-1-AVG	CEF-P45-GW-05S-1-D
sample	CEF-P45-GW-DU-02	CEF-P45-GW-DU-02
gis_date	19990909	19990909
Volatiles (ug/L)		
1,1,1-TRICHLOROETHANE		
1,1,2,2-TETRACHLOROETHANE		
1,1,2-TRICHLOROETHANE		
1,1-DICHLOROETHANE		
1,1-DICHLOROETHENE		
1,2-DIBROMOETHANE		
1,2-DICHLOROBENZENE		
1,2-DICHLOROETHANE		
1,2-DICHLOROETHENE(TOTAL)		
1,2-DICHLOROPROPANE		
1,3-DICHLOROBENZENE		
1,4-DICHLOROBENZENE		
2-BUTANONE		
2-CHLOROETHYLVINYLETHER		
2-HEXANONE		
4-METHYL-2-PENTANONE		
ACETONE		
BENZENE		
BROMODICHLOROMETHANE		
BROMOFORM		
BROMOMETHANE		
CARBONDISULFIDE		
CARBONTETRACHLORIDE		
CHLOROBENZENE		
CHLOROETHANE		
CHLOROFORM		
CHLOROMETHANE		
CIS-1,2-DICHLOROETHENE		
CIS-1,3-DICHLOROPROPENE		
DIBROMOCHLOROMETHANE		
DICHLORODIFLUOROMETHANE		
ETHYLBENZENE		
METHYLTERT-BUTYLETHER		
METHYLENECHLORIDE		
STYRENE		
TETRACHLOROETHENE		
TOLUENE		
TRANS-1,2-DICHLOROETHENE		
TRANS-1,3-DICHLOROPROPENE		
TRICHLOROETHENE		
TRICHLOROFLUOROMETHANE		
VINYLCHLORIDE		
XYLENES,TOTAL		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-05S	CEF-P45-05S
matrix	GW	GW
nsample	CEF-P45-GW-05S-1-AVG	CEF-P45-GW-05S-1-D
sample	CEF-P45-GW-DU-02	CEF-P45-GW-DU-02
gis_date	19990909	19990909
Semivolatiles (ug/L)		
1,2,4-TRICHLOROBENZENE		
1,2-DICHLOROBENZENE		
1,3-DICHLOROBENZENE		
1,4-DICHLOROBENZENE		
1-METHYLNAPHTHALENE		
2,2'-OXYBIS(1-CHLOROPROPANE)		
2,4,5-TRICHLOROPHENOL		
2,4,6-TRICHLOROPHENOL		
2,4-DICHLOROPHENOL		
2,4-DIMETHYLPHENOL		
2,4-DINITROPHENOL		
2,4-DINITROTOLUENE		
2,6-DINITROTOLUENE		
2-CHLORONAPHTHALENE		
2-CHLOROPHENOL		
2-METHYLNAPHTHALENE		
2-METHYLPHENOL		
2-NITROANILINE		
2-NITROPHENOL		
3,3'-DICHLOROBENZIDINE		
3-NITROANILINE		
4,6-DINITRO-2-METHYLPHENOL		
4-BROMOPHENYL PHENYL ETHER		
4-CHLORO-3-METHYLPHENOL		
4-CHLOROANILINE		
4-CHLOROPHENYL PHENYL ETHER		
4-METHYLPHENOL		
4-NITROANILINE		
4-NITROPHENOL		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-05S	CEF-P45-05S
matrix	GW	GW
nsample	CEF-P45-GW-05S-1-AVG	CEF-P45-GW-05S-1-D
sample	CEF-P45-GW-DU-02	CEF-P45-GW-DU-02
gis_date	19990909	19990909
ACENAPHTHENE		
ACENAPHTHYLENE		
ANTHRACENE		
BENZO(A)ANTHRACENE		
BENZO(A)PYRENE		
BENZO(B)FLUORANTHENE		
BENZO(G,H,I)PERYLENE		
BENZO(K)FLUORANTHENE		
BIS(2-CHLOROETHOXY)METHANE		
BIS(2-CHLOROETHYL)ETHER		
BIS(2-ETHYLHEXYL)PHTHALATE		
BUTYLBENZYL PHTHALATE		
CARBAZOLE		
CHRYSENE		
DI-N-BUTYL PHTHALATE		
DI-N-OCTYL PHTHALATE		
DIBENZO(A,H)ANTHRACENE		
DIBENZOFURAN		
DIETHYL PHTHALATE		
DIMETHYL PHTHALATE		
FLUORANTHENE		
FLUORENE		
HEXACHLOROBENZENE		
HEXACHLOROBUTADIENE		
HEXACHLOROCYCLOPENTADIENE		
HEXACHLOROETHANE		
INDENO(1,2,3-CD)PYRENE		
ISOPHORONE		
N-NITROSO-DI-N-PROPYLAMINE		
N-NITROSODIPHENYLAMINE		
NAPHTHALENE		
NITROBENZENE		
PENTACHLOROPHENOL		
PHENANTHRENE		
PHENOL		
PYRENE		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-05S	CEF-P45-05S
matrix	GW	GW
nsample	CEF-P45-GW-05S-1-AVG	CEF-P45-GW-05S-1-D
sample	CEF-P45-GW-DU-02	CEF-P45-GW-DU-02
gis_date	19990909	19990909
Pesticide/PCBs (ug/L)		
4,4'-DDD		
4,4'-DDE		
4,4'-DDT		
ALDRIN		
ALPHA-BHC		
ALPHA-CHLORDANE		
AROCLOR-1016		
AROCLOR-1221		
AROCLOR-1232		
AROCLOR-1242		
AROCLOR-1248		
AROCLOR-1254		
AROCLOR-1260		
BETA-BHC		
DELTA-BHC		
DIELDRIN		
ENDOSULFANI		
ENDOSULFANII		
ENDOSULFANSULFATE		
ENDRIN		
ENDRINALDEHYDE		
ENDRINKETONE		
GAMMA-BHC(LINDANE)		
GAMMA-CHLORDANE		
HEPTACHLOR		
HEPTACHLOREPOXIDE		
METHOXYCHLOR		
TOXAPHENE		

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTICAL RESULTS - BEFORE APRIL, 2000

location	CEF-P45-05S	CEF-P45-05S
matrix	GW	GW
nsample	CEF-P45-GW-05S-1-AVG	CEF-P45-GW-05S-1-D
sample	CEF-P45-GW-DU-02	CEF-P45-GW-DU-02
gis_date	19990909	19990909
Inorganics (ug/L)		
ALUMINUM		
ANTIONY		
ARSENIC		
BARIUM		
BERYLLIUM		
CADIUM		
CALCIUM		
CHROMIUM		
COBALT		
COPPER		
CYANIDE		
IRON		
LEAD	2.55 U	2.3 U
MAGNESIUM		
MANGANESE		
ERCURY		
NICKEL		
POTASSIUM		
SELENIUM		
SILVER		
SODIUM		
THALLIUM		
VANADIUM	4.15	4.5
ZINC		
Petroleum Hydrocarboons (mg/L)		
TPH (C8-C40)		

GROUNDWATER DATA AFTER TO APRIL 2000

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTIC RESULTS - AFTER APRIL 2000

order	001	002	004	005	006	007	008	009
location	CEF-007-01Sa	CEF-007-01Sa	CEF-P45-01S	CEF-P45-01S	CEF-P45-02S	CEF-P45-02S	CEF-P45-03S	CEF-P45-03S
nsample	CEF-B07-GW-01SA-02	CEF-B07-GW-01SA-02-F	CEF-P45-GW-01S-02	CEF-P45-GW-01S-02-	CEF-P45-GW-02S-02	CEF-P45-GW-02S-02-	CEF-P45-GW-03S-02	CEF-P45-GW-03S-02-
sample	CEF-B07-GW-01SA-02	CEF-B07-GW-01SA-02-F	CEF-P45-GW-01S-02	CEF-P45-GW-01S-02-	CEF-P45-GW-02S-02	CEF-P45-GW-02S-02-	CEF-P45-GW-03S-02	CEF-P45-GW-03S-02-
dup								
sample_dat	04/20/00	04/20/00	04/21/00	04/21/00	04/21/00	04/21/00	04/21/00	04/21/00
Inorganics (ug/L)								
LEAD	1.6 U		3.6 U		1.6 U		5.8 U	
VANADIUM	240		13.3		74.9		49	
Inorganics, Filtered (ug/L)								
LEAD, FILTERED		1.6 U		1.6 U		1.6 U		1.6 U
VANADIUM, FILTERED		233		6.5		85		40.4

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTIC RESULTS - AFTER APRIL 2000

order	010	011	012	013	014	015	016	017
location	CEF-P45-04S	CEF-P45-04S	CEF-P45-06S	CEF-P45-06S	CEF-P45-07S	CEF-P45-07S	CEF-P45-07S	CEF-P45-07S
nsample	CEF-P45-GW-04S-02	CEF-P45-GW-04S-02-	CEF-P45-GW-06S-01	CEF-P45-GW-06S-01-	CEF-P45-GW-07S-01	CEF-P45-GW-07S-01-AV	CEF-P45-GW-07S-01-D	CEF-P45-GW-07S-01-F
sample	CEF-P45-GW-04S-02	CEF-P45-GW-04S-02-	CEF-P45-GW-06S-01	CEF-P45-GW-06S-01-	CEF-P45-GW-07S-01	CEF-P45-GW-07S-01-AV	CEF-P45-GW-DU07	CEF-P45-GW-07S-01-F
dup					CEF-P45-GW-07S-01-D		CEF-P45-GW-07S-01	CEF-P45-GW-07S-01-F-
sample_dat	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00	04/20/00
Inorganics (ug/L)								
LEAD	5.4 U		1.6 U		1.8 U	1.7 U	1.6 U	
VANADIUM	68.2		3		4.9	5	5.1	
Inorganics, Filtered (ug/L)								
LEAD, FILTERED		3.1 U		1.6 U				1.6 U
VANADIUM, FILTERED		53.6		1.7				3.5

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTIC RESULTS - AFTER APRIL 2000

order	**018**	**019**	**020**	**021**	**022**	**023**	**024**	**025**
location	CEF-P45-07S	CEF-P45-07S	CEF-P45-08S	CEF-P45-08S	CEF-P45-09S	CEF-P45-09S	CEF-P45-10I	CEF-P45-10I
nsample	CEF-P45-GW-07S-01-F-AV	CEF-P45-GW-07S-01-F-D	CEF-P45-GW-08S-01	CEF-P45-GW-08S-01-	CEF-P45-GW-09S-01	CEF-P45-GW-09S-01-	CEF-P45-GW-10I-01	CEF-P45-GW-10I-01-
sample	CEF-P45-GW-07S-01-F-AV	CEF-P45-GW-DU07-F	CEF-P45-GW-08S-01	CEF-P45-GW-08S-01-	CEF-P45-GW-09S-01	CEF-P45-GW-09S-01-	CEF-P45-GW-10I-01	CEF-P45-GW-10I-01-
dup		CEF-P45-GW-07S-01-F						
sample_dat	04/20/00	04/20/00	04/20/00	04/20/00	04/21/00	04/21/00	04/20/00	04/20/00
Inorganics (ug/L)								
LEAD			34.6		1.6 U		12.6	
VANADIUM			5.4		0.72 U		26.5	
Inorganics, Filtered (ug/L)								
LEAD, FILTERED	1.65 U	1.7 U		10.2		1.6 U		1.6 U
VANADIUM, FILTERED	3.6	3.7		3.7		0.72 U		3.9

NAS CECIL FIELD - PSC 45
SUMMARY OF ANALYTIC RESULTS - AFTER APRIL 2000

order	**026**	**027**	**028**	**029**	**030**	**003**
location	CEF-P45-11S	CEF-P45-11S	CEF-P45-12S	CEF-P45-12S	CEF-P45-13S	CEF-P45-13S
nsample	CEF-P45-GW-11S-01	CEF-P45-GW-11S-01-	CEF-P45-GW-12S-01	CEF-P45-GW-12S-01-	CEF-P45-GW-13S-01	CEF-P45-GF-13S-01
sample	CEF-P45-GW-11S-01	CEF-P45-GW-11S-01-	CEF-P45-GW-12S-01	CEF-P45-GW-12S-01-	CEF-P45-GW-13S-01	CEF-P45-GF-13S-01
dup						
sample_dat	04/20/00	04/20/00	04/21/00	04/21/00	02/06/01	02/06/01
Inorganics (ug/L)						
LEAD	1.6		1.6 U			
VANADIUM	4.3		2		3.0 U	2.9 U
Inorganics, Filtered (ug/L)						
LEAD, FILTERED		1.6 U		1.6 U		
VANADIUM, FILTERED		3.9		2.1		

SOIL DATA

SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45S00101		45S00201		45S00301		45S00401	
Sample	45S00101		45S00201		45S00301		45S00401	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/16/95		11/16/95		11/16/95		11/16/95	
Matrix	Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG	
Volatile Organic Compounds								
1,1,1-TRICHLOROETHANE	11	U	11	U	11	U	11	U
1,1,2,2-TETRACHLOROETHANE	11	U	11	U	11	U	11	U
1,1,2-TRICHLOROETHANE	11	U	11	U	11	U	11	U
1,1-DICHLOROETHANE	11	U	11	U	11	U	11	U
1,1-DICHLOROETHENE	11	U	11	U	11	U	11	U
1,2-DICHLOROETHANE	11	U	11	U	11	U	11	U
1,2-DICHLOROPROPANE	11	U	11	U	11	U	11	U
2-BUTANONE	11	U	11	U	11	U	11	U
2-HEXANONE	11	U	11	U	11	U	11	U
4-METHYL-2-PENTANONE	11	U	11	U	11	U	11	U
ACETONE	11	U	11	U	11	U	11	U
BENZENE	11	U	11	U	11	U	11	U
BROMODICHLOROMETHANE	11	U	11	U	11	U	11	U
BROMOFORM	11	U	11	U	11	U	11	U
BROMOMETHANE	11	U	11	U	11	U	11	U
CARBON DISULFIDE	11	U	11	U	11	U	11	U
CARBON TETRACHLORIDE	11	U	11	U	11	U	11	U
CHLOROBENZENE	11	U	11	U	11	U	11	U
CHLORODIBROMOMETHANE	11	U	11	U	11	U	11	U
CHLOROETHANE	11	U	11	U	11	U	11	U
CHLOROFORM	11	U	11	U	11	U	11	U
CHLOROMETHANE	11	U	11	U	11	U	11	U
CIS-1,3-DICHLOROPROPENE	11	U	11	U	11	U	11	U
ETHYLBENZENE	11	U	11	U	11	U	11	U
METHYLENE CHLORIDE	11	U	11	U	11	U	11	U
STYRENE	11	U	11	U	11	U	11	U
TETRACHLOROETHENE	11	U	11	U	11	U	11	U
TOLUENE	11	U	11	U	11	U	11	U
TOTAL 1,2-DICHLOROETHENE	11	U	11	U	11	U	11	U
TOTAL XYLENES	11	U	11	U	11	U	11	U
TRANS-1,3-DICHLOROPROPENE	11	U	11	U	11	U	11	U
TRICHLOROETHENE	11	U	3	J	11	U	11	U
VINYL CHLORIDE	11	U	11	U	11	U	11	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45B00101		45B00201		45S00101		45S00201		45S00301		45S00301		45S00401	
Sample	45B00101		45B00201		45S00101		45S00201		45S00301		45S00301RE		45S00401	
Depth of Range (ft)	(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		9/23/98		11/16/95		11/16/95		11/16/95		11/16/95		11/16/95	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE					370	U	360	U	350	U	350	U	350	U
1,2-DICHLOROBENZENE					370	U	360	U	350	U	350	U	350	U
1,3-DICHLOROBENZENE					370	U	360	U	350	U	350	U	350	U
1,4-DICHLOROBENZENE					370	U	360	U	350	U	350	U	350	U
1-METHYLNAPHTHALENE	17	U	170	U										
2,2'-OXYBIS(1-CHLOROPROPANE)					370	U	360	U	350	U	350	U	350	U
2,4,5-TRICHLOROPHENOL					890	U	860	U	860	U	860	U	850	U
2,4,6-TRICHLOROPHENOL					370	U	360	U	350	U	350	U	350	U
2,4-DICHLOROPHENOL					370	U	360	U	350	U	350	U	350	U
2,4-DIMETHYLPHENOL					370	U	360	U	350	U	350	U	350	U
2,4-DINITROPHENOL					890	U	860	U	860	U	860	U	850	U
2,4-DINITROTOLUENE					370	U	360	U	350	U	350	U	350	U
2,6-DINITROTOLUENE					370	U	360	U	350	U	350	U	350	U
2-CHLORONAPHTHALENE					370	U	360	U	350	U	350	U	350	U
2-CHLOROPHENOL					370	U	360	U	350	U	350	U	350	U
2-METHYLNAPHTHALENE	17	U	170	U	370	U	360	U	20	J	350	U	350	U
2-METHYLPHENOL					370	U	360	U	350	U	350	U	350	U
2-NITROANILINE					890	U	860	U	860	U	860	U	850	U
2-NITROPHENOL					370	U	360	U	350	U	350	U	350	U
3,3'-DICHLOROBENZIDINE					370	U	360	U	350	U	350	U	350	U
3-NITROANILINE					890	U	860	U	860	U	860	U	850	U
4,6-DINITRO-2-METHYLPHENOL					890	U	860	U	860	U	860	U	850	U
4-BROMOPHENYL PHENYL ETHER					370	U	360	U	350	U	350	U	350	U
4-CHLORO-3-METHYLPHENOL					370	U	360	U	350	U	350	U	350	U
4-CHLOROANILINE					370	U	360	U	350	U	350	U	350	U
4-CHLOROPHENYL PHENYL ETHER					370	U	360	U	350	U	350	U	350	U
4-METHYLPHENOL					370	U	360	U	350	U	350	U	350	U
4-NITROANILINE					890	U	860	U	860	U	860	U	850	U
4-NITROPHENOL					890	U	860	U	860	U	860	U	850	U
ACENAPHTHENE	17	U	170	U	43	J	360	U	260	J	42	J	350	U
ACENAPHTHYLENE	3.3	U	33	U	20	J	18	J	350	U	350	U	350	U
ANTHRACENE	17	U	1,200		98	J	20	J	410		78	J	20	J
BENZO(A)ANTHRACENE	12		2,200		340	J	99	J	1,300		440		220	J
BENZO(A)PYRENE	2	U	1,200		430		130	J	860		440		190	J
BENZO(B)FLUORANTHENE	3	U	1,400		550		240	J	1,200		600		260	J
BENZO(G,H,I)PERYLENE	3.3	U	1,200		460		99	J	430		170	J	94	J
BENZO(K)FLUORANTHENE	2	U	800		150	J	100	J	380		230	J	130	J
BIS(2-CHLOROETHOXY)METHANE					370	U	360	U	350	U	350	U	350	U
BIS(2-CHLOROETHYL)ETHER					370	U	360	U	350	U	350	U	350	U
BIS(2-ETHYLHEXYL)PHTHALATE					580		120	J	150	J	240	J	350	U
BUTYL BENZYL PHTHALATE					260	J	27	J	350	U	350	U	350	U
CARBAZOLE					99	J	360	U	490		90	J	350	U
CHRYSENE	14		2,300		470		150	J	1,200		520		250	J
DIBENZO(A,H)ANTHRACENE	3.3	U	2,000		65	J	25	J	180	J	85	J	38	J
DIBENZOFURAN					370	U	360	U	93	J	350	U	350	U
DIETHYL PHTHALATE					370	U	360	U	350	U	350	U	350	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45B00101		45B00201		45S00101		45S00201		45S00301		45S00301		45S00401	
Sample	45B00101		45B00201		45S00101		45S00201		45S00301		45S00301RE		45S00401	
Depth of Range (ft)	(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		9/23/98		11/16/95		11/16/95		11/16/95		11/16/95		11/16/95	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE					370	U	360	U	350	U	350	U	350	U
DI-N-BUTYL PHTHALATE					36	J	78	J	350	U	350	U	350	U
DI-N-OCTYL PHTHALATE					370	U	360	U	350	U	350	U	350	U
FLUORANTHENE	9.6		6,400		580		170	J	2,100		740		380	
FLUORENE	3.3	U	710		39	J	360	U	210	J	30	J	350	U
HEXACHLOROBENZENE					370	U	360	U	350	U	350	U	350	U
HEXACHLOROBUTADIENE					370	U	360	U	350	U	350	U	350	U
HEXACHLOROCYCLOPENTADIENE					370	U	360	U	350	U	350	U	350	U
HEXACHLOROETHANE					370	U	360	U	350	U	350	U	350	U
INDENO(1,2,3-CD)PYRENE	1.7	U	870		160	J	67	J	440		250	J	100	J
ISOPHORONE					370	U	360	U	350	U	350	U	350	U
NAPHTHALENE	17	U	170	U	370	U	360	U	38	J	350	U	350	U
NITROBENZENE					370	U	360	U	350	U	350	U	350	U
N-NITROSO-DI-N-PROPYLAMINE					370	U	360	U	350	U	350	U	350	U
N-NITROSODIPHENYLAMINE					370	U	360	U	350	U	350	U	350	U
PENTACHLOROPHENOL					890	U	860	U	860	U	860	U	850	U
PHENANTHRENE	5	J	4,900		400		28	J	1,600		420		150	J
PHENOL					370	U	360	U	350	U	350	U	350	U
PYRENE	9.3		3,500		890		130	J	1,600		600		270	J

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45S00501		45S00601		45S00701		45S00801		45S00901		45S01001		45S01101	
Sample	45S00501		45S00601		45S00701		45S00801		45S00901		45S01001		45S01101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		9/23/98		9/23/98		9/23/98		9/23/98		9/23/98		9/23/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	170	U	17	U	17	U	170	U	84	U	170	U	170	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	170	U	17	U	17	U	170	U	84	U	170	U	170	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	170	U	17	U	17	U	170	U	84	U	170	U	170	U
ACENAPHTHYLENE	33	U	3.3	U	3.3	U	33	U	16	U	33	U	33	U
ANTHRACENE	410		17	U	32		440		83	U	170	U	170	U
BENZO(A)ANTHRACENE	1,500		77		83		1,400		100		250		260	
BENZO(A)PYRENE	1,200		80		25		1,000		120		270		200	
BENZO(B)FLUORANTHENE	1,400		120		110		1,100		160		330		270	
BENZO(G,H,I)PERYLENE	900		53		27		770		81		220		160	
BENZO(K)FLUORANTHENE	630		47		27		530		71		200		150	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	1,800		93		70		1,600		200		340		320	
DIBENZO(A,H)ANTHRACENE	900		3.3	U	130		730		100		420		450	
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45S00501		45S00601		45S00701		45S00801		45S00901		45S01001		45S01101	
Sample	45S00501		45S00601		45S00701		45S00801		45S00901		45S01001		45S01101	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		9/23/98		9/23/98		9/23/98		9/23/98		9/23/98		9/23/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	3,900		210		310		3,400		460		580		820	
FLUORENE	220		41		3.3	U	210		28		33	U	33	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	800		60		44		630		93		230		170	
ISOPHORONE														
NAPHTHALENE	170	U	17	U	17	U	170	U	84	U	170	U	170	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	1,900		70		150		1,800		290		180		250	
PHENOL														
PYRENE	2,300		130		340		2,000		240		400		730	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-001		CEF-P45-SS-001		CEF-P45-SS-001		CEF-P45-SS-002		CEF-P45-SS-003		CEF-P45-SS-004		CEF-P45-SS-005	
Sample	CEF-P45-SS-001-01		CEF-P45-SS-122-02		CEF-P45-SS-122-02-D		CEF-P45-SS-002-01		CEF-P45-SS-003-01		CEF-P45-SS-004-01		CEF-P45-SS-005-01	
Depth of Range (ft)	(0-1)		(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/27/99		6/29/99		6/29/99		4/27/99		4/27/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	100	U	38	J	120	J	105	U	100	U	106	U	101	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	100	U	36	U	35	U	105	U	100	U	106	U	101	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	100	U	36	U	35	U	105	U	100	U	106	U	101	U
ACENAPHTHYLENE	100	U	73	U	72	U	105	U	100	U	106	U	101	U
ANTHRACENE	16	U	5.4	U	5.4	U	16	U	15	U	16	U	101	U
BENZO(A)ANTHRACENE	16	U	5.4	U	10		16	U	15	U	16	U	111	
BENZO(A)PYRENE	16	U	5.4	U	5.4	U	16	U	15	U	16	U	149	
BENZO(B)FLUORANTHENE	16	U	5.4	U	13		16	U	15	U	16	U	182	
BENZO(G,H,I)PERYLENE	16	U	7.3	U	7.2	U	16	U	15	U	16	U	15	U
BENZO(K)FLUORANTHENE	16	U	5.4	U	5.8		16	U	15	U	16	U	154	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	16	U	5.4	U	6.8		16	U	15	U	16	U	15	U
DIBENZO(A,H)ANTHRACENE	16	U	9	U	8.9	U	16	U	15	U	16	U	15	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-001		CEF-P45-SS-001		CEF-P45-SS-001		CEF-P45-SS-002		CEF-P45-SS-003		CEF-P45-SS-004		CEF-P45-SS-005	
Sample	CEF-P45-SS-001-01		CEF-P45-SS-122-02		CEF-P45-SS-122-02-D		CEF-P45-SS-002-01		CEF-P45-SS-003-01		CEF-P45-SS-004-01		CEF-P45-SS-005-01	
Depth of Range (ft)	(0-1)		(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	4/27/99		6/29/99		6/29/99		4/27/99		4/27/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	16	U	41		41		16	U	15	U	16	U	760	
FLUORENE	100	U	7.3	U	7.2	U	105	U	100	U	106	U	101	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	16	U	5.4	U	5.4	U	16	U	15	U	16	U	15	U
ISOPHORONE														
NAPHTHALENE	100	U	36	U	35	U	105	U	100	U	106	U	101	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	100	U	13		19		105	U	100	U	106	U	101	U
PHENOL														
PYRENE	16	U	25		28		16	U	15	U	16	U	456	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-006		CEF-P45-SS-006		CEF-P45-SS-007		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-009	
Sample	CEF-P45-SS-006-01		CEF-P45-SS-006-01-D		CEF-P45-SS-007-01		CEF-P45-SS-008-01		CEF-P45-SS-123-02		CEF-P45-SS-123-02-D		CEF-P45-SS-009-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(1-2)		(0-1)	
Sample Date	4/27/99		4/27/99		4/27/99		4/27/99		6/29/99		6/29/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	102	U	103	U	100	U	112	U	37	U	70	U	101	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	102	U	103	U	100	U	1,111		37	U	37	U	101	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	102	U	103	U	100	U	281		37	U	37	U	101	U
ACENAPHTHYLENE	102	U	103	U	100	U	112	U	75	U	74	U	101	U
ANTHRACENE	102	U	103	U	100	U	112	U	10		12		101	U
BENZO(A)ANTHRACENE	15	U	15	U	15	U	3,162		54		66		15	U
BENZO(A)PYRENE	15	U	15	U	15	U	5,923		90		110		15	U
BENZO(B)FLUORANTHENE	15	U	15	U	15	U	12,029		200		270		15	U
BENZO(G,H,I)PERYLENE	15	U	15	U	15	U	9,790		110		160		15	U
BENZO(K)FLUORANTHENE	15	U	15	U	15	U	4,323		86		110		15	U
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	15	U	15	U	15	U	5,782		43		61		15	U
DIBENZO(A,H)ANTHRACENE	15	U	15	U	15	U	1,331		14		9.2	U	15	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-006		CEF-P45-SS-006		CEF-P45-SS-007		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-009	
Sample	CEF-P45-SS-006-01		CEF-P45-SS-006-01-D		CEF-P45-SS-007-01		CEF-P45-SS-008-01		CEF-P45-SS-123-02		CEF-P45-SS-123-02-D		CEF-P45-SS-009-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(1-2)		(0-1)	
Sample Date	4/27/99		4/27/99		4/27/99		4/27/99		6/29/99		6/29/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	15	U	15	U	15	U	5,952		84		91		15	U
FLUORENE	102	U	103	U	100	U	112	U	7.4	U	7.4	U	101	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	15	U	15	U	15	U	7,076		81		100		15	U
ISOPHORONE														
NAPHTHALENE	102	U	103	U	100	U	112	U	37	U	37	U	101	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	102	U	103	U	100	U	112	U	7.1		6.2		101	U
PHENOL														
PYRENE	15	U	15	U	15	U	7,110		120		120		15	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-010		CEF-P45-SS-010		CEF-P45-SS-011		CEF-P45-SS-012		CEF-P45-SS-012		CEF-P45-SS-013		CEF-P45-SS-013	
Sample	CEF-P45-SS-010-01		CEF-P45-SS-507-02		CEF-P45-SS-011-01		CEF-P45-SS-012-01		CEF-P45-SS-012-01-D		CEF-P45-SS-013-01		CEF-P45-SS-124-02	
Depth of Range (ft)	(0-1)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	4/27/99		3/8/00		4/27/99		4/27/99		4/27/99		4/27/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	103	U	180	U	105	U	103	U	102	U	105	U	36	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	4,080		180	U	1,230		103	U	102	U	681		1,700	
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	6,540		180	U	1,150		103	U	102	U	307		2,800	
ACENAPHTHYLENE	238		180	U	105	U	103	U	102	U	1,240		100	
ANTHRACENE	1,660		180	U	286		103	U	102	U	105	U	710	
BENZO(A)ANTHRACENE	3,850		27	U	810		15	U	15	U	1,010		3,400	
BENZO(A)PYRENE	3,230		27	U	705		157		128		1,900		3,900	
BENZO(B)FLUORANTHENE	3,420		27	U	861		138		144		2,430		6,600	
BENZO(G,H,I)PERYLENE	2,520		27	U	361		170		170		1,150		2,800	
BENZO(K)FLUORANTHENE	1,480		27	U	429		15	U	15	U	912		2,900	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	4,910		27	U	1,270		15	U	15	U	1,750		2,900	
DIBENZO(A,H)ANTHRACENE	413		27	U	15	U	15	U	15	U	16	U	36	
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-010		CEF-P45-SS-010		CEF-P45-SS-011		CEF-P45-SS-012		CEF-P45-SS-012		CEF-P45-SS-013		CEF-P45-SS-013	
Sample	CEF-P45-SS-010-01		CEF-P45-SS-507-02		CEF-P45-SS-011-01		CEF-P45-SS-012-01		CEF-P45-SS-012-01-D		CEF-P45-SS-013-01		CEF-P45-SS-124-02	
Depth of Range (ft)	(0-1)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	4/27/99		3/8/00		4/27/99		4/27/99		4/27/99		4/27/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	8,750		27	U	2,020		15	U	103	J	2,060		7,100	
FLUORENE	1,870		180	U	418		103	UJ	103	U	105	U	63	
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	2,490		27	U	380		194		15	U	1,270		2,300	
ISOPHORONE														
NAPHTHALENE	103	U	180	U	105	U	103	U	103	U	178		2,600	
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	6,300		180	U	1,610		103	U	103	U	272		720	
PHENOL														
PYRENE	6,720		27	U	1,590		128		149		2,280		5,400	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-013		CEF-P45-SS-013		CEF-P45-SS-014		CEF-P45-SS-015		CEF-P45-SS-016		CEF-P45-SS-016		CEF-P45-SS-017	
Sample	CEF-P45-SU-209-03		CEF-P45-SU-209-03-D		CEF-P45-SS-014-01		CEF-P45-SS-015-01		CEF-P45-SS-016-01		CEF-P45-SS-125-02		CEF-P45-SS-017-01	
Depth of Range (ft)	(2-3)		(2-3)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	9/13/99		9/13/99		4/27/99		4/27/99		4/27/99		6/30/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	74	U	79	U	115	U	108	U	102	U	36	U	110	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	74	U	79	U	115	U	108	U	102	U	170		110	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	74	U	79	U	115	U	108	U	102	U	290		110	U
ACENAPHTHYLENE	74	U	79	U	115	U	108	U	102	U	74	U	110	U
ANTHRACENE	74	U	79	U	115	U	108	U	102	U	29		110	U
BENZO(A)ANTHRACENE	11	U	12	U	17	U	16	U	156		110		16	U
BENZO(A)PYRENE	11	U	42		17	U	16	U	425		210		16	U
BENZO(B)FLUORANTHENE	11	U	12	U	17	U	16	U	593		340		16	U
BENZO(G,H,I)PERYLENE	11	U	12	U	17	U	16	U	549		350		16	U
BENZO(K)FLUORANTHENE	11	U	12	U	17	U	16	U	266		140		16	U
BIS(2-CHLOROETHOXY)METHAI														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	11	U	12	U	17	U	16	U	316		98		16	U
DIBENZO(A,H)ANTHRACENE	11	U	12	U	17	U	16	U	15	U	9	U	16	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-013		CEF-P45-SS-013		CEF-P45-SS-014		CEF-P45-SS-015		CEF-P45-SS-016		CEF-P45-SS-016		CEF-P45-SS-017	
Sample	CEF-P45-SU-209-03		CEF-P45-SU-209-03-D		CEF-P45-SS-014-01		CEF-P45-SS-015-01		CEF-P45-SS-016-01		CEF-P45-SS-125-02		CEF-P45-SS-017-01	
Depth of Range (ft)	(2-3)		(2-3)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	9/13/99		9/13/99		4/27/99		4/27/99		4/27/99		6/30/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	11	U	12	U	17	U	16	U	334		220		16	U
FLUORENE	74	U	79	U	115	U	108	U	102	U	9.9		110	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	11	U	12	U	17	U	16	U	604		170		16	U
ISOPHORONE														
NAPHTHALENE	74	U	79	U	115	U	108	U	102	U	36	U	110	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	74	U	79	U	115	U	108	U	102	U	88		110	U
PHENOL														
PYRENE	11	U	12	U	17	U	16	U	337		210		16	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-019		CEF-P45-SS-020		CEF-P45-SS-021	
Sample	CEF-P45-SS-018-01		CEF-P45-SS-127-02		CEF-P45-SU-210-03		CEF-P45-SU-305-04		CEF-P45-SS-019-01		CEF-P45-SS-020-01		CEF-P45-SS-021-01	
Depth of Range (ft)	(0-1)		(1-2)		(2-3)		(3-4)		(0-1)		(0-1)		(0-1)	
Sample Date	4/27/99		6/30/99		9/13/99		10/22/99		4/27/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	100	U	35	U	69	U	77	U	102	U	108	U	102	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	133		210		69.3		77	U	102	U	108	U	102	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	155		340		69	U	77	U	102	U	108	U	102	U
ACENAPHTHYLENE	100	U	71	U	69	U	77	U	102	U	108	U	102	U
ANTHRACENE	100	U	35		69	U	77	U	102	U	108	U	102	U
BENZO(A)ANTHRACENE	316		280		131		14.8		15	U	16	U	155	
BENZO(A)PYRENE	658		500		458		20.9		15	U	16	U	337	
BENZO(B)FLUORANTHENE	800		610		574		12.9		15	U	16	U	444	
BENZO(G,H,I)PERYLENE	470		450		519		12	U	15	U	16	U	289	
BENZO(K)FLUORANTHENE	385		270		195		12	U	15	U	16	U	228	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	533		250		186		37.1		15	U	16	U	295	
DIBENZO(A,H)ANTHRACENE	15	U	13		10	U	12	U	15	U	16	U	15	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-018		CEF-P45-SS-019		CEF-P45-SS-020		CEF-P45-SS-021	
Sample	CEF-P45-SS-018-01		CEF-P45-SS-127-02		CEF-P45-SU-210-03		CEF-P45-SU-305-04		CEF-P45-SS-019-01		CEF-P45-SS-020-01		CEF-P45-SS-021-01	
Depth of Range (ft)	(0-1)		(1-2)		(2-3)		(3-4)		(0-1)		(0-1)		(0-1)	
Sample Date	4/27/99		6/30/99		9/13/99		10/22/99		4/27/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	393		260		58.2		36.3		15	U	16	U	230	
FLUORENE	100	U	7.1		69	U	77	U	102	U	108	U	102	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	526		260		518		12	U	15	U	16	U	398	
ISOPHORONE														
NAPHTHALENE	100	U	35	U	69	U	77	U	102	U	108	U	102	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	100	U	79		69	U	77	U	102	U	108	U	102	U
PHENOL														
PYRENE	500		320		157		22.9		15	U	16	U	247	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-021		CEF-P45-SS-022		CEF-P45-SS-022		CEF-P45-SS-023		CEF-P45-SS-024		CEF-P45-SS-024		CEF-P45-SS-104	
Sample	CEF-P45-SS-514-02		CEF-P45-SS-022-01		CEF-P45-SS-022-01-D		CEF-P45-SS-023-01		CEF-P45-SS-024-01		CEF-P45-SS-128-02		CEF-P45-SS-104-01	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	3/8/00		4/27/99		4/27/99		4/27/99		4/27/99		6/30/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	170	U	101	U	101	U	103	U	109	U	37	U	38	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	170	U	101	U	101	U	103	U	109	U	37	U	180	
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	170	U	101	U	101	U	103	U	109	U	37	U	330	
ACENAPHTHYLENE	170	U	101	U	101	U	103	U	109	U	74	U	78	U
ANTHRACENE	170	U	101	U	101	U	103	U	109	U	5.5	U	30	
BENZO(A)ANTHRACENE	26	U	15	U	15	U	15	U	16	U	16		260	
BENZO(A)PYRENE	26	U	147		117		15	U	182		38		550	
BENZO(B)FLUORANTHENE	26	U	186		132		15	U	194		53		1,100	
BENZO(G,H,I)PERYLENE	26	U	136		128		15	U	176		100		570	
BENZO(K)FLUORANTHENE	26	U	15	U	15	U	15	U	16	U	20		480	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	26	U	15	U	15	U	15	U	175		25		290	
DIBENZO(A,H)ANTHRACENE	26	U	15	U	15	U	15	U	16	U	9.2	U	15	
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-021		CEF-P45-SS-022		CEF-P45-SS-022		CEF-P45-SS-023		CEF-P45-SS-024		CEF-P45-SS-024		CEF-P45-SS-104	
Sample	CEF-P45-SS-514-02		CEF-P45-SS-022-01		CEF-P45-SS-022-01-D		CEF-P45-SS-023-01		CEF-P45-SS-024-01		CEF-P45-SS-128-02		CEF-P45-SS-104-01	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	3/8/00		4/27/99		4/27/99		4/27/99		4/27/99		6/30/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	26	U	15	UJ	157	J	15	U	182		45		350	
FLUORENE	170	U	101	U	101	U	103	U	109	U	7.4	U	11	
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	26	U	137		156		15	U	188		44		520	
ISOPHORONE														
NAPHTHALENE	170	U	101	U	101	U	103	U	109	U	37	U	42	
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	170	U	101	U	101	U	103	U	109	U	13		96	
PHENOL														
PYRENE	26	U	183		139		15	U	185		39		570	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-105		CEF-P45-SS-106		CEF-P45-SS-107		CEF-P45-SS-108		CEF-P45-SS-109		CEF-P45-SS-109		CEF-P45-SS-109	
Sample	CEF-P45-SS-105-01		CEF-P45-SS-106-01		CEF-P45-SS-107-01		CEF-P45-SS-108-01		CEF-P45-SS-109-01		CEF-P45-SS-503-02		CEF-P45-SU-504-03	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(2-3)	
Sample Date	6/29/99		6/29/99		6/29/99		6/29/99		6/29/99		3/8/00		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	36	U	36	U	36	U	36	U	37	U	170	U	170	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	230		89		1,100		280		7,400		170	U	170	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	460		150		2,300		440		14,000		170	U	170	U
ACENAPHTHYLENE	74	U	74	U	73	U	74	U	370		170	U	170	U
ANTHRACENE	40		10		300		71		4,700		170	U	170	U
BENZO(A)ANTHRACENE	130		59		830		250		6,400		26	U	26	U
BENZO(A)PYRENE	230		84		730		160		3,700		26	U	26	U
BENZO(B)FLUORANTHENE	400		120		890		250		5,000		26	U	26	U
BENZO(G,H,I)PERYLENE	350		140		540		140		2,400		26	U	26	U
BENZO(K)FLUORANTHENE	160		49		420		110		2,600		26	U	26	U
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	240		76		920		220		6,400		26	U	26	U
DIBENZO(A,H)ANTHRACENE	21		11		38		19		320		26	U	26	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-105		CEF-P45-SS-106		CEF-P45-SS-107		CEF-P45-SS-108		CEF-P45-SS-109		CEF-P45-SS-109		CEF-P45-SS-109	
Sample	CEF-P45-SS-105-01		CEF-P45-SS-106-01		CEF-P45-SS-107-01		CEF-P45-SS-108-01		CEF-P45-SS-109-01		CEF-P45-SS-503-02		CEF-P45-SU-504-03	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(2-3)	
Sample Date	6/29/99		6/29/99		6/29/99		6/29/99		6/29/99		3/8/00		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	370		140		2,000		520		19,000		26	U	26	U
FLUORENE	13		7.4	U	73		19		2,400		170	U	170	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	180		48		450		45		1,900		26	U	26	U
ISOPHORONE														
NAPHTHALENE	42		36	U	63		45		1,900		170	U	170	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	110		40		1,100		270		17,000		170	U	170	U
PHENOL														
PYRENE	280		110		1,500		420		13,000		26	U	26	U

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-109		CEF-P45-SS-111		CEF-P45-SS-112		CEF-P45-SS-113		CEF-P45-SS-113		CEF-P45-SS-113		CEF-P45-SS-114	
Sample	CEF-P45-SU-504-03-D		CEF-P45-SS-111-01		CEF-P45-SS-112-01		CEF-P45-SS-113-01		CEF-P45-SS-501-02		CEF-P45-SU-502-03		CEF-P45-SS-114-01	
Depth of Range (ft)	(2-3)		(0-1)		(0-1)		(0-1)		(1-2)		(2-3)		(0-1)	
Sample Date	3/8/00		6/30/99		6/30/99		6/30/99		3/8/00		3/8/00		6/30/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	170	U	39	U	36	U	38	U	170	U	170	U	38	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	170	U	230		190		4,700		170	U	170	U	700	
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	170	U	380		340		6,600		170	U	170	U	1,200	
ACENAPHTHYLENE	170	U	79	U	73	U	370		170	U	170	U	76	U
ANTHRACENE	170	U	39		52		210		170	U	170	U	57	
BENZO(A)ANTHRACENE	26	U	130		160		5,800		26	U	26	U	2,000	
BENZO(A)PYRENE	26	U	210		230		7,300		26	U	26	U	2,000	
BENZO(B)FLUORANTHENE	26	U	350		340		16,000		26	U	26.3		4,200	
BENZO(G,H,I)PERYLENE	26	U	280		310		7,300		26	U	26	U	2,300	
BENZO(K)FLUORANTHENE	26	U	140		150		7,500		26	U	26	U	1,900	
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	26	U	180		150		9,500		26	U	26	U	1,900	
DIBENZO(A,H)ANTHRACENE	26	U	11		29		190		26	U	26	U	260	
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-109		CEF-P45-SS-111		CEF-P45-SS-112		CEF-P45-SS-113		CEF-P45-SS-113		CEF-P45-SS-113		CEF-P45-SS-114	
Sample	CEF-P45-SU-504-03-D		CEF-P45-SS-111-01		CEF-P45-SS-112-01		CEF-P45-SS-113-01		CEF-P45-SS-501-02		CEF-P45-SU-502-03		CEF-P45-SS-114-01	
Depth of Range (ft)	(2-3)		(0-1)		(0-1)		(0-1)		(1-2)		(2-3)		(0-1)	
Sample Date	3/8/00		6/30/99		6/30/99		6/30/99		3/8/00		3/8/00		6/30/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	26	U	370		360		12,000		26	U	26	U	2,400	
FLUORENE	170	U	13		16		83		170	U	170	U	49	
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	26	U	130		150		6,200		26	U	26	U	1,500	
ISOPHORONE														
NAPHTHALENE	170	U	43		38		230		170	U	170	U	99	
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	170	U	130		200		1,100		170	U	170	U	210	
PHENOL														
PYRENE	26	U	280		310		15,000		26	U	26	U	3,400	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-117		CEF-P45-SS-118		CEF-P45-SS-118		CEF-P45-SS-119		CEF-P45-SS-120		CEF-P45-SS-121		CEF-P45-SS-211	
Sample	CEF-P45-SS-117-01		CEF-P45-SS-118-01		CEF-P45-SS-513-02		CEF-P45-SS-119-01		CEF-P45-SS-120-01		CEF-P45-SS-121-01		CEF-P45-SS-211-01	
Depth of Range (ft)	(0-1)		(0-1)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	6/30/99		6/30/99		3/8/00		6/30/99		6/30/99		6/30/99		9/13/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
1,2,4-TRICHLOROBENZENE														
1,2-DICHLOROBENZENE														
1,3-DICHLOROBENZENE														
1,4-DICHLOROBENZENE														
1-METHYLNAPHTHALENE	35	U	170		170	U	34	U	37	U	37	U	71	U
2,2'-OXYBIS(1-CHLOROPROPAN														
2,4,5-TRICHLOROPHENOL														
2,4,6-TRICHLOROPHENOL														
2,4-DICHLOROPHENOL														
2,4-DIMETHYLPHENOL														
2,4-DINITROPHENOL														
2,4-DINITROTOLUENE														
2,6-DINITROTOLUENE														
2-CHLORONAPHTHALENE														
2-CHLOROPHENOL														
2-METHYLNAPHTHALENE	85		870		170	U	34	U	46		54		71	U
2-METHYLPHENOL														
2-NITROANILINE														
2-NITROPHENOL														
3,3'-DICHLOROBENZIDINE														
3-NITROANILINE														
4,6-DINITRO-2-METHYLPHENOL														
4-BROMOPHENYL PHENYL ETH														
4-CHLORO-3-METHYLPHENOL														
4-CHLOROANILINE														
4-CHLOROPHENYL PHENYL ETH														
4-METHYLPHENOL														
4-NITROANILINE														
4-NITROPHENOL														
ACENAPHTHENE	250		1,700		170	U	34	U	56		56		71	U
ACENAPHTHYLENE	71	U	72	U	170	U	70	U	76	U	76	U	71	U
ANTHRACENE	21		240		170	U	5.2	U	6.4		9.3		71	U
BENZO(A)ANTHRACENE	92		760		26.3		74		43		49		11	U
BENZO(A)PYRENE	110		560		16.8	J	140		80		81		11	U
BENZO(B)FLUORANTHENE	120		710		34.7		190		110		130		15	
BENZO(G,H,I)PERYLENE	72		470		26	U	190		91		94		11	U
BENZO(K)FLUORANTHENE	55		350		26	U	82		46		55		11	U
BIS(2-CHLOROETHOXY)METHAN														
BIS(2-CHLOROETHYL)ETHER														
BIS(2-ETHYLHEXYL)PHTHALATE														
BUTYL BENZYL PHTHALATE														
CARBAZOLE														
CHRYSENE	110		640		37.9		68		47		63		30	
DIBENZO(A,H)ANTHRACENE	10		10		26	U	8.6	U	9.3	U	9.4	U	11	U
DIBENZOFURAN														
DIETHYL PHTHALATE														

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-117		CEF-P45-SS-118		CEF-P45-SS-118		CEF-P45-SS-119		CEF-P45-SS-120		CEF-P45-SS-121		CEF-P45-SS-211	
Sample	CEF-P45-SS-117-01		CEF-P45-SS-118-01		CEF-P45-SS-513-02		CEF-P45-SS-119-01		CEF-P45-SS-120-01		CEF-P45-SS-121-01		CEF-P45-SS-211-01	
Depth of Range (ft)	(0-1)		(0-1)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	6/30/99		6/30/99		3/8/00		6/30/99		6/30/99		6/30/99		9/13/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds														
DIMETHYL PHTHALATE														
DI-N-BUTYL PHTHALATE														
DI-N-OCTYL PHTHALATE														
FLUORANTHENE	240		2,000		79.7		89		72		99		11.1	
FLUORENE	7	U	96		170	U	7	U	7.5	U	7.6		71	U
HEXACHLOROBENZENE														
HEXACHLOROBUTADIENE														
HEXACHLOROCYCLOPENTADIE														
HEXACHLOROETHANE														
INDENO(1,2,3-CD)PYRENE	56		260		26	U	56		60		58		21.2	
ISOPHORONE														
NAPHTHALENE	35	U	110		170	U	34	U	50		37	U	71	U
NITROBENZENE														
N-NITROSO-DI-N-PROPYLAMINE														
N-NITROSODIPHENYLAMINE														
PENTACHLOROPHENOL														
PHENANTHRENE	100		1,300		170	U	14		28		20		71	U
PHENOL														
PYRENE	170		1,400		53.2		110		82		80		11.9	

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-303		CEF-P45-SS-404		CEF-P45-SS-507		CEF-P45-SS-511		CEF-P45-SS-511		CEF-P45-SS-512	
Sample	CEF-P45-SS-303-01		CEF-P45-SU-404-03		CEF-P45-SU-508-03		CEF-P45-SS-511-01		CEF-P45-SS-511-01-D		CEF-P45-SS-512-01	
Depth of Range (ft)	(0-1)		(2-3)		(2-3)		(0-1)		(0-1)		(0-1)	
Sample Date	10/22/99		1/21/00		3/8/00		3/8/00		3/8/00		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds												
1,2,4-TRICHLOROBENZENE												
1,2-DICHLOROBENZENE												
1,3-DICHLOROBENZENE												
1,4-DICHLOROBENZENE												
1-METHYLNAPHTHALENE	73	U	77	U	180	U	180	U	180	U	246	
2,2'-OXYBIS(1-CHLOROPROPAN												
2,4,5-TRICHLOROPHENOL												
2,4,6-TRICHLOROPHENOL												
2,4-DICHLOROPHENOL												
2,4-DIMETHYLPHENOL												
2,4-DINITROPHENOL												
2,4-DINITROTOLUENE												
2,6-DINITROTOLUENE												
2-CHLORONAPHTHALENE												
2-CHLOROPHENOL												
2-METHYLNAPHTHALENE	73	U	77	U	180	U	180	U	180	U	180	U
2-METHYLPHENOL												
2-NITROANILINE												
2-NITROPHENOL												
3,3'-DICHLOROBENZIDINE												
3-NITROANILINE												
4,6-DINITRO-2-METHYLPHENOL												
4-BROMOPHENYL PHENYL ETH												
4-CHLORO-3-METHYLPHENOL												
4-CHLOROANILINE												
4-CHLOROPHENYL PHENYL ETH												
4-METHYLPHENOL												
4-NITROANILINE												
4-NITROPHENOL												
ACENAPHTHENE	73	U	77	U	180	U	180	U	180	U	180	U
ACENAPHTHYLENE	73	U	77	U	180	U	180	U	180	U	180	U
ANTHRACENE	73	U	77	U	180	U	180	U	180	U	180	U
BENZO(A)ANTHRACENE	25.4		61.7		26	U	28	J	57.6	J	140	
BENZO(A)PYRENE	51.9		23.5		26	U	14.3	J	33.4	J	226	
BENZO(B)FLUORANTHENE	122		49		26	U	90.6	J	164	J	888	
BENZO(G,H,I)PERYLENE	11	U	67.4		26	U	64.4		103		569	
BENZO(K)FLUORANTHENE	11	U	37.9		26	U	39.3	J	69.7	J	310	
BIS(2-CHLOROETHOXY)METHAN												
BIS(2-CHLOROETHYL)ETHER												
BIS(2-ETHYLHEXYL)PHTHALATE												
BUTYL BENZYL PHTHALATE												
CARBAZOLE												
CHRYSENE	11	U	73.1		26	U	48.3	J	99.2	J	317	
DIBENZO(A,H)ANTHRACENE	11	U	23.7		26	U	27	UJ	28.7	J	27	U
DIBENZOFURAN												
DIETHYL PHTHALATE												

SOIL SAMPLE RESULTS
SEMIVOLATILE ORGANIC COMPOUNDS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-303		CEF-P45-SS-404		CEF-P45-SS-507		CEF-P45-SS-511		CEF-P45-SS-511		CEF-P45-SS-512	
Sample	CEF-P45-SS-303-01		CEF-P45-SU-404-03		CEF-P45-SU-508-03		CEF-P45-SS-511-01		CEF-P45-SS-511-01-D		CEF-P45-SS-512-01	
Depth of Range (ft)	(0-1)		(2-3)		(2-3)		(0-1)		(0-1)		(0-1)	
Sample Date	10/22/99		1/21/00		3/8/00		3/8/00		3/8/00		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG		UG/KG		UG/KG	
Semivolatile Organic Compounds												
DIMETHYL PHTHALATE												
DI-N-BUTYL PHTHALATE												
DI-N-OCTYL PHTHALATE												
FLUORANTHENE	133		178		26	U	117	J	251	J	663	
FLUORENE	73	U	77	U	180	U	180	U	180	U	180	U
HEXACHLOROBENZENE												
HEXACHLOROBUTADIENE												
HEXACHLOROCYCLOPENTADIE												
HEXACHLOROETHANE												
INDENO(1,2,3-CD)PYRENE	11	U	60		26	U	55		91.4		435	
ISOPHORONE												
NAPHTHALENE	73	U	77	U	180	U	180	U	180	U	180	U
NITROBENZENE												
N-NITROSO-DI-N-PROPYLAMINE												
N-NITROSODIPHENYLAMINE												
PENTACHLOROPHENOL												
PHENANTHRENE	73	U	77	U	180	U	180	U	180	U	180	U
PHENOL												
PYRENE	84.8		124		26	U	86.3	J	157	J	435	

SOIL SAMPLE RESULTS
PESTICIDES/PCBS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45S00101		45S00201		45S00301		45S00401	
Sample	45S00101		45S00201		45S00301		45S00401	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	11/16/95		11/16/95		11/16/95		11/16/95	
Matrix	Soil		Soil		Soil		Soil	
Units	UG/KG		UG/KG		UG/KG		UG/KG	
Pesticides/PCBs								
4,4'-DDD	3.7	U	3.6	U	3.6	U	8.3	J
4,4'-DDE	0.21	J	24		1.9	J	160	
4,4'-DDT	3.7	U	22		3.6	U	44	
ALDRIN	1.8	U	1.8	U	0.4	J	8.8	U
ALPHA-BHC	1.8	U	1.8	U	1.8	U	8.8	U
ALPHA-CHLORDANE	1.6	J	5.3		0.2	J	18	
AROCLOR-1016	37	U	36	U	36	U	180	U
AROCLOR-1221	74	U	72	U	71	U	350	U
AROCLOR-1232	37	U	36	U	36	U	180	U
AROCLOR-1242	37	U	36	U	36	U	180	U
AROCLOR-1248	37	U	36	U	36	U	180	U
AROCLOR-1254	73		280		36	U	180	U
AROCLOR-1260	37	U	36	U	36	U	180	U
BETA-BHC	1.8	U	1.8	U	1.8	U	8.8	U
DELTA-BHC	1.8	U	1.8	U	1.8	U	8.8	U
DIELDRIN	3.7	U	3.6	U	3.6	U	18	U
ENDOSULFAN I	0.54	J	4.1		1.8	U	0.42	J
ENDOSULFAN II	3.7	U	3.6	U	3.6	U	18	U
ENDOSULFAN SULFATE	3.7	U	3.6	U	3.6	U	18	U
ENDRIN	3.7	U	3.6	U	3.6	U	0.39	J
ENDRIN ALDEHYDE	3.7	U	3.6	U	3.6	U	18	U
ENDRIN KETONE	3.7	U	0.83	J	3.6	U	18	U
GAMMA-BHC (LINDANE)	1.8	U	1.8	U	1.8	U	8.8	U
GAMMA-CHLORDANE	1.8	J	1.6	J	1.8	U	15	
HEPTACHLOR	1.8	U	1.8	U	1.8	U	8.8	U
HEPTACHLOR EPOXIDE	1.8	U	1.8	U	1.8	U	1.4	J
METHOXYCHLOR	18	U	18	U	18	U	88	U
TOXAPHENE	180	U	180	U	180	U	880	U

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45B00101		45B00201		45S00101		45S00201		45S00301		45S00401		45S00601	
Sample	45B00101		CEF-P45-SS-129-02		45S00101		45S00201		45S00301		45S00401		45S00601	
Depth of Range (ft)	(1-2)		(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		6/29/99		11/16/95		11/16/95		11/16/95		11/16/95		9/23/98	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM					2,440		4,430		2,450		1,460			
ANTIMONY					0.89	U	0.86	U	0.86	U	0.85	U		
ARSENIC	0.9	J			0.67	U	1.7	J	5.5		1.3	J	1.6	J
BARIUM					19.3	J	54.4		6.2	J	3.4	J		
BERYLLIUM					0.22	U	0.33	J	0.21	U	0.21	U		
CADMIUM					0.22	U	0.54	J	0.21	U	0.34	J		
CALCIUM					15,200		20,500		1,450		573	J		
CHROMIUM					8		14.3		5.5		2.5			
COBALT					0.59	J	1.3	J	0.22	J	0.21	U		
COPPER					22.3		73.3		8.7		48.5			
CYANIDE					0.17	J	0.1	U	0.11	U	0.1	U		
IRON					2,530		6,000		1,780		3,250			
LEAD					26.2		112		19.4		10.5			
MAGNESIUM					809	J	3,080		83.2	J	55.6	J		
MANGANESE					39.5		118		12.6		11.2			
MERCURY			0.07		0.76		5.2		0.11	U	0.11	U		
NICKEL					6.2	J	24.8		11.6		4.6	J		
POTASSIUM					157	J	470	J	24.5	J	19.3	J		
SELENIUM					0.89	U	0.86	U	0.86	U	0.85	U		
SILVER					0.22	U	0.26	J	0.29	J	0.21	U		
SODIUM					323	J	802	J	164	J	197	J		
THALLIUM					0.67	U	0.65	U	0.64	U	0.64	U		
VANADIUM					21.5		55.7		27.6		4.5	J		
ZINC					66.6		144		22.9		22.6			

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45S00701		45S00801		CEF-P45-SS-001		CEF-P45-SS-002		CEF-P45-SS-003		CEF-P45-SS-004		CEF-P45-SS-005	
Sample	45S00701		45S00801		CEF-P45-SS-001-01		CEF-P45-SS-002-01		CEF-P45-SS-003-01		CEF-P45-SS-004-01		CEF-P45-SS-005-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	9/23/98		9/23/98		4/27/99		4/27/99		4/27/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC	1.3	J	1.4	J	9.6		5		0.81	U	0.34	U	2.6	
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM					9.1		6		13.2		9.4		10.6	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-006		CEF-P45-SS-006		CEF-P45-SS-007		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-008		CEF-P45-SS-009	
Sample	CEF-P45-SS-006-01		CEF-P45-SS-006-01-D		CEF-P45-SS-007-01		CEF-P45-SS-008-01		CEF-P45-SS-123-02		CEF-P45-SS-123-02-D		CEF-P45-SS-009-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(1-2)		(0-1)	
Sample Date	4/27/99		4/27/99		4/27/99		4/27/99		6/29/99		6/29/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC	0.38	U	0.28	U	2		6		0.39	U	0.39	U	7.2	
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	2.4	U	1.8		10.4		62.8		3		4.3		5.9	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-010		CEF-P45-SS-011		CEF-P45-SS-012		CEF-P45-SS-012		CEF-P45-SS-012		CEF-P45-SS-013		CEF-P45-SS-013	
Sample	CEF-P45-SS-010-01		CEF-P45-SS-011-01		CEF-P45-SS-012-01		CEF-P45-SS-012-01-D		CEF-P45-SS-515-02		CEF-P45-SS-013-01		CEF-P45-SS-124-02	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)		(1-2)	
Sample Date	4/27/99		4/27/99		4/27/99		4/27/99		3/8/00		4/27/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC	1.7	U	0.99	U	0.47	U	0.98	U						
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY					0.04	U	0.04	U			0.07			
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	136		20.3		58.4		39.1		3.9		162		174	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-013		CEF-P45-SS-013		CEF-P45-SS-015		CEF-P45-SS-016		CEF-P45-SS-101		CEF-P45-SS-102		CEF-P45-SS-103	
Sample	CEF-P45-SU-304-03		CEF-P45-SU-403-04		CEF-P45-SS-015-01		CEF-P45-SS-016-01		CEF-P45-SS-101-01		CEF-P45-SS-102-01		CEF-P45-SS-103-01	
Depth of Range (ft)	(2-3)		(3-4)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	10/22/99		1/21/00		4/27/99		4/27/99		6/29/99		6/29/99		6/29/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC									6.3		0.72		2.2	
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY					0.05		0.04	U						
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	23.7		4.3		10.5									
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-104		CEF-P45-SS-105		CEF-P45-SS-106		CEF-P45-SS-107		CEF-P45-SS-108		CEF-P45-SS-109		CEF-P45-SS-109	
Sample	CEF-P45-SS-104-01		CEF-P45-SS-105-01		CEF-P45-SS-106-01		CEF-P45-SS-107-01		CEF-P45-SS-108-01		CEF-P45-SS-109-01		CEF-P45-SS-503-02	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	6/29/99		6/29/99		6/29/99		6/29/99		6/29/99		6/29/99		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC											2.9			
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	20		12.9		26.7		30.3		92.6		276		13.8	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-109		CEF-P45-SS-109		CEF-P45-SS-110		CEF-P45-SS-201		CEF-P45-SS-202		CEF-P45-SS-203		CEF-P45-SS-203	
Sample	CEF-P45-SU-504-03		CEF-P45-SU-504-03-D		CEF-P45-SS-110-01		CEF-P45-SS-201-01		CEF-P45-SS-202-01		CEF-P45-SS-203-01		CEF-P45-SS-509-02	
Depth of Range (ft)	(2-3)		(2-3)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	3/8/00		3/8/00		6/29/99		9/10/99		9/10/99		9/10/99		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC					1.5		3.6		1.5	U				
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	4.8		4.2								45.9		15	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-207		CEF-P45-SS-208		CEF-P45-SS-301		CEF-P45-SS-302		CEF-P45-SS-302		CEF-P45-SS-302		CEF-P45-SS-401	
Sample	CEF-P45-SS-207-01		CEF-P45-SS-208-01		CEF-P45-SS-301-01		CEF-P45-SS-302-01		CEF-P45-SS-302-01-D		CEF-P45-SS-516-02		CEF-P45-SS-401-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)		(0-1)	
Sample Date	9/10/99		9/10/99		10/14/99		10/14/99		10/14/99		3/8/00		1/21/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds														
ALUMINUM														
ANTIMONY														
ARSENIC	0.39	U	0.66	U										
BARIUM														
BERYLLIUM														
CADMIUM														
CALCIUM														
CHROMIUM														
COBALT														
COPPER														
CYANIDE														
IRON														
LEAD														
MAGNESIUM														
MANGANESE														
MERCURY														
NICKEL														
POTASSIUM														
SELENIUM														
SILVER														
SODIUM														
THALLIUM														
VANADIUM	8.7		9.7		16.4	J	18.9	J	9.3	J	10.3		5.4	
ZINC														

SOIL SAMPLE RESULTS
METALS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-401		CEF-P45-SS-402		CEF-P45-SS-509		CEF-P45-SS-511		CEF-P45-SS-511		CEF-P45-SS-512	
Sample	CEF-P45-SS-401-01-D		CEF-P45-SS-402-01		CEF-P45-SU-510-03		CEF-P45-SS-511-01		CEF-P45-SS-511-01-D		CEF-P45-SS-512-01	
Depth of Range (ft)	(0-1)		(0-1)		(2-3)		(0-1)		(0-1)		(0-1)	
Sample Date	1/21/00		1/21/00		3/8/00		3/8/00		3/8/00		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Inorganic Compounds												
ALUMINUM												
ANTIMONY												
ARSENIC			0.4	U								
BARIUM												
BERYLLIUM												
CADMIUM												
CALCIUM												
CHROMIUM												
COBALT												
COPPER												
CYANIDE												
IRON												
LEAD												
MAGNESIUM												
MANGANESE												
MERCURY												
NICKEL												
POTASSIUM												
SELENIUM												
SILVER												
SODIUM												
THALLIUM												
VANADIUM	5				40.7		12.3		15.9		5.6	
ZINC												

SOIL SAMPLE RESULTS
PERTOLEUM HYDROCARBONS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	45B00201	45S00101	45S00201	45S00301	45S00401	45S01001	45S01101
Sample	45B00201	45S00101	45S00201	45S00301	45S00401	45S01001	45S01101
Depth of Range (ft)	(1-2)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)	(0-1)
Sample Date	9/23/98	11/16/95	11/16/95	11/16/95	11/16/95	9/23/98	9/23/98
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Units	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Petro_Hydro							
TOTAL PETROLEUM HYDROCAR	220					150	120
TOTAL PETROLEUM HYDROCARBONS		770	560	230	23		

SOIL SAMPLE RESULTS
PERTOLEUM HYDROCARBONS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-012		CEF-P45-SS-012		CEF-P45-SS-013		CEF-P45-SS-013		CEF-P45-SS-013		CEF-P45-SS-015		CEF-P45-SS-016	
Sample	CEF-P45-SS-012-01		CEF-P45-SS-012-01-D		CEF-P45-SS-013-01		CEF-P45-SS-124-02		CEF-P45-SU-304-03		CEF-P45-SS-015-01		CEF-P45-SS-016-01	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(1-2)		(2-3)		(0-1)		(0-1)	
Sample Date	4/27/99		4/27/99		4/27/99		6/29/99		10/22/99		4/27/99		4/27/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Petro_Hydro														
TOTAL PETROLEUM HYDROCAR	109	J	388	J	440		494		30.3		341		148	
TOTAL PETROLEUM HYDROCAR														

SOIL SAMPLE RESULTS
PERTOLEUM HYDROCARBONS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-018		CEF-P45-SS-019		CEF-P45-SS-021		CEF-P45-SS-022		CEF-P45-SS-022		CEF-P45-SS-023		CEF-P45-SS-023	
Sample	CEF-P45-SS-018-01		CEF-P45-SS-019-01		CEF-P45-SS-021-01		CEF-P45-SS-022-01		CEF-P45-SS-022-01-D		CEF-P45-SS-023-01		CEF-P45-SS-126-02	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(1-2)	
Sample Date	4/27/99		4/27/99		4/27/99		4/27/99		4/27/99		4/27/99		6/30/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Petro_Hydro														
TOTAL PETROLEUM HYDROCAR	94.5		52.6		44.7		54.9		51.2		439		90	U
TOTAL PETROLEUM HYDROCAR														

SOIL SAMPLE RESULTS
PERTOLEUM HYDROCARBONS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-023		CEF-P45-SS-104		CEF-P45-SS-105		CEF-P45-SS-106		CEF-P45-SS-107		CEF-P45-SS-108		CEF-P45-SS-115	
Sample	CEF-P45-SS-126-02-D		CEF-P45-SS-104-01		CEF-P45-SS-105-01		CEF-P45-SS-106-01		CEF-P45-SS-107-01		CEF-P45-SS-108-01		CEF-P45-SS-115-01	
Depth of Range (ft)	(1-2)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)		(0-1)	
Sample Date	6/30/99		6/29/99		6/29/99		6/29/99		6/29/99		6/29/99		6/30/99	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Petro_Hydro														
TOTAL PETROLEUM HYDROCAR	90	U	109		100		150		393		489		95	U
TOTAL PETROLEUM HYDROCAR														

SOIL SAMPLE RESULTS
PERTOLEUM HYDROCARBONS
SITE 45
NAVAL AIR STATION CECIL FIELD

Location	CEF-P45-SS-116		CEF-P45-SS-204		CEF-P45-SS-207		CEF-P45-SS-207		CEF-P45-SS-208		CEF-P45-SS-505	
Sample	CEF-P45-SS-116-01		CEF-P45-SS-204-01		CEF-P45-SS-207-01		CEF-P45-SS-505-02		CEF-P45-SS-208-01		CEF-P45-SU-506-03	
Depth of Range (ft)	(0-1)		(0-1)		(0-1)		(1-2)		(0-1)		(2-3)	
Sample Date	6/30/99		9/10/99		9/10/99		3/8/00		9/10/99		3/8/00	
Matrix	Soil		Soil		Soil		Soil		Soil		Soil	
Units	MG/KG		MG/KG		MG/KG		MG/KG		MG/KG		MG/KG	
Petro_Hydro												
TOTAL PETROLEUM HYDROCAR	92	U	16.5		3,380		29.2		344		10.2	
TOTAL PETROLEUM HYDROCAR												

APPENDIX E

DATA VALIDATION SUMMARIES

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**JUNE 2, 2000**
FROM:	**JENNIFER M. MALLE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –FILTERED AND UNFILTERED LEAD AND VANADIUM**
CTO-078 NAS CECIL FIELD
SDG- F6332

SAMPLES: 26/Aqueous/

CEF-B07-GW-01SA-02	CEF-B07-GW-01SA-02-F
CEF-P45-GW-01S-02	CEF-P45-GW-01S-02-F
CEF-P45-GW-02S-02	CEF-P45-GW-02S-02-F
CEF-P45-GW-03S-02	CEF-P45-GW-03S-02-F
CEF-P45-GW-04S-02	CEF-P45-GW-04S-02-F
CEF-P45-GW-06S-01	CEF-P45-GW-06S-01-F
CEF-P45-GW-07S-01	CEF-P45-GW-07S-01-F
CEF-P45-GW-08S-01	CEF-P45-GW-08S-01-F
CEF-P45-GW-09S-01	CEF-P45-GW-09S-01-F
CEF-P45-GW-10I-01	CEF-P45-GW-10I-01-F
CEF-P45-GW-11S-01	CEF-P45-GW-11S-01-F
CEF-P45-GW-12S-01	CEF-P45-GW-12S-01-F
CEF-P45-GW-DU07	CEF-P45-GW-DU07-F

Overview

The sample set for CTO 078, NAS Cecil Field SDG F6332 includes twenty-six (26) aqueous environmental samples. The field duplicate pair CEF-P45-GW-07S-01/CEF-P45-GW-DU07 was included within this SDG.

All samples were analyzed for lead and vanadium. The samples were collected by Tetra Tech NUS on April 20-21, 2000 and analyzed by Accutest Laboratories in accordance with Naval Facilities Engineering Service Center (NFESC) Navy Installation Restoration Laboratory Quality Assurance Guide, (February 1996). Lead and vanadium analyses were conducted under SW846 method 6010B.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial and Continuing Calibration Verifications
• Laboratory Blank Analyses
* • Field Duplicate Precision
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminant was detected in the laboratory method/preparation blanks at the following maximum concentration:

Affected samples : All

Analyte	Maximum Concentration	Action Level (aqueous)
Lead	1.9 ug/L	9.5 ug/L

An action level of 5X the maximum concentration was used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration in evaluation for blank contamination. Positive results less than the action level for lead were qualified as nondetected for laboratory blank contamination.

Notes

A field duplicate summary comparison table is included in Appendix C.

The sample originally listed on the Chain of Custody (COC) as CEF-007-GW-01SA-02 was changed to CEF-B07-GW-01SA-02. Past samples taken from this well were identified with the "B" and the change was made for data consistency.

Executive Summary

Laboratory Performance: Lead was present in the laboratory method/preparation blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Jennifer M. Malle

Tetra Tech NUS
Jennifer M. Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-B07-GW-01SA-02			CEF-B07-GW-01SA-02-F			CEF-P45-GW-01S-02			CEF-P45-GW-01S-02-F		
SAMPLE DATE:	04/20/00			04/20/00			04/21/00			04/21/00		
LABORATORY ID:	F6332-3			F6332-3A			F6332-13			F6332-13A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.6	U		1.6	U		3.6	U	A	1.6	U	
VANADIUM	240			233			13.3			6.5		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-02S-02			CEF-P45-GW-02S-02-F			CEF-P45-GW-03S-02			CEF-P45-GW-03S-02-F		
SAMPLE DATE:	04/21/00			04/21/00			04/21/00			04/21/00		
LABORATORY ID:	F6332-12			F6332-12A			F6332-11			F6332-11A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.6	U		1.6	U		5.8	U	A	1.6	U	
VANADIUM	74.9			85			49.0			40.4		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-04S-02			CEF-P45-GW-04S-02-F			CEF-P45-GW-06S-01			CEF-P45-GW-06S-01-F		
SAMPLE DATE:	04/20/00			04/20/00			04/20/00			04/20/00		
LABORATORY ID:	F6332-7			F6332-7A			F6332-5			F6332-5A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	5.4	U	A	3.1	U	A	1.6	U		1.6	U	
VANADIUM	68.2			53.6			3.0			1.7		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-07S-01			CEF-P45-GW-07S-01-F			CEF-P45-GW-08S-01			CEF-P45-GW-08S-01-F		
SAMPLE DATE:	04/20/00			04/20/00			04/20/00			04/20/00		
LABORATORY ID:	F6332-1			F6332-1A			F6332-6			F6332-6A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.8	U	A	1.6	U		34.6			10.2		
VANADIUM	4.9			3.5			5.4			3.7		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-09S-01			CEF-P45-GW-09S-01-F			CEF-P45-GW-10I-01			CEF-P45-GW-10I-01-F		
SAMPLE DATE:	04/21/00			04/21/00			04/20/00			04/20/00		
LABORATORY ID:	F6332-9			F6332-9A			F6332-4			F6332-4A		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	0.0 %			0.0 %			0.0 %			0.0 %		
UNITS:	UG/L			UG/L			UG/L			UG/L		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.6	U		1.6	U		12.6			1.6	U	
VANADIUM	0.72	U		0.72	U		26.5			3.9		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-11S-01	CEF-P45-GW-11S-01-F	CEF-P45-GW-12S-01	CEF-P45-GW-12S-01-F
SAMPLE DATE:	04/20/00	04/20/00	04/21/00	04/21/00
LABORATORY ID:	F6332-2	F6332-2A	F6332-10	F6332-10A
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.6			1.6	U		1.6	U		1.6	U	
VANADIUM	4.3			3.9			2.0			2.1		

CTO078 - NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F6332

SAMPLE NUMBER:	CEF-P45-GW-DU07			CEF-P45-GW-DU07-F			/ /			/ /		
SAMPLE DATE:	04/20/00			04/20/00								
LABORATORY ID:	F6332-8			F6332-8A								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:	CEF-P45-GW-07S-01			CEF-P45-GW-07S-01-F								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	1.6	U		1.7	U	A						
VANADIUM	5.1			3.7								

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID:	CEF-007-GW-01SA-02		
Lab Sample ID:	F6332-3	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	240	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-007-GW-01SA-02		
Lab Sample ID:	F6332-3A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	233	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-01S-02		
Lab Sample ID:	F6332-13	**Date Sampled:**	04/21/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	3.6 B	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	13.3 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-01S-02		
Lab Sample ID:	F6332-13A	**Date Sampled:**	04/21/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	6.5 B	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-02S-02		
Lab Sample ID:	F6332-12	**Date Sampled:**	04/21/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	74.9	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-02S-02		
Lab Sample ID:	F6332-12A	**Date Sampled:**	04/21/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	85.0	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-03S-02		
Lab Sample ID:	F6332-11	**Date Sampled:**	04/21/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	5.8	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	49.0 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-03S-02		
Lab Sample ID:	F6332-11A	**Date Sampled:**	04/21/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	40.4 B	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-04S-02		
Lab Sample ID:	F6332-7	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	5.4	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	68.2	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-04S-02		
Lab Sample ID:	F6332-7A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	3.1 B	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	53.6	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-06S-01		
Lab Sample ID:	F6332-5	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	3.0 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-06S-01		
Lab Sample ID:	F6332-5A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	1.7 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-07S-01		
Lab Sample ID:	F6332-1	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.8 B	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	4.9 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-07S-01		
Lab Sample ID:	F6332-1A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	3.5 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-08S-01		
Lab Sample ID:	F6332-6	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Lead	34.6	5.0	ug/l	1	04/25/00	04/26/00 JK	SW846 6010A
Vanadium	5.4 B	50.0	ug/l	1	04/25/00	04/26/00 JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-08S-01		
Lab Sample ID:	F6332-6A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	10.2	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	3.7 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-09S-01		
Lab Sample ID:	F6332-9	**Date Sampled:**	04/21/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	0.72 U	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-09S-01		
Lab Sample ID:	F6332-9A	**Date Sampled:**	04/21/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	0.72 U	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-10I-01		
Lab Sample ID:	F6332-4	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method
Lead	12.6	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	26.5 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-10I-01		
Lab Sample ID:	F6332-4A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	3.9 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-11S-01		
Lab Sample ID:	F6332-2	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 B	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	4.3 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-11S-01		
Lab Sample ID:	F6332-2A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	3.9 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-12S-01		
Lab Sample ID:	F6332-10	**Date Sampled:**	04/21/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A
Vanadium	2.0 B	50.0	ug/l	1	04/25/00	04/26/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-12S-01		
Lab Sample ID:	F6332-10A	**Date Sampled:**	04/21/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.6 U	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	2.1 B	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-DU07		
Lab Sample ID:	F6332-8	**Date Sampled:**	04/20/00
Matrix:	AQ - Ground Water	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Lead	1.6 U	5.0	ug/l	1	04/25/00	04/26/00 JK	SW846 6010A
Vanadium	5.1 B	50.0	ug/l	1	04/25/00	04/26/00 JK	SW846 6010A

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GW-DU07		
Lab Sample ID:	F6332-8A	**Date Sampled:**	04/20/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	04/22/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	1.7 B	5.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A
Vanadium	3.7 B	50.0	ug/l	1	04/26/00	04/27/00	JK	SW846 6010A

RL = Reporting Limit

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**AUGUST 24, 2000**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – LEAD**
CTO 078 - NAS CECIL FIELD
SDG – F7265

SAMPLES: 2/Aqueous/

CEF-P45-GW-08S-02 CEF-P45-GW-08S-02-F

Overview

The sample set for CTO 078, Cecil Field, SDG F7265 consists of two (2) aqueous environmental samples.

Sample CEF-P45-GW-08S-03 was analyzed for total lead. Sample CEF-P45-GW-08S-02-F was analyzed for dissolved lead. The samples were collected by Tetra Tech NUS on August 3, 2000 and analyzed by Accutest Laboratory under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA / QC) criteria. Lead analyses were conducted using SW 846 method 6010B.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
• Laboratory Blank Analyses
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminant was detected in the laboratory blanks at the following maximum concentration:

Analyte	Maximum Concentration	Action Level
Lead	2.1µg/L	10.5µg/L

An action level of 5X the maximum concentration was used to established to evaluate for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Positive results less than the blank action level were qualified, "U", as a result of blank contamination.

Executive Summary

Laboratory Performance: Lead was present in laboratory blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy IRCDQM." (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A
QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

CTO078-NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F7265

SAMPLE NUMBER:	CEF-P45-GW-08S-02			CEF-P45-GW-08S-02-F			/ /			/ /		
SAMPLE DATE:	08/03/00			08/03/00								
LABORATORY ID:	F7265-1			F7265-1A								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	5.3	U	A	2.9	U	A						

CTO078-NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F7265

SAMPLE NUMBER:	CEF-P45-GW-08S-02			CEF-P45-GW-08S-02-F			/ /			/ /		
SAMPLE DATE:	08/03/00			08/03/00								
LABORATORY ID:	F7265-1			F7265-1A								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
LEAD	5.3	U	A	2.9	~~B~~ U	A						

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P45-GW-08S-02		
Lab Sample ID:	F7265-1	**Date Sampled:**	08/03/00
Matrix:	AQ - Ground Water	**Date Received:**	08/05/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	5.3	5.0	ug/l	1	08/08/00	08/09/00	JK	SW846 6010A

RL = Reporting Limit

002

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P45-GW-08S-02		
Lab Sample ID:	F7265-1A	**Date Sampled:**	08/03/00
Matrix:	AQ - Groundwater Filtered	**Date Received:**	08/05/00
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By		Method
Lead	2.9 B	5.0	ug/l	1	08/08/00	08/09/00	JK	SW846 6010A

RL = Reporting Limit

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Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO:	**M. SPERANZA**	**DATE:**	**APRIL 10, 2000**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TOC**
CTO 078 - CECIL FIELD
SDGs – F5993, F5995, F5996, F5997, F5998, F5999, F6000 AND F6001

SAMPLES: 9/Soils/

CEF-P21-SS-TOC-01	CEF-P25-SS-TOC-01
CEF-P32-SS-TOC-01	CEF-P42-SS-DU11
CEF-P42-SS-TOC-01	CEF-P44-SS-TOC-01
CEF-P45-SS-TOC-01	CEF-P46-SS-TOC-01
CEF-P49-SS-TOC-01	

Overview

The sample set for CTO 078, Cecil Field, SDGs F5993, F5995, F5996, F5997, F5998, F5999, F6000 AND F6001 consist of nine (9) soil environmental samples. One (1) field duplicate pair (CEF-P42-SS-TOC-01/ CEF-P42-SS-DU11) was included within these SDGs.

The samples were analyzed for total organic carbon (TOC). The samples were collected by Tetra Tech NUS on March 3, 2000 and analyzed by Accutest Laboratory under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA / QC) criteria. TOC analyses were conducted using Corp. Engineering method 81.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
* • Laboratory Blank Analyses
* • Field Duplicate Precision
* • Detection Limits

* - All quality control criteria were met for this parameter.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide." (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

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D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F5999

SAMPLE NUMBER:	CEF-P45-SS-TOC-01			
SAMPLE DATE:	03/03/00	/ /	/ /	/ /
LABORATORY ID:	F5999-1			
QC_TYPE:	NORMAL			
% SOLIDS:	94.2 %	100.0 %	100.0 %	100.0 %
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
MISCELLANEOUS PARAMETERS												
TOTAL ORGANIC CARBON(MG/KG)	12600											

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P45-SS-TOC-01		
Lab Sample ID:	F5999-1	**Date Sampled:**	03/03/00
Matrix:	SO - Soil	**Date Received:**	03/04/00
		Percent Solids:	94.2
Project:	NAS Cecil Field-PSC 45		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed By	Method
Solids, Percent	94.2		%	1	03/08/00 ANJ	EPA 160.3 M
Total Organic Carbon	12600	1100	mg/kg	1	03/10/00 ANJ	CORP ENG 81 M

RL = Reporting Limit

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Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**FEBRUARY 20, 2001**
FROM:	**ERIN M. FAUST**	**COPIES:**	**DV FILE**
SUBJECT:	**INORGANIC DATA VALIDATION – VANADIUM CTO-078 NAS CECIL FIELD SDG – F8902**		
SAMPLES:	2/Aqueous/		
	CEF-P45-GF-13S-01	CEF-P45-GW-13S-01	

Overview

The sample set for CTO 078, NAS Cecil Field, SDG F8902, consists of two (2) aqueous environmental samples.

Both samples were analyzed for vanadium only. The samples were collected by TetraTech NUS on February 6, 2001 and analyzed by Accutest Laboratory under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. Metals analyses were conducted using SW 846 method 6010B.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Recoveries
• Laboratory Blank Analyses
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were detected in the laboratory method blanks at the following maximum concentrations:

Analyte	Maximum Concentration	Action Level
Vanadium	1.4 µg/L	7.0 µg/L

An action level of 5X the maximum concentration were used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluation for blank contamination. Positive results less than the action level reported for vanadium were qualified "U" as a result of blank contamination.

Executive Summary

Laboratory Performance: Vanadium was present in the laboratory method blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy IRCDQM" (September 1999).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Erin M Faust

Tetra Tech NUS
Erin M. Faust
Environmental Scientist

TetraTech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

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QUALIFIED ANALYTICAL RESULTS

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A = Lab Blank Contamination
B = Field Blank Contamination
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D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

CTO078-NAS CECIL FIELD
WATER DATA
Accutest, NJ
SDG: F8902

SAMPLE NUMBER:	CEF-P45-GF-13S-01			CEF-P45-GW-13S-01								
SAMPLE DATE:	02/06/01			02/06/01			/ /			/ /		
LABORATORY ID:	F8902-2			F8902-1								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	0.0 %			0.0 %			100.0 %			100.0 %		
UNITS:	UG/L			UG/L								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
VANADIUM	2.9	U	A	3.0	U	A						

APPENDIX B
RESULTS AS REPORTED BY THE LABORATORY

Report of Analysis

Client Sample ID:	CEF-P45-GW-13S-01		
Lab Sample ID:	F8902-1	**Date Sampled:**	02/06/01
Matrix:	AQ - Ground Water	**Date Received:**	02/07/01
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Vanadium	3.0 B	50.0	ug/l	1	02/08/01	02/09/01 JK	SW846 6010B

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-P45-GF-13S-01		
Lab Sample ID:	F8902-2	**Date Sampled:**	02/06/01
Matrix:	AQ - Ground Water	**Date Received:**	02/07/01
		Percent Solids:	n/a
Project:	NAS Cecil Field-PSC 45		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method
Vanadium	2.9 B	50.0	ug/l	1	02/08/01	02/09/01	JK	SW846 6010B

RL = Reporting Limit

APPENDIX F

GEOTECHNICAL SAMPLE ANALYSES

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences • Construction Materials Testing • Threshold Inspections
3532 Maggie Blvd. • Orlando, FL 32811 • (407) 423-0504 • FAX (407) 423-3106

Project No.: 10132-002-02
Report No.: 113577.1
Date: May 3, 2000

REPORT ON
DRY UNIT WEIGHT, SPECIFIC GRAVITY, POROSITY, AND MOISTURE CONTENT, pH, Sieve Analysis

Client: Tetra Tech Nus, Inc.
Attn: M. Speranza/J. Logan
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, PA 15220-2745

Project: Site 21, 25, and 45, NAS Cecil Field, Jacksonville, Florida, P.O. No. PITT-N0039-P193(DW), CTO 0078, Contract No. N62467-94-D-0888

Location: CEF-P45 37 Feet

Soil Description: Tan Sand

Date Tested: 4-20-00 **Tested By:** Lori Bass

Date Sampled: 4-3-00 **Sample No.:** CEF-P45

TEST RESULTS

Dry Unit Weight	95.3	pcf
Specific Gravity	2.63	
Porosity	.3178	
Moisture Content	23.6	%
pH	6.41	

Sieve Size	Percent Passing
¾ In.	100.0
No. 4	100.0
No. 10	100.0
No. 40	99.8
No. 60	98.3
No. 100	25.5
No. 200	1.9

cc: Client (2)

dc (WO# N/S)

UNIVERSAL
ENGINEERING SCIENCES
Consultants In: Geotechnical Engineering • Environmental Sciences • Construction Materials Testing • Threshold Inspections
3532 Maggie Blvd. • Orlando, FL 32811 • (407) 423-0504 • FAX (407) 423-3106

Project No.: 10132-002-02
Report No.: 113575.1
Date: May 3, 2000

REPORT ON
DRY UNIT WEIGHT, SPECIFIC GRAVITY, POROSITY, AND MOISTURE CONTENT, pH, Sieve Analysis

Client: Tetra Tech Nus, Inc.
Attn: M. Speranza/J. Logan
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, PA 15220-2745

Project: Site 21, 25, and 45, NAS Cecil Field, Jacksonville, Florida, P.O. No. PITT-N0039-P193(DW), CTO 0078, Contract No. N62467-94-D-0888

Location: CEF-P45, 6 Feet

Soil Description: Dark Brown Sand with Silt

Date Tested: 4-20-00 **Tested By:** Lori Bass

Date Sampled: 4-3-00 **Sample No.:** CEF-P25

TEST RESULTS

Dry Unit Weight	86.3	pcf
Specific Gravity	2.58	
Porosity	.4629	
Moisture Content	15.2	%
pH	5.82	

Sieve Size	Percent Passing
¾ In.	100.0
No. 4	100.0
No. 10	100.0
No. 40	99.5
No. 60	97.2
No. 100	60.4
No. 200	9.3

cc: Client (2)

dc (WO# N/S)

APPENDIX G

RISK EVALUATION – SOIL – BOOTSTRAPPING CALCULATIONS

nsample	BAPEQ(PRE)		BAPEQ(POST)		As(PRE)		As(POST)		Hg(PRE)		Hg(POST)		V (PRE)		V (POST)		TPH(PRE)		TPH(POST)
MIN	4.1000		4.1000		0.1400		0.1400		0.0200		0.0200		1.8000		1.2000		10.2000		10.2000
MAX	10,375.00		2,478.00		9.60		9.60		5.20		0.07		276.00		48.80		3,380.00		439.00
MEAN	854.84		246.79		2.18		1.85		0.70		0.05		35.43		11.02		296.89		79.15
t 0.95, n-1	0.229147251		0.227444919		0.267105881		0.253481327		0.259083366		0.370212757		0.224776414		0.262394916		0.214217473		0.231532869
STANDARD DEVIATION	1,917.97		407.12		2.45		2.40		1.70		0.02		55.63		12.15		636.46		88.34
COEFFICIENT OF VARIATION	2.24		1.65		1.12		1.30		2.43		0.36		1.57		1.10		2.14		1.12
n	74		74		31		31		9		9		42		42		27		27
UCL $_{0.95}$	906		258		2.3		2.0		0.8		0.05		37.4		11.5		323		83
Goal	500.00		500.00		3.70		3.70		8.70		8.70		7,400.00		7,400.00		2,500.00		2,500.00
Leachability	8,000.00		8,000.00		29.00		29.00		2.10		2.10		6,000.00		6,000.00		340.00		340.00
Remediation Level	142		142		0.45		0.45		0.06		0.06		1.2		1.2		38		38
45B00101	4.1		4.1		0.9	J	0.9												
45B00201	3657		142														220		38
45S00101	602		142		0.34	U	0.45		0.76		0.06		21.5		1.2				
45S00201	197		142		1.7	J	0.45		5.2		0.06		55.7		1.2				
45S00301	657		657		5.5		5.5		0.06	U	0.06		27.6		27.6				
45S00401	288		288		1.3	J	1.3		0.06	U	0.06		4.5	J	4.5				
45S00501	2478		2478																
45S00601	108		108		1.6	J	1.6												
45S00701	179		179		1.3	J	1.3												
45S00801	2050		2050		1.4	J	1.4												
45S00901	256		256																
45S01001	773		773														150		150
45S01101	722		142														120		38
CEF-P45-SS-001	18		18		9.6		9.6						9.1		9.1				
CEF-P45-SS-002	18		18		5		5						6		6				
CEF-P45-SS-003	17		17		0.41	U	0.41						13.2		13.2				
CEF-P45-SS-004	18		18		0.17	U	0.17						9.4		9.4				
CEF-P45-SS-005	188		188		2.6		2.6						10.6		10.6				
CEF-P45-SS-006	17		17		0.14	U	0.14						1.8		1.8				
CEF-P45-SS-007	17		17		2		2						10.4		10.4				
CEF-P45-SS-008	9529		142		6		0.45						62.8		1.2				
CEF-P45-SS-009	17		17		7.2		7.2						5.9		5.9				
CEF-P45-SS-010	4638		142		0.85	U	0.45						136		1.2				
CEF-P45-SS-011	923		923		0.5	U	0.5						20.3		20.3				
CEF-P45-SS-012	175		175		0.24	U	0.24		0.02	U	0.02		48.8	D	48.8		229	JD	229
CEF-P45-SS-013	2390		142						0.07		0.06		162		1.2		440		38
CEF-P45-SS-014	20		20																
CEF-P45-SS-015	18		142						0.05		0.06		10.5		1.2		341		38
CEF-P45-SS-016	571		571						0.02	U	0.02						148		148
CEF-P45-SS-017	18		18																
CEF-P45-SS-018	834		834														94.5		94.5
CEF-P45-SS-019	17		17														52.6		52.6
CEF-P45-SS-020	18		18																
CEF-P45-SS-021	446		446														44.7		44.7
CEF-P45-SS-022	169	D	169	D													53.1	D	53.1
CEF-P45-SS-023	17		17														439		439
CEF-P45-SS-024	229		229																
CEF-P45-SS-101					6.3		6.3												
CEF-P45-SS-102					0.72		0.72												
CEF-P45-SS-103					2.2		2.2												
CEF-P45-SS-104	758		758										20		20		109		109
CEF-P45-SS-105	324		324										12.9		12.9		100		100
CEF-P45-SS-106	118		118										26.7		26.7		150		150
CEF-P45-SS-107	990		142										30.3		1.2		393		38
CEF-P45-SS-108	235		142										92.6		1.2		489		38
CEF-P45-SS-109	5382		142		2.9		0.45						276		1.2				
CEF-P45-SS-110					1.5		0.45												
CEF-P45-SS-111	284		284																

nsample	BAPEQ(PRE)		BAPEQ(POST)		As(PRE)		As(POST)		Hg(PRE)		Hg(POST)		V (PRE)		V (POST)		TPH(PRE)		TPH(POST)
MIN	4.1000		4.1000		0.1400		0.1400		0.0200		0.0200		1.8000		1.2000		10.2000		10.2000
MAX	10,375.00		2,478.00		9.60		9.60		5.20		0.07		276.00		48.80		3,380.00		439.00
MEAN	854.84		246.79		2.18		1.85		0.70		0.05		35.43		11.02		296.89		79.15
t 0.95, n-1	0.229147251		0.227444919		0.267105881		0.253481327		0.259083366		0.370212757		0.224776414		0.262394916		0.214217473		0.231532869
STANDARD DEVIATION	1,917.97		407.12		2.45		2.40		1.70		0.02		55.63		12.15		636.46		88.34
COEFFICIENT OF VARIATION	2.24		1.65		1.12		1.30		2.43		0.36		1.57		1.10		2.14		1.12
n	74		74		31		31		9		9		42		42		27		27
$UCL_{0.95}$	906		258		2.3		2.0		0.8		0.05		37.4		11.5		323		83
Goal	500.00		500.00		3.70		3.70		8.70		8.70		7,400.00		7,400.00		2,500.00		2,500.00
Leachability	8,000.00		8,000.00		29.00		29.00		2.10		2.10		6,000.00		6,000.00		340.00		340.00
Remediation Level	142		142		0.45		0.45		0.06		0.06		1.2		1.2		38		38
CEF-P45-SS-112	326		326																
CEF-P45-SS-113	10375		142																
CEF-P45-SS-114	3051		142																
CEF-P45-SS-115																	48	U	48
CEF-P45-SS-116																	46	U	46
CEF-P45-SS-117	147		147																
CEF-P45-SS-118	747		747																
CEF-P45-SS-119	177		177																
CEF-P45-SS-120	106		106																
CEF-P45-SS-121	110		110																
CEF-P45-SS-122-02	9		9																
CEF-P45-SS-123-02	149		149		0.2	UD	0.2						3.7	D	3.7				
CEF-P45-SS-124-02	5198		142										174		1.2		494		38
CEF-P45-SS-125-02	278		278																
CEF-P45-SS-126-02																	45	U	45
CEF-P45-SS-127-02	631		631																
CEF-P45-SS-128-02	54		54																
CEF-P45-SS-129-02									0.07		0.07								
CEF-P45-SS-201-01					3.6		3.6												
CEF-P45-SS-201-02					0.8	U	0.8												
CEF-P45-SS-203													45.9		45.9				
CEF-P45-SS-204																	16.5		16.5
CEF-P45-SS-207					0.2	U	0.45						8.7		1.2		3380		38
CEF-P45-SS-208					0.33	U	0.45						9.7		1.2		344		38
CEF-P45-SS-211	17		17																
CEF-P45-SS-301													16.4	J	16.4				
CEF-P45-SS-302													14.1	JD	14.1				
CEF-P45-SS-303	77		77																
CEF-P45-SS-401													5.2		5.2				
CEF-P45-SS-402					0.2	U	0.2												
CEF-P45-SS-501-02	30		30																
CEF-P45-SS-503-02	30		30										13.8		13.8				
CEF-P45-SS-505-02																	29.2		29.2
CEF-P45-SS-507-02	31		31																
CEF-P45-SS-509-02													15		15				
CEF-P45-SS-511	70	D	70										14.1	D	14.1				
CEF-P45-SS-512	389		389										5.6		5.6				
CEF-P45-SS-513-02	37		37																
CEF-P45-SS-514-02	30		30																
CEF-P45-SS-515-02													3.9		3.9				
CEF-P45-SS-516-02													10.3		10.3				
CEF-P45-SU-209-03	32		32																
CEF-P45-SU-210-03	587		587																
CEF-P45-SU-304-03													23.7		23.7		30.3		30.3
CEF-P45-SU-305-04	30		30																
CEF-P45-SU-403-04													4.3		4.3				
CEF-P45-SU-404-03	65		65																
CEF-P45-SU-502-03	31		31																

nsample	BAPEQ(PRE)	BAPEQ(POST)	As(PRE)	As(POST)	Hg(PRE)	Hg(POST)	V (PRE)	V (POST)	TPH(PRE)	TPH(POST)
MIN	4.1000	4.1000	0.1400	0.1400	0.0200	0.0200	1.8000	1.2000	10.2000	10.2000
MAX	10,375.00	2,478.00	9.60	9.60	5.20	0.07	276.00	48.80	3,380.00	439.00
MEAN	854.84	246.79	2.18	1.85	0.70	0.05	35.43	11.02	296.89	79.15
t 0.95, n-1	0.229147251	0.227444919	0.267105881	0.253481327	0.259083366	0.370212757	0.224776414	0.262394916	0.214217473	0.231532869
STANDARD DEVIATION	1,917.97	407.12	2.45	2.40	1.70	0.02	55.63	12.15	636.46	88.34
COEFFICIENT OF VARIATION	2.24	1.65	1.12	1.30	2.43	0.36	1.57	1.10	2.14	1.12
n	74	74	31	31	9	9	42	42	27	27
UCL $_{0.95}$	906	258	2.3	2.0	0.8	0.05	37.4	11.5	323	83
Goal	500.00	500.00	3.70	3.70	8.70	8.70	7,400.00	7,400.00	2,500.00	2,500.00
Leachability	8,000.00	8,000.00	29.00	29.00	2.10	2.10	6,000.00	6,000.00	340.00	340.00
Remediation Level	142	142	0.45	0.45	0.06	0.06	1.2	1.2	38	38
CEF-P45-SU-504-03	30	30					4.5 D	4.5		
CEF-P45-SU-506-03									10.2	10.2
CEF-P45-SU-508-03	30	30								
CEF-P45-SU-510-03							40.7	40.7		

Remediation Level for BaPEq and TPH based on NFF data.
Remediation Levels for metals based on one-half highest detection limit of metal detected at PSC 45.
Bolded samples are those that were removed and replaced with clean fill.
TPH concentration for sample 023 exceeds leachability criterion, but sample immediately below had concentration less than criterion.